# ISTS Rolling Plan

## *Interim report 2030-31*

*September 2025*

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# ROLLING PLAN 2030-31

INTER-STATE TRANSMISSION SYSTEM (ISTS)

(INTERIM REPORT)

*September 2025*

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# Executive Summary

India's power sector is a key driver of economic growth and development, supporting industrial expansion and improved living standards. With a vast and evolving energy landscape, the sector is undergoing rapid transformation through policy reforms, technological upgrades, and increased focus on clean energy. As demand rises, India is working to ensure reliable, affordable, and sustainable electricity for all. To set the stage, the Union Budget 2025-26 introduces transformative provisions for nuclear power, reinforcing India's commitment to clean and reliable energy. With the launch of the Nuclear Energy Mission for Viksit Bharat[1], aimed at expanding nuclear power capacity to meet rising energy demands and environmental objectives. Additionally, at COP29 in November 2024, India reaffirmed its commitment of achieving 500 GW of non-fossil fuel-based electricity capacity by 2030. India in collaboration with International Solar Alliance (ISA) also highlighted the role of solar energy in ensuring energy security and climate resilience for developing nations at Energy Transition for the Global South, which called for a 20x increase in solar adoption by 2050.

India's rising electricity demand is being met with a robust clean energy push in line with its revised Nationally Determined Contributions (NDC) targets, India aims to reduce emissions intensity by 45% and ensure 50% of installed power capacity comes from non-fossil sources by 2030. Complementing these efforts, the National Green Hydrogen Mission targets 5 million metric tonnes (MMT) of annual green hydrogen production by 2030, backed by ₹8 lakh crore in investments and expected to avert 50 MMT of $CO_2$ emissions[2]. India also aims to capture 10% of the global green hydrogen market, positioning itself as a major exporter and clean energy leader. These efforts are part of India's broader vision to become energy independent by 2047 and achieve net-zero emissions by 2070.

To meet energy transition objectives and support the large-scale integration of renewable energy (RE), the Central Electricity Authority (CEA) released a report in December 2022 titled "Transmission System for Integration of over 500GW RE Capacity by 2030." This report outlines the transmission needs for RE integration up to 2030, including energy storage requirements for the grid and the need for new HVDC systems. In line with global best practices in transmission planning, the CEA has also updated and published the "Manual on Transmission Planning Criteria, 2023", which provides a comprehensive framework for planning and implementing transmission systems. Further, regulations for Solar and Non-solar hours-based connectivity have been introduced for effective and optimal utilisation of Transmission Infrastructure and Energy Resources.

The large-scale integration of renewable energy (RE) generation into the National Grid to achieve energy transition goals requires reliable and secure transfer of power to the country's major load centres. This calls for ongoing development of a resilient National Grid, featuring high-capacity AC and HVDC systems, as well as advanced FACTS devices & Synchronous

[1] PIB-Nuclear Power in Union Budget 2025-26: https://www.pib.gov.in/PressReleasePage.aspx?PRID=2099244
[2] MNRE-National Green Hydrogen Mission: https://cdnbbsr.s3waas.gov.in/s3716e1b8c6cd17b771da77391355749f3/uploads/2023/01/2023012338.pdf

Condensers for controlling power system parameters. India's Renewable energy potential, Green Hydrogen strategy, and climate action plan are key elements in attaining these energy transition goals. The country's approach to integrate RE into its National Grid could serve as a model for other nations in developing modern electricity grids. Furthermore, there is a focus on the development and integration of energy storage solutions- such as Battery Energy Storage System (BESS) and Pumped Hydro Systems- into the National Grid to provide balancing of power during periods of low or no renewable energy generation and to enhance the utilization of transmission systems linked to RE projects.

The transmission system plays a vital role in connecting generation sources and demand centres to the National Grid, ensuring the smooth integration of generation projects. It is essential that the transmission system is adequately planned and developed to provide reliable, secure and affordable power to consumers.

CTUIL undertakes Inter State Transmission System (ISTS) planning for evacuation of power from generation pockets to the load centres, augmentation /reconfiguration of existing system etc. in consultation with stakeholders. The schemes are deliberated in monthly consultation meetings and taken up with NCT/RPC/MoP for recommendations/approval and thereon for implementation through TBCB or RTM route by TSP(s). Planning of cross border interconnections with neighbouring countries are also carried out in consultation with the counterparts of respective countries. CTU also draws up plan for ISTS for up to next five years on rolling basis every year in consultation with various stakeholders, which provides visibility of new transmission system for next five years. CTU publishes ISTS Rolling Plan Reports twice a year (an Interim Report in September and a Final Report in March). This exercise was started from 2021 and last final report was released on March 31, 2025. This ISTS Rolling Plan interim report evaluates the transmission system needs for the 2030-31 period, including the "Transmission System for Integration of over 500GW RE Capacity by 2030" report.

**Chapter-1** gives Background and Objectives of the ISTS Rolling Plan Report.

In **Chapter-2**, Installed capacity & Peak demand met as on Jul'25 and projected installed capacity & demand by FY 2030-31 have been presented. All India installed capacity is expected to increase from about 490 GW (including about 188 GW RE + 50 GW Hydro) to about 917 GW (including about 486 GW RE + 65.3 GW Hydro + 51 GW ESS) by FY 2030-31. All India Peak demand is 242 GW as on Jul'25 and is expected to increase to about 351 GW by FY 2030-31. Furthermore, an additional demand of about 35 GW has been considered as direct drawl from ISTS bulk consumers by 2030-31 (including Green Hydrogen/Ammonia projects of about 19 GW and industrial demand/data centres of about 16 GW).

In order to integrate the envisaged generation capacity, predominantly RE, and to meet the projected demand, comprehensive studies have been performed for planning and development of Inter-State Transmission System (ISTS). To perform the studies, Load Generation Balance (LGB) has been prepared considering the diurnal and seasonal load and generation variations across the country. Accordingly, nine number of load-generation scenarios have been

identified corresponding to Monsoon, Summer, and Winter seasons along with three points on daily load curve for each season viz. Solar max, Peak demand, and Night Off-peak demand.

Detailed overview of the load generation balance preparation, challenges observed while balancing the same and study results have been brought out in **Chapter-3**. While preparing LGB for nine scenarios to cover all probable operational scenarios, in line with provisions under CEA's Manual on Transmission Planning Criteria, merit order economic dispatch of thermal generations and RPO obligations of states have been taken into consideration. While working out the LGBs, maximum and minimum demand of 366 GW and 211 GW respectively have emerged in 2030-31 Timeframe. For solar max scenarios of monsoon, summer and winter season, surplus generation of about 37 GW, 53 GW and 24 GW respectively were observed necessitating the requirement of two-shift operation of thermal generation or equivalent energy storage plants in the grid.

Network expansion schemes have been planned and are being planned to take care of the observed system violations. Accordingly, year on year progressive addition of transmission system in ISTS network in terms of new transmission lines (ckm) and substations (MVA) upto 2030-31, and corresponding broad estimated cost has also been brought out in the report. Cumulatively by 2030-31, transmission schemes comprising of 67,263 ckm of transmission lines and transformation capacity of 6,29,597 MVA at estimated cost of ₹4,85,593 Cr. are expected to be added in the grid in the next five years.

**Chapter-4** to **Chapter-8** is dedicated to each of the five regions, i.e., one Chapter for each Region, where detailed scope of works and implementation Timeframe along with schematic of new ISTS schemes including schemes for RE evacuation have been brought out in these Chapters.

India being centrally placed in South Asia is playing a vital role in establishment of interconnections among South Asian countries to establish a large South Asian electricity grid. In **Chapter-9**, details on existing, under-construction and under discussion cross-border interconnections between India and neighbouring countries have been brought out.

The summary of the ISTS expansion schemes which were under various stages of planning/ implementation, way forward etc. are included in **Chapter-10**.

# Chapter 1: Background and Objective

India's power sector has undergone a profound transformation over the decades. As one of the fastest-growing economies in the world, India faces an ever-increasing demand for energy, prompting sustained efforts to expand its generation capacity. The nation has remained steadfast in its commitment to delivering energy that is reliable, affordable, and environmentally sustainable. Through strategic reforms, technological advancements, and a focus on inclusive access, India continues to strengthen its energy infrastructure to meet the evolving needs of its citizens and support long-term economic development.

India is dedicated to build its sustainable energy future, powered by a rich mix of clean energy sources—from solar and wind to hydro and bioenergy. It's a testament to India's strategic vision and relentless pursuit of green growth. With 50.3% of its total installed generation capacity i.e., 246 GW out of 490 GW sourced from non-fossil fuel as on Jul'25[3] out of which Solar and Wind capacity is about 24% (119 GW) and 11% (52 GW) respectively and balance 15.3% from other non-fossil sources, India is well-positioned to emerge as a global leader in renewable energy, contributing to environmental sustainability and energy security. India envisaged to enhance the non-Fossil fuel based installed generation capacity to about 564 GW out of 917 GW total installed capacity by 2031. 62% of the total installed capacity shall be from Non-Fossil Fuel based energy resource comprising of 37% (339 GW) Solar, 16% (143 GW) Wind and balance 10% from other resources such as Hydro, Pumped storage plants, Nuclear etc. The several ongoing efforts of India reflect a holistic approach to building a greener economy, ensuring that India not only meets its energy needs but also addresses the pressing challenges of climate change and resource conservation.

Integration of large scale RE Generation capacity into the Grid poses many challenges like low-capacity utilization factor (CUF), intermittency, round the clock availability etc. To address these challenges, mitigating measures such as deployment of Energy Storage System including Pumped Storage Plants, adequate Reactive Compensation (including Dynamic Compensation such as STATCOM and SVG) and Synchronous Condensers (for Grid Inertia support and Dynamic Stability) is being taken up in consultation with all the stakeholders.

Considering the diurnal and seasonal variation of Generation and Demand across the country preparation of Load Generation Balance (LGB) with fair assumptions is the key to plan an optimised ISTS Network. Accordingly, considering the optimal dispatch scenarios capturing the availability of the various energy resources and to meet peak power requirements, an optimised ISTS network plan evolved in consultation with stakeholders.

CTU draws up a plan for Inter-State Transmission System (ISTS) for up to next five years on Rolling basis every year, involving two cycles i.e., from April to September and October to March (Interim Report in Sept and Final Report in March of every financial year), identifying specific transmission projects which are required to be taken up along with their

[3] CEA-Installed Capacity Report: https://cea.nic.in/wp-content/uploads/installed/2025/07/IC_July_2025_allocation_wise_approved.pdf

implementation timelines. In this direction, rolling plan reports have been published from 2021 providing the visibility of ISTS network requirements for next five years which are also available on CTUIL website. This ISTS Rolling Plan Interim report is being brought out wherein transmission system requirement in ISTS has been identified upto 2030-31 Timeframe.

This interim report covers the present v/s future (FY 2030-31) Power Supply Scenario, Load Generation Balance (and its challenges), year wise ISTS planned and under implementation across the country to integrate the RE generation and to cater the growing demand along with the estimated (approx.) cost of the proposed ISTS Network Schemes.

# Chapter 2: Power Supply Scenario

India's peak demand met is about 242 GW as on July'25[4] and as per 20th EPS it is projected to be about 351 GW by 2030-31. Furthermore, an additional demand of about 35 GW is envisaged to be added as direct drawl from ISTS bulk consumers including Green Hydrogen/ Green Ammonia projects of about 19 GW and industrial demand/data centres of 16 GW by 2030-31 which will further boost the projected peak demand.

As on Jul'25, non-fossil fuel based installed generation capacity is around 246 GW (50.3% of total installed capacity) and is planned to increase to around 564 GW (62% of total installed capacity) by 2030-31 at a CAGR of 13.4%. Further, about 51 GW of Energy Storage is also planned to integrate in the grid by 2030-31. Installed capacity vis a vis peak demand trend from FY 2014-15 to Jul'25 is depicted in **Figure 2-1** and growth of RE resources is shown in **Figure 2-2**.

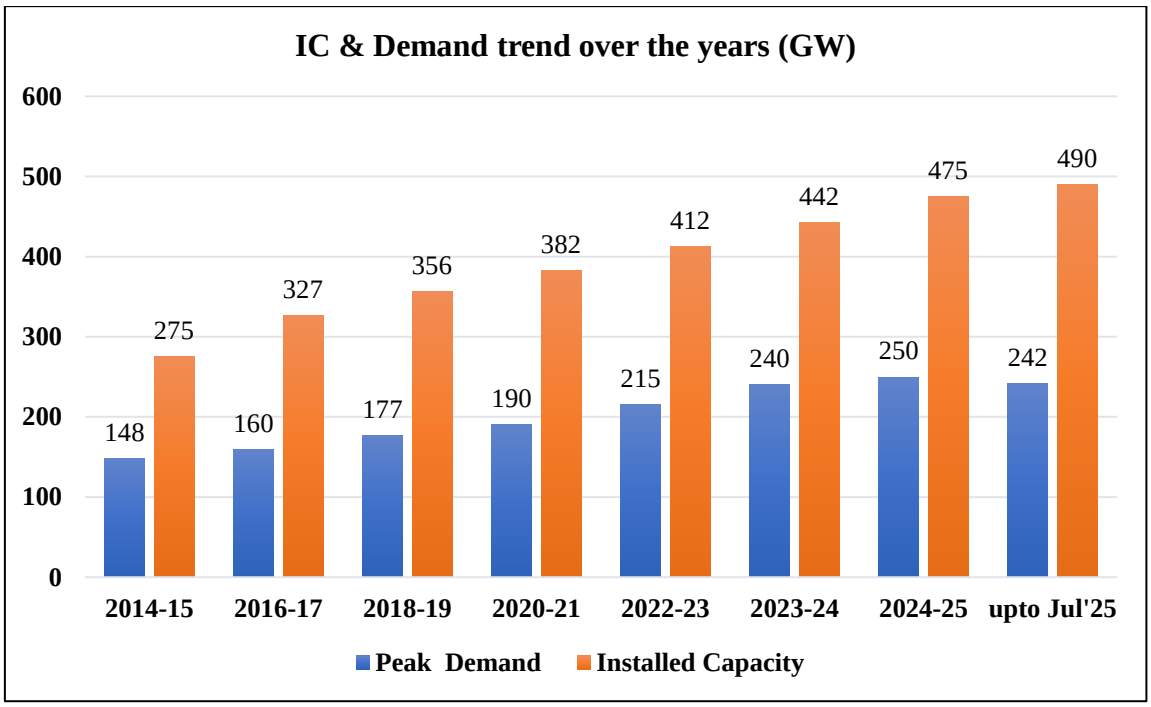



*Figure 2-1: Installed Capacity & Demand trend in GW*

All India peak demand of about 242 GW was met on 12th June'25 as against 250 GW of peak demand met on 30th May'24. All India peak demand of 2025-26 is yet to be observed.

[4] CEA-Power Supply Report: https://cea.nic.in/wp-content/uploads/power_supply/2025/07/Peak_July25_Revised.pdf

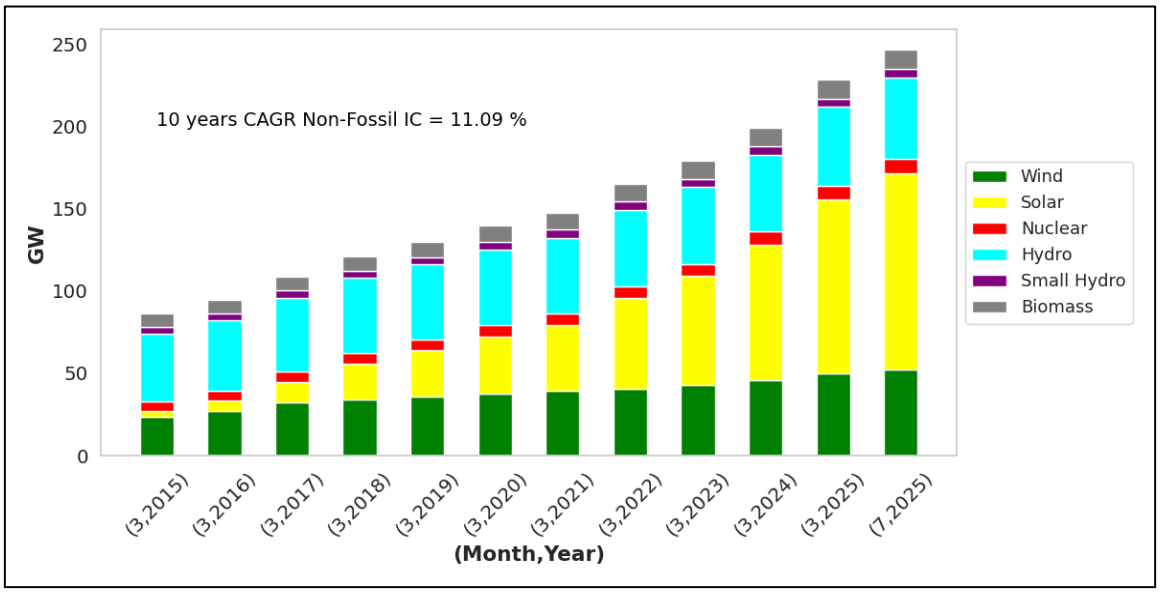



*Figure 2-2: Growth of RE resources*

Transmission system has played a vital role in catering the country's demand from various generating plants located across the country. Electricity transmission system in India is generally categorised as Inter-State Transmission System (ISTS) and Intra-State Transmission System (Intra-STS) Transmission system. CTU is the nodal agency for planning and co-ordinating the ISTS system. Growth of ISTS from 2015 till Jul'25 in terms of ckm and MVA is depicted in **Figure 2-3** and **Figure 2-4**.

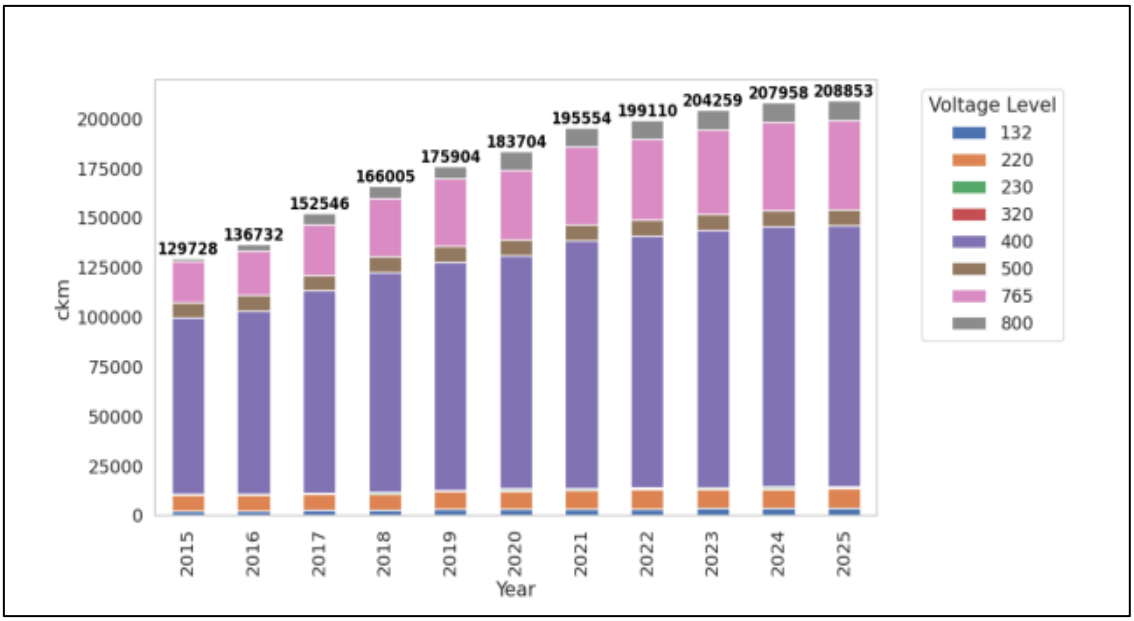



*Figure 2-3: ckm growth in past decade*

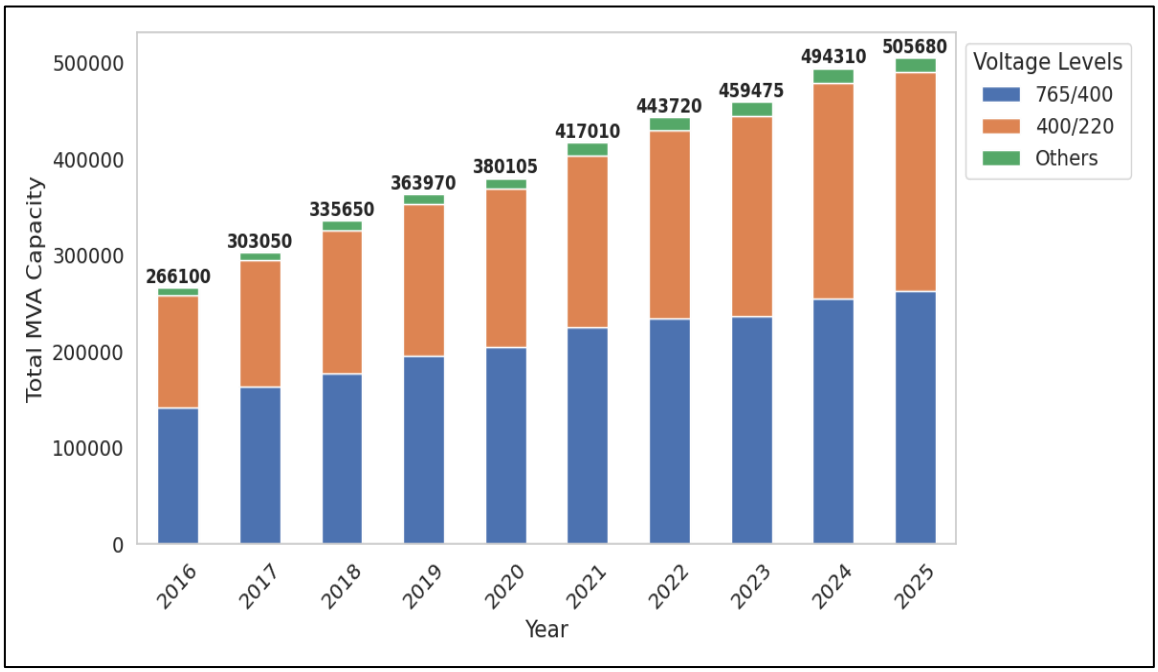



*Figure 2-4: MVA growth in past decade*

## 2.1 Power Supply Scenario as of Jul'25

Total installed capacity as on Jul'25 is about 490 GW [5]and the All-India peak demand met is of about 242 GW. Region-wise breakup of source wise installed capacity and peak demand met as of Jul'25 is given in the **Table 2-1**. Fossil and non-fossil fuel-based generation installed capacity accounts for 49.7% and 50.3% of total installed generation capacity respectively, which is portrayed in **Figure 2-5.**

*Table 2-1: Installed Capacity and Peak Demand in GW as of Jul'25*

*(All Fig in GW)*

| Region | Fossil | | | Non-Fossil | | | | Grand Total | Peak Demand* |
|---|---|---|---|---|---|---|---|---|---|
| | Thermal | Gas/ Diesel | Total | Nuclear | Hydro | RES | Total | | |
| **NR** | 61.5 | 5.7 | **67.2** | 2.2 | 22.0 | 51.8 | **76.0** | **143.2** | 90.77 |
| **WR** | 75.0 | 9.4 | **84.4** | 3.2 | 7.7 | 69.5 | **80.5** | **164.9** | 80.05 |
| **SR** | 55.7 | 3.4 | **59.1** | 3.3 | 13.1 | 63.2 | **79.7** | **138.8** | 66.69 |
| **ER** | 30.0 | 0.0 | **30.0** | 0.0 | 4.9 | 2.6 | **7.4** | **37.4** | 33.45 |
| **NER** | 1.3 | 1.7 | **2.9** | 0.0 | 1.9 | 0.7 | **2.6** | **5.6** | 4.09 |
| **All India** | **223.5** | **20.1** | **243.7** | **8.8** | **49.6** | **187.8** | **246.2** | **489.9** | **242.49** |

**with diversity*

[5] CEA-Installed Capacity Report: https://cea.nic.in/wp-content/uploads/installed/2025/07/IC_July_2025_allocation_wise_approved.pdf

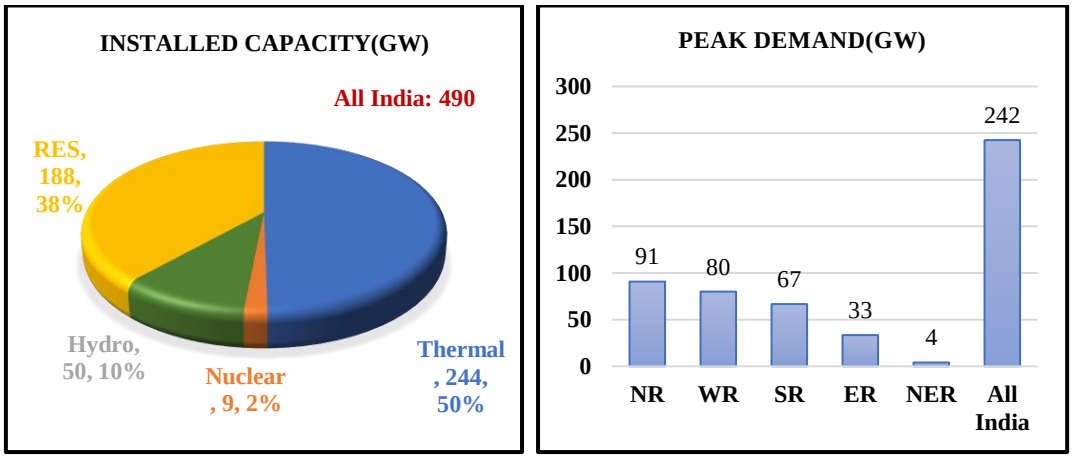



*Figure 2-5: Installed Capacity and Peak Demand as of Jul'25*

## 2.2 Envisaged Power Supply Scenario by 2030-31

All India peak demand for 2030-31 is envisaged to be about 351GW as per 20th Electric Power Survey (EPS) report of CEA. Furthermore, an additional demand of about 35 GW has been considered as direct drawl by ISTS bulk consumers including Green Hydrogen/Ammonia projects of about 19 GW and industrial demand/data centres of 16 GW is planned to be integrated to the grid by 2030-31. To meet the enhanced demand of about 108 GW from present peak demand met of 242 GW, net generation capacity addition of about 427 GW including ESS is planned to be integrated in the grid after accounting the retirement of thermal generation by 2030-31 as anticipated in draft National Electricity Plan (NEP) of CEA.

Total installed generation capacity for 2030-31 shall be about 917 GW including the pumped storage and energy storage capacity including CEA report "Transmission System for Integration of 500 GW RE Capacity by 2030". The anticipated region-wise breakup of the installed capacity and projected peak demand for 2030-31 are summarised in **Table 2-2** Renewable Energy resources generation installed capacity is expected to be about 53% of total installed generation capacity, which is shown in **Figure 2-6.**

*Table 2-2: Projected Installed Capacity & Peak Demand by FY 2030-31*

(All Fig in GW)

| Region | Fossil | | | Non-Fossil | | | | ESS (PSP+ BESS) | Grand Total | Peak Demand |
|---|---|---|---|---|---|---|---|---|---|---|
| | Thermal | Gas | Total | Nuclear | Hydro | RES | Total | | | |
| **NR** | 63.2 | 3.6 | **66.8** | 3.0 | 25.3 | 110.5 | **138.8** | 17.1 | **222.7** | 122.1 |
| **WR** | 102.3 | 10.1 | **112.4** | 3.2 | 6.1 | 190.2 | **199.5** | 16.0 | **328.0** | 123.4 |
| **SR** | 54.5 | 1.5 | **56.0** | 5.8 | 14.0 | 175.8 | **195.6** | 12.3 | **264.0** | 102.4 |
| **ER** | 64.2 | 0.0 | **64.2** | 0.0 | 13.9 | 5.5 | **19.4** | 2.7 | **86.3** | 48.1 |
| **NER** | 0.8 | 2.5 | **3.3** | 0.0 | 6.0 | 4.0 | **10.0** | 2.9 | **16.2** | 7.5 |
| **All India** | **285.0** | **17.8** | **302.7** | **12.1** | **65.3** | **486.1** | **563.5** | **51.0** | **917.3** | **350.7** |

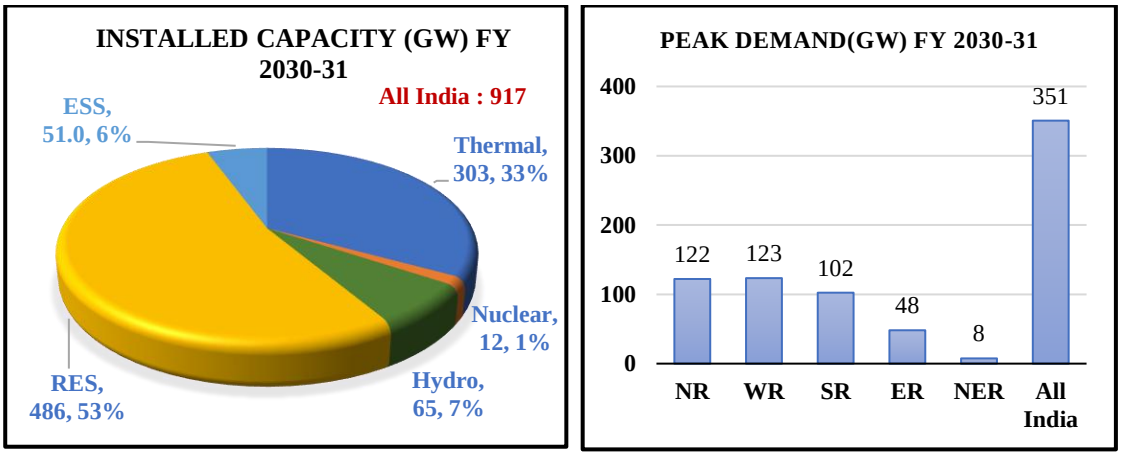



*Figure 2-6: Projected Installed Capacity & Peak Demand by FY 2030-31*

The region wise growth in demand and fuel type wise increase in installed generation capacity for 2030-31 from Jul'25 is tabulated below in **Table 2-3**.

*Table 2-3: Peak demand & Generation IC in Jul'25 and 2030-31*

| Peak Demand (GW) | | | | |
|---|---|---|---|---|
| | **As on Jul'25** | **2030-31** | **Growth** | **CAGR** |
| **NR** | 90.77 | 122.13 | 31.36 | 6.1% |
| **WR** | 80.05 | 123.38 | 43.33 | 9.0% |
| **SR** | 66.69 | 102.38 | 35.69 | 8.9% |
| **ER** | 33.45 | 48.13 | 14.68 | 7.5% |
| **NER** | 4.09 | 7.53 | 3.44 | 13.0% |
| **All India** | **242.49** | **350.67** | **108.18** | **7.7%** |

| Generation IC (GW) | | | | |
|---|---|---|---|---|
| | ***As on Jul'25*** | ***2030-31*** | ***Diff*** | ***CAGR*** |
| **Thermal** | 223.54 | 284.97 | 61.44 | 5.0% |
| **Gas** | 20.13 | 17.75 | -2.38 | -2.5% |
| **Nuclear** | 8.78 | 12.08 | 3.30 | 6.6% |
| **Hydro** | 49.63 | 65.31 | 15.68 | 5.6% |
| **Solar** | 119.02 | 339.63 | 220.62 | 23.3% |
| **Other RE+ESS** | 68.80 | 197.50 | 128.70 | 23.5% |
| **Total** | **489.90** | **917.25** | **427.35** | **13.4%** |

# Chapter 3: All India

Renewable-based generation installed capacity share in total installed capacity mix is expected to change from about 38% at present to about 53% by March'31. Further, it is going to change continuously with integration of increasing renewable energy plants in the Indian power sector. To plan transmission network for integrating this RE potential and meet electricity requirement of the country, first it is important to understand the locations of generation pockets and load centre in wide Indian demography. Most of the conventional thermal generation are located in eastern part of the India due to availability of coal-reserves. Hydro-potential is mostly concentrated in Himalayan Ranges whereas, new generation addition in the form of renewable energy is emerging in northern, western, and southern part of India as depicted in **Figure 3-1** which makes Indian power sector one of the most challenging and diversified. To meet energy demand of the country from conventional generation, strong backbone transmission system is already planned from eastern part of the country to the major load centre across the country and implemented in past decades. With the advent of renewable-based generation addition, new transmission system is being planned and implemented from northern, western, and southern part of country to cater the load requirements across the country, which is resulting in changed power flow pattern on existing transmission system. It becomes important to understand the change in power flow pattern and regional power exchange in various seasons and in different times of a day depending upon the generation and demand of a region. Therefore, additional transmission system needs to be planned considering continuous changing load-generation scenarios.

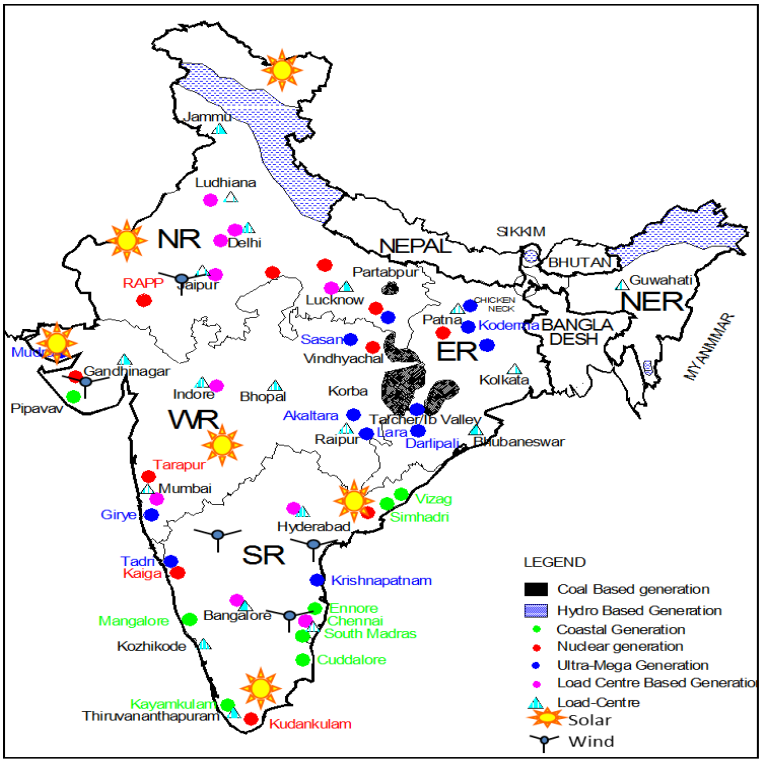



*Figure 3-1: India's map showing various generations in different parts of the country*

The present study has been carried out to identify power exchanges across the regions and adequacy of existing, approved and planned transmission systems to meet the power transfer requirement for the Timeframe of 2030-31 with an All-India perspective. Periodic assessment of transmission requirement under ISTS is also made part of this report. Here it is to mention that substantial solar generation capacity addition has been envisaged in future which shall only generate in daytime. A region having a high solar installed capacity shall become an exporter of power during the afternoon and may become importer of the power during evening.

To study such phenomenon and analyse power flow patterns in transmission network, various scenarios were identified. Accordingly, nine load generation balance scenarios were prepared corresponding to Monsoon, Summer, and Winter season along with three points on daily load curve for each season. Details about the same will be discussed in next section.

### 3.1 Load Generation Balance

For the study of load generation balance nine different scenarios are taken based on different season and different times of a day, as follows:

- Scenarios 1, 4 and 7 belong to Solar Max Generation scenario for Monsoon (August), Summer (June), and Winter (February) season respectively.
- Scenarios 2, 5 and 8 belong to Evening Peak Load scenario for Monsoon (August), Summer (June), and Winter (February) season respectively.
- Scenarios 3, 6 and 9 belong to Night Off-Peak scenario for Monsoon (August), Summer (June), and Winter (February) season respectively.

To replicate and simulate daily power requirement variations in different seasons in a year, three load-generation scenarios within a day in three different seasons were chosen. Three points on load curves were identified for each day i.e. Solar max (afternoon), Peak load (evening) and Off-peak load (night). Further, the same was carried out for three seasons viz. Monsoon (August), Summer (June) and Winter (February). Accordingly, load generation has been prepared for following nine scenarios:

- Aug’30: Solar max (Scenario-1), Evening Peak (Scenario-2) and Night off-peak (Scenario-3)
- Jun’30: Solar max (Scenario-4), Evening Peak (Scenario-5) and Night off-peak (Scenario-6)
- Feb’31: Solar max (Scenario-7), Evening Peak (Scenario-8) and Night off-peak (Scenario-9)

Load Generation Balance (LGB) for above mentioned nine scenarios considered for the study was prepared. During afternoon hours, solar generation is at its peak and thermal generation requirement is minimal. While in evening, solar generation is zero and the thermal generation

requirement is maximum. To prepare load generation balance, details about the selection of points on load curve and generation despatching philosophies are discussed subsequently.

All India peak demand considered for current study Timeframe 2030-31 is about 351 GW as per 20th EPS. Further an additional demand of about 35 GW (including Green Hydrogen/Ammonia plants of about 19 GW and others of about 16 GW) has been considered as direct drawl from ISTS. To find out variation of this demand for nine scenarios, demand pattern of calendar year 2025 for the three representative months of three seasons were collected from system operator (Grid-INDIA) for monsoon (Aug-24), summer (Jun-24) and for winter (Feb-24). The data comprises of demand profile of all the days of the month with resolution of 5 mins time interval. Three load conditions each corresponding to solar max, evening peak and night off peak were selected from the representative demand curve of three seasons as depicted in **Figure 3-2, Figure 3-3** & **Figure 3-4**. For evening peak scenario and night off peak scenario, maximum demand (between 4:00 pm to midnight) and minimum demand (between midnight to 06:00 am) were considered respectively. However, for solar max scenario, maximum demand corresponding to noon (12:00 pm) was considered. To obtain the demand factors for study time-frame of 2030-31, demand corresponding to these load conditions were divided by maximum All India/regional demand of the corresponding year i.e. 2025. All India/regional demand factors for different scenarios of 2030-31 are shown in **Figure 3-5**.

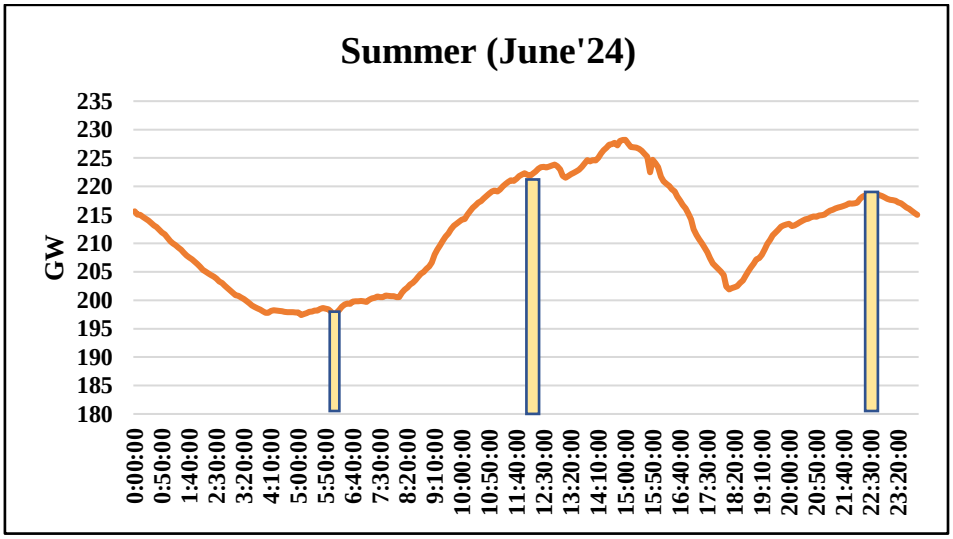



*Figure 3-2: Summer (June'24) Load Curve*

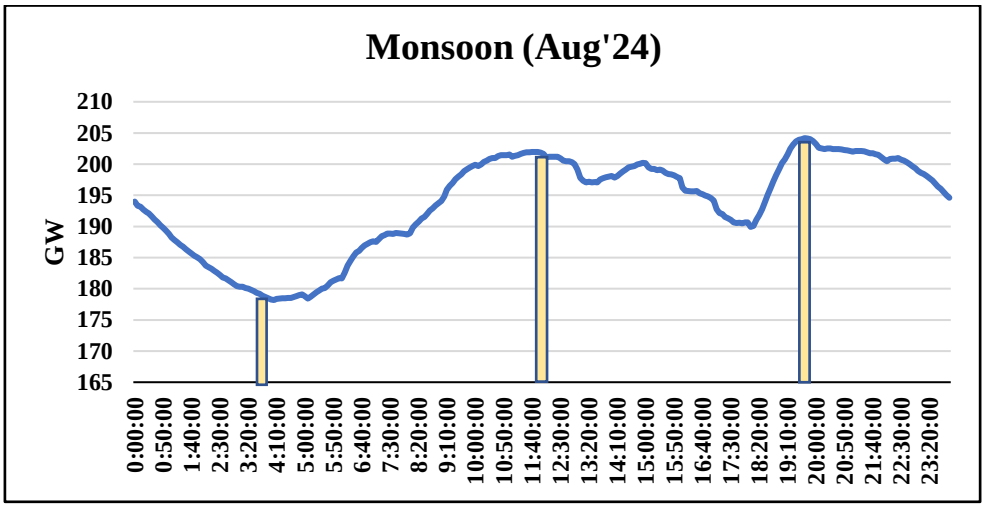



*Figure 3-3: Monsoon (Aug'24) Load Curve*

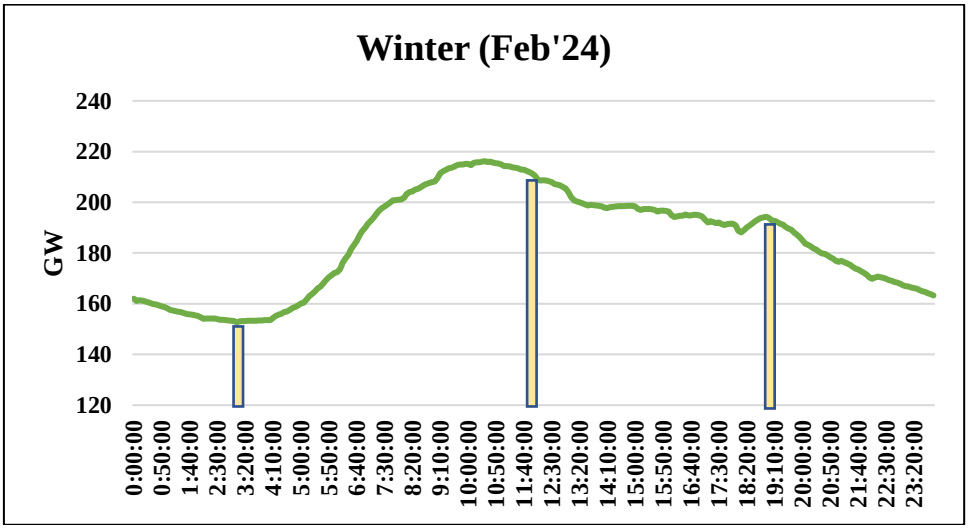



*Figure 3-4: Winter (Feb'24) Load Curve*

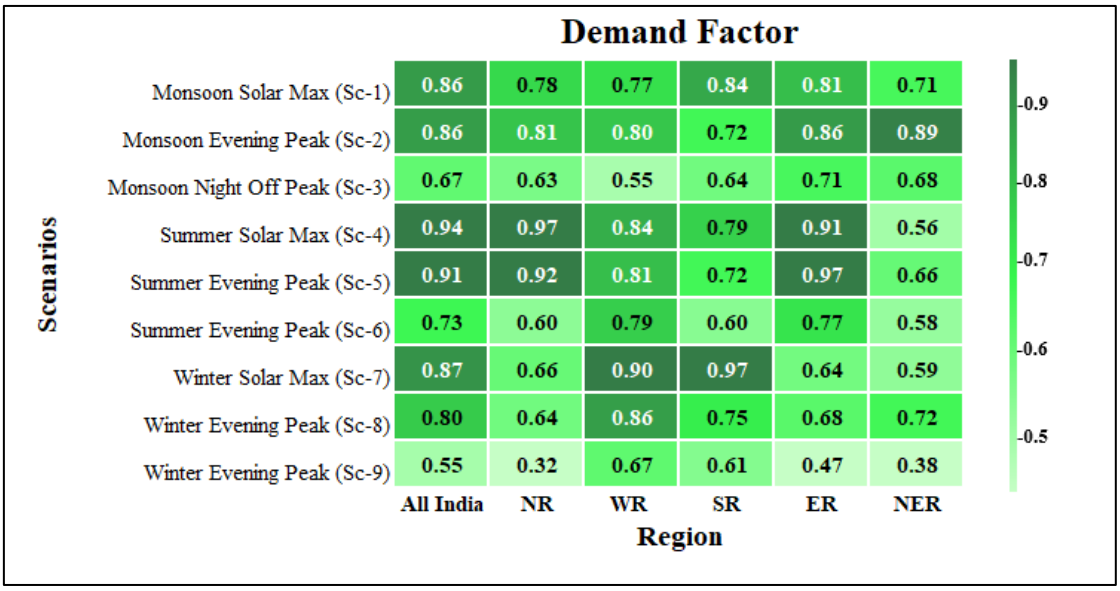



*Figure 3-5: Demand factors considered for 2030-31 Timeframe*

To meet the anticipated demand in different scenarios, various sources of generations viz. Thermal, Nuclear, Hydro, Gas, Solar, Wind is available. However, despatch of some of these generators shall be as per their diurnal and seasonal variation. Each generation except thermal generation in a region was despatched as per the despatch factors considered in regional chapters.

RE has been considered as must-run, at first the demand was balanced by RE generation. Since all utilities have RE RPO obligation, total RE generation has been apportioned as per RE RPO to all regions based on their projected EPS demand. Further, for accounting the availability of solar roof-top generation, equivalent demand was reduced from respective regions. After determining the demand met by renewable energy, nuclear and hydro generation, remaining demand was met by Thermal generation.

Evening peak scenario of each month was setup first as the number of thermal units required on bar shall be maximum. Total thermal generation requirement for the evening peak scenario was apportioned between State and Central sector thermal generations as per their installed capacity in each region. Further, state thermal generation requirement was divided among the states as per their maximum demand in respective month of 2025. After obtaining state thermal generation requirement, state thermal units were dispatched about 85% of their IC in merit order for each state.

ISGS, CGS & IPP thermal plants with lower variable cost were dispatched about 85% of their IC region wise progressively. To meet the deficit demand of any region thermal generation dispatches from other regions (considering all India merit order for evening peak scenario) was considered. For preparing night off-peak scenario, on bar thermal units were scaled down proportionately.

While preparing the LGB for Solar max scenario, all the on-bar thermal plants were dispatched at technical minimum of 40% and it is observed that in the Solar max scenario there is absolute surplus power available in the grid. It is due to availability of peak solar generation and lesser demand in the noon. This surplus is on account of keeping the same number of thermal plants operating at technical minimum (40%) in Solar max scenario which are required to meet evening peak demand. Even after considering the flexibility exhibited by gas and hydro generation between the evening peak and solar max scenario, the absolute surplus generation of about **37 GW, 53 GW and 24 GW** was observed in solar max scenarios of monsoon, summer and winter scenarios respectively, which either to be stored in ESS/PSP or to be backed down. To absorb the maximum RE generation during the daytime most of the thermal units are required to shut down necessitating the requirement of two-shift operation of thermal generation or more energy storage plants in the grid. Accordingly, thermal plants with higher cost (on merit order basis) were switched off progressively till the LGB is balanced.

Based on above philosophy, LGBs prepared for different scenarios are depicted in **Figure 3-6**, **Figure 3-7** & **Figure 3-8** along with regional surplus/deficit scenario and details about the same are attached at **Annex-3.1.** Requirement of thermal generation is very less considering the amount of planned RE integration and its dispatches in Solar Max scenario. It is observed

that despatch from thermal generation is only 3% and 2% of total generation in Monsoon and Summer Solar Max scenario respectively.

## Monsoon Aug'2030

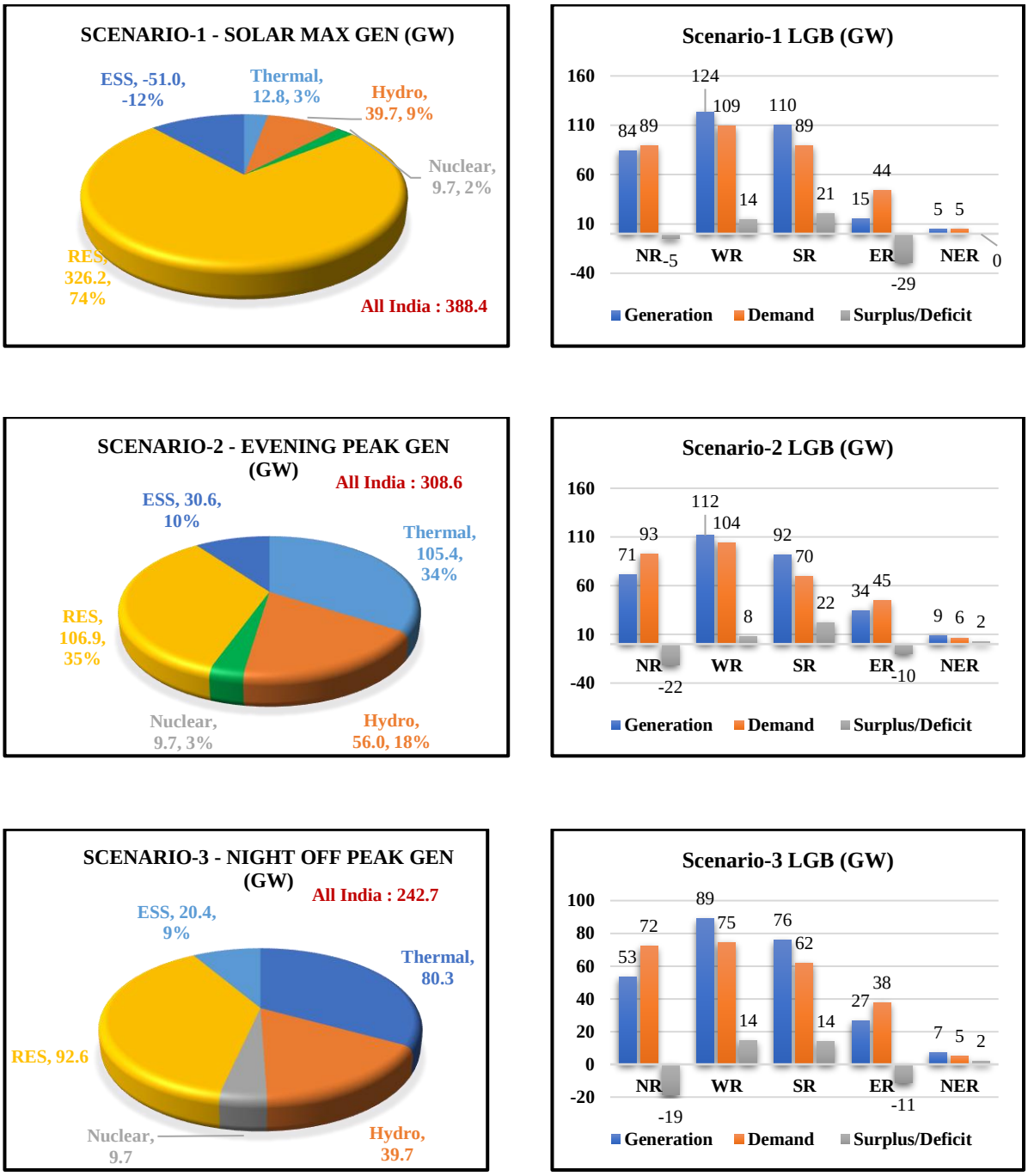
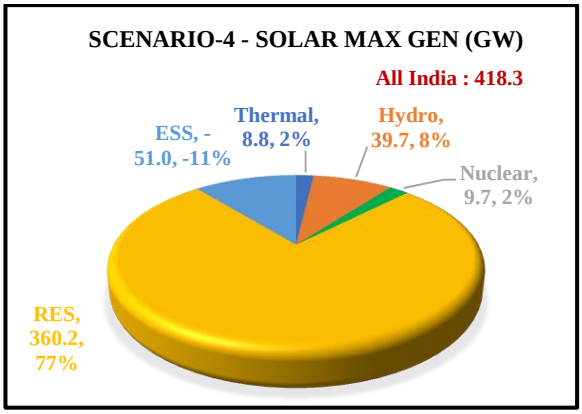
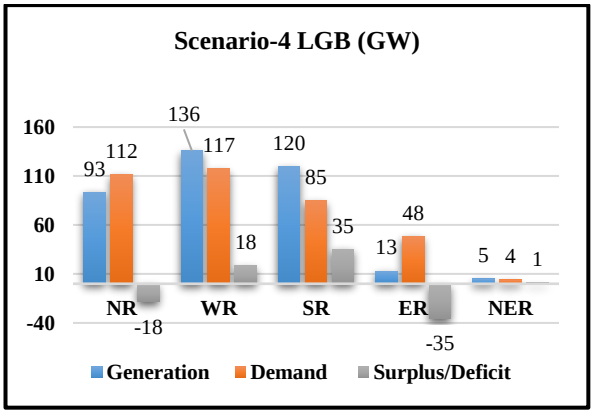
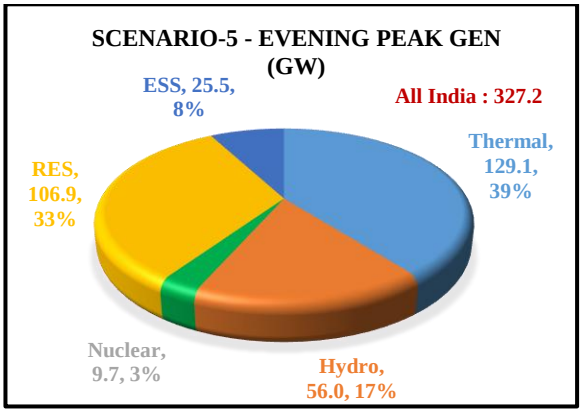


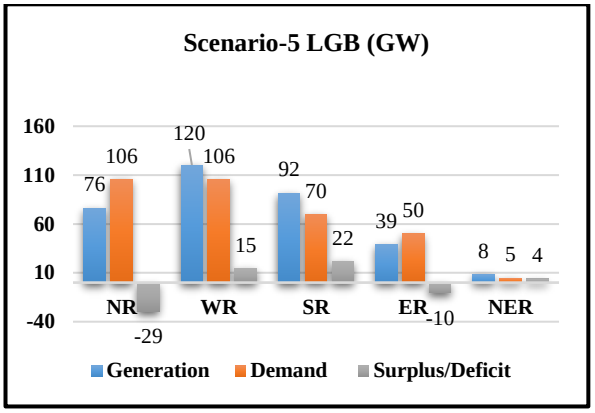

*Figure 3-6: LGB for Monsoon (Aug'2030)*

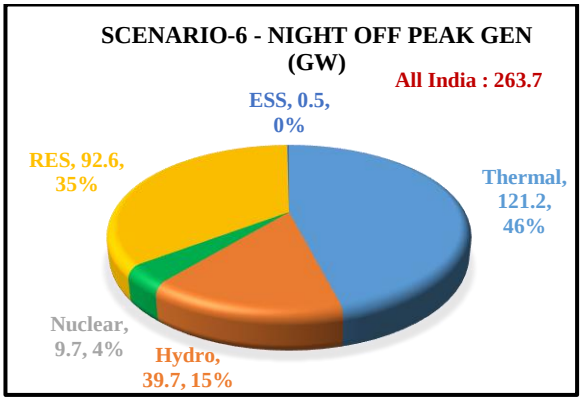
## Summer June'2030



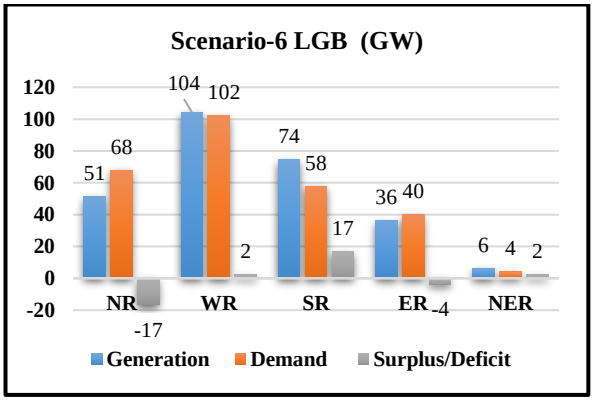




*Figure 3-7: LGB for Summer (June'2030)*

## Winter Feb'2031

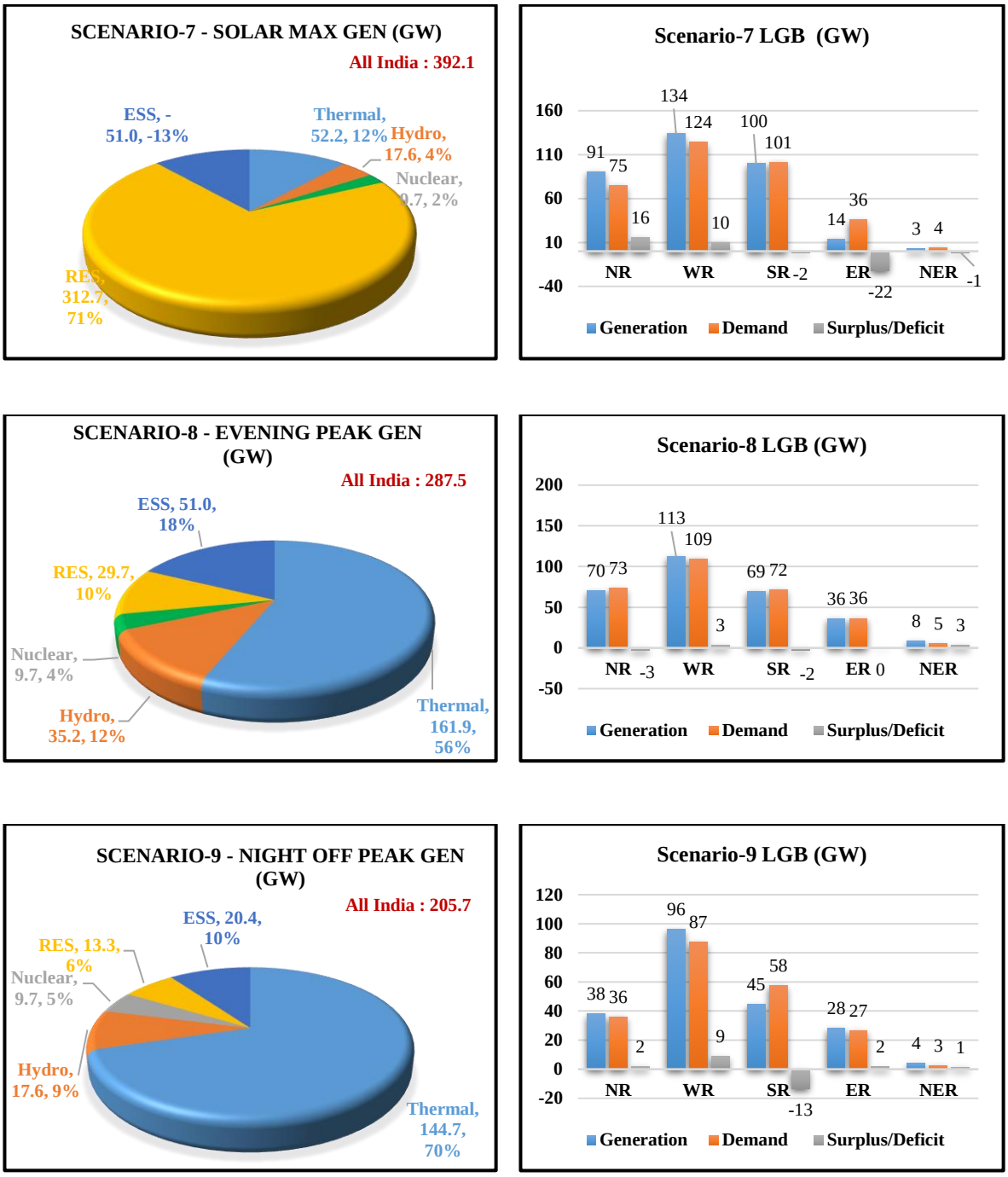



*Figure 3-8: LGB for Winter (Feb'2031)*

Out of these nine scenarios, Scenario-4 (Jun'30 Solar Max) and Scenario-9 (Feb'31 Night off peak) corresponds to two extreme cases with respect to demand i.e., highest demand (366 GW) and lowest demand (211 GW) scenarios respectively. In all other scenarios, all India demand is varying between these two demands as per demand factors. Further Scenario-1 corresponds to maximum RE generation share to meet the demand of that scenario. Based on LGB, region

wise surplus/deficit in each scenario is summarised in **Table 3-1**. Furthermore, both maximum surplus and deficit of each region is highlighted too in **Table 3-1**.

*Table 3-1: Regional Surplus/Deficit summary in MW*

| **Surplus (+) / Deficit (-)** | **Monsoon (Aug'30)** | | | **Summer (Jun'30)** | | | **Winter (Feb'31)** | | |
|---|---|---|---|---|---|---|---|---|---|
| **Scenario No. / Region** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
| | **Solar Max** | **Evening Peak** | **Night Off Peak** | **Solar Max** | **Evening Peak** | **Night Off Peak** | **Solar Max** | **Evening Peak** | **Night Off Peak** |
| **NR** | -5236 | -21572 | -18801 | -18274 | **-29392** | -16591 | **15536** | -3049 | 2010 |
| **WR** | 14387 | 7703 | 14317 | **18396** | 14718 | 2215 | 9899 | 3390 | 8670 |
| **SR** | 20587 | 22063 | 13821 | **35212** | 21816 | 16583 | -1720 | -2420 | **-13217** |
| **ER** | -28877 | -10149 | -11257 | **-35487** | -10435 | -3855 | -21745 | -497 | **1629** |
| **NER** | -439 | 2406 | 2119 | 1022 | **3744** | 2098 | **-1358** | 3025 | 1359 |

From the above table it may be inferred that:

- NR is importing power in evening peak scenario whereas, it is exporting power in solar max scenario due to high solar generation in NR. Maximum import of power is happening in Summer (June) evening peak load scenario & Maximum export of power is in Winter (Feb) solar max scenario.
- WR is exporting the power in most of the scenarios with Maximum export of 18 GW, observed in Summer (June) solar max scenario.
- SR is expected to export power in most of the scenarios except winter evening peak and night off peak scenario. Maximum export of power is 35 GW in Summer (June) solar max scenario, whereas maximum import of the order of 13 GW is taking place in the Winter (February) night off peak scenario.
- ER is mostly importing power in most of the scenarios except winter night off-peak scenario, due to RE RPO requirements of ER. It shall not be able to meet its RPO requirement from its own regional RE and has to import RE power from neighbouring regions.
- NER is mostly exporting in most of the scenarios except Monsoon solar max and Winter solar max scenarios- with maximum export of about 4 GW in winter evening peak scenario and maximum import of 1.3 GW in winter solar max scenario.

Considering the above LGB for nine scenarios, load flow cases were prepared for detailed studies to assess the adequacy of Inter State Transmission System including inter-regional corridors planned to cater the power transfer requirement across the region in study Timeframe of FY 2030-31. Study results of the same have been discussed in subsequent sections.

## 3.2 ISTS Expansion up to 2030-31

### 3.2.1 Summary of ISTS network

ISTS network expansion schemes across the country up to FY 2030-31 are enclosed in **Annex-3.2**. Summary of the same i.e. ckm addition, MVA addition and the broad estimated cost are tabulated below in **Table 3-2** , **Table 3-3** & **Table 3-4** respectively.

*Table 3-2: Transmission Line addition by 2030-31 (in ckm)*

| Sl. No. | FY | WR | SR | NR | ER | NER | Total |
|---|---|---|---|---|---|---|---|
| **1** | 2025-26 | 2,740 | 2,371 | 6,831 | 638 | 250 | **12,830** |
| **2** | 2026-27 | 6,140 | 2,943 | 8,534 | - | 271 | **17,888** |
| **3** | 2027-28 | 6,520 | 2,600 | 1,149 | 2,025 | 177 | **12,471** |
| **4** | 2028-29 | 980 | 7961 | 3992 | 348 | 450 | **13,731** |
| **5** | 2029-30 | 3,528 | 280 | - | 3,424 | 1,210 | **8,442** |
| **6** | 2030-31 | - | - | 1,900 | - | - | **1,900** |
| | **Total** | **19,908** | **16,155** | **22,406** | **6,435** | **2,359** | **67,263** |

*Table 3-3: Transformation Capacity addition by 2030-31 (in MVA)*

| Sl. No. | FY | WR | SR | NR | ER | NER | Total |
|---|---|---|---|---|---|---|---|
| **1** | 2025-26 | 58,500 | 37,500 | 53,605 | 4,500 | 1,720 | **1,55,825** |
| **2** | 2026-27 | 59,600 | 51,500 | 59,200 | 500 | 50 | **1,70,850** |
| **3** | 2027-28 | 92,000 | 46,000 | 7,500 | 12,000 | 32 | **1,57,532** |
| **4** | 2028-29 | 18,130 | 88,000 | 14,130 | - | 1,000 | **1,21,260** |
| **5** | 2029-30 | 13,500 | 1,630 | - | - | - | **15,130** |
| **6** | 2030-31 | - | - | 9,000 | - | - | **9,000** |
| | **Total** | **2,41,730** | **2,24,630** | **1,43,435** | **17,000** | **2,802** | **6,29,597** |

*Table 3-4: Broad estimated cost of schemes to be added by 2030-31 (in ₹ Cr.)*

| Sl. No. | FY | WR | SR | NR | ER | NER | Total |
|---|---|---|---|---|---|---|---|
| **1** | 2025-26 | 13,215 | 13,293 | 33,174 | 4,012 | 947 | **64,641** |
| **2** | 2026-27 | 41,425 | 19,394 | 45,818 | 495 | 122 | **1,07,254** |
| **3** | 2027-28 | 45,322 | 17,655 | 6,171 | 9,640 | 866 | **79,654** |
| **4** | 2028-29 | 11,249 | 46,899 | 39,667 | 913 | 1,804 | **1,00,531** |
| **5** | 2029-30 | 61,836 | 6,242 | - | 37,981 | 2,502 | **1,08,561** |
| **6** | 2030-31 | - | - | 24,951 | - | - | **24,951** |
| | **Total** | **1,73,047** | **1,03,483** | **1,49,781** | **53,040** | **6,241** | **4,85,593** |

Above summary has been divided in two categories-

- Summary of **under construction** ISTS network - ckm addition, MVA addition and the broad estimated cost of are tabulated below in **Table 3-5**, **Table 3-6** & **Table 3-7** respectively.

*Table 3-5: Under Construction Transmission Line (in ckm)*

| Sl. No. | FY | WR | SR | NR | ER | NER | Total |
|---|---|---|---|---|---|---|---|
| **1** | 2025-26 | 2,700 | 2,371 | 6,186 | 638 | 250 | **12,145** |
| **2** | 2026-27 | 6,140 | 2,943 | 3,320 | - | 271 | **12,674** |
| **3** | 2027-28 | 1,910 | 200 | - | 715 | 177 | **3,002** |
| **4** | 2028-29 | 470 | - | 2,028 | - | - | **2,498** |
| **5** | 2029-30 | 1,320 | 280 | - | - | - | **1,600** |
| **6** | 2030-31 | - | - | - | - | - | |
| | **Total** | **12,540** | **5,794** | **11,534** | **1,353** | **699** | **31,919** |

*Table 3-6: Under Construction Transformation Capacity (in MVA)*

| Sl. No. | FY | WR | SR | NR | ER | NER | Total |
|---|---|---|---|---|---|---|---|
| **1** | 2025-26 | 57,000 | 37,500 | 49,715 | 4,500 | 1,720 | **1,50,435** |
| **2** | 2026-27 | 59,600 | 51,500 | 19,000 | 500 | 50 | **1,30,650** |
| **3** | 2027-28 | 22,50 | 7,000 | - | 3,000 | - | **32,500** |
| **4** | 2028-29 | 4,630 | - | 6,630 | - | - | **11,260** |
| **5** | 2029-30 | 9,000 | 1,630 | - | - | - | **10,630** |
| **6** | 2030-31 | - | - | - | - | - | - |
| | **Total** | **1,52,730** | **97,630** | **75,345** | **8,000** | **1,770** | **3,35,475** |

*Table 3-7: Broad estimated cost (in ₹ Cr.) (Under Construction)*

| Sl. No. | FY | WR | SR | NR | ER | NER | Total |
|---|---|---|---|---|---|---|---|
| **1** | 2025-26 | 12,944 | 13,293 | 30,046 | 4,012 | 837 | **61,182** |
| **2** | 2026-27 | 41,425 | 19,378 | 17,636 | 495 | 122 | **79,057** |
| **3** | 2027-28 | 10,676 | 1,470 | - | 3,317 | 866 | **16,329** |
| **4** | 2028-29 | 6,921 | - | 26,967 | - | - | **33,888** |
| **5** | 2029-30 | 24,819 | 6,242 | - | - | - | **31,061** |
| **6** | 2030-31 | - | - | - | - | - | |
| | **Total** | **96,834** | **40,384** | **74,650** | **7,824** | **1,825** | **2,21,517** |

- Summary under **planning/approval/bidding** ISTS network - ckm addition, MVA addition and the broad estimated cost of are tabulated below in **Table 3-8**, **Table 3-9** & **Table 3-10** respectively.

*Table 3-8: Under planning/approval/bidding Transmission Lines (in ckm)*

| Sl. No. | FY | WR | SR | NR | ER | NER | Total |
|---|---|---|---|---|---|---|---|
| **1** | 2025-26 | 40 | - | 645 | - | - | **685** |
| **2** | 2026-27 | - | - | 5,214 | - | - | **5,214** |
| **3** | 2027-28 | 4,610 | 2,400 | 1,149 | 1,310 | - | **9,469** |
| **4** | 2028-29 | 510 | 7,961 | 1,964 | 348 | 450 | **11,233** |
| **5** | 2029-30 | 2,208 | - | - | 3,424 | 1,210 | **6,842** |
| **6** | 2030-31 | - | - | 1,900 | - | - | **1,900** |
| | **Total** | **7,368** | **10,361** | **10,872** | **5,082** | **1,660** | **35,343** |

*Table 3-9: Under planning/approval/bidding Transformation Capacity (in MVA)*

| Sl. No. | FY | WR | SR | NR | ER | NER | Total |
|---|---|---|---|---|---|---|---|
| **1** | 2025-26 | 1,500 | - | 3,890 | - | - | **5,390** |
| **2** | 2026-27 | - | - | 40,200 | - | - | **40,200** |
| **3** | 2027-28 | 69,500 | 39,000 | 7,500 | 9,000 | 32 | **1,25,032** |
| **4** | 2028-29 | 13,500 | 88,000 | 7,500 | - | 1,000 | **1,10,000** |
| **5** | 2029-30 | 4,500 | - | - | - | - | **4,500** |
| **6** | 2030-31 | | | 9,000 | | | **9,000** |
| | **Total** | **89,000** | **1,27,000** | **68,090** | **9,000** | **1,032** | **2,94,122** |

*Table 3-10: Broad estimated cost (in ₹ Cr.) (under planning/approval/bidding)*

| Sl. No. | FY | WR | SR | NR | ER | NER | Total |
|---|---|---|---|---|---|---|---|
| **1** | 2025-26 | 221 | - | 3,128 | - | 110 | **3,459** |
| **2** | 2026-27 | - | 16 | 28,181 | - | - | **28,198** |
| **3** | 2027-28 | 34,647 | 16,185 | 6,171 | 6,323 | - | **63,325** |
| **4** | 2028-29 | 4,328 | 46,899 | 12,700 | 913 | 1,804 | **66,643** |
| **5** | 2029-30 | 37,017 | - | - | 37,981 | 2,502 | **77,500** |
| **6** | 2030-31 | - | - | 24,951 | - | - | **24,951** |
| | **Total** | **76,213** | **63,100** | **75,131** | **45,216** | **4,416** | **2,64,076** |

Cumulative ckm and MVA capacity of ISTS network by 2030-31 is depicted in **Figure 3-9**

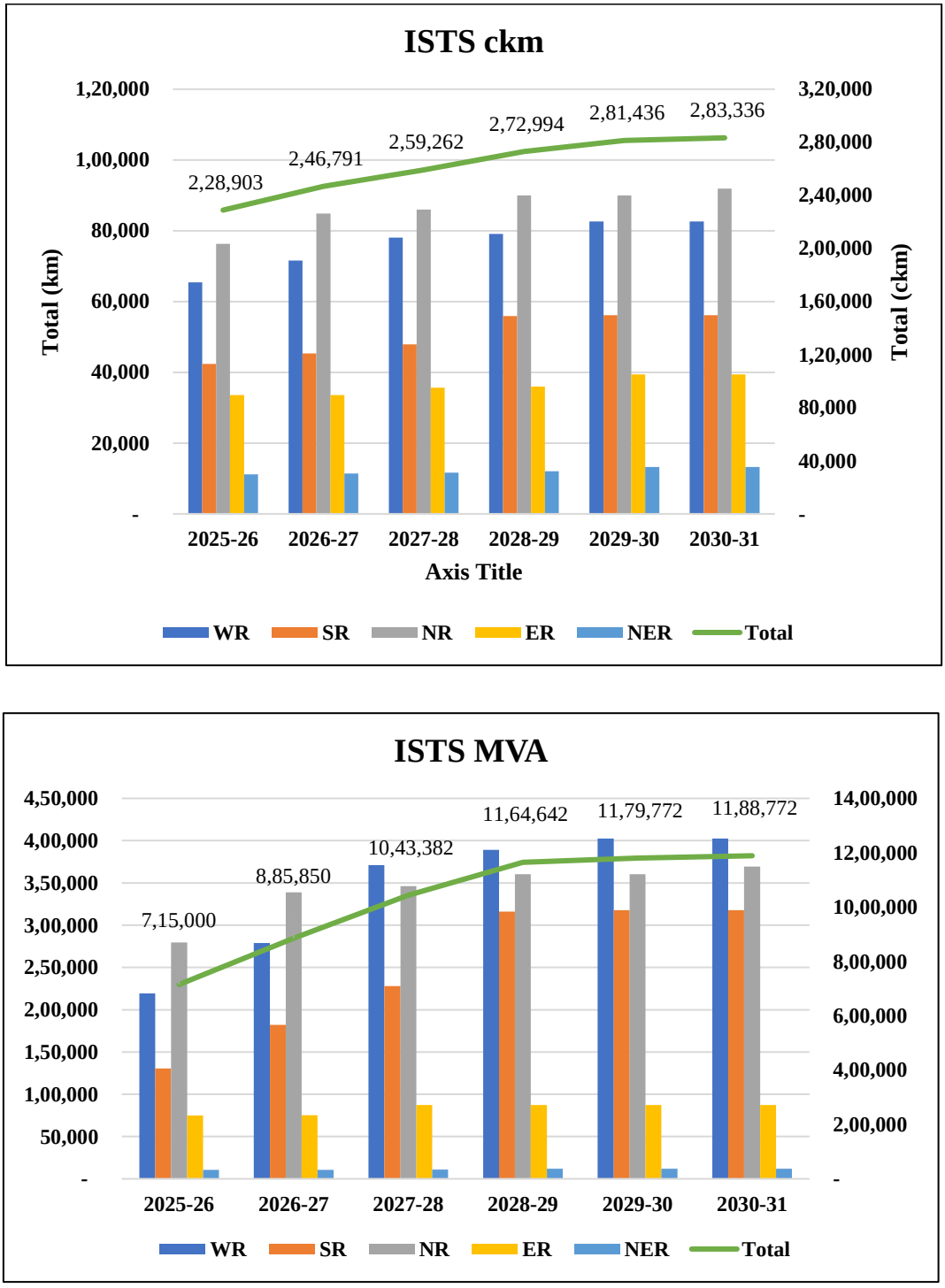



*Figure 3-9: Cumulative ckm and MVA of ISTS Network by 2030-31*

### 3.2.2 Inter-Regional (IR) Capacity

The progressive growth in Inter-Regional (IR) transmission capacity from 2015-16 till 2030-31 is given below in **Figure 3-10.** As on Jul'25, IR transmission capacity is about 120 GW which is expected to increase to about 161 GW by 2030-31.

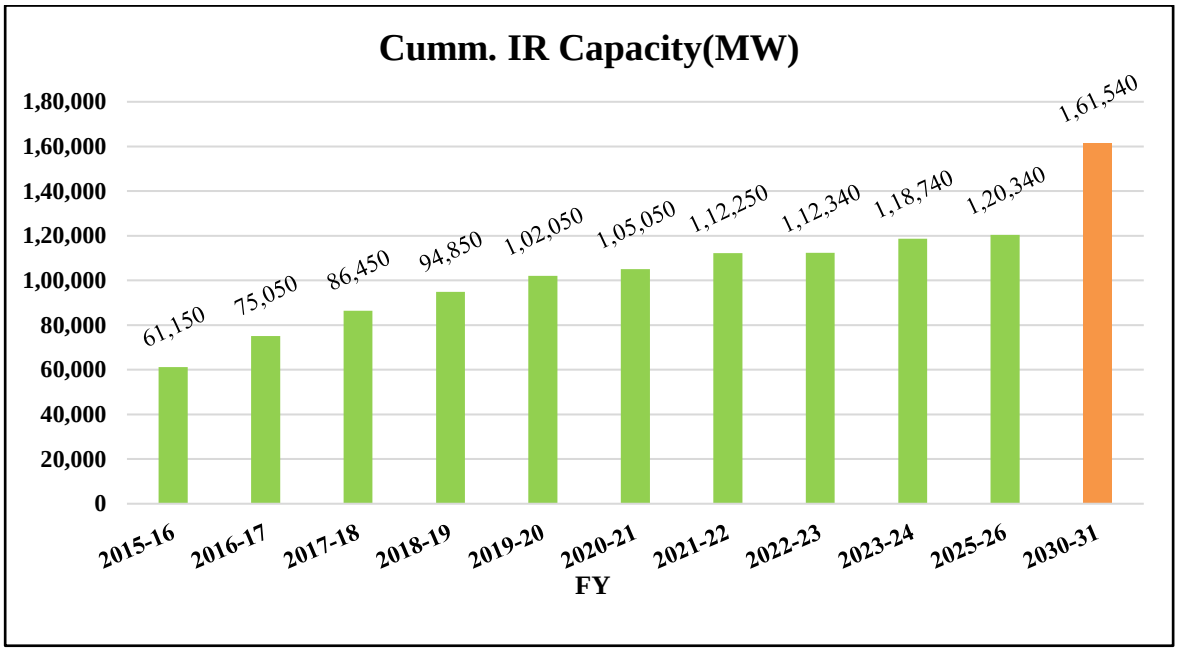



*Figure 3-10: IR Capacity*

Details of approved Inter Regional corridor capacity are attached at **Annex-3.3** for 2030-31 and the schematic of the same is given below in **Figure 3-11**.

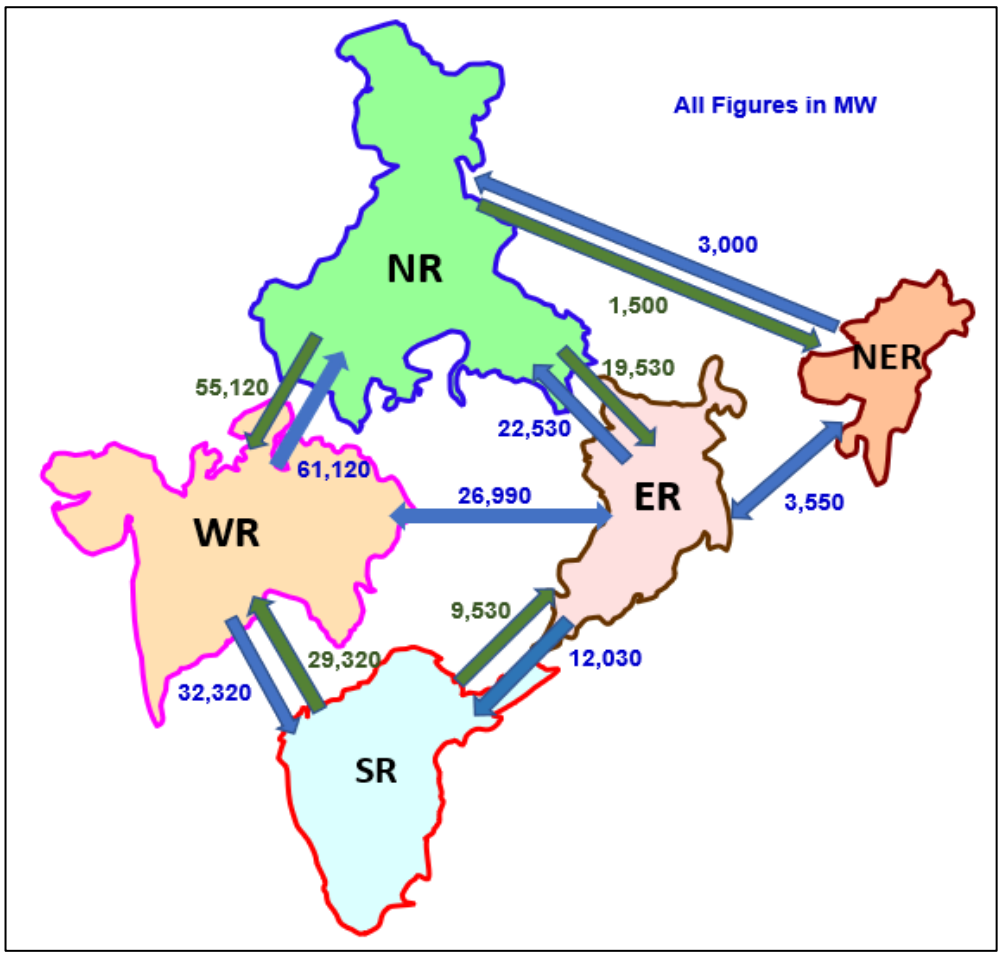



*Figure 3-11: Inter-Regional Transmission Capacity by 2030-31*

# Chapter 4: Northern Region

Northern Region is connected to Western and Eastern Region through 765kV/400kV high-capacity corridors along with Back-to-Back/ HVDCs. The thermal generating stations of Northern Regions are predominantly located in UP, Rajasthan and Haryana whereas hydro generation concentrated into J&K, HP and Uttarakhand. Further, Rajasthan is being a RE rich state comprise of lot of Solar & Wind capacity.

As of now Northern Region imports power from other regions during evening peak load period whereas it will export power to other regions during high RE scenarios in future.

## 4.1 Power Supply Scenario as on July'25

As on July'2025, total Installed Capacity of Northern Region is about 143.2 GW and the peak demand is about 90.8 GW. The state-wise breakup of installed capacity and peak demand is summarised at **Table 4-1** below.

*Table 4-1: NR Installed Capacity and Peak Demand as on July'25*

*(All Fig in GW)*

| State | Generation (GW) | | | | | | | | Peak Demand (GW) |
|---|---|---|---|---|---|---|---|---|---|
| | Fossil | | | Non-Fossil | | | | Grand Total | |
| | Thermal | Gas | Total | Nuclear | Hydro | RES (MNRE) | Total | | |
| **Delhi** | 3.6 | 2.0 | 5.7 | 0.2 | 1.0 | 0.4 | 1.6 | **7.2** | 8.4 |
| **Haryana** | 8.6 | 0.6 | 9.2 | 0.1 | 2.4 | 2.6 | 5.1 | **14.4** | 14.1 |
| **Himachal Pradesh** | 0.1 | 0.0 | 0.1 | 0.0 | 3.5 | 1.3 | 4.8 | **5.0** | 1.9 |
| **Jammu & Kashmir** | 0.6 | 0.1 | 0.7 | 0.1 | 2.3 | 0.3 | 2.8 | **3.5** | 2.9 |
| **Punjab** | 8.2 | 0.2 | 8.4 | 0.2 | 3.8 | 2.2 | 6.3 | **14.6** | 16.7 |
| **Rajasthan** | 14.2 | 0.8 | 15.0 | 0.8 | 2.1 | 37.8 | 40.7 | **55.6** | 18.5 |
| **UP** | 23.9 | 1.0 | 24.9 | 0.4 | 3.6 | 5.8 | 9.8 | **34.7** | 31.5 |
| **Uttarakhand** | 0.6 | 0.7 | 1.4 | 0.0 | 2.3 | 1.2 | 3.5 | **4.9** | 2.9 |
| **Chandigarh** | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.2 | **0.3** | 0.5 |
| **Central unallocated** | 1.5 | 0.3 | 1.8 | 0.3 | 0.9 | 0.0 | 1.2 | **3.0** | 97.4 |
| **Total** | **61.5** | **5.7** | **67.2** | **2.2** | **22.0** | **51.8** | **76.0** | **143.2** | **90.8** |

*Source: CEA monthly report*

From above, it can be concluded that share of non-fossil fuel-based generation capacity in total present installed capacity (IC) of 143.2 GW is about 76 GW i.e. 53.07% of total IC. This share would further increase in envisaged scenario of 2030-31 Timeframe.

## 4.2 Envisaged Power Supply Scenario by 2030-31

As per the 20$^{th}$ EPS, Northern Region demand for 2030-31 Timeframe is expected to increase to about 122.1 GW. As per the inputs received from various stakeholders, total installed

capacity of Northern Region for 2030-31 is expected to be about 231.7 GW. The state wise bifurcation of installed capacity and peak demand is summarized below at **Table 4-2.**

*Table 4-2: NR Installed Capacity and peak demand (2030-31)*

*(All Fig in GW)*

| State | Generation (GW) | | | | | | | | | Peak Demand (GW) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Fossil | | | Non-Fossil | | | | ESS | Grand Total | |
| | Thermal | Gas | Total | Nuclear | Hydro | RES (MNRE) | Total | | | |
| **Delhi** | 0.5 | 1.5 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **2.0** | 11.6 |
| **Haryana** | 3.6 | 0.0 | 3.6 | 0.0 | 0.1 | 0.9 | 1.0 | 0.0 | **4.6** | 20.6 |
| **Himachal Pradesh** | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.3 | 0.0 | **0.3** | 3.1 |
| **Jammu & Kashmir** | 0.0 | 0.2 | 0.2 | 0.0 | 1.2 | 0.0 | 1.2 | 0.0 | **1.4** | 4.4 |
| **Punjab** | 5.7 | 0.0 | 5.7 | 0.0 | 1.4 | 0.0 | 1.4 | 0.0 | **7.0** | 20.0 |
| **Rajasthan** | 12.4 | 0.2 | 12.6 | 0.0 | 0.5 | 22.0 | 22.6 | 8.8 | **44.0** | 26.0 |
| **UP** | 29.1 | 0.0 | 29.1 | 0.0 | 1.3 | 11.6 | 12.9 | 3.7 | **45.7** | 41.9 |
| **Uttarakhand** | 0.0 | 0.0 | 0.0 | 0.0 | 2.2 | 0.0 | 2.2 | 0.0 | **2.2** | 4.0 |
| **Chandigarh** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **0.0** | 0.5 |
| **Central** | 11.9 | 1.8 | 13.6 | 3.0 | 14.2 | 74.7 | 91.9 | 1.5 | **107.0** | - |
| **IPP** | 0.0 | 0.0 | 0.0 | 0.0 | 4.1 | 0.0 | 4.1 | 3.1 | **7.2** | - |
| **Rooftop / Other RE** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.9 | 5.9 | 0.0 | **5.9** | - |
| **Total** | **63.2** | **3.6** | **66.8** | **3** | **25.3** | **110.5** | **138.8** | **17.1** | **222.7** | **122.1** |

From above, it is observed that growth in installed capacity of Northern Region is majorly from non-fossil fuel-based generation resources. Share of non-fossil fuel-based generation capacity in total present installed capacity (IC) is expected to be increased from 53.07% to 62.32%. There is a growth in peak demand of Northern Region from present Timeframe (2025-26) to 2030-31 with a CAGR of 4.63%. The state wise peak demand growth is given at

**Table 4-3.**

*Table 4-3: Increase in Peak Demand of Various States*

*(All Fig in MW)*

| | Peak Demand | | | |
|---|---|---|---|---|
| | **2025-26** | **2030-31 (20th EPS)** | **Increase in demand** | **CAGR (%)** |
| **Chandigarh** | 460 | 549 | 89 | 3.6 |
| **Delhi** | 8442 | 11615 | 3173 | 6.59 |
| **Haryana** | 14084 | 20648 | 6564 | 7.95 |
| **Himachal Pradesh** | 1943 | 3087 | 1144 | 9.7 |
| **Jammu & Kashmir (including Ladakh)** | 2906 | 4539 | 1633 | 9.32 |
| **Punjab** | 16670 | 20028 | 3358 | 3.74 |
| **Rajasthan** | 18,509 | 26,048 | 7539 | 7.07 |
| **UP** | 31486 | 41910 | 10424 | 5.88 |
| **Uttarakhand** | 2910 | 4004 | 1094 | 6.59 |
| **NR** | **97410** | **122134** | **24724** | **4.63** |

From the above data it is observed that the CAGR growth of peak demand is maximum for Himachal Pradesh (9.7%) and minimum for Chandigarh (3.6%).

### 4.3 Load Generation Balance for 2030-31 Timeframe

In Chapter-3, All India Load Generation Balance (LGB) for identified nine scenarios - was prepared as per the methodology finalized in consultation with CTU, CEA and GRID INDIA. This section elaborates the Northern Region Load Generation Balance (LGB) for 2030-31 time-frame. For Northern Region also, three points on the daily load curve i.e. Solar max (afternoon), Peak load (evening) and Off-peak load (night) for three seasons viz. Monsoon (August), Summer (June) and Winter (February) have been considered.

Load generation balance has been prepared considering the generation despatch factors as mentioned at **Table 4-4** for the 9 scenarios. Further, thermal generators have been despatched as per the merit order.

*Table 4-4: Northern Region Generation Dispatch and Demand Factors*

| Scenario No & Name | Nuclear | Hydro | Solar | Wind | ESS | Gas | Regional DF |
|---|---|---|---|---|---|---|---|
| 1-Aug Solar Max | 80% | 70% | 75% | 50% | -100% | 0% | 78% |
| 2-Aug Peak Load | 80% | 95% | 0% | 70% | 60% | 50% | 81% |
| 3-Aug Night Off Peak | 80% | 70% | 0% | 60% | 40% | 50% | 63% |
| 4-Jun Solar Max | 80% | 70% | 85% | 50% | -100% | 0% | 97% |
| 5-Jun Peak Load | 80% | 95% | 0% | 70% | 50% | 50% | 92% |
| 6-Jun Night Off Peak | 80% | 70% | 0% | 60% | 0% | 50% | 60% |
| 7-Feb Solar Max | 80% | 30% | 90% | 10% | -100% | 0% | 66% |
| 8-Feb Peak Load | 80% | 60% | 0% | 35% | 100% | 50% | 64% |
| 9-Feb Night Off Peak | 80% | 30% | 0% | 10% | 40% | 30% | 32% |

The despatch from thermal generations have been done considering merit order despatch.

### 4.4 ISTS Network Expansion Schemes Evolved from Feb'25 to July'25

Various transmission schemes have been discussed/finalized in the Consultative Meeting for Evolution of Transmission System of Northern Region (CMETS-NR) from Feb 2025 to July 2025. Brief of all such deliberated transmission schemes are tabulated below:

| Sl. No. | Name of the Transmission Scheme | Expected Timeframe | Type of Scheme | Quantum (MW) | Tentative Cost (in Cr.) |
|---|---|---|---|---|---|
| | **Rajasthan** | | | | |
| **(i)** | Augmentation of 2x500 MVA (7th & 8th), 400/220 kV ICTs along with 220 kV Sectionalizer bay (1 set), 220 kV BC (1 no.) bay and 220 kV TBC (1 no.) bay at Bikaner-IV PS | 2026-27 | RE | - | 122.88 |

| Sl. No. | Name of the Transmission Scheme | Expected Timeframe | Type of Scheme | Quantum (MW) | Tentative Cost (in Cr.) |
|---|---|---|---|---|---|
| **(ii)** | Augmentation of Transformation capacity by 1x500MVA, 400/220kV ICT (4th) at 400/220kV Sikar (PG) S/s in Rajasthan | 2027-28 | Conv | - | 53.57 |
| **(iii)** | Implementation of 3 nos. 220kV line bays and 1 no. 400kV line bay for interconnection of REGS at 765/400/220kV Fatehgarh-IV (sec-2) PS | 2026-27 | RE | - | 33.06 |
| **(iv)** | Augmentation of Transformation capacity at 400/220kV Jaipur South (PG) S/s in Rajasthan by 1x500MVA ,400/220kV ICT (3rd) | 2026-27 | Conv | - | 48.96 |
| **(v)** | Augmentation of transformation capacity at 400/220kV Neemrana (PG) in Rajasthan by 1x500 MVA, 400/220kV ICT (3rd) | 2026-27 | Conv | - | 48.96 |
| **(vi)** | Implementation of 3 nos. of 220 kV line bays for interconnection of M/s Furies Solren Private Limited (300MW) [1 no. bay] & M/s SJVN Green Energy Limited (500MW) [2 no. bays] RE power projects at 765/400/220kV Bikaner-IV PS | 2026-27 | RE | - | 18.54 |
| **(vii)** | Implementation of 1 no. of 220 kV line bay at 765/400/220kV Barmer-I PS for interconnection of M/s Anboto Solar Private Limited (250MW+50MW) RE power projects | 2026-27 | RE | - | 6.18 |
| **(viii)** | Implementation of 1 no. 220kV line bay for interconnection of M/s Rajasthan BESS Private Limited (250MW) BESS Project at 765/400/220kV Bhadla-III PS | 2026-27 | RE | - | 6.18 |
| **(ix)** | Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-5:6 GW) [Barmer Complex] Barmer-II: 6GW (Solar) | 2029-2030 | RE | 6000 | 24951.28 |
| | **Jammu and Kashmir** | | | | |
| **(x)** | Augmentation of Transformation Capacity at 400/220kV New Wanpoh (PG) S/s in Jammu & Kashmir by 400/220kV, 1x315MVA (3x105MVA) ICT (3rd) | 2027-28 | Conv | - | 61 |
| | **Delhi** | | | | |
| **(xi)** | Augmentation of transformation capacity at 400/220kV Maharani Bagh (PG) S/s (GIS) in Delhi by 1x500 MVA, 400/220kV ICT (5th) | 2027-28- | Conv | - | 77.59 |
| **(xii)** | Implementation of 1 no. 400kV ICT bay along with 400kV Sectionalization bay (GIS) at 765/400kV Jhatikara (PG) S/s | 2026-27 | Conv | - | 51.88 |

| Sl. No. | Name of the Transmission Scheme | Expected Timeframe | Type of Scheme | Quantum (MW) | Tentative Cost (in Cr.) |
|---|---|---|---|---|---|
| | **Uttar Pradesh** | | | | |
| **(xiii)** | Augmentation of transformation capacity at 400/220kV Lucknow (PG) S/s in Uttar Pradesh | 2027-28 | Conv | - | 87.10 |
| | **Total** | | | **6000** | **25567.18** |

Details of the schemes are reproduced below state-wise:

### 4.4.1 Rajasthan

**(A) <u>Augmentation of 2x500 MVA (7th & 8th), 400/220 kV ICTs along with 220 kV Sectionalizer bay (1 set), 220 kV BC (1 no.) bay and 220 kV TBC (1 no.) bay at Bikaner-IV PS</u>**

In the 36th CMETS-NR meeting held on 15.01.2025, it was stated that 765/400/220 kV Bikaner-IV PS is an under implementation RE pooling station with transformation capacity of 6x1500MVA at 765/400kV level and 6x500MVA at 400/220kV level with the schedule of Nov'26. At present, total connectivity granted at Bikaner-IV PS is 6000MW, out of this, 3150 MW is granted at 220 kV level and 2850 MW is granted at 400 kV level. As per Manual on Transmission Planning Criteria 2023, 'N-1' contingency 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.

Considering the power evacuation and N-1 contingency criteria, Augmentation of 400/220 kV 2x500 MVA (7th & 8th) ICTs at Bikaner-IV PS were agreed in 36th CMETS-NR meeting held on 15.01.25 & 29th NCT meeting held on 17.04.25.

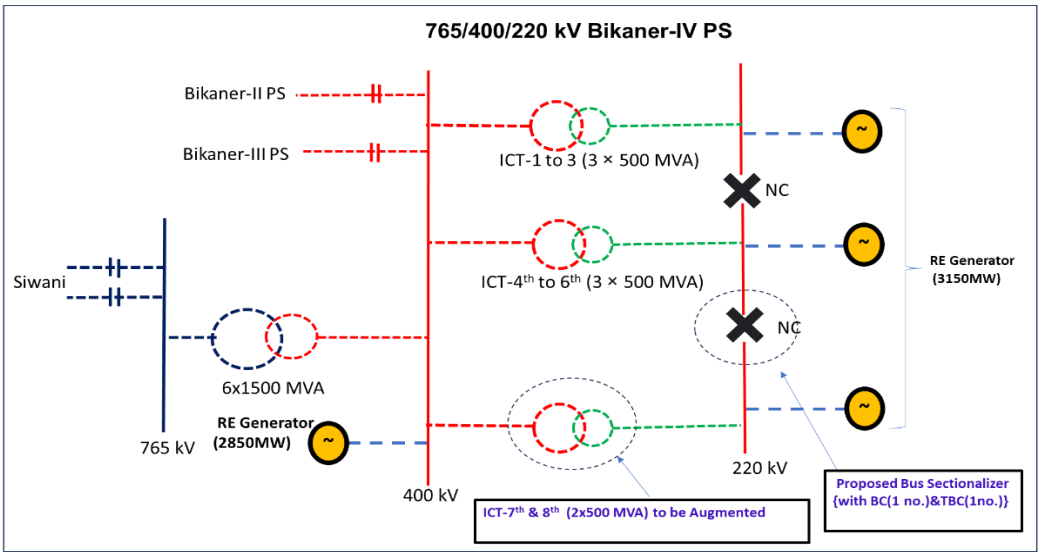



*Figure 4-1: Schematic of 765/400/220 kV Bikaner-IV PS*

The scheme is under implementation with following details:

**Project Name** - Augmentation of 2x500 MVA (7th & 8th), 400/220 kV ICTs along with 220 kV Sectionalizer bay (1 set), 220 kV BC (1 no.) bay and 220 kV TBC (1 no.) bay at Bikaner-IV PS

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of the Transmission Scheme | Item Description |
|---|---|---|
| 1. | Augmentation of 400/220 kV, 2x500 MVA (7th & 8th) ICTs at Bikaner-IV PS along with associated transformer bays | • 500 MVA, 400/220 kV ICT - 2 nos.<br>• 400kV ICT bays – 2 nos.<br>• 220 kV ICT bay – 2 nos. |
| 2. | 220 kV Sectionalizer bay (1 set), 220 kV BC (1 no.) bay and 220 kV TBC (1 no.) bay at Bikaner-IV PS | • 220 kV Sectionalizer bay: 1 set<br>• 220 kV BC bay: 1 no.<br>• 220 kV TBC bay:1 no. |

**Implementation Timeframe:** 21 months from date of allocation

**Total Estimated Cost:122.88 Cr.**

**(B) <u>Augmentation of Transformation capacity by 1x500MVA ,400/220kV ICT (4th) at 400/220kV Sikar (PG) S/s</u>**

In the 37th CMETS-NR meeting held on 27.03.2025, it was discussed that as per operational feedback noted in 225th OCC meeting held on 12.11.24, N-1 non-compliance of 400/220kV ICT at Sikar (PG) Substation was being observed.
It was also noted in 37th CMETS-NR that from analysis of loading pattern of Sikar ICTs (1x500MVA+2x315MVA), it was observed that loading is breaching N-1 limit (820 MW) in summer season (Jun'24-Jul'24) and during winter season (Nov'25-Mar'25) for sufficient duration of time. In the meeting, RVPN stated that they would further analyse the proposal and confirm in subsequent CMETS-NR meeting. Thereafter, the agenda was deliberated in 38th CMETS-NR meeting held on 28.05.2025, in which RVPN stated that considering the future load as well as N-1 non-compliance issue in Sikar ICT, augmentation of 400/220 kV ,1x500 MVA (4th) ICT at 400/220kV Sikar (PG) S/s is required. Considering above, the subject proposal was agreed in 38th CMETS-NR held on 28.05.2025.

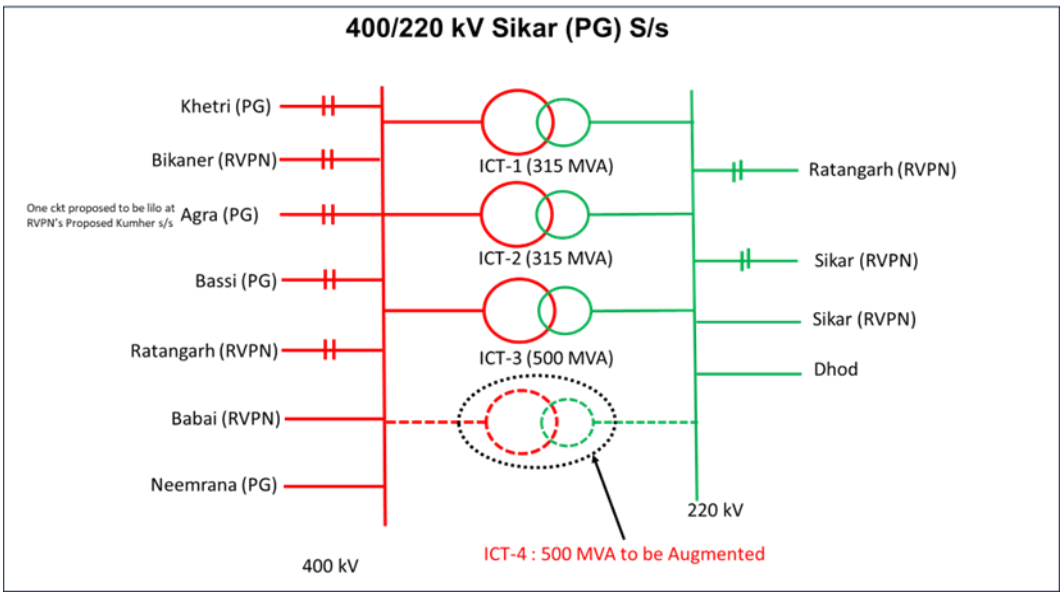



*Figure 4-2: Schematic of 400/220 kV Sikar (PG) S/s*

The scheme is under implementation with following details:

**Project Name** - Augmentation of Transformation capacity by 1x500MVA ,400/220kV ICT ($4^{th}$) at 400/220kV Sikar (PG) S/s

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of the Transmission Scheme | Capacity/km |
|---|---|---|
| 1 | Augmentation of Transformation capacity by 400/220 kV, 1x500 MVA ($4^{th}$) ICT at 400/220kV Sikar (PG) S/s along with transformer bays. | • 500 MVA, 400/220 kV ICT - 1 No.<br>• 400 kV ICT bay – 1 No. Main Bay (termination in existing spare bay of half diameter)<br>• 220 kV ICT bay – 1 No.<br>• 245 kV, 2500 Sq.mm XLPE cable - 720m (approx.) along with associated cable termination. |

**Implementation Timeframe:** 21 months from date of allocation

**Total Estimated Cost:53.57 Cr.**

**(C) <u>Implementation of 3 nos. 220kV line bays and 1 no. 400kV line bay for interconnection of REGS at 765/400/220kV Fatehgarh-IV (sec-2) PS</u>**

In 23rd CMETS-NR held on 29.08.2023, connectivity application of M/s BN Dispatchable was agreed for grant through 1 no. of 220kV line bay at Fatehgarh-IV (Sec-2) PS with bay implementation at Fatehgarh-IV(Sec-2) end under ISTS scope.

Also, in the 27th CMETS-NR held on 10.01.2024, it was agreed to grant connectivity to M/S NTPC Renewable Energy Limited through 1 no. of 400kV line bay at Fatehgarh-IV PS(Sec-2) PS. M/s NTPC Renewable agreed for the same with 400 kV line bay at Fatehgarh-IV PS(Sec-2) PS end under ISTS scope.

In 31st CMETS-NR held on 27.06.2024, connectivity application of M/s Avaada and M/s Gamma Renewables was agreed for grant through 1 no. of 220kV line bay each at Fatehgarh-IV (Sec-2) PS with bay implementation of both bays at Fatehgarh-IV (Sec-2) under ISTS scope.

Considering matching implementation timeframes of RE generators and corresponding transmission schemes, implementation of 3 nos. of 220 kV line bays for interconnection of M/s Avaada Energy), M/s BN Dispatchable-1 & M/s Gamma Renewables India Project One and 1 nos. of 400 kV line bay for interconnection of M/s NTPC Renewable Energy at Fatehgarh-IV (Sec-2) PS were taken up.

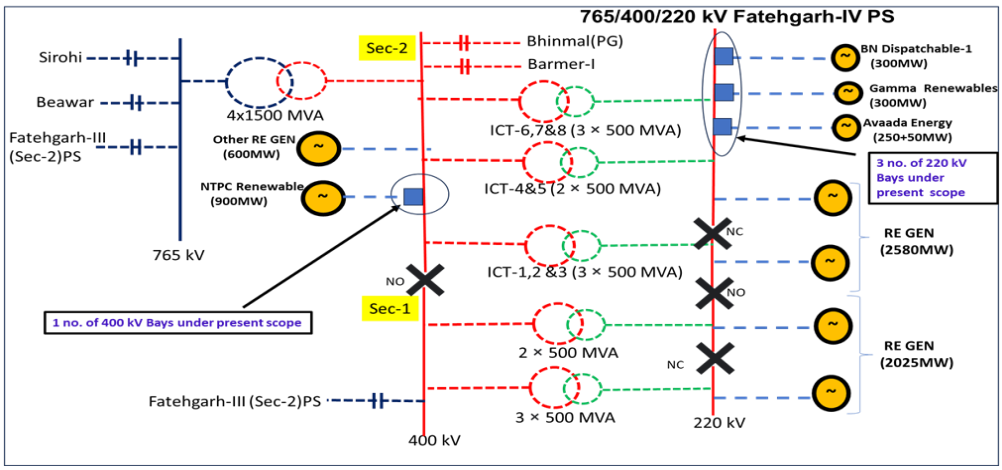



*Figure 4-3: Schematic of 765/400/220 kV Fatehgarh-IV (PG) PS*

The scheme is under implementation with following details:

**Project Name** - Implementation of 3 nos. 220kV line bays and 1 no. 400kV line bay for interconnection of REGS at 765/400/220kV Fatehgarh-IV (sec-2) PS

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of the Transmission Scheme | Capacity/km | Implementation Timeframe |
|---|---|---|---|
| 1 | 1 no. of 220 kV line bays at 765/400/220kV Fatehgarh-IV (sec-2) PS for interconnection of 300MW REGS of M/s Avaada Energy Pvt. | • 220 kV Line Bay (AIS) - 1 no. | 07-Nov-2026 (matching with SCOD of Rajasthan REZ Ph- |

| Sl. No. | Scope of the Transmission Scheme | Capacity/km | Implementation Timeframe |
|---|---|---|---|
| | Ltd. (App. No. 2200000290-250MW & App no. 2200000077-50MW) | | IV (Part-2), Part F transmission scheme) |
| 2 | 1 no. of 220 kV line bays at 765/400/220kV Fatehgarh-IV (sec-2) PS for interconnection of 300MW REGS of M/s BN Dispatchable-1 Pvt. Ltd. (App. no. 2200000103 - 300MW) | • 220 kV Line Bay (AIS) - 1 no. | |
| 3 | 1 no. of 220 kV line bays at 765/400/220kV Fatehgarh-IV (sec-2) PS for interconnection of 300MW REGS of M/s Gamma Renewables India Project One Pvt. Ltd. (App. No. 2200000355-300MW) | • 220 kV Line Bay (AIS) - 1 no. | 30-Dec-2026(matching with SCOD of Rajasthan REZ Ph-IV (Part-4: 3.5 GW) transmission scheme) |
| 4 | 1 no. of 400 kV line bay at 765/400/220kV Fatehgarh-IV (sec-2) PS for interconnection 900MW REGS of M/s NTPC Renewable Energy Ltd. (App. no. 2200000348 - 900MW) | • 400 kV Line Bay (along with associated Tie Bay) (AIS) - 1 No. | |

**Implementation Timeframe:** As mentioned above in Detailed scope of scheme

**Total Estimated Cost: 33.06 Cr.**

**(D) <u>Augmentation of Transformation capacity at 400/220kV Jaipur South (PG) S/s in Rajasthan by 1x500MVA ,400/220kV ICT (3rd)</u>**

The proposal was deliberated in the 36th CMETS-NR meeting held on 15.01.2025. In the meeting, it was noted that POWERGRID vide letter dated 27.08.2024 informed that ICTs in few of the substations (including Jaipur South S/s) are having high utilization and violating N-1 contingency criteria. POWERGRID also mentioned that Peak Utilization of Jaipur South ICTs observed in May'24 is 77%. Further, in the 225th OCC meeting held on 12.11.2024, NRLDC also highlighted the issue of N-1 non-compliance of 400/220kV ICT at Jaipur South (PG) Substation. Considering above, the proposal for 400/220kV ICT augmentation at Jaipur South (PG) S/s was agreed in 36th CMETS-NR.

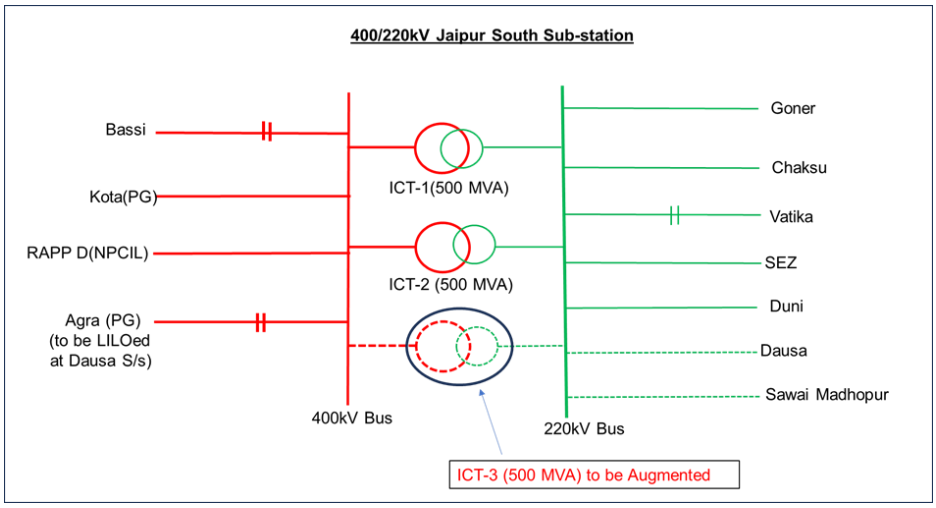



*Figure 4-4: Schematic of 400/220 kV Jaipur South (PG) S/s*

The scheme is under implementation with following details:

**Project Name** - Augmentation of Transformation capacity at 400/220kV Jaipur South (PG) S/s in Rajasthan by 1x500MVA ,400/220kV ICT (3rd)

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of the Transmission Scheme | Capacity/km |
|---|---|---|
| 1 | Augmentation of transformation capacity at 400/220kV Jaipur South (PG) S/s by 1x500 MVA, 400/220kV ICT (3rd) along with associated bays | • 500 MVA, 400/220 kV ICT -1 no.<br>• 400 kV ICT bay (in existing diameter) - 1 no.<br>• 220 kV ICT bay- 1 no |

**Implementation Timeframe:** 21 months from the date of allocation

**Total Estimated Cost: 48.96 Cr.**

**(E) <u>Augmentation of transformation capacity at 400/220kV Neemrana (PG) in Rajasthan by 1x500 MVA, 400/220kV ICT (3rd)</u>**

The proposal was deliberated in the 36th CMETS-NR meeting held on 15.01.2025. In the meeting, it was noted that POWERGRID vide letter dated 27.08.2024 informed that ICTs in few of the substations (including Neemrana (PG) S/s) are having high utilization and violating N-1 contingency criteria. POWERGRID also mentioned that Peak Utilization of Neemrana ICTs observed in May'24 is 76%. Further, in the 225th OCC meeting held on 12.11.2024, NRLDC also highlighted the issue of N-1 non-compliance of 400/220kV ICT at Neemrana (PG) Substation. Considering above, the proposal for 400/220kV ICT augmentation at Neemrana (PG) S/s was agreed in 36th CMETS-NR.

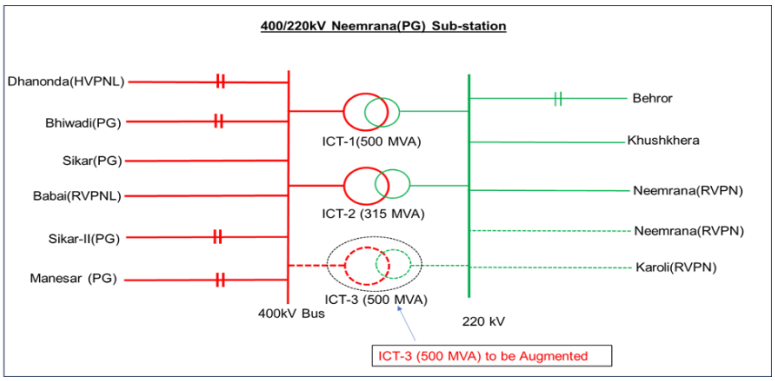



*Figure 4-5: Schematic of 400/220 kV Neemrana (PG) S/s*

The scheme is under implementation with following details:

**Project Name** - Augmentation of transformation capacity at 400/220kV Neemrana (PG) in Rajasthan by 1x500 MVA, 400/220kV ICT (3rd)

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of the Transmission Scheme | Capacity/km |
|---|---|---|
| 1 | Augmentation of transformation capacity at 400/220kV Neemrana (PG) by 1x500 MVA, 400/220kV ICT (3rd) along with associated bays | • 500 MVA, 400/220 kV ICT -1 no.<br>• 400 kV ICT bay (in existing diameter) - 1 no.<br>• 220 kV ICT bay- 1 no |

**Implementation Timeframe:** 21 months from date of allocation

**Total Estimated Cost: 48.96 Cr.**

**(F) <u>Implementation of 3 nos. of 220 kV line bays for interconnection of M/s Furies Solren Private Limited (300MW) [1 no. bay] & M/s SJVN Green Energy Limited (500MW) [2 no. bays] RE power projects at 765/400/220kV Bikaner-IV PS</u>**

In 31st CMETS-NR held on 27.06.2024, connectivity application of M/s Furies Solren and M/s SJVN Green Energy was agreed for grant through 1 no. and 2 nos. of 220kV line bay at Bikaner-IV PS respectively with bay implementation at Bikaner-IV PS end under ISTS scope.

Considering matching implementation timeframes of RE generators and corresponding transmission schemes, implementation of 3 nos. of 220 kV line bays for interconnection of M/s Furies Solren and M/s SJVN Green Energy were taken up.

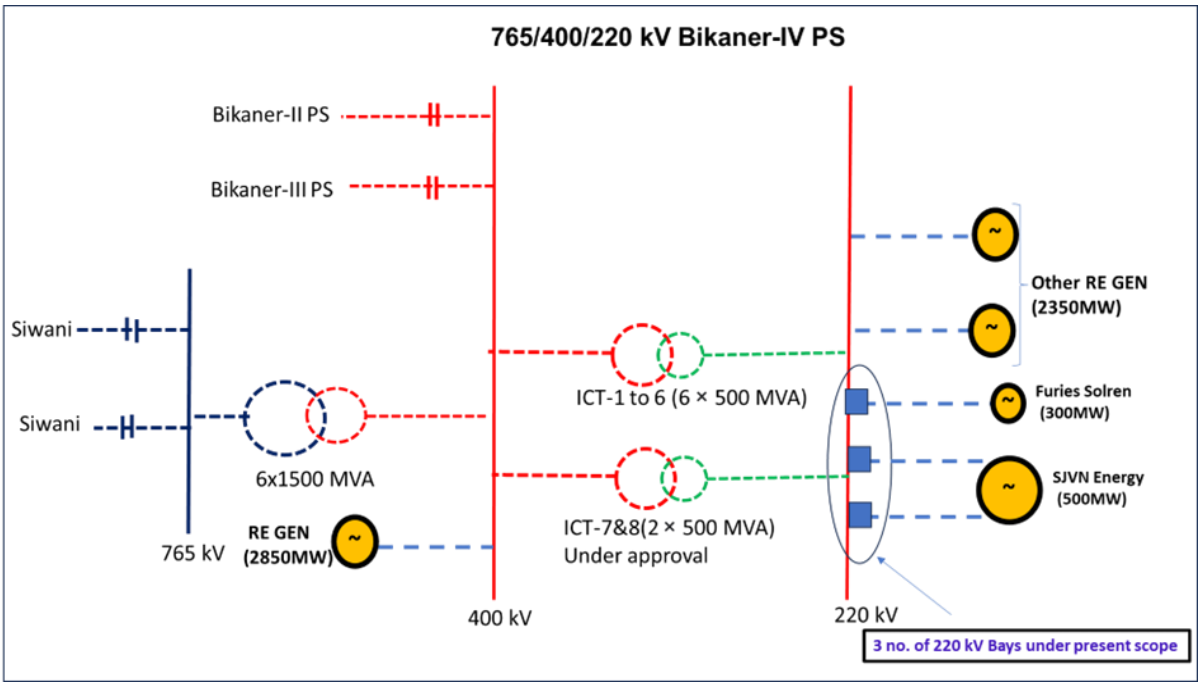



*Figure 4-6: Schematic of 765/400/220 kV Bikaner-IV PS*

The scheme is under implementation with following details:

**Project Name** - Implementation of 3 nos. of 220 kV line bays for interconnection of M/s Furies Solren Private Limited (300MW) [1 no. bay] & M/s SJVN Green Energy Limited (500MW) [2 no. bays] RE power projects at 765/400/220kV Bikaner-IV PS

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of the Transmission Scheme | Capacity/km |
|---|---|---|
| 1 | 3 nos. of 220 kV line bays at 765/400/220 kV Bikaner-IV PS (1 no. for M/s Furies Solren Private Limited (300MW) & 2 nos. for M/s SJVN Green Energy Limited (500MW)) for interconnection of its RE power projects | • 220 kV Line bay- 3 nos. |

**Implementation Timeframe:** 11.11.2026

**Total Estimated Cost: 18.54 Cr.**

**(G) <u>Implementation of 1 no. of 220 kV line bay at 765/400/220kV Barmer-I PS for interconnection of M/s Anboto Solar Private Limited (250MW+50MW) RE power projects</u>**

In 31st CMETS-NR held on 27.06.2024, connectivity application of M/s Anboto Solar was agreed for grant through 1 no. of 220kV line bay at Barmer-I PS with bay implementation at Barmer-I PS end under ISTS scope.

Considering matching implementation timeframe of RE generator and corresponding transmission schemes, implementation of 1 no. of 220 kV line bay for interconnection of M/s Anboto Solar at Barmer-I PS was taken up.

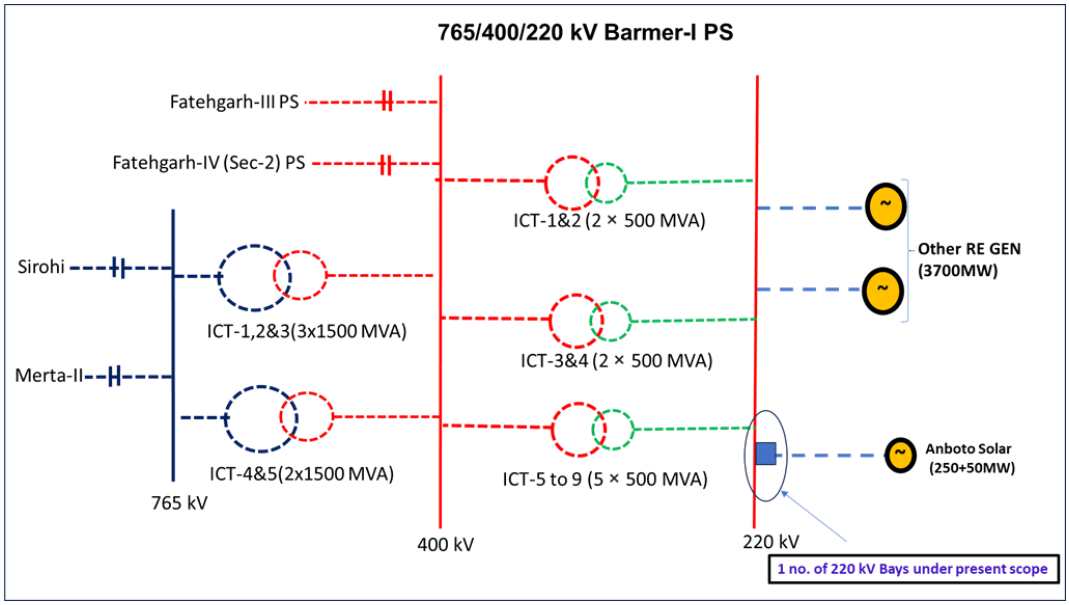



*Figure 4-7: Schematic of 765/400/220 kV Barmer-I PS*

The scheme is under implementation with following details:

**Project Name** - Implementation of 1 no. of 220 kV line bay at 765/400/220kV Barmer-I PS for interconnection of M/s Anboto Solar Private Limited (250MW+50MW) RE power projects

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of the Transmission Scheme | Capacity/km |
|---|---|---|
| 1 | 1 no. of 220 kV line bay for interconnection of M/s Anboto Solar Private Limited (250MW+50MW) RE power projects at 765/400/220kV Barmer-I PS | • 220 kV Line bay- 1 no. |

**Implementation Timeframe:** 07.11.2026

**Total Estimated Cost: 6.18 Cr.**

## (H) Implementation of 1 no. 220kV line bay for interconnection of M/s Rajasthan BESS Private Limited (250MW) BESS Project at 765/400/220kV Bhadla-III PS

In 39th CMETS-NR held on 28.07.2025, connectivity application of M/s Rajasthan BESS was agreed for grant through 1 no. of 220kV line bay at Bhadla-III PS with bay implementation at Bhadla-III PS end under ISTS scope.

Considering matching implementation timeframe of RE generator and corresponding transmission schemes, implementation of 1 no. of 220 kV line bay for interconnection of M/s Rajasthan BESS at Bhadla-III PS was taken up.

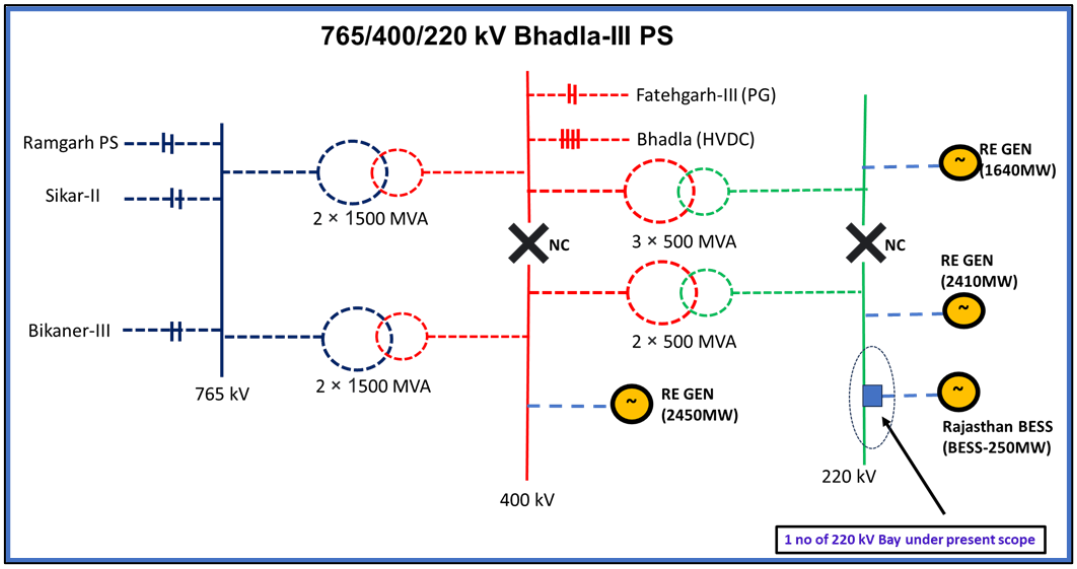



*Figure 4-8: Schematic of 765/400/220 kV Bhadla-III PS*

The scheme is under implementation with following details:

**Project Name** - Implementation of 1 no. 220kV line bay for interconnection of M/s Rajasthan BESS Private Limited (250MW) BESS Project at 765/400/220kV Bhadla-III PS

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of the Transmission Scheme | Capacity/km |
|---|---|---|
| 1 | 1 No. of 220 kV line bay for interconnection of M/s Rajasthan BESS Private Limited (250MW) RE power projects at 765/400/220 kV Bhadla-III PS | • 220 kV Line bay- 1 no. |

**Implementation Timeframe:** 18 months from date of allocation

**Total Estimated Cost: 6.18 Cr.**

## (I) Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-5 :6 GW) [Barmer Complex] Barmer-II: 6GW (Solar)

Renewable Energy Zones (REZs) were identified by MNRE/SECI with a total capacity of 75 GW REZs in Rajasthan (comprising of 15 GW Wind and 60 GW Solar) of which 13GW was planned at Fatehgarh (5GW) & Barmer (8GW) complex.

In the joint study meeting held on 28.12.2023 & 09.01.2024, CTU stated that as per committee report Barmer-II PS was planned for 6GW RE potential (2GW BESS capacity) with 4GW evacuation capacity. In 27th CMETS-NR meeting held on 10.01.2024, SECI informed that at present there is no clear visibility for RE projects with BESS before 2027 as award process will take time (1-2 years). In view of that, 7.5 GW RE potential (solar) remains untapped due to non-materialisation of BESS capacity (Fatehgarh-IV:4GW+Barmer-I: 1.5GW+Barmer-II: 2GW). Accordingly, it was suggested that 2 GW additional RE potential may be considered for planning of transmission scheme from Barmer- II PS.

Considering receipt of connectivity application in Barmer complex, Transmission scheme for evacuation of power as part of Rajasthan REZ Ph-IV (Part-5: 6GW) (Barmer Complex) was agreed in 36th CMETS-NR & 35th CMETS-WR meeting held on 15.01.2025 & 30.01.2025 respectively. The transmission scheme was discussed and agreed in the special WRPC meeting held on 13.03.2025 & 53rd TCC/78th NRPC meeting held on 16th - 17th Mar'25. Further this scheme was discussed in 29th ,30th & 32nd NCT meeting held on 17.04.2025, 30.05.2025 & 12.08.2025 respectively and agreed (LCC Configuration) in 30th NCT meeting.

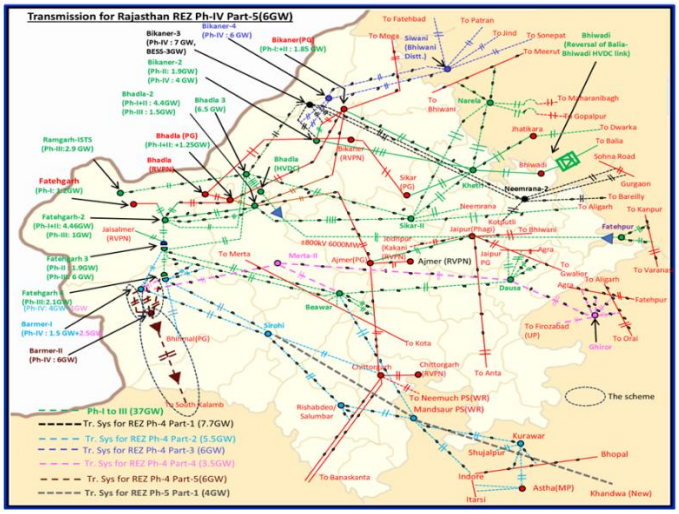



*Figure 4-9: Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-5 :6 GW) [Barmer Complex] Barmer-II: 6GW (Solar)*

The scheme is under implementation with following details:

**Project Name** - Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-5 :6 GW) [Barmer Complex] Barmer-II: 6GW (Solar)

**Detailed scope of the scheme is given below: (LCC Configuration)**

| Sl. No. | Description of Transmission Element | Scope of work<br><br>(Type of Substation/Conductor capacity/km/no. of bays etc.) |
|---|---|---|
| 1 | Establishment of 400/220kV, 6x500MVA S/s at suitable location near Barmer (Barmer-II Substation) along with 2x125 MVAr bus reactor<br><br>**<u>Future provisions (excl. scope of present scheme):</u>**<br>➢ 400 kV line bays along with switchable line reactor –6<br>➢ 400 kV line bays –4 nos.<br>➢ 400 kV Bus Reactor along with bays: 1 no.<br>➢ 400/220 kV ICT along with bays-4 Nos.<br>➢ 400 kV Sectionalization bays: 2 sets<br>➢ 220 kV line bays for connectivity of RE Applications -5 Nos.<br>➢ 220kV Sectionalization bay: 2 sets<br>➢ 220 kV BC (2 Nos.) & TBC (2 Nos.)<br>➢ 2 nos. of Syncon units* at 400kV level along with 2 nos. of 400kV bays<br>➢ STATCOM (2x±300 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR) along with 400 kV bays (2 Nos.)<br><br>*(1 No. of SynCon unit comprises dynamic support of +300 MVAr/ -200 MVAr (Minimum) & Short circuit contribution at PCC of 1200 MVA (Minimum)) (Value of inertia (MW-secs) shall be provided in RfP document)** | Barmer-II PS - AIS<br><br>• 400/220 kV 500 MVA ICTs- 6 nos.<br>• 400 kV ICT bays- 6 no.<br>• 220 kV ICT bays- 6 no.<br>• 125 MVAr Bus Reactor-2 nos.<br>• 400 kV Bus reactor bays- 2 no.<br>• 400kv line bays– 4 nos. (for RE interconnection)<br>• 220KV line bays – 7 nos. (for RE connectivity)<br>• 220kV Sectionalization bay: 1 set<br>• 220 kV BC (2 Nos.) & TBC (2 Nos.)<br>• 400 kV sectionaliser bay- 1 Set |
| 2 | LILO of both ckts of 400kV Fatehgarh-IV PS - Barmer-I PS at Barmer-II PS | Line Length ~ 10 km (LILO length ~ 10 km) |

| Sl. No. | Description of Transmission Element | Scope of work<br><br>(Type of Substation/Conductor capacity/km/no. of bays etc.) |
|---|---|---|
| | | • 400 kV line bays-4 nos. (at Barmer-II PS end) |
| 3 | 400kV Barmer-II PS - Barmer-I PS D/c line (Quad) | Line Length – (~30 km)<br>• 400 kV line bays at Barmer-II PS – 2 nos.<br>• 400 kV line bays at Barmer-I PS S/s – 2 nos. |
| 4 | Establishment of 6000 MW, ± 800 kV Barmer-II (HVDC) [LCC] terminal station (4x1500 MW) at a suitable location near Barmer-II substation | HVDC terminal station (± 800 kV, 3000 MW (Bipole configuration)- 2nos.)<br>➢ 400/33 kV, 2x50 MVA transformers for exclusively supplying auxiliary power to HVDC terminal. |
| 5 | Establishment of 6000MW, ± 800kV South Kalamb S/s (HVDC) [LCC] terminal station (4x1500 MW) at a suitable location near South of Kalamb | HVDC terminal station (± 800 kV, 3000 MW (Bipole configuration)- 2nos.) |
| 6 | ±800 kV HVDC Bipole line (Hexa lapwing) between Barmer-II (HVDC) & South Kalamb (HVDC) (with parallel Dedicated Metallic Return) (capable to evacuate 6000MW) [with 100% reverse power capability] | Line Length – (~900 km) |
| 7 | Augmentation of South Kalamb S/s# by 4x1500 MVA, 765/400 kV ICTs (3 on 400 kV & 765 kV Section-II & 1 No. on 400 kV & 765 kV Section-I) along with 2x330 MVAR, 765 kV bus reactor & 2x125 MVAR, 420 kV bus reactor on Section-II. The Section-II will be established under a different network expansion scheme in WR as per details given below*<br><br>(2x1500 MW HVDC Bipole-I to be terminated on 400 kV Sec-I & 2x1500 MW HVDC Bipole-II to be terminated on 400 kV Sec-II of South Kalamb S/s & 765 kV bus sectionalizer to be kept normally | • 765/400 kV 1500 MVA ICTs- 4 nos.<br>• 765 kV ICT bays- 4 no.<br>• 400 kV ICT bays- 4 no<br>• 330 MVAr Bus Reactor-2 nos. (at bus section-II)<br>• 765 kV Bus reactor bays- 2 nos. (at bus section-II)<br>• 125 MVAr Bus Reactor-2 nos. (at bus section-II)<br>• 400 kV Bus reactor bays- 2 nos. (at bus section-II) |

| Sl. No. | Description of Transmission Element | Scope of work<br><br>(Type of Substation/Conductor capacity/km/no. of bays etc.) |
|---|---|---|
| | closed & 400 kV bus sectionalizer to be kept normally open) | |
| 8 | 2 nos. of Syncon* units at 400kV level of Barmer-II PS<br><br>(1 no. of SynCon unit comprises dynamic support of +300MVAr/-150MVAr (Minimum) & Short circuit contribution at PCC of 1200MVA (Minimum)<br><br>**** Value of inertia constant (H) shall be provided in RfP document.*** | • Syncon units – 2 nos.<br>• 400kv line bays – 2nos. |

*#South Kalamb S/s establishment with 2x1500 MVA, 765/400 kV ICTs with 2x330 MVAR, 765 kV bus reactor and 2x125 MVAR, 420 kV bus reactor alongwith LILO of Pune-III – Boisar-II 765 kV D/c line (presently under bidding stage).*

** Network Expansion Scheme: Creation of New 765 kV & 400 kV Bus Sections-II & III through 765 kV Sectionalization bay: 2 sets & 400 kV Sectionalization bay: 2 sets alongwith 2x330 MVAR, 765 kV bus reactor & 2x125 MVAR, 420 kV bus reactor on Section-III is being proposed along with ICT augmentation (3x1500 MVA, 765/400 kV ICTs) at Bus Section -III at both 765 kV & 400 kV levels alongwith downstream 400 kV lines at bus section-III from South Kalamb S/s with implementation Timeframe of 24 months from effective date. [400 kV Sectionaliser between Sections-I & II & between sections-II & III to be normally open. Further, 765 kV sectionaliser between Sections-I & II & between II & III shall be kept normally closed. The 400 kV sectionalisers can be closed under contingency conditions.].*

*** The above is as per discussions with OEMs and the under-excitation limit is as considered by the committee formed under Chairmanship of Member Secretary, NRPC along with members from CEA, NLDC, NRLDC, NTPC, BHEL, CTU and STUs to do futuristic analysis for requirement of Synchronous Condensers based on the inertia considerations for Northern Region*

**Implementation Timeframe:** 54 months from allocation of project (Pole-1: 48 months, Pole-2: 54 months)

**Total Estimated Cost: 24951.28 Cr.**

### 4.4.2 Jammu and Kashmir

**(A) <u>Augmentation of Transformation Capacity at 400/220kV New Wanpoh (PG) S/s in Jammu & Kashmir by 400/220kV, 1x315MVA (3x105MVA) ICT (3rd)</u>**

As per CTU OM dated 22.03.2024, CTU awarded the implementation of the transmission scheme "Augmentation of Transmission Capacity at 400/220kV New Wanpoh (PG) S/s in Jammu and Kashmir by 400/220kV, 1x315 MVA ICT(3rd)" to the implementing agency "Power Grid Corporation of India Ltd." with implementation timeline of 31.12.2025.

POWERGRID vide letter dated 24.12.2024 informed that several challenges are being faced in awarding the contract execution of substation extension work at New Wanpoh Substation with a completion schedule of 21 months i.e., Dec'25 based on CTUIL OM dated 22.03.2024.

POWERGRID also stated in 36th CMETS-NR held on 15.01.2025 that they would require at least 30 months (24 months for supply and 6 months for execution) from revised OM date.

Considering the above, the proposal to implement 400/220kV, 1x315 MVA ICT (3rd) (3x105MVA single phase units) at New Wanpoh (PG) S/s under ISTS was agreed in 38th CMETS-NR meeting held on 28.05.2025.

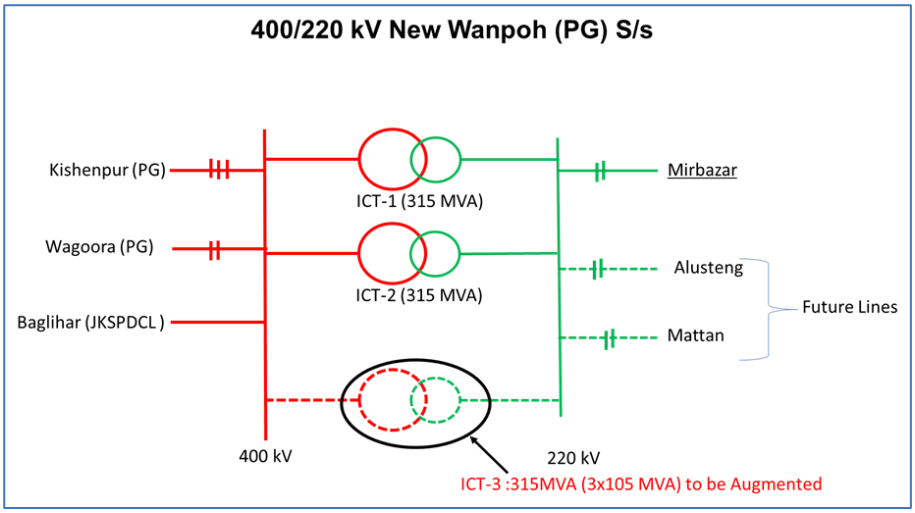



*Figure 4-9: Schematic of 400/220 kV New Wanpoh (PG) S/s*

The scheme is under implementation with following details:

**Project Name** - Augmentation of Transformation Capacity at 400/220kV New Wanpoh (PG) S/s in Jammu & Kashmir by 400/220kV, 1x315MVA (3x105MVA) ICT (3rd)

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of the Transmission Scheme | Capacity/km |
|---|---|---|
| 1 | Augmentation of Transformation Capacity at 400/220 kV New Wanpoh (PG) S/s in Jammu & Kashmir by 400/220kV, 1x315 MVA ICT (3rd) (3x105 MVA single phase units) along with associated transformer bays. | • 315 MVA, 400/220 kV ICT (3x105 MVA single phase units)- 1 No<br>• 400 kV ICT bay (AIS) – 1 No. (in existing dia)<br>• 220 kV ICT bay (AIS) – 1 No. |

**Implementation Timeframe:** 30.06.2027

**Total Estimated Cost: 61 Cr.**

### 4.4.3 Delhi

**(A) <u>Augmentation of transformation capacity at 400/220kV Maharani Bagh (PG) S/s (GIS) in Delhi by 1x500 MVA, 400/220kV ICT (5th)</u>**

The proposal was deliberated in the 34th CMETS-NR meeting held on 20.09.2024. As part of Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part D, 765kV Sikar-II-Narela D/c line is under implementation. Further, as part of Rajasthan Phase-II Part-G and G1 scheme, 765/400kV Narela along with 400kV Narela-Maharani Bagh 2xD/c is being implemented. Further, 1 D/c out of 2xD/c 400kV Narela-Maharani Bagh was proposed to be LILOed at Gopalpur (DTL) S/s. But, since Gopalpur S/s is not even yet awarded by DTL and may be available by 2027-28, loadings on 400/220kV ICTs at Maharani Bagh may further increase (through interconnection of 400kV Narela-Maharani Bagh 2xD/c lines) with commissioning of Rajasthan Ph-II & Ph-III schemes which may impact RE evacuation.

Further, a Joint Site Visit on 24.10.2024 was conducted to assess the feasibility of installing the 400/220kV, 5th ICT along with associated bay equipment at Maharani Bagh (PG) S/s. Accordingly, detailed scope of ICT augmentation was finalized.

Considering growing demand of Delhi (incl. additional load to be fed by Maharani Bagh S/s in 2027 Timeframe) and delay in implementation of 400/220kV Gopalpur S/s by DTL, proposal for 400/220kV ICT augmentation at Maharani Bagh (PG) S/s was agreed in 34th CMETS-NR.

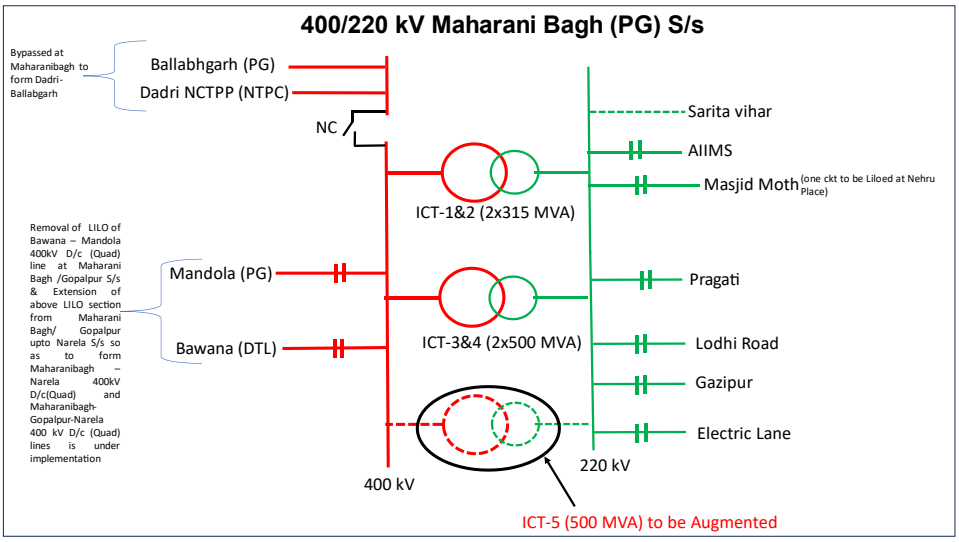



*Figure 4-10: Schematic of 400/220 kV Maharani Bagh (PG) S/s*

The scheme is under implementation with following details:

**Project Name** - Augmentation of transformation capacity at 400/220kV Maharani Bagh (PG) S/s (GIS) in Delhi by 1x500 MVA, 400/220kV ICT (5th)

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of the Transmission Scheme | Capacity/km |
|---|---|---|
| 1 | Augmentation of transformation capacity at 400/220kV Maharani Bagh (PG) S/s (GIS) by 1x500 MVA, 400/220kV ICT (5th) along with associated bays | • 500 MVA, 400/220 kV ICT– 1 No.<br>• 400 kV ICT bay (GIS) – 1 No.<br>• 220 kV ICT bay (GIS) – 1 No.<br>• 400kV GIB Duct (1-Ph) – 225 m (approx.)<br>• 220kV GIB Duct (1-Ph) – 100 m (approx.)<br>• 400kV Air Bushing for connecting GIS to AIS – 3 Nos.<br>• 220kV Air Bushing for connecting GIS to AIS – 3 Nos.<br>• 220kV XLPE Cable – 300 m<br>• Cable Termination Kit – 2 Nos.<br>• Store, Drains, Boundary wall and spare ICT foundation and other associated civil works - 1 No. |

**Implementation Timeframe:** 24 months from the date of allocation

**Total Estimated Cost: 77.59 Cr.**

## (B) Implementation of 1 no. 400kV ICT bay along with 400kV Sectionalization bay (GIS) at 765/400kV Jhatikara (PG) S/s

In 224th OCC meeting held on 18.10.2024, power-flow congestion to Delhi Ring Main unit through 400 kV Switchyard at 765/400KV Jhatikara substation was deliberated and further also deliberated in the 36th CMETS-NR meeting held on 15.01.2025. In the meeting, POWERGRID stated that 400 kV Bus at Jhatikara is sectionalised in 2 nos. sections (Section-1 feeds load to Bamnauli/Dwarka S/s through 765/400 kV ICT-1&2, whereas Section-2 feeds load to Mundka S/s through 765/400 kV ICT-3&4).

Further, in 225th OCC meeting held on 12.11.2024, CTU informed that various options were explored to resolve the critical loading issue in tie-bay of section-2 i.e. upgradation of existing tie bay, implementation of new tie bay as part of new diameter, direct coupling of both 400kV sections etc. Based on short term and long-term requirement of Delhi region as well as implementation Timeframe for various options, it was decided by that a new tie bay (in new diameter) is to be implemented in section-2 as part of short-term solution with implementation Timeframe of 6 months. The above diameter will also be utilized for termination of 765/400kV ICT-6 (3rd in section-2) to cater growing demand of Delhi.

Considering above deliberations, implementation of 1 no. 400kV bay (Main+Tie) (2 Breaker) (in Mundka section) & 400kV Sectionalization bay (1 set) at 765/400kV Jhatikara (PG) S/s was agreed in 36th CMETS-NR.

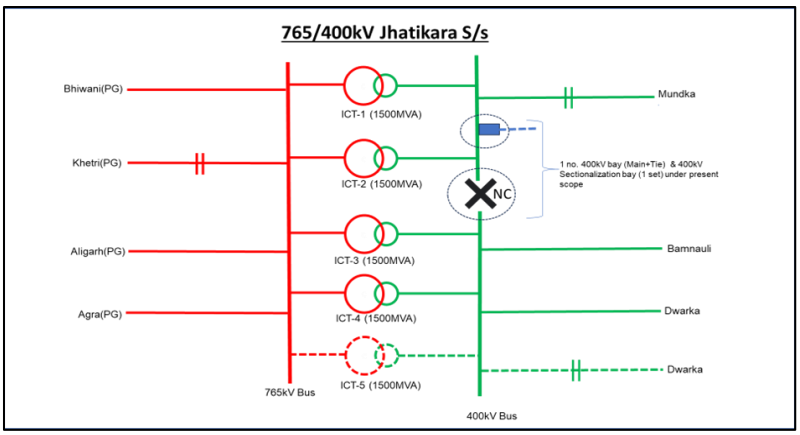



*Figure 4-11: Schematic of 765/400 kV Jhatikara (PG) S/s*

The scheme is under implementation with following details:

**Project Name** - Implementation of 1 no. 400kV ICT bay along with 400kV Sectionalization bay (GIS) at 765/400kV Jhatikara (PG) S/s

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of the Transmission Scheme | Capacity/km | Implementation Timeframe |
|---|---|---|---|
| 1 | Implementation of 1 No. 400kV ICT Bay at 400kV Mundka Section to mitigate power flow congestion at Delhi Ring Main unit through 400 kV Switchyard at 765/400kV Jhatikra substation | • 400kV ICT Bay (along with associated Tie Bay) – 1 no. (at 400kV Mundka section)<br>• 400kV Bus Extension works | 9 months from the date of issuance of OM by CTUIL i.e. 05-Feb-2026 |
| 2 | 400kV Sectionalization bay (GIS) at 765/400kV Jhatikara (PG) S/s to interconnect both 400kV sections in the event of contingency | • 400kV Sectionalization Bay (GIS) - 1 set<br>• 400kV GIB Duct (1-Ph) – 840 m (approx.) along with associated 400kV Air Bushing for connecting GIS to AIS | 18 months from the date of issuance of OM by CTUIL i.e. 05-Nov-2026 |

**Implementation Timeframe:** As mentioned above in Detailed scope of scheme

**Total Estimated Cost: 51.88 Cr.**

### 4.4.4 Uttar Pradesh

**(A) <u>Augmentation of transformation capacity at 400/220kV Lucknow (PG) S/s in Uttar Pradesh</u>**

In 50th TCC & 74th NRPC meeting held on 28-29th June 2024, it was deliberated that N-1 non-compliance issue is being observed in 400/220kV Lucknow (PG) ICT which was further deliberated in 34th CMETS-NR meeting held on 20.09.2024. In the meeting it was informed that, for 400/220kV Lucknow (PG) ICT augmentation, confirmation from UPPTCL to be provided as Mohanlalganj is also commissioned near Lucknow. In 221st OCC meeting held 19.07.2024, POWERGRID apprised forum that 400/220kV Lucknow (PG) ICT are not complying N-1 contingency criteria under the peak loading scenario. UPPTCL vide letter dated 30.08.2024 stated that, load flow study was done on various Substations in UP and accordingly additional 500 MVA ICT would be required at Lucknow PG S/s.

Considering above deliberations, including UPPTCL request for augmentation, proposal for 400/220kV ICT augmentation at Lucknow (PG) S/s was agreed in 34th CMETS-NR for N-1 compliance as well as to meet UPPTCL future drawl requirement.

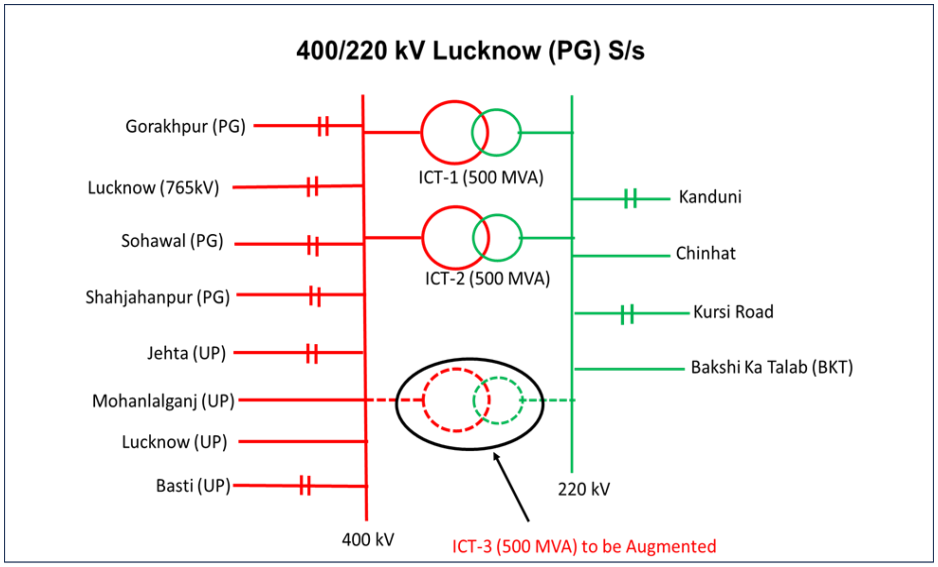



*Figure 4-12: Schematic of 400/220 kV Lucknow (PG) S/s*

The scheme is under implementation with following details:

**Project Name** - Augmentation of transformation capacity at 400/220kV Lucknow (PG) S/s in Uttar Pradesh

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of the Transmission Scheme | Capacity/km |
|---|---|---|
| 1 | Augmentation of transformation capacity at 400/220kV Lucknow (PG) S/s by 1x500 MVA, 400/220kV ICT (3rd) along with associated bays | • 500 MVA, 400/220 kV ICT- 1 no.<br>• 400 kV ICT bay (including associated tie bay) (Outdoor GIS) - 1 No.<br>• 220 kV ICT bay (AIS) - 1 no.<br>• 220kV Bus extension works for 2 nos. future bays - 1 Set<br>• 400kV Bus extension with GIB Duct - 1100 m (approx.)<br>• Interconnection from 220kV Bay to 220kV ICT side through Duct (245kV GIB Duct) – 300 m (approx.)<br>• Associated 400kV & 220kV interconnection works (420kV SF6/Air bushing for Bus extension through GIS Duct & ICT interconnection and 245KV SF6/Air bushing for ICT interconnection) |

**Implementation Timeframe:** 24 months from the date of allocation

**Total Estimated Cost: 87.10 Cr.**

# Chapter 5: Western Region

Due to geographical location, Western Region is connected to Northern, Southern and Eastern Regions through 765/400kV high-capacity corridors along with Back-to-Back HVDCs and Bi-Pole HVDC links. The thermal generating stations of Western Regions are predominantly concentrated in the coal rich states of Chhattisgarh, Eastern part of Maharashtra and Madhya Pradesh. Further, Gujarat, Maharashtra and Madhya Pradesh are RE rich states comprising of Solar & Wind capacity. Western part of Maharashtra, southern Gujarat and DD & DNH have high demand and less internal generation. Accordingly, power flows from Chhattisgarh/ Eastern Maharashtra through high-capacity corridors to Western part of Maharashtra, Southern Gujarat, DD & DNH. Based on the generation availability and demand, Western Region imports power from NR & exports to ER during high RE scenarios whereas it exports power to NR & SR during evening peak and night off peak load.

## 5.1 Power Supply Scenario as on Jul'25

As on Jul'25, total Installed Capacity (IC) of Western Region was about 165GW which constitute capacity from fossil sources (51.18% share) & balance (48.82% share) from non-fossil sources comprising of nuclear, renewable generation capacity including hydro and the peak demand met was about 80.1 GW. The share from non-fossil sources would further increase in future considering India's vision of generating 500 GW of non-fossil generation capacity by 2030. At present, there is no shortage of power supply in meeting these demands. State-wise breakup is summarised in **Table 5-1.**

*Table 5-1:WR Installed Capacity and Demand met as of July'25*

*(All Fig in GW)*

| State | Generation | | | | | | | Grand Total | Peak Demand Met |
|---|---|---|---|---|---|---|---|---|---|
| | Fossil | | | Non-Fossil | | | | | |
| | Thermal | Gas | Total | Nuclear | Hydro | RES | Total | | |
| **Gujarat** | 18.6 | 5.6 | 24.2 | 1.0 | 0.9 | 36.2 | 38.1 | **62.4** | 26.5 |
| **MP** | 15.1 | 0.3 | 15.5 | 0.5 | 3.2 | 9.2 | 12.9 | **28.3** | 14.5 |
| **Maharashtra** | 24.7 | 3.1 | 27.8 | 1.1 | 3.3 | 22.1 | 26.5 | **54.3** | 30.7 |
| **Chhattisgarh** | 12.6 | 0.0 | 12.6 | 0.1 | 0.3 | 1.9 | 2.3 | **14.9** | 6.8 |
| **UT of DD & DNH** | 0.6 | 0.1 | 0.7 | 0.0 | 0.0 | 0.1 | 0.1 | **0.8** | 1.4 |
| **Goa** | 0.5 | 0.0 | 0.5 | 0.0 | 0.0 | 0.1 | 0.1 | **0.6** | 0.9 |
| **Central unallocated** | 2.8 | 0.2 | 3.0 | 0.4 | 0.0 | 0.0 | 0.4 | **3.5** | 0.0 |
| **WR** | **75.0** | **9.4** | **84.4** | **3.2** | **7.7** | **69.5** | **80.5** | **164.9** | **80.1** |

*Source: CEA Monthly Report*

## 5.2 Envisaged Power Supply Scenario by 2030-31

As per the 20th EPS, Western Region demand for 2030-31 timeframe is expected to increase to about 123.4 GW. The Installed capacity of Western Region is expected to be about 328GW. The state wise bifurcation of the same is given at **Table 5-2.**

*Table 5-2: WR Installed Capacity and Peak Demand (2030-31)*

*(All Fig in GW)*

| State | Generation | | | | | | | | | Peak Demand |
|---|---|---|---|---|---|---|---|---|---|---|
| | Fossil | | | Non-Fossil | | | | ESS | Grand Total | |
| | Thermal | Gas | Total | Nuclear | Hydro | RES | Total | | | |
| **Gujarat** | 7.8 | 2.8 | 10.6 | 0.0 | 0.3 | 33.3 | 33.6 | 0.2 | **44.5** | 35.1 |
| **MP** | 6.9 | 0.0 | 6.9 | 0.0 | 3.1 | 4.2 | 7.3 | 0.0 | **14.2** | 26.5 |
| **Maharashtra** | 19.5 | 1.2 | 20.7 | 0.0 | 2.5 | 50.0 | 52.5 | 4.4 | **77.7** | 55.8 |
| **Chhattisgarh** | 3.7 | 0.0 | 3.7 | 0.0 | 0.1 | 0.2 | 0.4 | 0.0 | **4.0** | 9.2 |
| **DD** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **0.0** | 0.6 |
| **DNH** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **0.0** | 1.6 |
| **Goa** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **0.0** | 1.1 |
| **Central** | 24.4 | 3.3 | 27.7 | 3.2 | 0.0 | 102.5 | 105.8 | 11.4 | **144.9** | - |
| **IPP** | 40.0 | 2.8 | 42.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **42.8** | - |
| **WR** | **102.3** | **10.1** | **112.4** | **3.2** | **6.1** | **190.2** | **199.5** | **16.0** | **328.0** | **123.4** |

There is growth of around 43.3 GW in the peak demand of Western Region from present Timeframe to 2030-31. The state wise growth in demand for 2030-31 from present Timeframe is tabulated below at **Table 5-3:**

*Table 5-3: Increase in Peak Demand of Various States of WR*

*(All Fig in MW)*

| Peak Demand | | | | |
|---|---|---|---|---|
| **State** | **Present (MW)** | **20th EPS/Demand projected by States (MW)** | **Increase in demand (MW)** | ***CAGR*** |
| | **2024-25 (Till July'2025)** | **2029-30** | | |
| **Gujarat** | 26457 | 35137 | 8680 | 5.8% |
| **MP** | 14486 | 26534 | 12048 | 12.9% |
| **Maharashtra** | 30659 | 55773 | 25114 | 12.7% |
| **Chhattisgarh** | 6819 | 9248 | 2429 | 6.3% |
| **UT of DD & DNH** | 1411 | 2172 | 761 | 9.0% |
| **Goa** | 864 | 1086 | 222 | 4.7% |
| **WR** | **80052** | **123381** | **43329** | **9.0%** |

From the above data it is observed that the CAGR growth of peak demand is maximum for Madhya Pradesh (12.9%) and minimum for Goa (4.7%). The CAGR of demand of WR is about 9.0% which is more than the National Average of 7.7 %.

In addition to above, bulk power demand of about 20GW has been considered which consist of 9.2 GW from various upcoming green hydrogen/ green ammonia identified by MNRE & 10.7 GW bulk consumers/distribution licensees who have been granted GNA under GNA Regulations, 2022 is proposed to be directly connected to ISTS.

### 5.3 Load Generation Balance for 2030-31 Timeframe

In Chapter 3, All India Load Generation Balance (LGB) for identified nine scenarios was prepared as per the methodology finalized in consultation with CTU, CEA and GRID INDIA. This section elaborates the Western Region Load Generation Balance (LGB) for 2030-31 Timeframe. For Western Region also, three points on the daily load curve i.e. Solar max (afternoon), Peak load (evening) and Off-peak load (night) for three seasons viz. Monsoon (August), Summer (June) and Winter (February) have been considered.

Load generation balance has been prepared considering the generation despatch factors as mentioned at **Table 5-4** for the 9 scenarios. Further, thermal generators have been despatched as per the merit order.

*Table 5-4: Western Region Generation Dispatch and Demand Factors*

| Scenario No & Name | Generation Dispatch Factors | | | | | | Demand Factors |
|---|---|---|---|---|---|---|---|
| | Hydro | Nuclear | Solar | Wind | ESS | Gas | |
| 1-Aug Solar Max | 40% | 80% | 75% | 50% | -100% | 0% | 77% |
| 2-Aug Peak Load | 70% | 80% | 0% | 75% | 60% | 50% | 80% |
| 3-Aug Night Off Peak | 40% | 80% | 0% | 65% | 40% | 50% | 55% |
| 4-Jun Solar Max | 40% | 80% | 85% | 50% | -100% | 0% | 84% |
| 5-Jun Peak Load | 70% | 80% | 0% | 75% | 50% | 50% | 81% |
| 6-Jun Night Off Peak | 40% | 80% | 0% | 65% | 0% | 50% | 79% |
| 7-Feb Solar Max | 20% | 80% | 90% | 10% | -100% | 0% | 90% |
| 8-Feb Peak Load | 40% | 80% | 0% | 20% | 100% | 50% | 86% |
| 9-Feb Night Off Peak | 20% | 80% | 0% | 20% | 40% | 30% | 67% |

The despatch from thermal generations have been done considering merit order despatch.

Considering the above LGB for nine scenarios, load flow cases were prepared for 2030-31 Timeframe (till Jul'2025).

### 5.4 ISTS Network schemes evolved from Feb'25 to Jul'25

Various transmission systems have been planned and deliberated for implementation in the Consultation Meetings for Evolving Transmission Schemes in Western Region (CMETS-WR) and joint study meetings held from Feb'25 to Jul'25 including WR-ER Inter-Regional Network Expansion Scheme which will relieve critical overloading observed on WR-ER corridors & also facilitate evacuation of power from upcoming thermal generation projects in Chhattisgarh.

These schemes are at various stages of implementation/bidding/approval. The details of the schemes have been summarized below at **Table 5-5:**

*Table 5-5: Details of the schemes evolved in WR*

| Sl. No. | Name of Scheme | Time frame | Type of Scheme* | Quantum (MW) | Tentative cost (in Crores) |
|---|---|---|---|---|---|
| **Gujarat** | | | | | |
| **1.** | Addition of 1 x 500 MVA ICT along with 400 kV & 220 kV bays at Pirana (PG) S/s | 2027-28 | SS | 0 | 50 |
| **Maharashtra** | | | | | |
| **1.** | Augmentation of Transformation capacity at Navi Mumbai (GIS) (PG) S/s in Maharashtra by 400/220 kV, 1x500 MVA (3rd) ICT | 2027-28 | SS | 0 | 63.75 |
| **2.** | Network Expansion Scheme for drawal of power at South Kalamb S/s | 2028-29 | RE | 0 | 917 |
| **3.** | Transmission system for providing connectivity to PSPs up to 4500MW in Satara Area | 2028-29 | RE | 4500 | 3777.56 |
| **4.** | Implementation of 1 no. 220kV bay at Dhule PS for Interconnection of 94MW Hybrid project of Adyant Enersol Private Limited (AEPL) | 2027-28 | RE | 0 | 6 |
| **5.** | ISTS Works associated with uprating existing conductors by High performance conductors by MSETCL in Talegaon area | 2027-28 | SS | 0 | 90 |
| **Madhya Pradesh** | | | | | |
| **1.** | Implementation of 1 no. 400kV bay at Ishanagar (New) S/s for Interconnection of 350MW Wind project of Avaada Energy Pvt. Ltd. (AEPL) | 2027-28 | RE | 650 | 13.98 |
| **Chhattisgarh** | | | | | |
| **1.** | Augmentation of Transformation capacity at Raipur (PG) S/s in Chhattisgarh by 400/220 kV, 1x500 MVA (4th) ICT | 2027-28 | SS | 0 | 63.40 |
| **2.** | Augmentation of Transformation Capacity at Champa PS for interconnection of Thermal Project of Korba Power Limited | 2027-28 | Conv. | 1320 | 169.72 |
| **3.** | ICT Augmentation at Dharamjaigarh S/s for providing connectivity to Thermal Project of Korba Power Limited (KPL) | 2028-29 | Conv | 1600 | 550 |
| | **Total** | - | **-** | **8070** | **5701.41** |

**RE – Renewable Energy; SS- System Strengthening; GH – Green Hydrogen; Conv – Conventional generators.*

The schemes are detailed in the following sections.

### 5.4.1 Gujarat

**A. Addition of 1 x 500 MVA ICT along with 400 kV & 220 kV bays at Pirana (PG) S/s:**

A meeting was held on 21.03.2025 and 26.03.2025 to discuss applications received for grant of Additional GNA Under Regulation 19.2 of GNA Regulations from STUs as well as GNA Transfer applications. While discussing the GNA application of GETCO, a prominent constraint point was observed at 400/220kV, 2x315MVA Pirana (PG) ICTs under N-1 contingency condition. For grant of 500MW additional GNA of GETCO starting from 01.01.2028, it was decided to implement 3rd 400/220kV, 1x500MVA ICT at Pirana (PG) S/s with timeline of 31.12.2027.

From load flow studies, it was observed that with the 3rd ICT, loading on Pirana – Bhat line becomes critical (more than 300MW under N-1). Regarding loading on downstream 220kV lines, it was decided that GETCO shall plan additional outlets / reconductoring / load trimming schemes, as may be required to limit N-1 overloading on Pirana – Bhat 220kV D/c line. In the 36th CMETS-WR meeting, it was informed that from the studies it was observed that the Pirana (PG) ICTs are seen to be breaching N-1 limits in 2027-28 timeframe, the ICT remains critical even in 2026-27 timeframe. Hence, it may be implemented as early as possible.

WRLDC informed that 2x315 MVA, 400/220 kV Pirana (PG) ICTs are emerging as one of the limiting constraints for drawl of power from ISTS by Gujarat. ICT constraint would be relieved with additional 1x500 MVA ICT. However, GETCO should also plan additional 220 kV transmission lines to draw more power from Pirana (PG) S/s. Hence, after deliberation the subject transmission scheme was agreed in 36th CMETS -WR held on 26.05.2025

**Detailed scope of work:**

| Sl. No. | Scope of the Transmission Scheme | Capacity /km |
|---|---|---|
| 1. | 400/220kV, 1x500MVA ICT (3rd) at Pirana (PG) S/s along with associated bays | • 400/220kV, 1x500MVA ICT-1 No.<br>• 400kV ICT bay –1 No.<br>• 220kV ICT bay –1 No. |

**Implementation Timeframe:** 21 Months from award to implementing agency

**Estimated Cost:** Rs. 50 Cr.

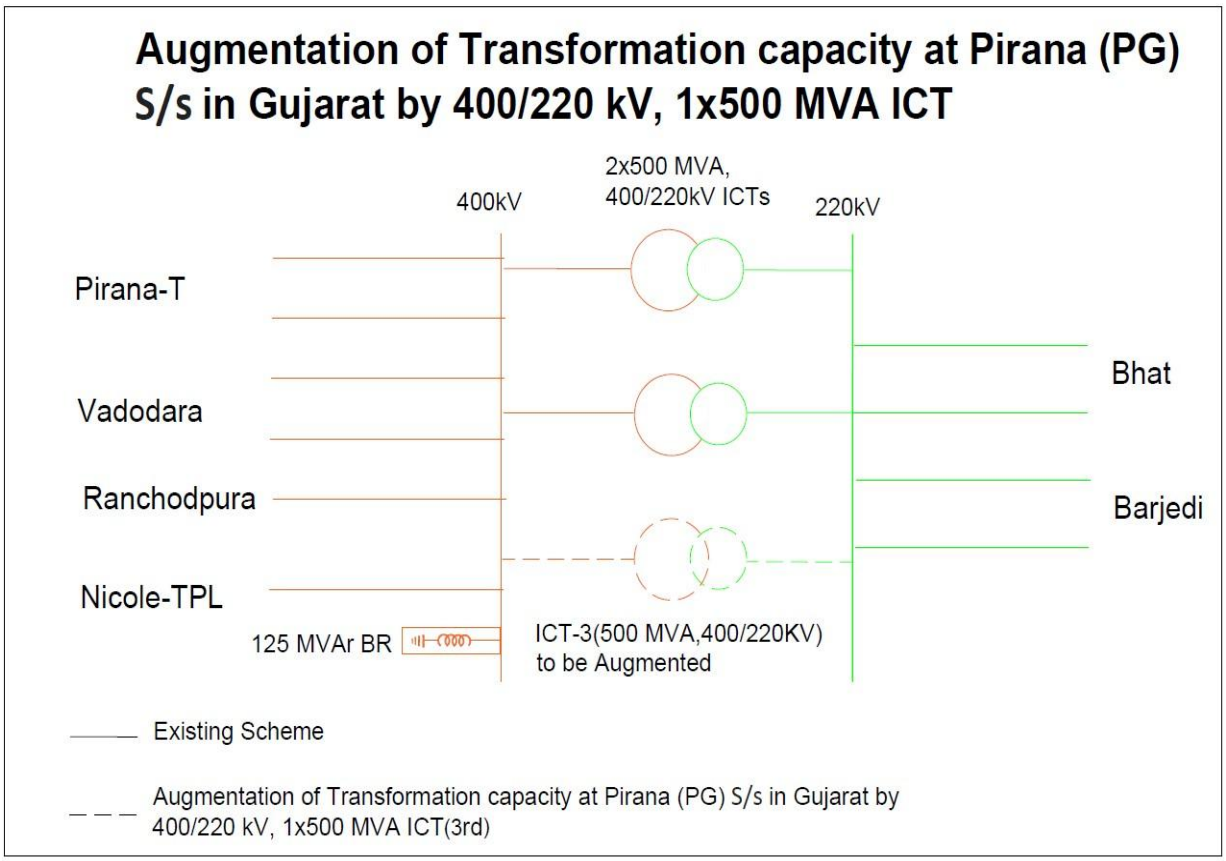



*Figure 5-1: Schematic of 400/220 kV Pirana (PG) S/s*

### 5.4.2 Maharashtra

**A. Augmentation of Transformation capacity at Navi Mumbai (GIS) (PG) S/s in Maharashtra by 400/220 kV, 1x500 MVA (3rd) ICT**

400/220kV Navi Mumbai (GIS) (PG) S/s is implemented by POWERGRID and presently under operation with 2x315 MVA, 400/220kV ICTs.

In general, it is observed that- majority of the time loading on each ICT is more than 60 - 75 % of their rated ICT capacity, except during the rainy season and off-peak hours. Keeping in view of high loading, there is requirement of augmentation of transformation capacity at Navi Mumbai (GIS) S/s by 1x500MVA, 400/220kV ICT (3rd) to cater to the high demand requirement on 220kV side of Navi Mumbai Sub-station and also for ensuring N-1 contingency compliance of 400/220kV ICTs at Navi Mumbai (GIS) S/s, as stipulated in the CEA Transmission Planning Criteria, 2023

Considering the above, the matter was deliberated in the 35th Consultation Meeting for Evolving Transmission Schemes (CMETS) in Western Region held on 07.02.2025, wherein, the "Augmentation of Transformation capacity at Navi Mumbai (GIS) (PG) S/s in Maharashtra by 400/220 kV, 1x500 MVA (3rd) ICT" scheme was deliberated & agreed. CTU vide OM dated 03.09.2025 has approved implementation of subject scheme under RTM mode by Power Grid Corporation of India Ltd as per details given below:

**Detailed scope of the scheme:**

| Sl. No. | Scope of the Transmission Scheme | Item Description |
|---|---|---|
| 1 | Augmentation of Transformation capacity at 400/220kV Navi Mumbai (GIS) (PG) S/s by 400/220kV 1x500MVA ICT (3rd) along with associated bays | • 400/220kV, 1x500MVA ICT – 1 No.<br>• 400kV ICT bay (GIS) – 1 No. (Double main scheme)<br>• 220kV ICT bay (GIS) – 1 No.<br>• 245 kV 2500 Sqm XLPE Cable - 300m (approx.) along with associated cable termination.<br>• 400kV GIS Bus Duct (m) - 150m (approx.) along with associated GIS to AIS bushings. |
| | | **Total Estimated Cost: ₹ 63.75 Cr.** |

**Implementation Timeframe:** 24 months from the date of allocation

**Estimated Cost:** Rs. 63.75 Cr.

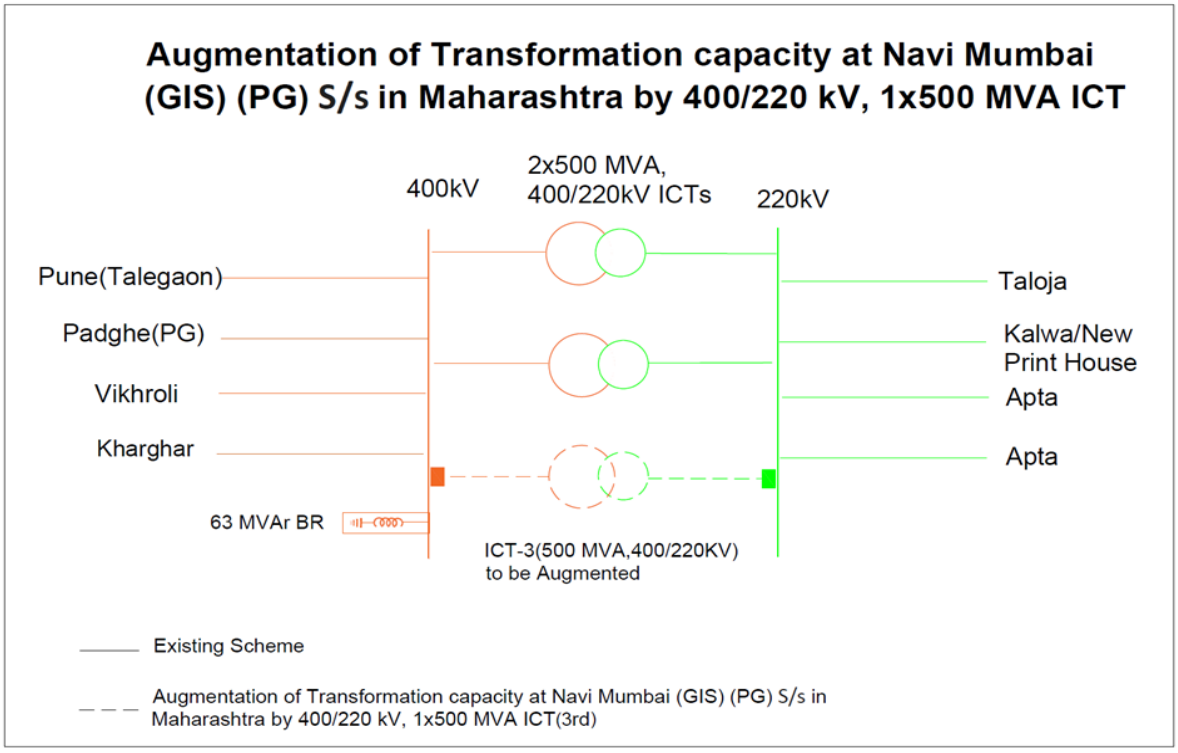



*Figure 5-2: Schematic of 400/220 kV Navi Mumbai (GIS) (PG) S/s*

**B. Network Expansion Scheme for drawal of power at South Kalamb S/s**

Establishment of South Kalamb S/s with 2x1500 MVA, 765/400 kV ICTs with 2x330 MVAR, 765 kV bus reactor and 2x125 MVAR, 420 kV bus reactor alongwith LILO of Pune-III – Boisar-II 765 kV D/c line is presently under implementation by M/s AESL.

From studies & as per discussions with MSETCL in a meeting amongst CEA, CTU & MSETCL on 22.01.2025 & 12.02.2025, various downstream lines were planned from South Kalamb S/s along with Installation of 3x1500MVA, 765/400kV ICTs at South

Kalamb S/s (400kV Sec-III & 765kV Section-III) in order to facilitate direct infeed of power into Mumbai area.

The matter was discussed in the 35th CMETS-WR meeting held on 07.02.2025, wherein it was deliberated that although the 6GW HVDC terminal planned at South Kalamb S/s (from Barmer-II) would require minimum of 48 to 54 months for commissioning, the above downstream system from South Kalamb S/s may be implemented in reduced time-frame of 24 months as it would provide direct infeed of power into Mumbai area and would help increase ATC of the area. After deliberations, the downstream lines planned from South Kalamb S/s were agreed with schedule of 24 months from award.

The scheme was discussed and agreed in following meetings.

- 35th CMETS-WR meeting held on 07.02.25
- 54th WRPC meeting held on 25.04.2025 & 26.04.2025
- 31st NCT meeting held on 14.07.2025

After deliberations in NCT, the transmission scheme **"Network Expansion Scheme for drawal of power at South Kalamb S/s: Part A"** was recommended for implementation under TBCB mode while **"Network Expansion Scheme for drawal of power at South Kalamb S/s: Part B (WTPL line reconductoring) and Network Expansion Scheme for drawal of power at South Kalamb S/s: Part C (POWERGRID Bay Upgradation)**" were approved for implementation under RTM mode as follows:

**Detailed scope of the scheme is given below:**

| Sl. Nos. | Description of Transmission Element | Scope of work (Type of Substation/Conductor capacity/km/Nos. of bays etc.) |
|---|---|---|
| **Part A** | | |
| 1 | • Creation of New 765 kV Bus Sections-II & III & 400 kV Bus Sections-II & III through 765 kV Sectionalization bay: 2 set & 400 kV Sectionalization bay: 2 set along with 2x330 MVAR, 765 kV bus reactor & 2x125 MVAR, 420 kV bus reactor on Section-III. 400 kV Sectionaliser between Sections-I & II & between sections-II & III to be normally open. Further, 765 kV sectionaliser between Sections-I & II & between II & III shall be kept normally closed. The 400 kV sectionalisers can be closed under contingency conditions.<br>• Installation of 3x1500MVA, 765/400 kV ICTs at South Kalamb S/s (400 kV Sec-III & 765 kV Section-III)<br>• All space provisions on 400 kV & 765 kV | • 765/400 kV 1500 MVA ICTs- 3 nos.<br>• 765 kV ICT bays- 3 Nos. (at bus section-III)<br>• 400 kV ICT bays- 3 no (at bus section-III)<br>• 330 MVAr Bus Reactor-2 nos. (at bus section-III)<br>• 765 kV Bus reactor bays- 2 nos. (at bus section-III)<br>• 125 MVAr Bus Reactor-2 nos. (at bus section-III)<br>• 400 kV Bus reactor bays- 2 nos. (at bus section-III)<br>• 765 kV Sectionalization bay: 2 sets |

| Sl. Nos. | Description of Transmission Element | Scope of work (Type of Substation/Conductor capacity/km/Nos. of bays etc.) |
|---|---|---|
| | Bus Sections-I & II of South Kalamb S/s as per RfP document of "Network Expansion scheme in Western Region to cater to Pumped storage potential near Talegaon (Pune)" scheme shall be kept while implementing this scheme. TSP of "Network Expansion scheme in Western Region to cater to Pumped storage potential near Talegaon (Pune)" scheme shall provide necessary space free of cost for above bus extension / sectionalisation / augmentation works. | • 400 kV Sectionalization bay: 2 sets |
| 2 | LILO of Nagothane – Padghe 400 kV D/c line at South Kalamb with Quad ACSR/AAAC/AL59 moose equivalent conductor | LILO route length~10km. |
| 3 | LILO of Pune (AIS) – Navi Mumbai 400 kV line at South Kalamb with Quad ACSR/AAAC/AL59 moose equivalent conductor | LILO route length~10km. |
| 4 | LILO of Pune (AIS) – Vikhroli 400 kV line at South Kalamb with Quad ACSR/AAAC/AL59 moose equivalent conductor | LILO route length~10km. |
| 5 | 8 Nos. 400 kV bays at South Kalamb S/s for LILO lines at Sl. 2, 3 & 4 | 400 kV line bays – 8 Nos. (Sec-III) |
| ***Note:*** <br> 1. *TSP of South Kalamb S/s shall provide space for above scope of work at South Kalamb S/s free of cost* | | |

| **Part-B:** | | |
|---|---|---|
| 6 | Reconductoring of the balance line section of Pune (AIS) – Vikhroli 400 kV line (upto LILO point of LILO of Lonikand-Kalwa 400 kV line at Pune (AIS)) of Western Transco Power Ltd. (a subsidiary of AESL) with conductor having capacity of 2100MVA per ckt at nominal voltage <br> [MSETCL shall reconductor the balance line portion from above LILO point upto Kalwa (excl. LILO portion at Vikhroli which is already implemented with high-capacity conductor) | 1.707 km. reconductoring (under ownership of WTPL) |

| | | |
|---|---|---|
| | with conductor having capacity of 2100MVA per ckt at nominal voltage in matching time-frame] | |
| **Part-C:** | | |
| 7 | Upgradation of 400 kV bay at Pune (AIS) of POWERGRID (associated with Pune (AIS) – Vikhroli 400 kV line) commensurate with the reconductoring capacity of 2100MVA at nominal voltage. | Upgradation of the Complete Dia 6 (Vikroli Line Main Bay, Tie Bay & 315 MVA ICT3 Main Bay) to be carried out |

**Implementation Timeframe:**

**Part A**: 24 months from the date of SPV transfer or allocation

**Part B & C**: 24 months from the date of issuance of OM by CTUIL

**Estimated Cost: Rs. 917 Crs.**

**Part A**: Rs. 901 Crs.

**Part B**: Rs. 5 Crs.

**Part C**: Rs. 11 Crs.

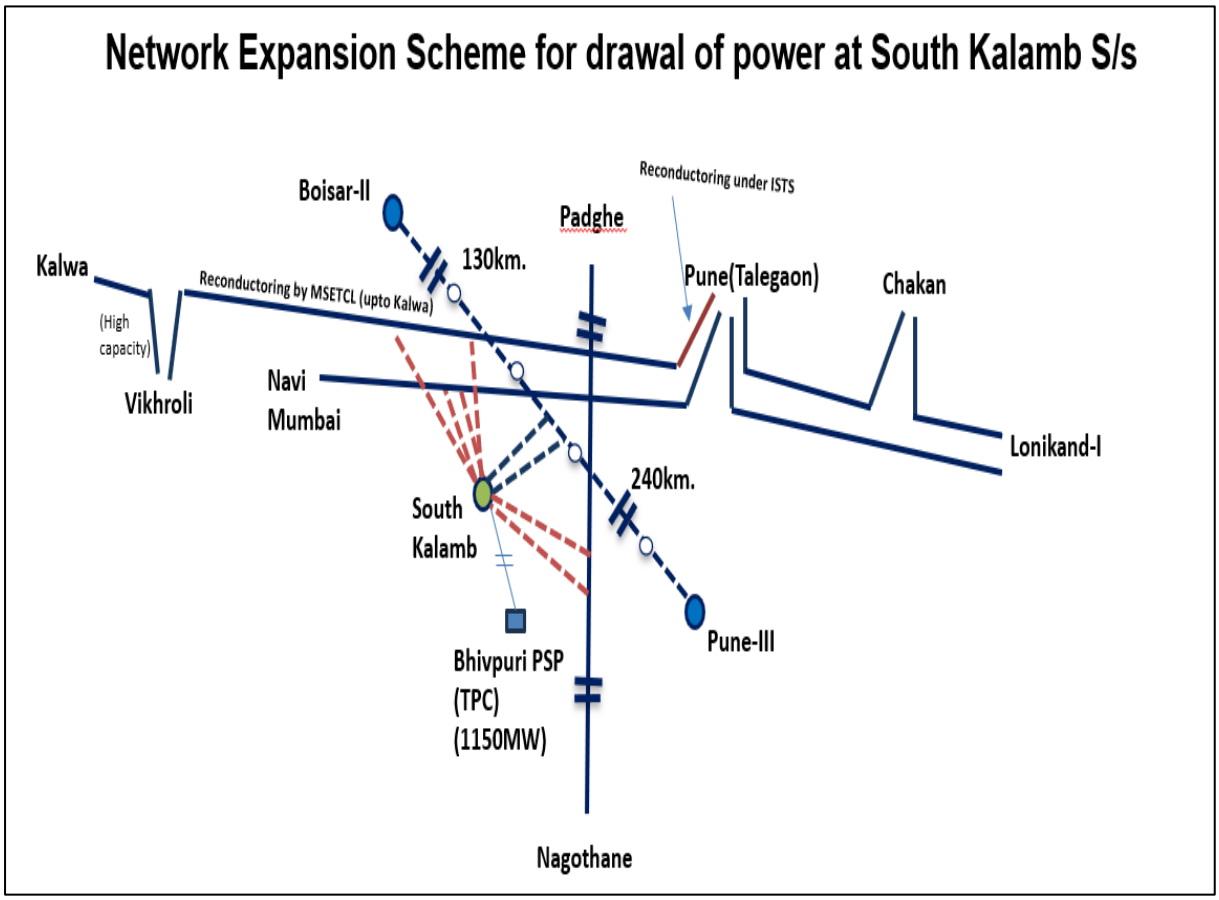



*Figure 5-3: Schematic of network Expansion scheme for drawal of power at South Kalamb S/s*

**C. Transmission system for providing connectivity to PSPs up to 4500MW in Satara Area:**

Government of India has set a target for establishing 500 GW non-fossil generation capacity by 2030. In view of this certain PSPs are identified in satara area for which transmission system for the evacuation of power needs to be evolved.

Both Tarali & Koyna PSPs of Adani are identified PSPs in Satara district as per information provided by CEA for which CEA/CTU are to plan comprehensive transmission plan as per decision in meeting held on 28.05.2024 under the Chairmanship of Chairperson, CEA. In view of the same, M/s Adani Renewable Energy One Ltd. (AREOL) & M/s Adani Saur Urja (KA) Limited have applied for 1800MW connectivity (Inj:1500MW & Drawal:1800MW) each at Satara area.

For granting Connectivity to both the above applications & to cater to additional potential in Satara area, studies were carried out and the following transmission system was deliberated and agreed in the 36$^{th}$ CMETS-WR held on 28.05.2025 for evacuation of power from PSPs in Satara area (upto 4500MW drawal) in first phase.

- Installation of 2x1500MVA, 765/400kV ICTs at Kolhapur S/s along with upgradation of Kolhapur S/s to 765kV level
- Upgradation of Narendra (New) – Kolhapur 765kV line (presently charged at 400kV) to 765kV level
- Establishment of 4x1500MVA, 765/400kV Satara S/s
- Kolhapur – Satara 765kV D/c line (~125Km)
- LILO of Pune-III – Karjat-II(M)/Pune (GIS) 765kV D/c line at Satara(~125Km)

M/s Adani's applications for cumulative Connectivity of 3600MW drawal at satara area was also discussed in the 36$^{th}$ CMETS-WR meeting, wherein, it was agreed to grant connectivity with the above identified transmission system. Also, it was informed that as decided in the above meeting at CEA, CTUIL while granting Connectivity to PSPs shall mention that PSPs shall not operate in generating mode during high RE generation period and if required, PSPs may inject power during high RE generation period based on margin available in the system.

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of the Transmission Scheme | Capacity /km |
|---|---|---|
| **Part-A** | | |
| **1.** | Creation of 765kV level at Kolhapur with Installation of 2x1500MVA, 765/400kV ICTs at Kolhapur S/s along with upgradation of Kolhapur S/s to 765kV level | • 765/400 kV, 1500 MVA ICT – 2 No.<br>• 765 kV ICT bays – 2 No. (AIS)<br>• 400 kV ICT bays – 2 No. (AIS) |

| Sl. No. | Scope of the Transmission Scheme | Capacity /km |
|---|---|---|
| **2.** | Installation of 2x330 MVAR 765kV bus reactors at Kolhapur | • 1x330 MVAr, 765 kV bus reactor- 2 Nos. (7x110 MVAR single phase Reactors including one spare Unit for bus /line reactor)<br>• 765 kV Bus reactor bay – 2 Nos. (1 on Sec-I & 1 on Sec-II) |
| **3.** | Upgradation of Narendra (New) – Kolhapur 765kV D/c line (presently charged at 400kV) to 765kV level | • 765kV line bays at Narendra (New) – 2 Nos. (GIS)<br>• 765kV line bays at Kolhapur (PG) – 2 Nos. (AIS)<br>• Charging the ~190km D/c line to 765kV level |
| **4.** | 765kV, 330MVAr Switchable line reactors on each circuit at Kolhapur end of Narendra (New) – Kolhapur 765kV D/c line | • 330 MVAr, 765 kV switchable line reactor- 2 Nos.<br>• Switching equipment for 765 kV line reactor- 2 Nos.<br>• 765kV, 110MVAr spare single-phase reactor provided at Sl. 2 above at Kolhapur to be utilized for above Switchable LR |
| **Part-B** | | |
| **5.** | **Establishment of 765/400 kV, 4x1500MVA Satara S/s** with 2x330 MVAR 765kV bus reactor and 2x125 MVAR 400kV bus reactor. ***(3x1500MVA on Sec-I & 1x1500MVA on Sec-II)***<br><br>**Future provision (space for):**<br>➢ 765/400 kV, 1500MVA ICT along with bays- 2 Nos. (on Sec-II)<br>➢ 765 kV line bays along with switchable line reactors – 6 Nos. (2 Nos. on Sec-I & 4 Nos. on Sec-II)<br>➢ 765 kV, 330MVAr Bus Reactor along with bay: 2 Nos. (1 on Sec-I & 1 on Sec-II)<br>➢ 400/220 kV, 500MVA ICT along with bays - 6 Nos. (3 on Sec-I & 3 on Sec-II)<br>➢ 400 kV line bays along with switchable line reactors– 8 Nos. *(6 on Sec-I & 6 on Sec-II)*<br>➢ 420 kV, 125MVAr Bus Reactor along with bays: 2 Nos. (1 on Sec-I & 1 on Sec-II)<br>➢ 220 kV Sectionaliser bay: 1- set | • 765/400 kV, 1500 MVA ICT – 4 Nos. (13x500 MVA single phase units including one spare ICT Unit)<br>• 765 kV ICT bays – 4 Nos.<br>• 400 kV ICT bays –4 Nos.<br>• 765 kV Line bays – 6 Nos. (4 Nos. on Sec-I for Kolhapur & Pune (GIS)/Karjat-II lines and 2 Nos. on Sec-II for Pune-III)<br>• 1x330 MVAr, 765 kV bus reactor- 2 Nos. (7x110 MVAR single phase Reactors including one spare Unit for bus /line reactor)<br>• 765 kV Bus reactor bay – 2 Nos. (1 on Sec-I & 1 on Sec-II)<br>• 125 MVAr, 420 kV reactor- 2 Nos.<br>• 400 kV Reactor bay- 2 Nos. (1 on Sec-I & 1 on Sec-II)<br>• 400 kV line bays - 4 Nos. (2 Nos. on Sec-I & 2 Nos. on Sec-II) for PSP Interconnection |

| Sl. No. | Scope of the Transmission Scheme | Capacity /km |
|---|---|---|
| | ➢ 220kV BC & TBC – 2 No. each<br>➢ 220 kV line bays: 8 No. on Sec-I & 8 Nos. on Section-II<br>➢ STATCOM (±400 MVAr) along with associated bays-2 no. (1 on Sec-I & 1 on Sec-II) | • 765 kV Sectionaliser bay: 1 -set<br>• 400 kV Sectionaliser bay: 1- set |
| **6.** | **Kolhapur – Satara 765kV D/c line** (125km.) | 125 km (250 ckm) |
| **7.** | 2 Nos. 765 kV line bays at Kolhapur S/s for **Kolhapur – Satara 765kV D/c line** | 765 kV line bays – 2 Nos. (AIS) |
| **8.** | 765kV, 240MVAr Switchable line reactors on each circuit at Satara end of Kolhapur – Satara 765kV D/c line | • 240 MVAr, 765 kV switchable line reactor- 2 Nos.<br>• Switching equipment for 765 kV line reactor- 2 Nos.<br>• 765kV, 80MVAr spare singlephase reactor at Satara for above Switchable LR |
| **9.** | **LILO of Pune-III – Karjat-II(M)/Pune (GIS) 765kV D/c line at Satara** | 65km. LILO route length (260ckm) |

**Note:**

a) Bay(s) required for completion of diameter (GIS) in one-and-half breaker scheme shall also be executed by the TSP.

b) TSP of Kolhapur S/s i.e. POWERGRID to provide space for above scope of work as Sl. 1 (Free of cost)

**Implementation Timeframe:** 31.07.2028 (matching with PSP project of M/s AREOL) (subject to minimum 24 months from award to implementing agency)

**Estimated Cost:** Rs. 3777.56 Cr.

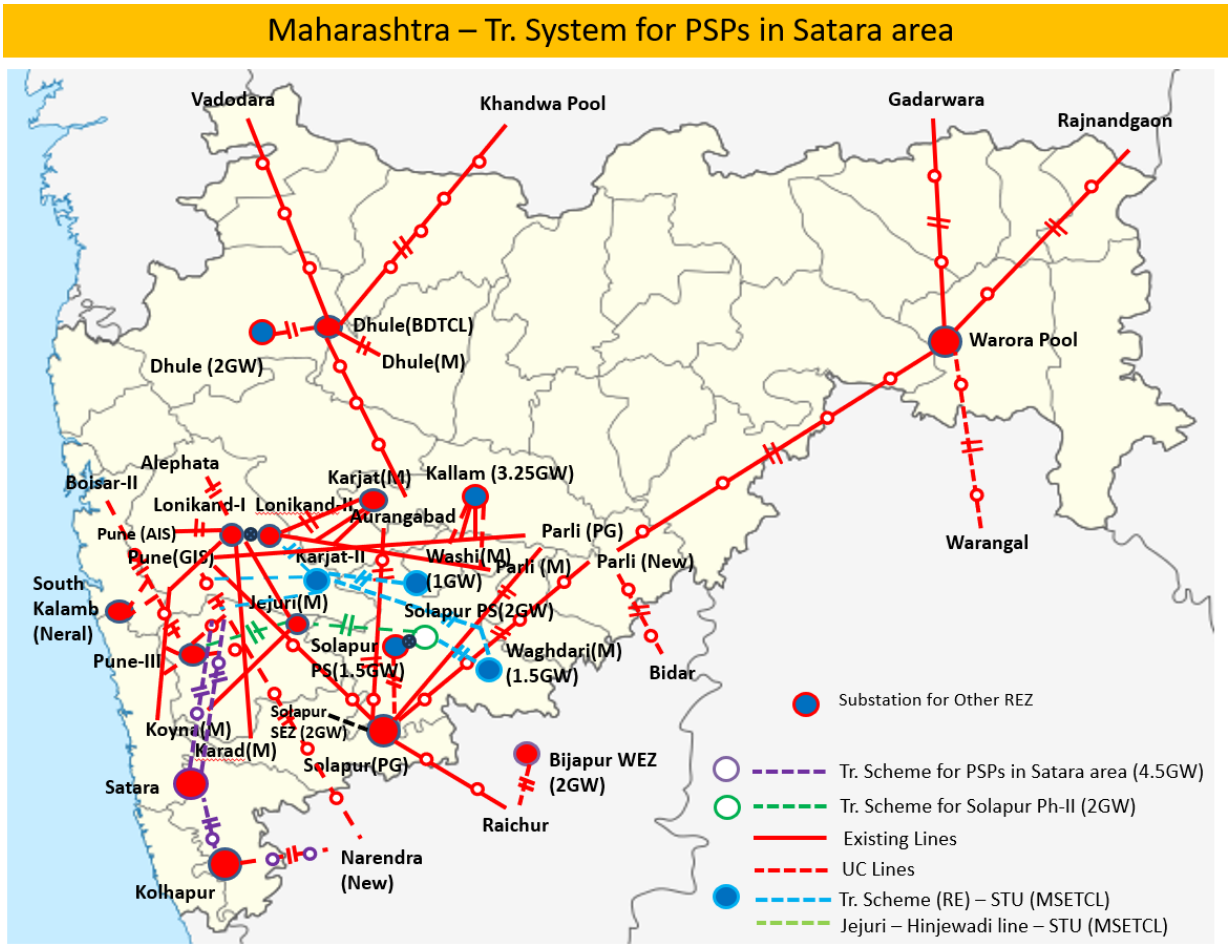



*Figure 5-4: Transmission system for providing connectivity to PSPs up to 4500MW in Satara Area*

**D. Implementation of 1 no. 220kV bay at Dhule PS for Interconnection of 94MW Hybrid project of Adyant Enersol Private Limited (AEPL):**

4x500 MVA, 400/220 kV Pooling Station near Dhule is under implementation under "Transmission Scheme for evacuation of power from Dhule 2 GW REZ" by M/s Dhule Power Transmission Ltd. (DPTL) with implementation Timeframe of 24 months from the SPV transfer i.e. 09.02.2026.

In the 36th CMETS-WR meeting held on 26.05.2025, AEPL was agreed to be granted connectivity for its 94MW Hybrid project (Application No. - 2200001584) at Dhule S/s through 220kV S/c line with the availability of Common Transmission system Augmentation which inter-alia includes Establishment of 4x500 MVA, 400/220 kV Pooling Station near Dhule & 1 no of 220kV line bay at Dhule PS for interconnection of DTL of AEPL.

Accordingly, the scheme with following scope of works was discussed and agreed in the 36th CMETS-WR held on 26.05.2025.

**Details of the scheme are given below:**

| Sl. No. | Scope of the Transmission Scheme | Capacity /km |
|---|---|---|
| **1.** | 220kV line bay at Dhule PS for RE Interconnection (Appl. 2200001584: Adyant Enersol Private Limited: 94MW) | • 220kV line bay –1 No. |

**Implementation Timeframe:** 31.03.2027 (matching with start date sought by applicant) (subject to minimum 18 months from award to implementing agency)

**Estimated Cost:** Rs. 6 Cr.

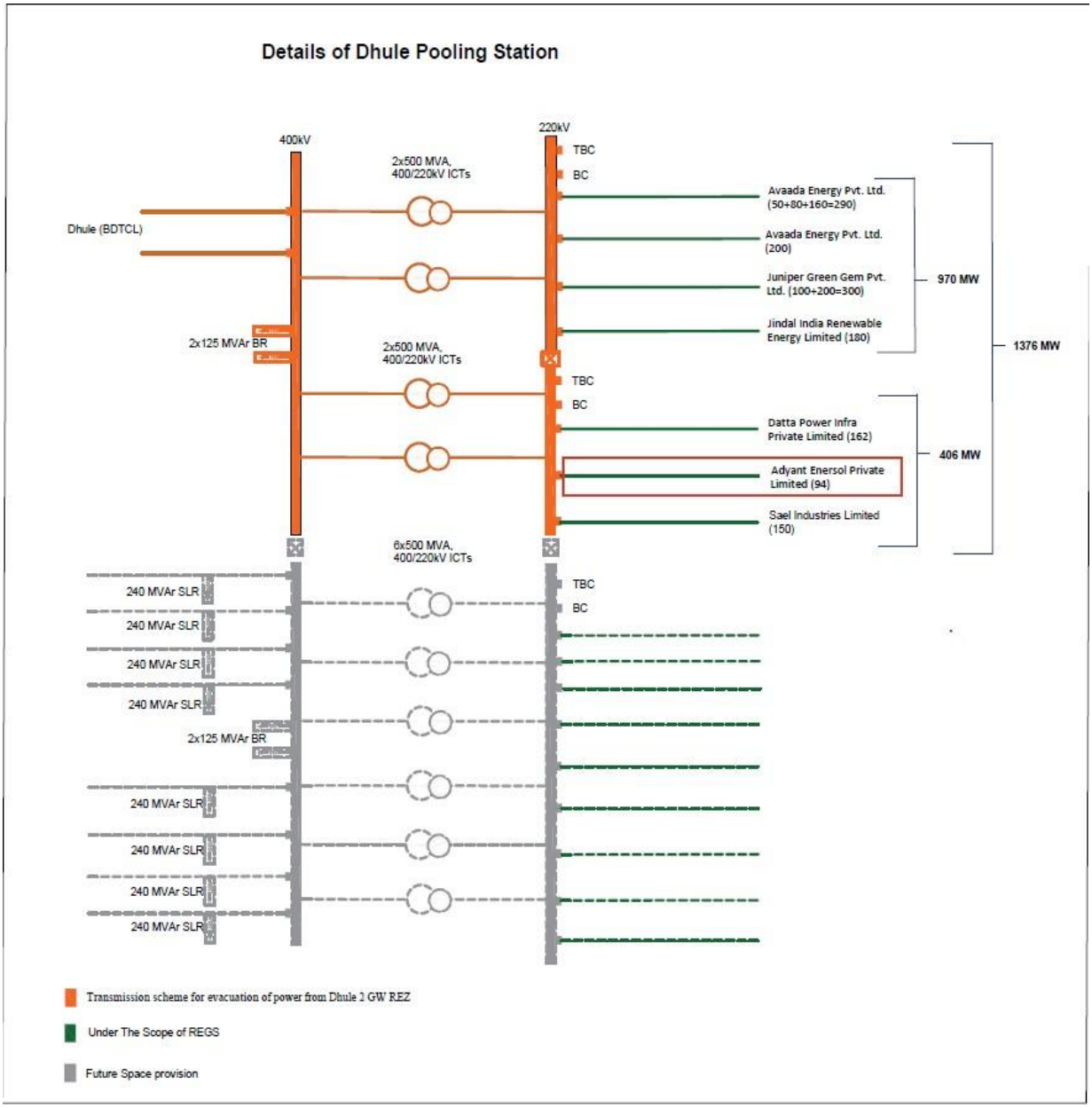



*Figure 5-5: Transmission system for providing connectivity to AEPL (94MW) in Dhule PS*

**E. ISTS Works associated with uprating existing conductors by High performance conductors by MSETCL in Talegaon area:**

STU has proposed LILO of 400 kV Talegaon (PG) - Navi Mumbai-Kharghar, 400 kV Talegaon (PG) - Vikroli -Kalwa & 400 kV Padghe-Nagothane D/c Line for downstream network of 765/400 kV South Kalamb (Neral).

In order to strengthen the InsTS system for integration with CTU network for evacuation of RE power, catering to the projected demand in MMR area without any system constraints and mitigating the existing transmission system constrains in Pune Ring main network, MSETCL has proposed to uprate the line Conductor (525 sq. mm Twin moose) for Sr. no 1 to 5 & 0.4 ACSR for Sr. no 6 by twin/single High performance to enhance the capacity of the 400kV Line to 2000 MW each & 220kV line to 500 MW:

| Sl. No. | Name of Line | STU Plan | Status (HTLS: 3600A) |
|---|---|---|---|
| 1 | 400 kV Talegaon (PG)-Vikhroli S/C Line | 2026-27 | Dec-26<br>MERC approval pending |
| 2 | 400 kV Talegaon (PG)-Kharghar to be LILO at Navi Mumbai (PG) S/C Line | 2026-27 | Dec-26<br>MERC approval pending |
| 3 | 400 kV Kharghar – Kalwa Line | 2026-27 | Dec-26<br>MERC approval pending |
| 4 | 400 kV Talegaon (PG) – Chakan | 2025-26 | LOA in Apr-25<br>Apr-26 |
| 5 | 400 kV Talegaon (PG) – Lonikand-I | 2026-27 | Dec-26<br>MERC approval pending |
| 6 | 220 kV Talegaon (PG)-Talegaon Ambi I&II | 2026-27 | Dec-26<br>MERC approval pending |

Some part of lines under Sr no 1, 2, 4 & 5 along with bays at 400kV Talegaon (PGCIL) and 400kV Navi Mumbai (PG) end is under the ownership of WTL & PGCIL respectively and are part of the ISTS network. For Sr no 6 the bays 220 kV Talegaon (PG) end are owned by PGCIL. It is thus necessary to uprate the corresponding ISTS bays /line portion equivalent with the capacity of the lines in matching timelines.

400 kV Talegaon (PG)-Vikhroli S/C line LILO portion to be reconductored was agreed under **Network Expansion Scheme for drawal of power at South Kalamb S/s Part B scheme in the 31st NCT meeting dated 14.07.2025 by WTPL under RTM route -** Length of Line in the ownership of WTPL**: 400KV Lonikhand – Kalwa line = 1.707 km.** Also, upgradation of 400 kV bay at Pune (AIS) of POWERGRID (associated with Pune (AIS) –Vikhroli 400 kV line) commensurate with the reconductoring capacity of 2100MVA at nominal voltage was also agreed under RTM route and to implemented by POWERGRID under **Network Expansion Scheme for drawal of power at South Kalamb S/s Part B scheme in the 31st NCT meeting dated 14.07.2025.**

The matter regarding uprating of 400 kV Talegaon (PG) – Chakan & 400 kV Talegaon (PG) – Lonikand-I lines alongwith bay upgradation at Talegaon (PG) S/s was deliberated in the 36th

CMETS-WR meeting held on 26.05.2025, wherein, the following scope of work was agreed under ISTS:

**Bay Upgradation Works at Talegaon (PG) S/s:**

- Upgradation of Equipment (like CT, CVT, Isolator, Wave Trap) in 400kV DIAMETER 1-400kV Chakan Line -Tie- Kharghar Line (401-402-403) at Talegaon S/s (POWERGRID) from 2000A to 3150A and Jack Bus conductor from Twin Moose to Twin HTLS/Quad Moose commensurate with upgraded bay equipment ampacity
- Upgradation of Equipment (like CT, CVT, Isolator, Wave Trap) in 400kV DIAMETER 5-400kV Lonikand Line -Tie- Bus Reactor Bay (413-414-415) at Talegaon S/s (POWERGRID) from 2000A to 3150A and Jack Bus conductor from Twin Moose to Twin HTLS/Quad Moose commensurate with upgraded bay equipment ampacity
- Upgradation of Equipment (like CT, CVT, Isolator, Wave Trap) in 400kV DIAMETER 3 (400 kV Talegaon GIS Line # 2- Tie - Talegaon GIS Line # 3) (407-408-409) from 2000A to 3150A and Jack Bus conductor from Twin Moose to Twin HTLS/Quad Moose commensurate with upgraded bay equipment ampacity

**Implementation Timeframe:** 18 months from the date of allocation

**Reconductoring works of WTPL line portion emanating from Talegaon (PG) S/s:**

- Reconductoring of the balance line section of Pune (AIS) –Lonikand-I 400kV D/c line (one ckt via Chakan) (upto LILO point of LILO of Lonikand-Kalwa 400kV line at Pune (AIS)) of Western Transco Power Ltd. (a subsidiary of AESL)) with conductor having capacity of 2100MVA per ckt at nominal voltage* (Chakan section: 0.092km & Lonikand-I section: 1.317km)

**MSETCL shall reconductor the balance line portion from above LILO point upto Kalwa with conductor having capacity of 2100MVA per ckt at nominal voltage*

**Implementation Timeframe:** 18 months from the date of allocation

**Estimated Cost:** Rs. 90 Cr.

**Note:** *As decided in the 26th NCT meeting held on 06.01.2025, all the reconductoring proposals will be deliberated in NCT along with cost breakup of Reconductoring portion and the developer who is awarded the scheme under RTM shall approach the appropriate commission in terms of the existing provisions of the regulations.*

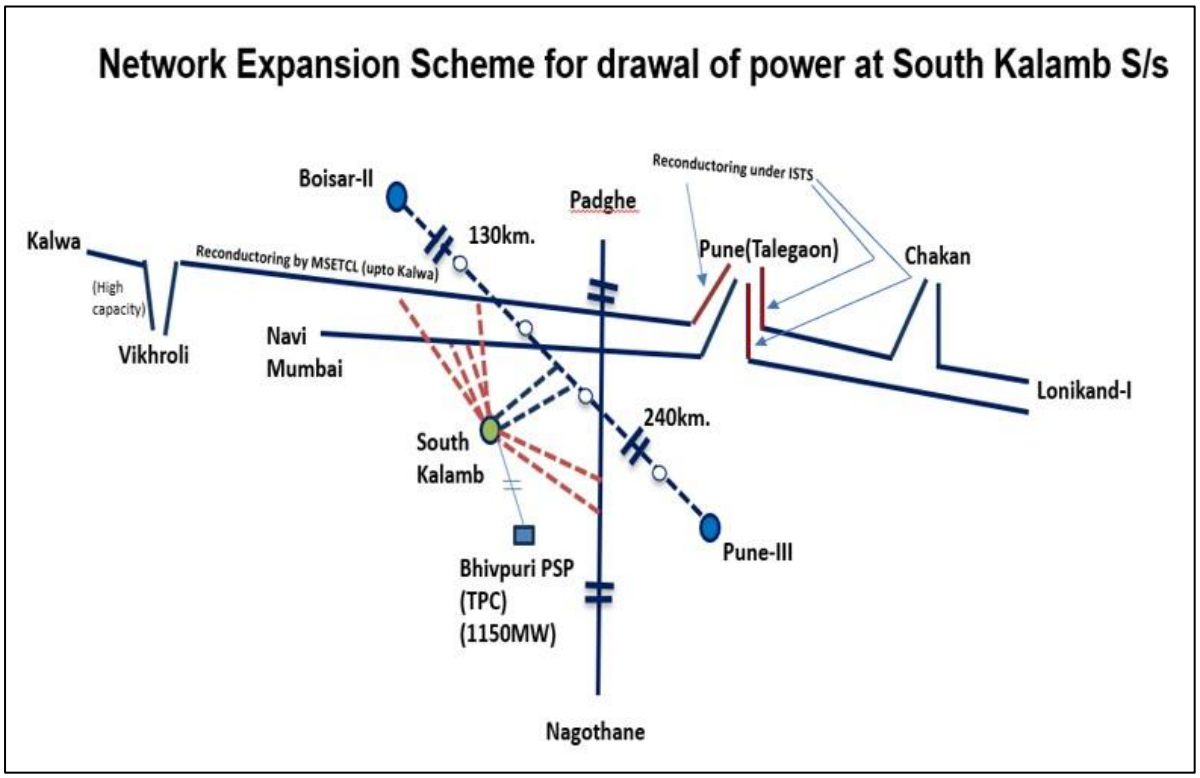



*Figure 5-6: Schematic of reconductoring under ISTS of LILO line at Pune (Talegaon) S/s*

### 5.4.3 Madhya Pradesh

**A. Implementation of 1 no. 400kV bay at Ishanagar (New) S/s for Interconnection of 350MW Wind project of Avaada Energy Pvt. Ltd. (AEPL)**

2x1500MVA 765/400kV and 2x500MVA, 400/220kV Ishanagar (New) S/s is under implementation under "Western Region Expansion Scheme XXXIII (WRES - XXXIII): Part C" by M/s Ishanagar Power Transmission Limited (IPTL) with implementation Timeframe of 24 months from the SPV transfer i.e. 09.02.2026.

In the 35th CMETS-WR meeting held on 07.02.2025, AEPL was agreed to be granted connectivity for its 350MW Wind plant (Application No.: 2200001421) at Ishanagar (New) S/s through 400kV S/c line (on D/c tower) with the avalibility of Common Transmission system Augmentation which inter-alia includes Establishment of 2x1500MVA, 765/400kV and 2x500MVA, 400/220kV Ishanagar (New) S/s & 1 no of 400kV line bay at Ishanagar (New) S/s for interconnection of AEPL generation project.

Accordingly, the scheme with following scope of works was discussed and agreed in the 35$^{th}$ CMETS-WR held on 07.02.2025.

**Details of the scheme are given below:**

| Sl. No. | Scope of the Transmission Scheme | Capacity /km |
|---|---|---|
| **1.** | 400kV line bay at Ishanagar (New) S/s for RE Interconnection (Appl. 2200001421: Avaada Energy Pvt. Ltd.) | • 400kV line bay –1 No. |

**Implementation Timeframe:** 30.06.2027 (As per start date of connectivity requested by applicant)

**Estimated Cost:** Rs. 13.98 Crs.

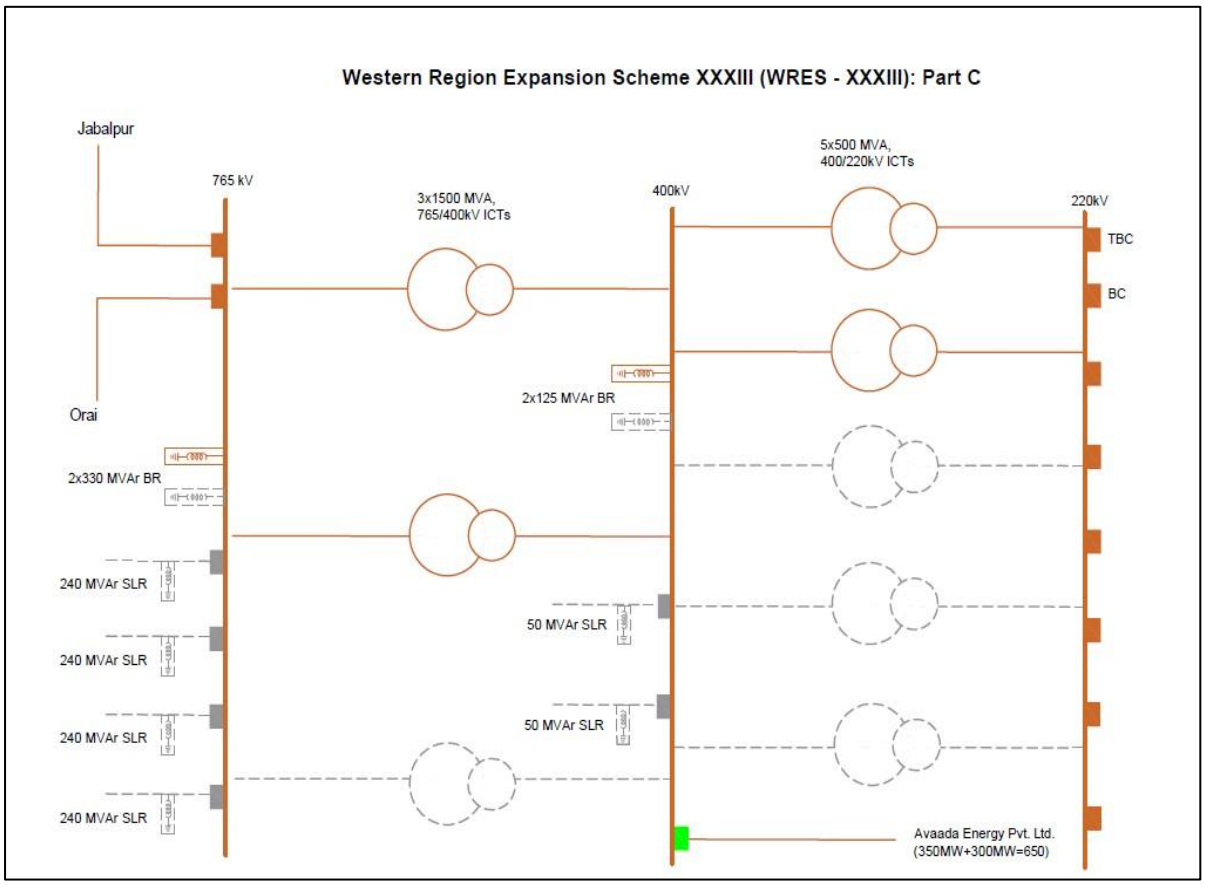



*Figure 5-7: Schematic for Ishanagar (New) 765/400 kV S/s*

### 5.4.4 Chhattisgarh

**A. Augmentation of Transformation capacity at Raipur (PG) S/s in Chhattisgarh by 400/220 kV, 1x500 MVA (4th) ICT:**

400/220kV Raipur (PG) S/s is implemented by POWERGRID and presently under operation with 3x315 MVA, 400/220kV ICTs. POWERGRID informed that the monthly average loading on existing 3x315 MVA 400/220kV ICTs at Raipur S/s is more than 75% and monthly peak loading is more than 90%.

Hence, to meet the N-1 contingency criterion, the implementation of 1x500 MVA 400/220kV ICT (4th) along with associated bays at existing 3x315MVA, 400/220kV Raipur S/S is proposed. Subsequently, the matter was deliberated in the 35th CMETS-WR meetings dated 07.02.2025. The matter was deliberated in the 36th CMETS-WR held from 26.05.2025 to 28.05.2025, wherein, it was decided that the 4th 400/220kV ICT at Raipur (PG) S/s is required in parallel with existing 3x315MVA ICTs for ensuring N-1 compliance. CTU vide OM dated 03.09.2025 has approved implementation of subject scheme under RTM mode by Power Grid Corporation of India Ltd as per details given below:

**Details of the scheme:**

| Sl. No. | Scope of the Transmission Scheme | Item Description |
|---|---|---|
| 1. | Augmentation of Transformation capacity at 400/220kV Raipur (PG) S/s by 400/220kV 1x500MVA ICT (4th) along with associated bays at both ends | • 400/220kV, 1x500MVA ICT-1 No.<br>• 400kV ICT bay –1 No. Main Bay (Termination in existing spare bay of half diameter)<br>• 220kV ICT bay –1 No.<br>• 220kV 2500 Sqm XLPE Cable - 4x750Mtrs (approx.) along with associated cable termination. |
| **Total Estimated Cost: ₹ 63.40 Cr.** | | |

**Note:** *As informed by POWERGRID vide e-mail dated 23.04.2025, the ICT will be located on the opposite side of the existing 400/220kV ICTs, but within the same 400kV Bus Section as the other three ICTs. Consequently, the 220kV cable will need to be routed across the entire 400kV diameter.*

**Implementation Timeframe:** 21 months from the date of allocation

**Estimated Cost:** Rs. 63.40 Crs

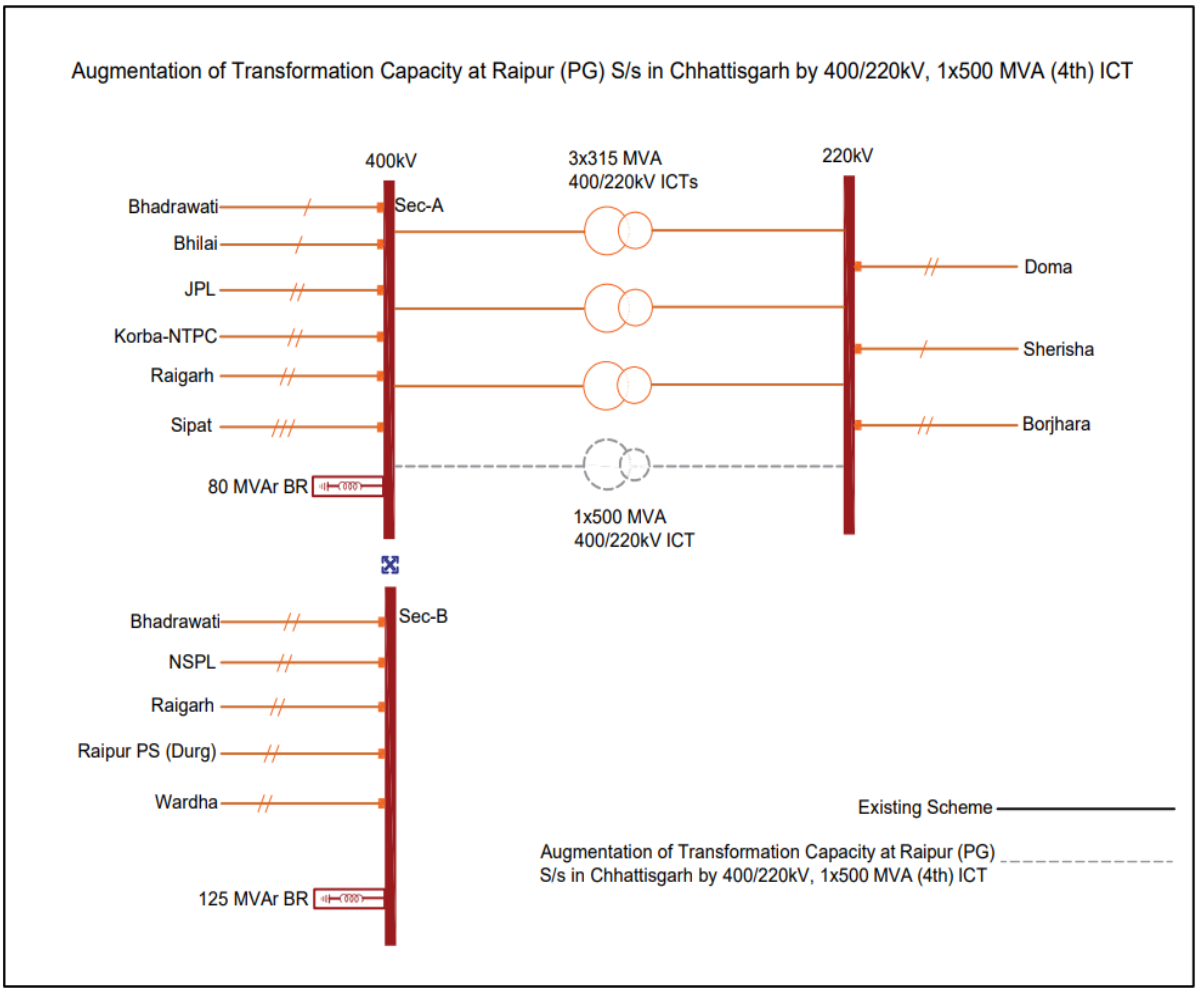



*Figure 5-8: Schematic of 400/220 kV Raipur (PG) S/s*

**B. Augmentation of Transformation Capacity at Champa PS for interconnection of Thermal Project of Korba Power Limited:**

Korba Power Ltd. (Erswhile Lanco Amarkantak) has applied for connectivity for its Phase-I generation project of 2x660MW capacity at Champa-PS.

Earlier, connectivity was granted to M/s Lanco at Champa PS through 400kV D/c line on Sec-A (where Lara-I units are connected). However, in the revised load generation scenario and also considering reverse flow requirement on Raigarh – Pugalur HVDC link (from SR to WR), constraints are being observed on Raigarh (Kotra) 765/400kV ICTs. Hence, in case Korba Power Ltd.'s connectivity is again proposed at Sec-A (where Lara-I units are connected), it would lead to further overloading of ICTs at Raigarh (Kotra) since Champa 400kV Sec-A is connected to Raigarh (Kotra) through Lara-I project. In view of the above, it is being contemplated to grant connectivity to Korba Power Ltd on 400kV Bus Section B (with KSK 3x600MW Units & Lara-II (2x800MW) generating stations) for which space has been sought from POWERGRID for 2 nos. 400kV bays as well as space for additional 765/400kV 1500MVA ICT on Sec-B vide e-mail dated 30.01.2025. POWERGRID vide e-mail dated 06.03.2025 has confirmed the space for installation of additional 765/400kV

1500MVA ICT (7th) (on Sec-B) with associated ICT bays with requirement of separate 500MVA single phase spare ICT bank & GIS bus duct.

With this, no further margins for injection would be left at Champa PS as fault level would reach near design limit. Also, S/s N-1 compliance limit would also be near its limit at 400kV Sec-B of Champa PS. The proposed 765/400kV ICT augmentation at Champa PS (Sec-B) would enable immediate injection of power from Korba Power Limited generation project. For onwards evacuation of power, WR-ER Inter-Regional Network Expansion Scheme would be required inter-alia including Raigarh (Kotra)-II S/s, Jamshedpur establishment alongwith Raigarh (Tamnar) – Jamshedpur 765kV D/c line which would be Common transmission system for the generation project.

The subject scheme was deliberated & agreed to be implemented as Associated Transmission System for Korba Power Limited generation 2x660MW project in the 36th CMETs-WR meeting held on 26.05.2025.

**Details of the scheme is given below:**

| Sl. No. | Scope of the Transmission Scheme | Capacity /km |
|---|---|---|
| **1.** | ➢ Augmentation of Transformation capacity at Champa Sec-B by 765/400kV 1500MVA ICT (7th) (on Sec-B) with associated ICT bays including 500MVA single phase spare ICT bank | • 765/400 kV, 1500 MVA ICT – 1 Nos. (4x500 MVA single phase units including one spare ICT Unit)<br>• 765 kV ICT bays – 1 No.<br>• 400 kV ICT bays –1 No. |

**Implementation Timeframe**: 21 months from award to implementing agency

**Estimated Cost:** Rs. 169.72 Crs

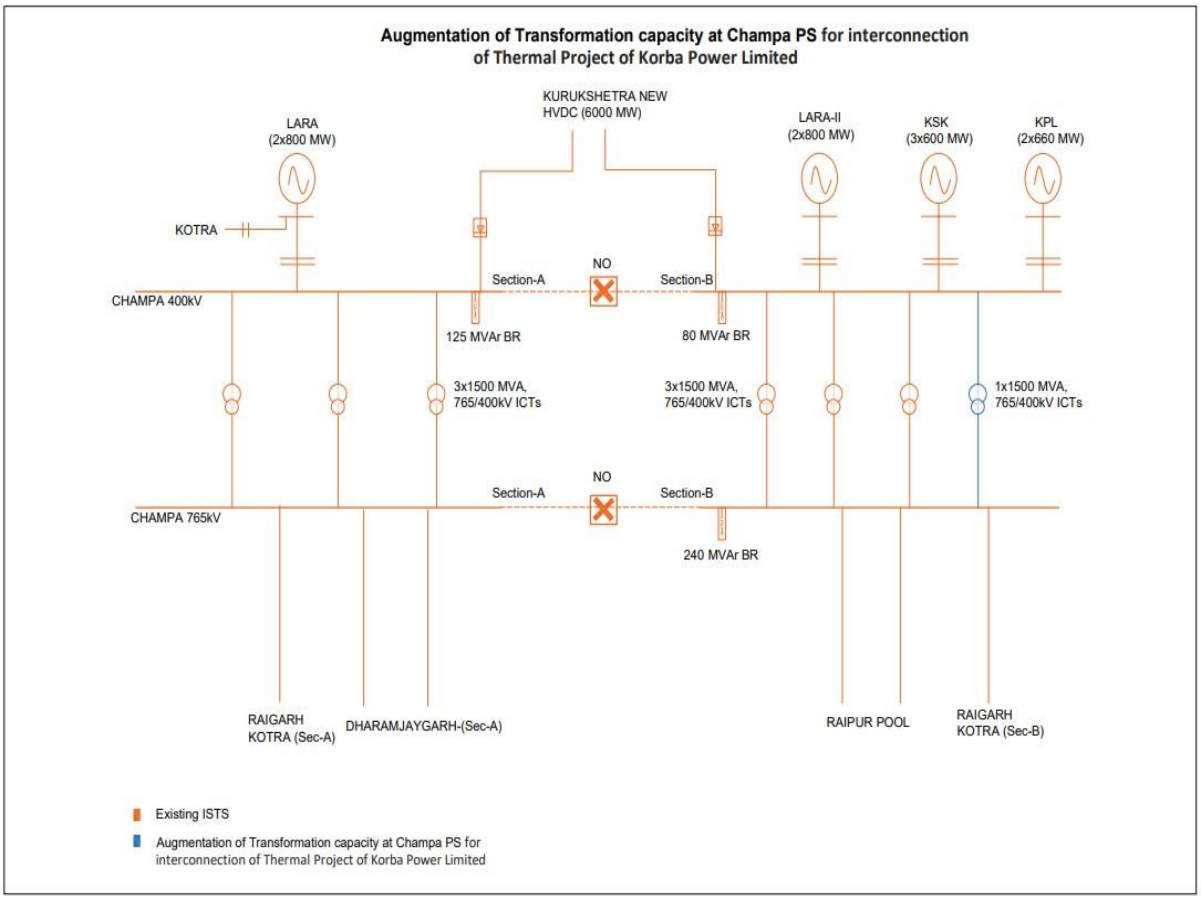



*Figure 5-9: Schematic of 765/400 kV Champa PS*

**C. ICT Augmentation at Dharamjaigarh S/s for providing connectivity to Thermal Project of Korba Power Limited (KPL):**

Dharamjaigarh is an existing substation with 2x1500MVA 765/400kV and 2x500MVA 400/220kV level. Korba Power Limited has applied for connectivity for its 1600MW thermal project at area near Dharamjaigarh.

In the 36th CMETS-WR meeting held on 26.05.2025, Korba Power Limited was agreed to be granted connectivity for its 1600MW thermal project (Application no. -2200001692) by creation of 400kV Sec-B at Dharamjaigarh S/s along with Augmentation of Transformation capacity at Dharamjaigarh S/s by 3x1500MVA ICTs (on Sec-B) with associated ICT bays & 2 nos. 400kV line bays at Sec-B for termination of DTL of KPL generation project. The proposed 765/400kV ICT augmentation at Dharamjaigarh S/s would enable immediate injection of power from Korba Power Limited generation project. For onwards evacuation of power, WR-ER Inter-Regional Network Expansion Scheme would be required inter-alia including Raigarh (Kotra)-II S/s, Jamshedpur establishment alongwith Raigarh (Tamnar) – Jamshedpur 765kV D/c line which would be Common transmission system for the generation project.

The subject scheme was deliberated & agreed to be implemented as Associated Transmission System for Korba Power Limited generation 1600MW project in the 36th CMETs-WR meeting held on 26.05.2025.

**Details of the scheme are given below:**

| Sl. No. | Scope of the Transmission Scheme | Capacity /km |
|---|---|---|
| **1.** | Creation of 400kV Sec- B at D'jaigarh S/s along with Augmentation of Transformation capacity at D'jaigarh S/s by 3x1500MVA ICTs (on Sec-B) (with associated ICT bays) | • 765/400 kV, 1500 MVA ICT – 3 Nos. (9x500 MVA single phase units) **(existing 500MVA spare unit to be utilised)**<br>• 765 kV ICT bays – 3 Nos. (on Sec-B)<br>• 400 kV ICT bays –3 Nos. (on Sec-B)<br>• 400kV Sectionaliser bays – 1 set<br>• 125 MVAr, 420 kV reactor- 1 No.<br>• 400 kV Reactor bay- 1 Nos. (on Sec-B) |
| **2.** | 2 no. 400kV bays at Dharamjaigarh S/s (Sec-B) for Korba Power Limited (TPP): 1600MW: 2200001692 | • 400 kV Line bays- 2 Nos. (on Sec-B) |

**Implementation Timeframe:** 01.11.2028 (matching with start date sought by Korba Power Limited: 1600MW)

**Estimated Cost:** Rs. 550 Crs

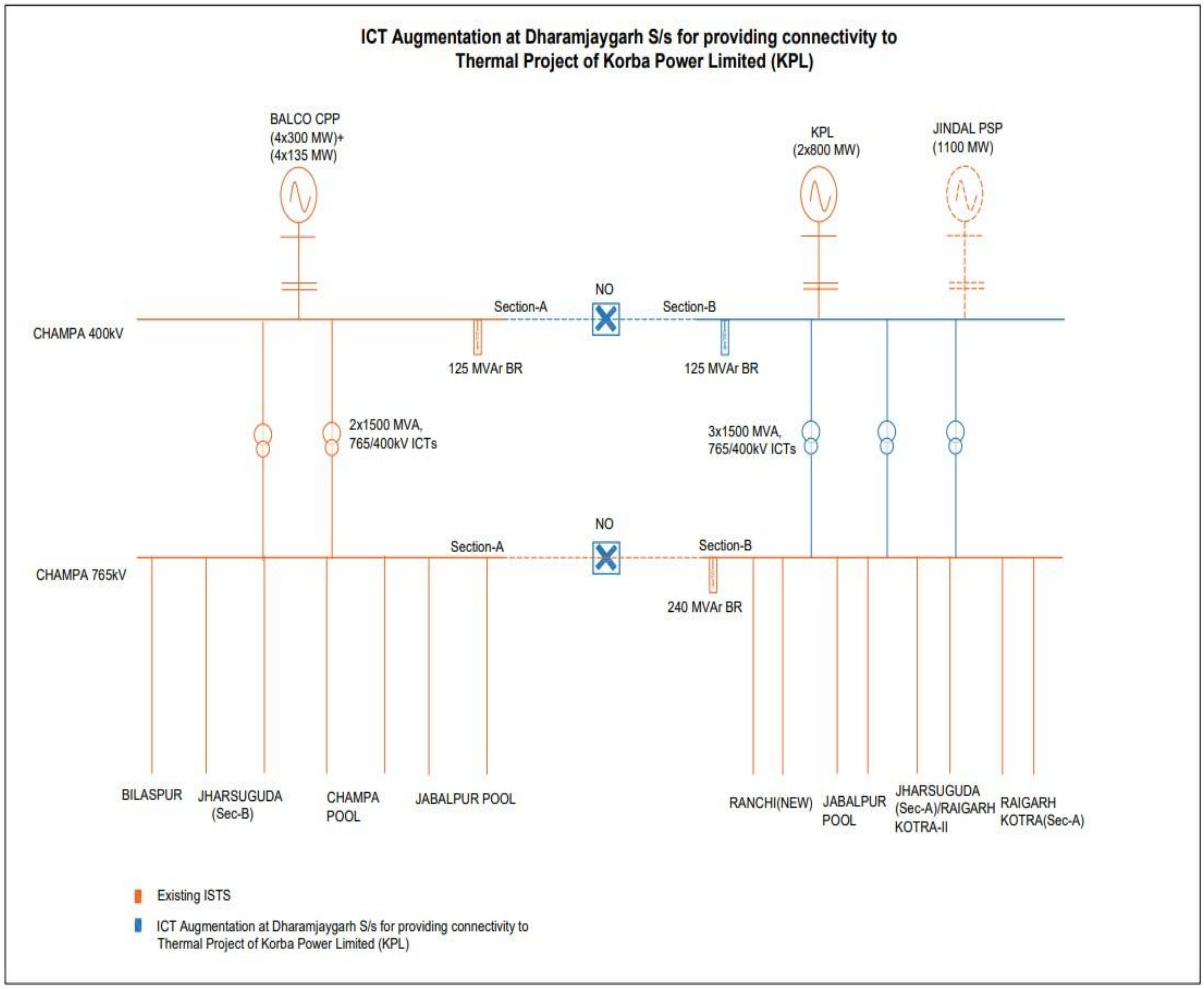



*Figure 5-10: Schematic of 765/400 kV Dharamjaygarh S/s*

# Chapter 6: Southern Region

Southern Region is connected to Western and Eastern Regions through high capacity 765kV AC links, Back-to-Back HVDC and Bi-pole HVDC links. The thermal generating stations of Southern Region are predominantly concentrated in the States of Tamil Nadu, Karnataka, Andhra Pradesh and Telangana. The States of Tamil Nadu, Karnataka and Andhra Pradesh are rich in RE comprising of large-scale Solar & Wind potential. Southern part of Karnataka (Bangalore), Kerala and Central part of Telangana (Hyderabad) has high demand and less internal generation. With the continuous increase in demand and limited conventional generation availability, Southern Region imports power from NEW Grid during peak demand period whereas it exports power to NEW Grid during high RE scenario / off peak demand period.

## 6.1 Power Supply Scenario as on July'25

As on July, 2025 total Installed Capacity (IC) of Southern Region was about 139 GW and the peak demand was about 67 GW. Southern Region has touched the maximum export of about 11 GW and maximum import of about 22 GW. The state-wise breakup of installed capacity and peak demand is summarised at **Table 6--1**.

*Table 6--1: SR Installed Capacity and Peak Demand as on July'25*

*All Fig in GW*

| State | Generation | | | | | | | Grand Total | Peak Demand |
|---|---|---|---|---|---|---|---|---|---|
| | Fossil | | | Non-Fossil | | | | | |
| | Thermal | Gas | Total | Nuclear | Hydro | RES | Total | | |
| **Andhra Pradesh** | 12.6 | 1.3 | 13.9 | 0.1 | 2.9 | 10.7 | 13.7 | **27.6** | 13.1 |
| **Telangana** | 12.5 | 0.4 | 12.9 | 0.1 | 2.5 | 5.4 | 8.1 | **21** | 15.4 |
| **Karnataka** | 10.4 | 0.4 | 10.8 | 0.7 | 3.6 | 21 | 25.4 | **36.2** | 17.3 |
| **Kerala** | 2.8 | 0.4 | 3.1 | 0.4 | 2.0 | 2.1 | 4.5 | **7.6** | 5.2 |
| **Tamil Nadu** | 15 | 0.9 | 15.9 | 1.4 | 2.2 | 23.9 | 27.5 | **41.8** | 19.9 |
| **NLC and Lakshadweep** | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | **0.1** | 0.0 |
| **Puducherry** | 0.3 | 0.0 | 0.3 | 0.1 | 0.0 | 0.1 | 0.2 | **0.4** | 0.5 |
| **Central unallocated** | 2.1 | 0.0 | 2.1 | 0.5 | 0.0 | 0.0 | 0.5 | **2.6** | 0.0 |
| **SR** | **55.7** | **3.4** | **59.1** | **3.3** | **13.1** | **63.3** | **79.7** | **138.8** | **66.7** |

*(Source: CEA monthly report)*

From above, it can be concluded that share of non-fossil fuel-based generation capacity in total present installed capacity (IC) of 138.8 GW is 79.9 GW i.e. 57.4% of total IC. This share would further increase in envisaged scenario of 2030-31 Timeframe.

## 6.2 Envisaged Power Supply Scenario by 2030-31

As per the 20th EPS, Southern Region demand for 2030-31 Timeframe is expected to increase to about 102 GW. As per the inputs received from various stakeholders, total installed capacity of Southern Region for 2030-31 is expected to be about 264 GW. The state wise bifurcation of installed capacity and peak demand is summarized at **Table 6-2.**

*Table 6-2: SR Installed Capacity and peak demand (2030-31)*

*(All Fig in GW)*

| State | Generation | | | | | | | | | Peak Demand |
|---|---|---|---|---|---|---|---|---|---|---|
| | Fossil | | | Non-Fossil | | | | ESS | Grand Total | |
| | Thermal | Gas | Total | Nuclear | Hydro | RES | Total | | | |
| **Andhra Pradesh** | 7.1 | 0.2 | 7.3 | 0.0 | 2.9 | 8.4 | 11.3 | 1.4 | **19.9** | 23.2 |
| **Telangana** | 9.2 | 0.0 | 9.2 | 0.0 | 2.5 | 2.8 | 5.2 | 0 | **14.5** | 25.6 |
| **Karnataka** | 7.7 | 0.4 | 8.1 | 0.0 | 4.3 | 33.4 | 37.7 | 0.0 | **45.8** | 21.0 |
| **Kerala** | 0.0 | 0.4 | 0.4 | 0.0 | 2.4 | 0.5 | 2.8 | 0.0 | **3.2** | 6.7 |
| **Tamil Nadu** | 10.5 | 0.6 | 11.0 | 0.0 | 1.9 | 25.4 | 27.4 | 1.9 | **40.3** | 27 |
| **Puducherry** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **0.0** | 0.6 |
| **Central** | 15.3 | 0.0 | 15.3 | 5.8 | 0.0 | 0.0 | 5.8 | 0.0 | **21.1** | - |
| **IPP** | 4.8 | 0.0 | 4.8 | 0.0 | 0.0 | 105.4 | 105.4 | 9.1 | **101.3** | - |
| **SR** | **54.5** | **1.5** | **56.0** | **5.8** | **14.0** | **175.8** | **195.6** | **12.3** | **264** | **102.4** |

From above, it is observed that growth in installed capacity of Southern Region is majorly from non-fossil fuel-based generation resources. Share of non-fossil fuel-based generation capacity in total present installed capacity (IC) will increased from 57.4% to 74%.

Compound annual growth rate in peak demand of Southern Region from present Timeframe to 2030-31 is around 7.8 %. The state wise peak demand growth is given at **Table 6-3**.

*Table 6-3: Increase in Peak Demand of Various States of SR*

*(All Fig in MW)*

| Peak Demand (MW) | | | | |
|---|---|---|---|---|
| **State** | **Present** | **2030-31** | **Difference** | **% CAGR** |
| **Andhra Pradesh** | 13117 | 23,200 | 10083 | 12.1 |
| **Telangana** | 15443 | 25,600 | 10157 | 10 |
| **Karnataka** | 17330 | 21,000 | 3670 | 3.9 |
| **Kerala** | 5178 | 6,700 | 1522 | 5.3 |
| **Tamil Nadu** | 19878 | 27000 | 7122 | 6.3 |
| **Puducherry** | 548 | 600 | 52 | 3.1 |
| **SR** | **71494** | **104,100** | **32606** | **7.8** |

In addition to above, bulk power demand of about 8.2 GW has been considered from various upcoming Green Hydrogen / Green Ammonia identified by MNRE is proposed to be directly connected to ISTS.

## 6.3 Load Generation Balance for 2030-31 Timeframe

In chapter-3, all India Load Generation Balance (LGB) for identified nine scenarios was prepared as per the methodology finalized in consultation with CTU, CEA and Grid-India. This section elaborates the Southern Region Load Generation Balance (LGB) for 2030-31 Timeframe. For Southern Region also, three points on the daily load curve i.e. Solar max (afternoon), Peak load (evening) and Off-peak load (night) for three seasons viz. Monsoon (August), Summer (June) and Winter (February) have been considered.

Load generation balance has been prepared considering the generation dispatch factors as mentioned at **Table 6-4** for the 9 scenarios. Further, thermal generators have been despatched as per the merit order.

*Table 6-4: Southern Region Generation Dispatch and Demand Factors*

| Scenario No & Name | Generation Dispatch Factors | | | | | | Demand Factors |
|---|---|---|---|---|---|---|---|
| | Hydro | Nuclear | Solar | Wind | ESS | Gas | |
| 1-Aug Solar Max | 40% | 80% | 75% | 50% | -100% | 0% | 84% |
| 2-Aug Peak Load | 70% | 80% | 0% | 75% | 60% | 50% | 72% |
| 3-Aug Night Off Peak | 40% | 80% | 0% | 65% | 40% | 50% | 64% |
| 4-Jun Solar Max | 40% | 80% | 85% | 50% | -100% | 0% | 79% |
| 5-Jun Peak Load | 70% | 80% | 0% | 75% | 50% | 50% | 72% |
| 6-Jun Night Off Peak | 40% | 80% | 0% | 65% | 0% | 50% | 60% |
| 7-Feb Solar Max | 20% | 80% | 90% | 0% | -100% | 0% | 97% |
| 8-Feb Peak Load | 40% | 80% | 0% | 20% | 100% | 50% | 75% |
| 9-Feb Night Off Peak | 20% | 80% | 0% | 0% | 40% | 30% | 61% |

## 6.4 ISTS Network Expansion Schemes Evolved from Feb'25 to Jul'25

Various transmission schemes have been discussed/finalized in the Consultative Meeting for Evolution of Transmission System of Southern Region (CMETS-SR) from Feb' 2025 to Jul' 2025. Brief of all such deliberated transmission schemes are tabulated at **Table 6-5**.

*Table 6-5: Details of the schemes evolved in SR*

| Sl. No. | Name of the Transmission Scheme | Expected Timeframe | Type of scheme* | Quantum (MW) | Tentative Cost (in Cr.) |
|---|---|---|---|---|---|
| **Karnataka** | | | | | |
| **1.** | Transmission system strengthening for integration of additional RE potential at Davanagere (0.25 GW) and Bellary (2.75 GW) | 2027-28 | RE | 3000 | 1111 |
| **2.** | Transmission system strengthening at Tumkur-II for integration of additional RE potential (1.5 GW) | 2027-28 | RE | 1500 | 1051 |

| Sl. No. | Name of the Transmission Scheme | Expected Timeframe | Type of scheme* | Quantum (MW) | Tentative Cost (in Cr.) |
|---|---|---|---|---|---|
| **3.** | Implementation of 1 no. of 220kV line bay at Tumkur (Pavagada) PS for providing Connectivity to M/s TEQ Green Power XX Pvt. Ltd. | 2026-27 | RE | - | 6.36 |
| **4.** | Augmentation of transformation capacity by 1x500 MVA, 400/220kV ICT (3rd) at Narendra (existing) S/s in Karnataka | 2027-28 | RE | - | 67.92 |
| **Andhra Pradesh** | | | | | |
| **1.** | Augmentation of transformation capacity by 1x500 MVA, 400/220kV ICT (6th) at N P Kunta PS in Andhra Pradesh | 2027-28 | SS | 500 | 53 |
| **2.** | Transmission System for integration of Kurnool-V REZ – Phase-I (4.5 GW) | 2028-29 | RE | 4500 | 7,187 |
| **3.** | Transmission System for integration of Kurnool-V REZ – Phase-II (3 GW) | 2028-29 | RE | 3500 | 1,313 |
| **4.** | Transmission Scheme for integration of Anantapur-III Phase-I REZ (4.5 GW) | 2028-29 | RE | 4500 | 4,531 |
| **5.** | Transmission Scheme for integration of Anantapur-III Phase-II REZ (3 GW) | 2028-29 | RE | 3500 | 3,969 |
| **6.** | Transmission System for Integration of Kadapa-II REZ -Phase-I (4.5 GW) | 2028-29 | RE | 4500 | 5,105 |
| **7.** | Transmission System for Integration of Kadapa-II REZ -Phase-II (3 GW) | 2028-29 | RE | 3000 | 3,395 |
| **8.** | Transmission system for proposed Green Hydrogen / Green Ammonia projects in Vizag area, Andhra Pradesh (Phase-I) | 2028-29 | GH | - | 8,386 |
| **9.** | Transmission system for proposed Green Hydrogen / Green Ammonia projects in Vizag area, Andhra Pradesh (Phase-II) | 2028-29 | GH | - | 5,000 |
| **10.** | Transmission system for proposed Green Hydrogen / Green Ammonia projects in Ramayapatnam area (4 GW) | 2028-29 | GH | - | 5,000 |
| **Tamil Nadu** | | | | | |
| **1.** | Augmentation of 1x500 MVA, 400/230kV ICT (4th) at Kalivanthapattu S/s | 2027-28 | SS | - | 73.57 |
| **2.** | Transmission System strengthening at Karur PS for integration of RE generation capacity within the declared potential | 2028-29 | RE | 1000 | 400 |
| **3.** | Upgradation of Udumalpet – Madurai 400kV S/c line | 2027-28 | SS | - | 600 |
| **4.** | Reconductoring of Tirunelveli – Udumalpet and Pugalur – Madurai 400kV D/c lines with HTLS conductor | 2027-28 | SS | - | 1200 |
| **Kerala** | | | | | |
| 1. | Augmentation of 1x500 MVA,400/220kV ICT (3rd) at Thrissur VSC HVDC Station in Kerala | 2027-28 | SS | - | 170 |

| Sl. No. | Name of the Transmission Scheme | Expected Timeframe | Type of scheme* | Quantum (MW) | Tentative Cost (in Cr.) |
|---|---|---|---|---|---|
| **Telangana** | | | | | |
| **1.** | Proposal for reduction of High Short Circuit level at 400kV Maheshwaram (TG) bus | 2027-28 | SS | - | 200 |
| **2.** | Augmentation of transformation capacity by 1x500 MVA (5th), 400/220kV ICT at Hyderabad (Ghanapur) S/s in Telangana | 2027-28 | SS | - | 75 |
| **Puducherry** | | | | | |
| **1.** | Transmission system for reliable power supply to Puducherry and Tamil Nadu | 2028-29 | SS | - | 1100 |
| | | | | **Total** | **49,994** |

**RE – Renewable Energy; SS- System Strengthening; GH – Green Hydrogen;*
*#: Inputs awaited from TSP for estimating the cost.*

Details of the schemes are reproduced below state-wise:

### 6.4.1 Karnataka:

**A. <u>Augmentation of transformation capacity by 1x500 MVA, 400/220kV ICT (3rd) at Narendra (existing) S/s in Karnataka</u>**

During the 210th OCC meeting of SRPC held on 10.01.2024, requirement of additional ICT at Narendra (existing) S/s due to continuous overloading / N-1 violation of existing ICTs was discussed and the proposal for additional 500 MVA ICT at Narendra (existing) was approved in principle. SRLDC in its quarterly report Q4(Jan'24-Mar'24) has highlighted that during high demand period of Karnataka, ICTs at Narendra are not complying N-1 criteria. Proposal for augmentation of 1x500 MVA ICT (3rd) at Narendra was deliberated and agreed in joint study meeting held on 01.04.2024. Same was discussed and agreed in the 38th CMETS-SR held on 02.06.2025. Schematic is given at Figure **6-1-**

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of the Transmission Scheme | Item Description |
|---|---|---|
| 1. | Augmentation of transformation capacity by 1x500 MVA, 400/220kV ICT (3rd) at Narendra (existing) S/s in Karnataka | • 1x500 MVA, 400/220 kV ICT<br>• 400 kV Bay – 1 No. Main Bay (Termination in existing spare bay of half diameter).<br>• 220 kV Outdoor GIS Bay – 1 No.<br>• 220 kV, 1Ph. GIB (to connect outdoor GIS to AIS main bus) – 500m along with associated GIS to AIS bushings. |

| Sl. No. | Scope of the Transmission Scheme | Item Description |
|---|---|---|
| | | • 245 kV, 2500 Sq.mm, Cu XLPE Cable (To connect LV side 400/220kV Transformer to 220kV Bay) –1200m (approx.) along with associated cable termination |

**Implementation Timeframe:** 24 months from the date of allocation

**Estimated Cost:** ₹67.92 Crs.

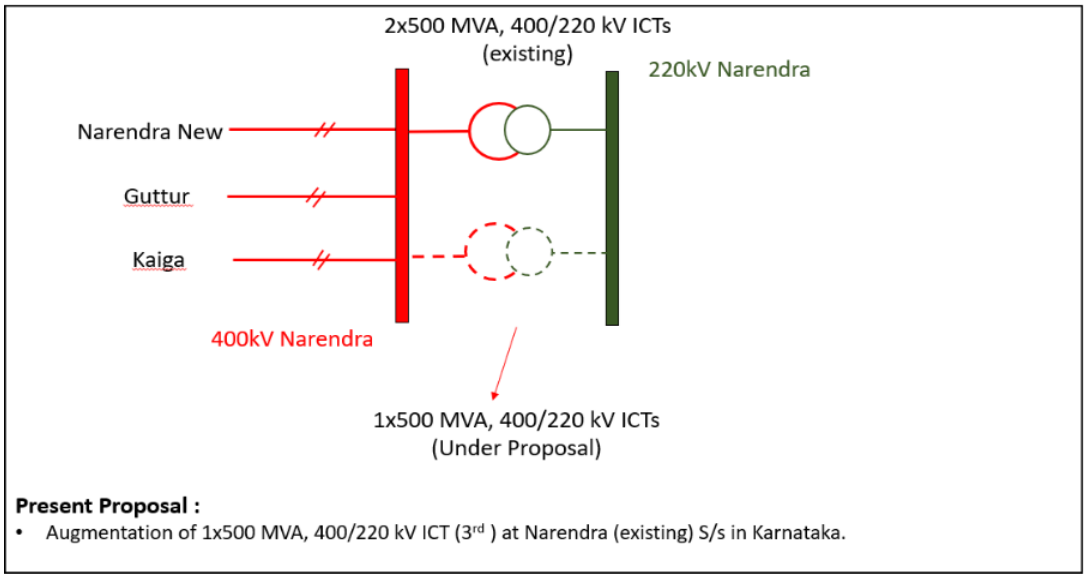



*Figure 6-1: Augmentation of transformation capacity by 1x500 MVA (3rd), 400/220kV ICT at Narendra(existing) 400/220kV GIS S/s in Karnataka*

## B. Transmission system for integration of additional RE capacity in Davanagere, Bellary and Tumkur-II REZ:

MNRE vide letter dated 25.06.2025 has identified additional RE potential of 6 GW in the state of Karnataka. The details are as given below:

| District | Pooling Station | Existing RE potential declared (GW) | Additional RE potential declared (GW) | Total (GW) |
|---|---|---|---|---|
| Vijayanagar | Bellary | 1.5 | 2.75 | 4.25 |
| Davangere | Davangere | 4 | 0.25 | 4.25 |
| Vijayapura | Bijapur | 2 | 1.5 | 3.5 |
| Tumkuru | Tumkur-II | 1.5 | 1.5 | 3 |
| | **Total** | **9** | **6** | **15** |

Earlier based on the identified potential by MNRE as the part of 500 GW non-fossil capacity by 2030, transmission system was identified for integration of Davanagere / Chitradurga (4 GW), Bellary (1.5 GW) and Tumkur-II (1.5 GW). However, the transmission system was to be implemented in phased manner, accordingly, transmission system for 2 GW at Davanagere / Chitradurga, 1.5 GW at Bellary and 1.5 GW at Tumkur-II was taken up for implementation

Following transmission system is required for integration of additional RE potential declared at Davanagere (0.25 GW), Bellary (2.75 GW) and Tumkur-II (1.5 GW):

**i. Transmission system strengthening for integration of additional RE potential at Davanagere (0.25 GW) and Bellary (2.75 GW):**

- Augmentation of transformation capacity by 2x1500 MVA, 765/400kV ICTs (6$^{th}$ & 7$^{th}$) at Davanagere PS
- Augmentation of transformation capacity by 6x500 MVA, 400/220kV ICTs (5$^{th}$ – 10$^{th}$) at Bellary PS
- Bellary – Davanagare 2$^{nd}$ 400kV (Quad) D/c line (~ 70 km)
- 4 nos. of 220kV line bays and 1 no. of 400kV line bay at Davanagere PS for termination of dedicated transmission lines of RE generation projects.
- 7 nos. of 220kV line bays at Bellary PS for termination of dedicated transmission lines of RE generation projects.

The above transmission schemes were deliberated and agreed in the special SRPC meeting held on 4$^{th}$ Feb, 2025 and 31$^{st}$ NCT held on 14$^{th}$ July, 2025. Schematic is given at **Figure 6-2**

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of the Transmission Scheme | Item Description |
|---|---|---|
| 1. | Augmentation of transformation capacity by 2x1500 MVA, 765/400kV ICTs (6th & 7th) at Davanagere PS | • 220 kV line bay – 1 No.<br>• 765/400kV, 1500 MVA, ICTs – 2 Nos.<br>• 765kV ICT bays – 2 Nos. ·<br>• 400kV ICT bays – 2 Nos. ·<br>• 400kV Bus Sectionalizer: 1 set |
| 2. | 4 Nos. of 220kV line bays and 1 No. of 400kV line bay at Davanagere PS for termination of dedicated transmission lines of RE generation projects | • 400kV line bays – 1 No<br>• 220kV line bays – 4 Nos |
| 3. | Augmentation of Bellary PS by 400/220kV, 6x500 MVA ICTs | • 400/220kV, 500 MVA, ICTs – 6 Nos.<br>• 400kV ICT bays – 6 Nos.<br>• 220kV ICT bays – 6 Nos.<br>• 220kV Bus Sectionalizer: 2 set<br>• 220 kV Bus Coupler (BC) Bay – 2 Nos.<br>• 220 kV Transfer Bus Coupler (TBC) Bay – 2 Nos |

| | | |
|---|---|---|
| 4. | Bellary – Davanagare 2nd 400kV (Quad) D/c line (~ 80 km) | ~ 80 km<br>• 400kV line bays – 2 Nos. (at Bellary PS)<br>• 400kV line bays – 2 Nos. (at Davanagere |
| 5. | 5 Nos. of 220kV line bays at Bellary PS for termination of dedicated transmission lines of RE developers | • 220kV line bay – 5 Nos |

**Implementation Timeframe:** 24 months from date of SPV transfer

**Estimated Cost:** Rs.1111 Crs**.**

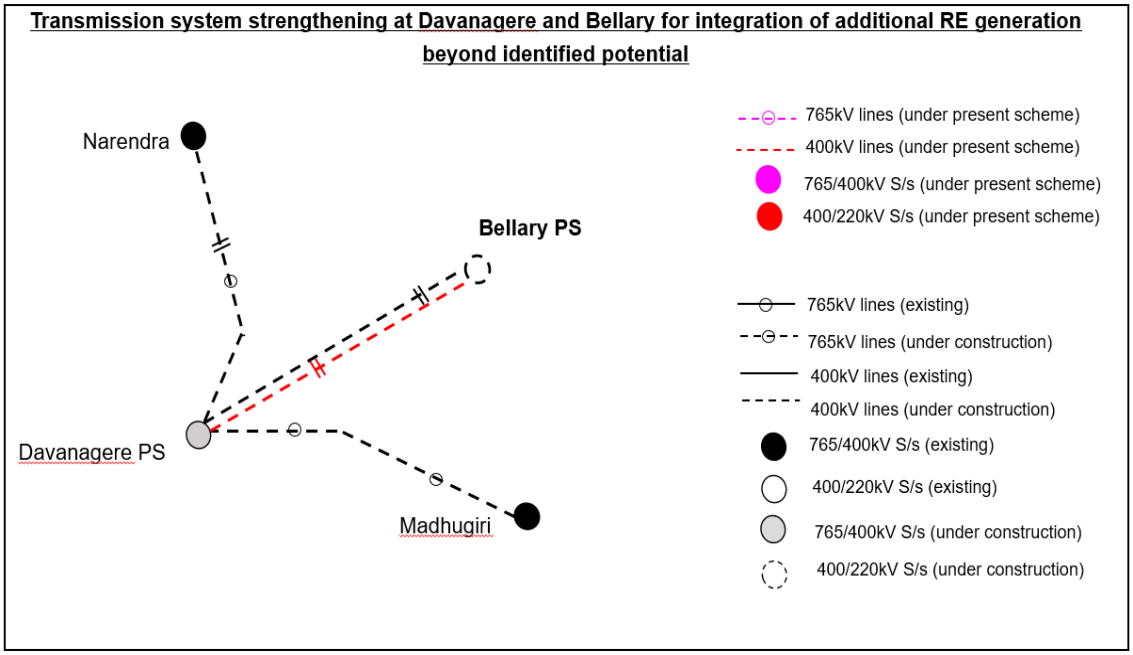



*Figure 6-2 Transmission system strengthening for integration of additional RE potential at Davanagere (0.25 GW) and Bellary (2.75 GW)*

## ii. Transmission system strengthening at Tumkur-II for integration of additional RE potential (1.5 GW)

- Augmentation of transformation capacity by 3x500 MVA, 400/220kV ICTs (5th – 7th) at Tumkur-II PS
- Tumkur-II – Madhugiri 400kV (Quad) D/c line (~100 km)
- ± 300 MVAR STATCOM with switching arrangement of under implementation 2x125 MVAr bus reactors.
  2 nos. of 220kV line bays for termination of dedicated transmission lines of RE generation projects

The above transmission schemes were deliberated and agreed in the special SRPC meeting held on 4th Feb, 2025 and 31st NCT held on 14th July, 2025. Schematic is given at **Figure 6-3**

| Sl. No. | Scope of the Transmission Scheme | Item Description |
|---|---|---|
| **1.** | Augmentation of Tumkur-II PS by 400/220 kV, 3x500 MVA ICTs ($5^{th}$ to $7^{th}$) | • 400/220kV, 500 MVA, ICTs – 3 Nos.<br>• 400kV ICT bays – 3 Nos.<br>• 220kV ICT bays – 3 Nos.<br>• 220kV Bus Sectionalizer: 2 set<br>• 220 kV Bus Coupler (BC) Bay – 2 Nos.<br>• 220 kV Transfer Bus Coupler (TBC) Bay – 2 Nos. |
| 2. | Tumkur-II – Madhugiri 400kV (Quad) D/c line (~ 100 km) | • 400kV line bays – 2 Nos. (at Tumkur-II PS)<br>• 400kV line bays – 2 Nos. (at Madhugiri) |
| 3. | ±300 MVAR STATCOM at Tumkur-II PS with switching arrangement of under implementation 2x125 MVAr bus reactors | • ± 300 MVAR STATCOM at Tumkur-II PS with switching arrangement of under implementation 2x125 MVAr bus reactors<br>• 400 kV bay – 1 No |
| 4. | 2 Nos. of 220kV line bay at Tumkur-II PS for termination of dedicated transmission lines of RE developers | • 220kV line bays – 2 Nos |

**Implementation Timeframe:** 24 months from date of SPV transfer

**Estimated Cost:** Rs. 1051 Crs.

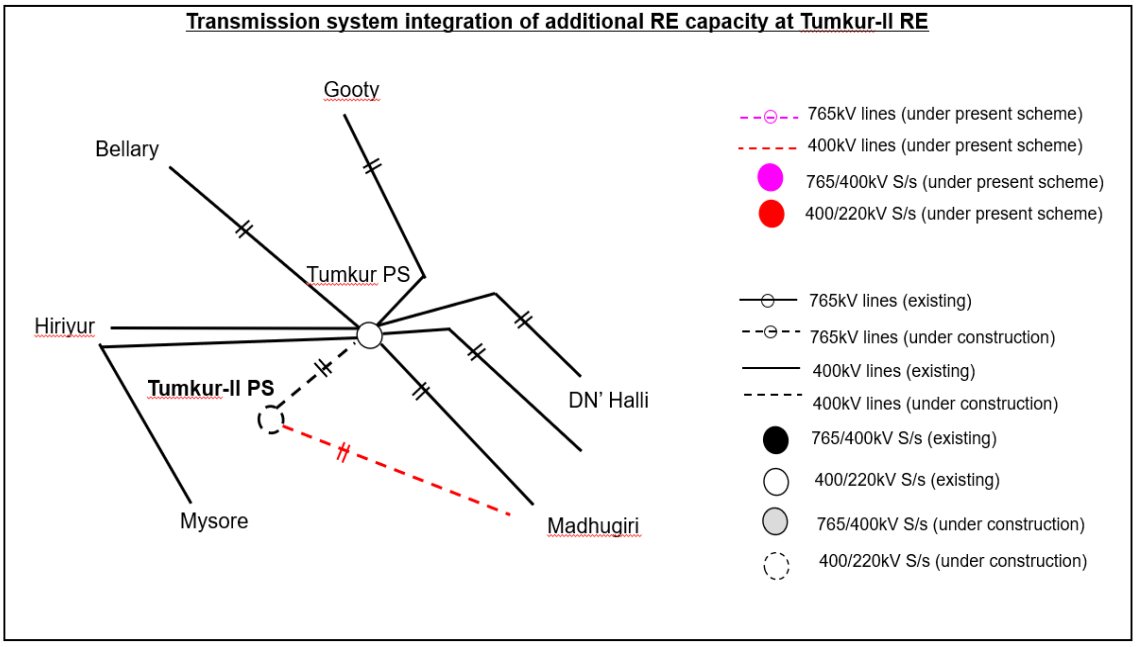



*Figure 6-3 Transmission system strengthening at Tumkur-II for integration of additional RE potential*

## C. Implementation of 1 no. of 220kV line bay at Tumkur (Pavagada) PS for providing Connectivity to M/s TEQ Green Power XX Pvt. Ltd.

Tumkur (Pavagada) PS is under operation with 6x500 MVA, 400/220kV ICTs and owned by POWERGRID. Further, addl. 4x500 MVA (7th to 10th) ICTs are under construction by POWERGRID for providing connectivity for RE generation projects. Connectivity of 300 MW has been agreed for grant to M/s TEQ Green Power XX Pvt. Ltd. at 220kV level of Tumkur (Pavagada) PS with 1 no. of 220kV bay under ISTS during the 36th CMETS-SR held on 19.12.2024. Schematic is given in **Figure** 6-4 . The details are as below:

- 1 no. of 220kV line bay at Tumkur (Pavagada) PS for termination of dedicated transmission line of M/s TEQ Green Power XX Pvt. Ltd.

Transmission scheme has been awarded to PGCIL for implementation.

| Sl. No. | Scope of the Transmission Scheme | Item Description |
|---|---|---|
| **1.** | Implementation of 1 no. of 220kV line bay at Tumkur (Pavagada) PS for providing Connectivity to M/s TEQ Green Power XX Pvt. Ltd | • 220 kV line bay – 1 No. |

**Implementation Timeframe:** 15.03.2027 as per the start date of Connectivity

**Estimated Cost:** Rs. 6.36 Crs.

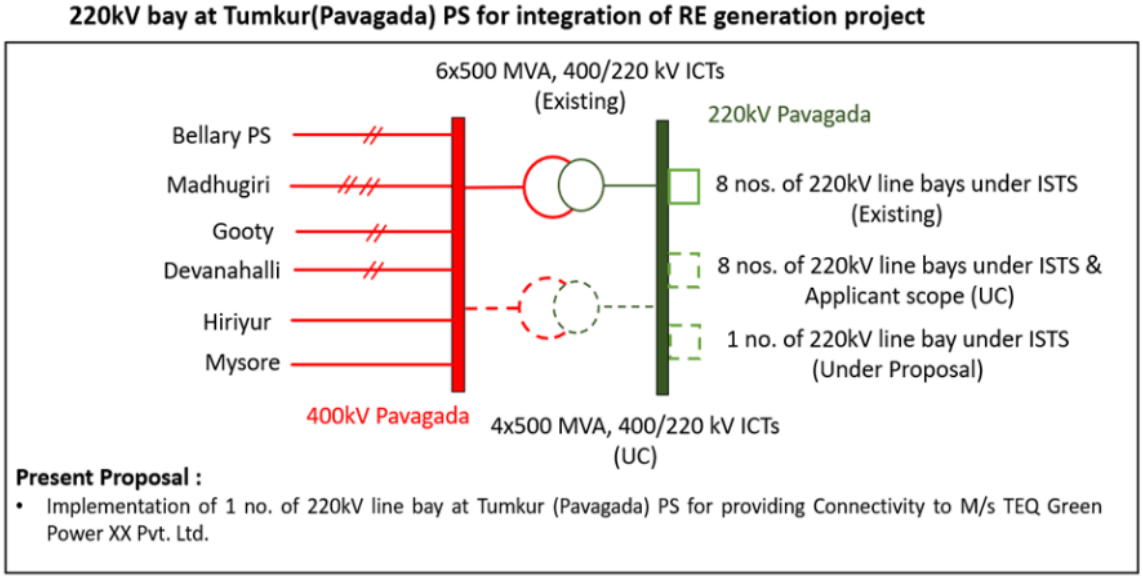



*Figure 6-4: Implementation of 1 no. of 220kV line bay at Tumkur (Pavagada) PS for providing Connectivity to M/s TEQ Green Power XX Pvt. Ltd.*

### 6.4.2 Andhra Pradesh

**A. <u>Augmentation of transformation capacity by 1x500 MVA, 400/220kV ICT (6th) at N P Kunta PS in Andhra Pradesh</u>**

NP Kunta PS is under operation with 4x500 MVA, 400/220kV ICTs. Further, 1x500 MVA ICT (5th) at NP Kunta PS is under implementation and is expected by Dec'25. Connectivity of about 2000 MW has been granted / agreed for grant at NP Kunta. In addition to the above, connectivity for about 200 MW has been received at NP Kunta PS. Accordingly, for grant of connectivity to above applications, 1x500 MVA, 400/220 kV ICT (6th) at NP Kunta PS is required

In view of the above, the augmentation of transformation capacity by 1x500 MVA, 400/220kV ICT (6th) at NP Kunta PS in Andhra Pradesh was discussed and agreed in the 39th CMETS-SR held on 18th Jul, 2025. Schematic is given at **Figure 6-5**

**Implementation Timeframe:** 21 months from the date of allocation

**Estimated Cost:** Rs. 53 Cr

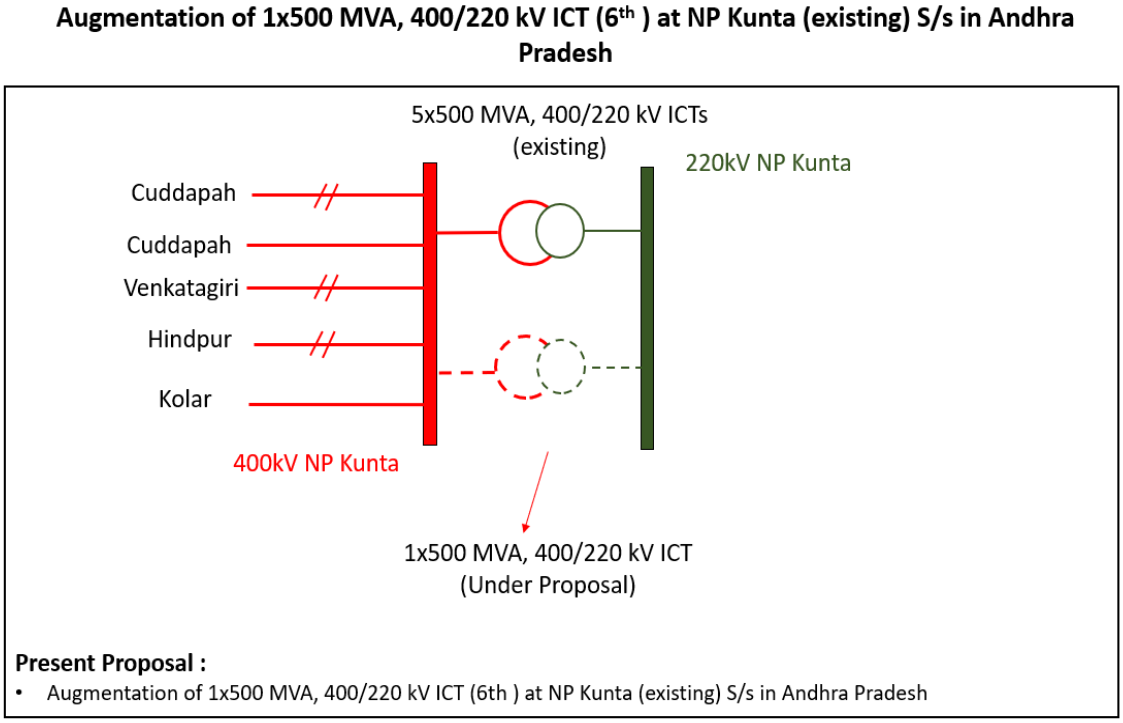



*Figure 6-5: Augmentation of transformation capacity by 1x500 MVA, 400/220kV ICT (6th) at N P Kunta PS in Andhra Pradesh*

**B. <u>Transmission System for integration of Kurnool-V, Ananthapuram-III and Kadapa-II REZs in Andhra Pradesh</u>**

Govt. of India has set a target of 500 GW generation capacity from non-fossil fuel resources by 2030. In this direction, MNRE has identified addition of 86 GW RE

Potential in the State of Andhra Pradesh, Telangana, Karnataka and Tamil Nadu (Offshore) in Southern Region. Out of the identified (86 GW) RE Potential in Southern Region, 51 GW has been identified in the State of Andhra Pradesh (Ananthapur– 20 GW, Kurnool – 23 GW & Kadapa – 8 GW).

A comprehensive transmission system for integration of 51 GW RE Potential in Andhra Pradesh have been identified by CEA and a report on Transmission System for Integration of over 500 GW RE Capacity has been published by CEA on 07.12.2022. The details of district wise potential are as below.

| District | Potential (GW) | | Total (GW) |
|---|---|---|---|
| | Wind | Solar | |
| Anantapur | 10 | 10 | 20 |
| Kurnool | 8 | 15 | 23 |
| Kadapa | 0 | 8 | 8 |
| **Total** | **18** | **33** | **51** |

The transmission system for integration of 7.5 GW each at Ananthapuram-II and Kurnool-IV has already been identified and the transmission system is at various stages of implementation. Connectivity of about 7500 MW has already been granted / agreed for grant at Ananthapuram-II PS and Kurnool-IV PS. In addition to the above, additional applications for about 3630 MW at Ananthapuram-III PS and 1900 MW at Kurnool-V PS has already been received till Jun' 25. As Ananthapuram-II PS and Kurnool-IV PS is planned for 7.5 GW and accordingly Ananthapuram-III PS and Kurnool-V PS shall be required for grant of connectivity for balance applications seeking connectivity in Anantapur and Kurnool area.

Further, Connectivity of about 600 MW has been agreed for grant / received at Kadapa-II PS till Jun'25 and accordingly Kadapa-II PS shall be required for grant of connectivity to the applications seeking connectivity in Kadapa area

Joint Study meeting of SR constituents was held from 23rd to 25th April, 2025 at Thrissur wherein following transmission system was agreed for integration of RE generation projects at Kurnool-V, Ananthapuram-III and Kadapa-II in Andhra Pradesh.

**i. Transmission System for Integration of Kurnool-V REZ – 7.5 GW**

**Phase-I (4.5 GW)**

- Establishment of 4x1500 MVA, 765/400 kV and 5x500 MVA, 400/220kV Kurnool-V Pooling Station along with 2x330 MVAr bus reactor at Kurnool-V
- ± 300 MVAr STATCOM at Kurnool-V
- Kurnool-V – Shadnagar 765 kV D/c line (240 km) 1x240 MVAr SLR (convertible) at both ends on both circuits

- Kurnool-V – Raichur New 765 kV D/c line (150 km) 1x240 MVAr SLR (convertible) at Kurnool-V end on both circuits
- Establishment of 3x1500 MVA, 765/400 kV Sagar substation with 2x330 MVAr bus reactors and space provision for establishment of 400/220 kV switchyard
- Sagar – N'Sagar 400 kV quad D/c line (25 km)
- Kurnool-V – Sagar 765 kV D/c line (240 km) 1x240 MVAr SLR (convertible) at both ends on both circuits

**Phase-II (3 GW)**

- Augmentation of 2x1500 MVA, 765/400 kV and 5x500 MVA, 400/220kV ICTs at Kurnool-V Pooling Station
- Kurnool-V – Nellore 765 kV D/c line (240 km) 1x240 MVAr SLR (convertible) at both ends on both circuits
- Khammam-II – Sagar 765 kV D/c line (150 km) 1x240 MVAr SLR (convertible) at Khammam-II end on both circuits

The above transmission schemes were deliberated in the 38th CMETS-SR held on 2nd June, 2025 wherein it was agreed that initially transmission system for Phase-I of Kurnool-V may be taken up for implementation and Phase-II transmission system for Kurnool-V may be taken up subsequently based on the receipt of further applications

This scheme also discussed and agreed in 55th SRPC held on 26th Jul,2025 and 32nd NCT held on 12th Aug, 2025. Schematic is given in **Figure 6-6**

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of the Transmission Scheme | Capacity /km |
|---|---|---|
| 1. | Establishment of 4x1500 MVA, 765/400 kV and 5x500 MVA, 400/220kV Kurnool-V Pooling Station near Kodumur in Kurnool district along with 2x330 MVAr (765 kV) bus reactors at Kurnool-V PS with provision of two (2) sections of 4500 MVA each at 400kV level<br>**Future Space Provisions:**<br>• 765/400kV, 1500 MVA, ICTs – 2 Nos.<br>• 765kV ICT bays – 2 Nos.<br>• 400kV ICT bays – 2 Nos.<br>• 400/220kV, 500 MVA, ICTs – 13 Nos.<br>• 400kV ICT bays – 13 Nos.<br>• 220kV ICT bays – 13 Nos.<br>• 765kV line bays – 8 Nos. (with provision for SLR)<br>• 400kV line bays – 12 Nos. (with provision for SLR)<br>• 220kV line bays – 19 Nos.<br>• 220kV Bus Sectionalizer : 2 sets<br>• 220 kV Bus Coupler (BC) Bay – 2 Nos. | • 765/400kV, 1500 MVA, ICTs – 4 Nos. (13x500 MVA incl. 1 spare unit)<br>• 765kV ICT bays – 4 Nos.<br>• 400kV ICT bays – 4 Nos.<br>• 765kV line bays – 6 Nos. (at Kurnool-V PS for termination of Kurnool-V – Shadnagar, Kurnool-V – Raichur New and Kurnool-V – Sagar 765kV D/c lines)<br>• 765 kV, 330 MVAr Bus Reactor – 2 Nos. (7x110 MVAr inc. 1 switchable spare unit for both bus reactor and line reactor)<br>• 765 kV Bus Reactor bays – 2 Nos.<br>• 400/220kV, 500 MVA, ICTs – 5 Nos. |

| Sl. No. | Scope of the Transmission Scheme | Capacity /km |
|---|---|---|
| | • 220 kV Transfer Bus Coupler (TBC) Bay – 2 Nos.<br>• 400kV Bus Sectionalizer : 1 set | • 400kV ICT bays – 5 Nos. 220kV ICT bays – 5 Nos.<br>• 220kV line bays – 6 Nos.<br>• 220kV Bus Sectionalizer : 1 set<br>• 220 kV Bus Coupler (BC) Bay – 2 Nos.<br>• 220 kV Transfer Bus Coupler (TBC) Bay – 2 Nos... |
| 2. | Kurnool-V – Shadnagar 765 kV D/c line (about 240 km) with 240 MVAr SLR (convertible) at both ends on both circuits | ~ 240 km<br>• 765 kV line bays – 2 Nos. (at Shadnagar)<br>• 765 kV, 240 MVAr SLR at Kurnool-V PS – 2 Nos. (7x80 MVAr inc. 1 switchable spare unit)<br>• Switching Equipment for 765 kV SLR at Kurnool-V PS – 2 Nos.<br>• 765 kV, 240 MVAr SLR at Shadnagar PS – 2 Nos. (7x80 MVAr inc. 1 switchable spare unit)<br>• Switching Equipment for 765 kV SLR at Shadnagar PS – 2 Nos |
| 3. | Kurnool-V – Raichur New 765 kV D/c line (about 150 km) with 240 MVAr SLR (convertible) at Raichur New end on both circuits | ~ 150 km<br>• Conversion of 765 kV Bus Reactor bay to 765 kV Line bay with SLR – 2 Nos. (at Raichur New)<br>(The Kurnool-V – Raichur 765kV D/c line is to be terminated in the existing 240 MVAr bus reactor bays and converting these bus reactors into switchable line reactors) |
| 4. | ± 300 MVAr STATCOM at Kurnool-V PS | • 400kV bay – 1 no.<br>• ± 300 MVAr STATCOM – 1 set |
| 5. | Establishment of 3x1500 MVA, 765/400 kV Sagar substation with 2x330 MVAr (765 kV) bus reactors with space provision for establishment of 220 kV switchyard<br>**Future Space Provisions**:<br>• 765/400kV, 1500 MVA, ICTs – 3 Nos.<br>• 765kV ICT bays – 3 Nos.<br>400kV ICT bays – 3 Nos.<br>• 765kV line bays – 12 Nos. (with provision for SLR) | • 765/400kV, 1500 MVA, ICTs – 3 Nos. (10x500 MVA incl. 1 spare unit)<br>• 765kV ICT bay – 3 Nos.<br>• 400kV ICT bay – 3 Nos.<br>• 765kV line bays – 2 Nos. (at Sagar for termination of Kurnool-V – Sagar 765 kV D/c line) |

| Sl. No. | Scope of the Transmission Scheme | Capacity /km |
|---|---|---|
| | • 400kV line bays – 10 Nos. (with provision for SLR)<br>• 400kV Bus Sectionalizer : 1 set<br><br>**Future Space Provisions for 220kV switchyard**:<br>• 400/220kV, 500 MVA, ICTs – 10 Nos.<br>• 400kV ICT bays – 10 Nos.<br>• 220kV ICT bays – 10 Nos.<br>• 220kV line bays – 16 Nos.<br>• 220kV Bus Sectionalizer: 3 set<br>• 220 kV Bus Coupler (BC) Bay – 4 Nos.<br>• 220 kV Transfer Bus Coupler (TBC) Bay – 4 Nos. | • 765 kV, 330 MVAr Bus Reactors – 2 Nos. (7x110 MVAr inc. 1 switchable spare unit)<br>• 765 kV Bus Reactor bays – 2 Nos.<br>• 400kV line bays – 2 Nos. (at Sagar for termination of Sagar – Nagarjunasagar 400 kV quad D/c line) |
| 6. | Kurnool-V – Sagar 765 kV D/c line (about 240 km) with 240 MVAr SLR (convertible) at both ends on both circuits | ~ 240 km<br>• 765 kV line bays – 2 Nos. (at Sagar)<br>• 765 kV, 240 MVAr SLR at Kurnool-V PS – 2 Nos. (6x80 MVAr switchable units)<br>• Switching Equipment for 765 kV SLR at Kurnool-V PS – 2 Nos.<br>• 765 kV, 240 MVAr SLR at Sagar – 2 Nos. (7x80 MVAr inc. 1 switchable spare unit)<br>• Switching Equipment for 765 kV SLR at Sagar – 2 Nos. |
| 7 | Sagar – Nagarjunasagar 400 kV quad D/c line (about 25 km) | ~25km<br><br>• 400kV line bays – 2 Nos. (at Nagarjunasagar) |

**Implementation Timeframe:** 30 months from date of SPV transfer

**Estimated Cost:** Rs.7187 Crs

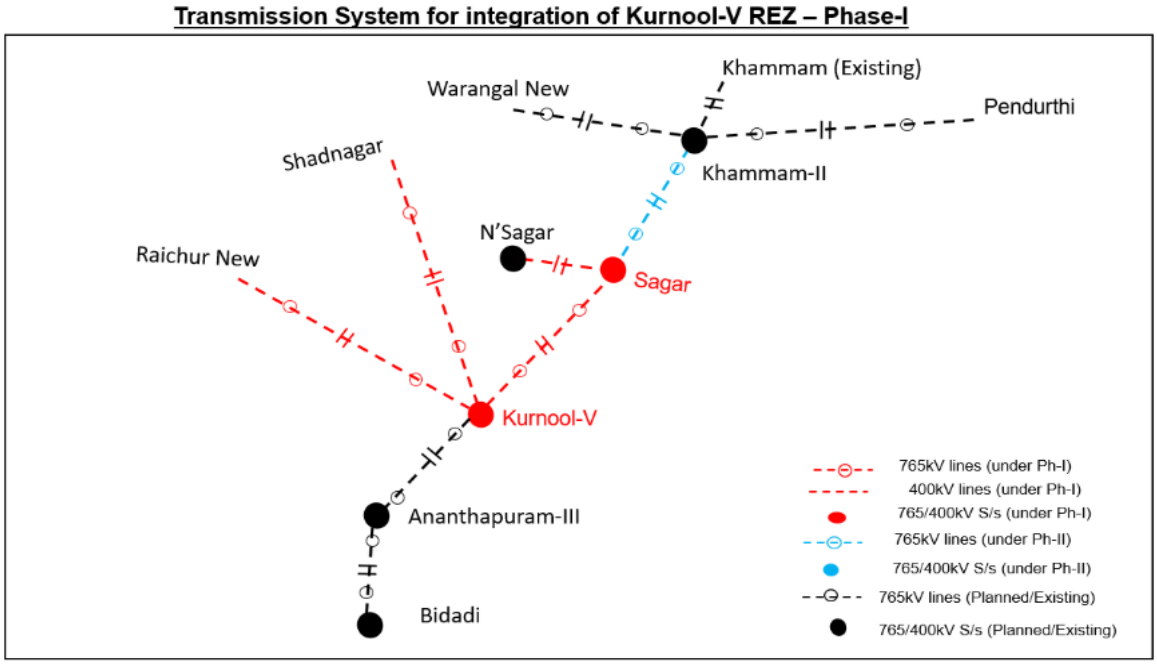



*Figure 6-6: Transmission System for Integration of Kurnool-V REZ Phase-I*

## ii. Transmission System for Integration of Ananthapuram-III REZ – 7.5 GW

**Phase-I (4.5 GW)**

- Establishment of 4x1500 MVA, 765/400 kV and 5x500 MVA, 400/220kV Ananthapuram-III Pooling Station along with 2x330 MVAr bus reactor
- ± 300 MVAr STATCOM or SYNCON (on pilot basis) at Ananthapuram-III
- Ananthapuram-III – Kurnool-V 765kV D/c line (170 km) with 1x330 MVAr SLR (convertible) at Ananthapuram-III end on both circuit
- Upgradation of existing 400/220kV Bidadi Station to 765kV level with 3x1500 MVA, 765/400 kV ICTs (Additional land for upgradation to 765kV level to be provided by KPCL at the earliest so that it can be implemented in matching Timeframe)
- Ananthapuram-III – Bidadi 765kV D/c line (90 km)

**Phase-II (3.5 GW)**

- Augmentation of 2x1500 MVA, 765/400 kV and 5x500 MVA, 400/220kV ICTs at Ananthapuram-III Pooling Station

The above transmission schemes were deliberated in the 38$^{th}$ CMETS-SR held on 2$^{nd}$ June, 2025 wherein it was agreed that initially transmission system for Phase-I of Ananthapuram-III may be taken up for implementation and Phase-II transmission system for Ananthapuram-III may be taken up subsequently based on the receipt of further applications

This scheme also discussed and agreed in 55th SRPC held on 26th Jul, 2025 and 32nd NCT held on 12th Aug 2025. Schematic is shown in **Figure 6-7**.

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of the Transmission Scheme | Capacity /km |
|---|---|---|
| 1. | Establishment of 4x1500 MVA, 765/400 kV and 9x500 MVA, 400/220kV Ananthapuram-III Pooling Station near Urvakonda/Beluguppa/Kalyandurg areas in Anantapur district along with 2x330 MVAr (765 kV) bus reactors at Ananthapuram-III PS with provision of two (2) sections of 4500 MVA each at 400kV level<br>**Future Space Provisions:**<br>• 765/400kV, 1500 MVA, ICTs – 2 Nos.<br>• 765kV ICT bays – 2 Nos.<br>• 400kV ICT bays – 2 Nos.<br>• 400/220kV, 500 MVA, ICTs – 10 Nos.<br>• 400kV ICT bays – 9 Nos.<br>• 220kV ICT bays – 9 Nos.<br>• 765kV line bays – 10 Nos. (with provision for SLR)<br>• 400kV line bays – 11 Nos. (with provision for SLR)<br>• 220kV line bays – 14 Nos.<br>• 220kV Bus Sectionalizer : 1 set<br>• 220 kV Bus Coupler (BC) Bay – 1 no.<br>• 220 kV Transfer Bus Coupler (TBC) Bay – 1 no. | • 765/400kV, 1500 MVA, ICTs – 4 Nos. (13x500 MVA incl. 1 spare unit)<br>• 765kV ICT bays – 4 Nos.<br>• 400kV ICT bays – 4 Nos.<br>• 765kV line bays – 4 Nos. (at Ananthapuram-III PS for termination of Ananthapuram-III – Kurnool-V and Ananthapuram-III – Bidadi 765kV D/c lines)<br>• 765 kV, 330 MVAr Bus Reactor – 2 Nos. (7x110 MVAr inc. 1 switchable spare unit for both bus reactor and line reactor)<br>• 765 kV Bus Reactor bays – 2 Nos.<br>• 400/220kV, 500 MVA, ICTs – 9 Nos.<br>• 400kV ICT bays – 9 Nos.<br>• 220kV ICT bays – 9 Nos.<br>• 400kV Bus Sectionalizer : 1 set<br>• 220kV line bays – 11 Nos<br>• 220kV Bus Sectionalizer: 2 sets<br>• 220 kV Bus Coupler (BC) Bay – 3 Nos.<br>• 220 kV Transfer Bus Coupler (TBC) Bay – 3 Nos. |
| 2. | Ananthapuram-III – Kurnool-V 765 kV D/c line (about 170 km) with 330 MVAr SLR (convertible) at Ananthapuram-III end on both circuits<br>**Future Space Provisions:**<br>• 765/400kV, 1500 MVA, ICTs – 3 Nos.<br>• 765kV ICT bays – 3 Nos.<br>• 400kV ICT bays – 3 Nos.<br>• 765kV line bays – 6 Nos. (with provision for SLR)<br>• 400kV line bays – 6 Nos. (with provision for SLR) | ~ 170 km<br>• 765 kV line bays – 2 Nos. (at Kurnool-V)<br>• 765 kV, 330 MVAr SLR at Ananthapuram-III PS – 2 Nos. (6x110 MVAr switchable units)<br>• Switching Equipment for 765 kV SLR at Ananthapuram-III PS – 2 Nos |
| 3. | Upgradation of existing 400/220kV Bidadi GIS to 765kV level GIS with 3x1500 MVA, 765/400 kV ICTs | • 765/400kV, 1500 MVA, ICTs – 3 Nos. (10x500 MVA incl. 1 spare unit)<br>• 765kV ICT bays – 3 Nos.<br>• 400kV ICT bays – 3 Nos. |

| Sl. No. | Scope of the Transmission Scheme | Capacity /km |
|---|---|---|
| | | • 765kV line bays – 2 Nos. (at Bidadi for termination of Ananthapuram-III – Bidadi 765kV D/c line)<br>• 765 kV, 330 MVAr Bus Reactor – 2 Nos. (7x110 MVAr inc. 1 switchable spare unit)<br>• 765 kV Bus Reactor bays – 2 Nos) |
| 4. | ±300 MVAR STATCOM at Ananthapuram-III PS | • 400kV bay – 1 no.<br>• + 300 MVAr STATCOM – 1 set |
| 5. | Ananthapuram-III – Bidadi 765kV D/c line (about 90 km) | ~ 90 km<br>• 765 kV line bays – 2 Nos. (at Ananthapuram-III) |

**Implementation Timeframe:** 30 months from the date of SPV transfer

**Estimated Cost:** Rs.4531 Crs.

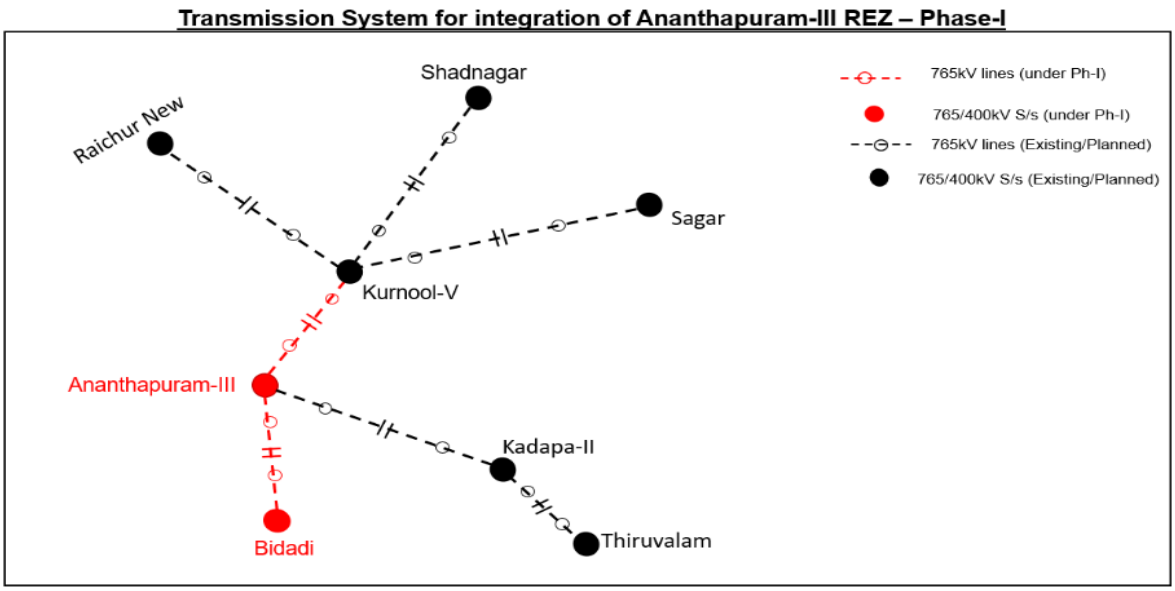



*Figure 6-7: Transmission System for integration of Anantapur-III REZ Phase-I*

### iii. Transmission System for Integration of Kadapa-II REZ – 7.5 GW:

**Phase-I (4.5GW)**

- Establishment of 4x1500 MVA, 765/400 kV and 5x500 MVA, 400/220kV Kadapa-II Pooling Station along with 2x330 MVAr bus reactor
- ± 300 MVAr STATCOM at Kadapa-II
- Kadapa-II – Thiruvelam 765kV D/c line (250 km) 1x240 MVAr SLR (convertible) at both ends on both circuits
- Ananthapuram-III – Kadapa-II 765kV D/c line (220 km) with 1x330 MVAr SLR (convertible) at Ananthapuram-III end on both circuits

**Phase-II (3 GW)**

- Augmentation of 2x1500 MVA, 765/400 kV and 5x500 MVA, 400/220kV Kadapa-II Pooling Station
- Upgradation of Nagapattinam GIS to 765 kV level with 2x1500 MVA, 765/400kV ICTs
- Thiruvelam – Nagapattinam 765kV D/c line (250 km) 1x240 MVAr SLR (convertible) at both ends on both circuits

The above transmission schemes were deliberated in the 38th CMETS-SR held on 2nd June 2025 wherein it was agreed that initially transmission system for Phase-I of Kadapa-II REZs may be taken up for implementation and Phase-II transmission system for Kadapa-II REZs may be taken up subsequently based on the receipt of further applications

"Transmission System for Integration of Kadapa-II REZ (Ph-I)" were discussed and agreed in principally in the 55th SRPC meeting held on 26th Jul 2025. Schematic is shown in **Figure 6-8**

| Sl. No. | Scope of the Transmission Scheme | Capacity /km |
|---|---|---|
| 1. | Establishment of 4x1500 MVA, 765/400 kV and 5x500 MVA, 400/220kV Kadapa-II Pooling Station along with 2x330 MVAr (765 kV) bus reactors at Kadapa-II PS with provision of two (2) sections of 4500 MVA each at 400kV level<br>**Future Space Provisions:**<br>• 765/400kV, 1500 MVA, ICTs – 2 Nos.<br>• 765kV ICT bays – 2 Nos<br>• 400kV ICT bays – 2 Nos.<br>• 400/220kV, 500 MVA, ICTs – 14 Nos.<br>• 400kV ICT bays – 14 Nos.<br>• 220kV ICT bays – 14 Nos.<br>• 765kV line bays – 10 Nos. (with provision for SLR)<br>• 400kV line bays – 12 Nos. (with provision for SLR<br>• 220kV line bays – 19 Nos.<br>• 220kV Bus Sectionalizer: 2 sets<br>• 220 kV Bus Coupler (BC) Bay – 2 Nos.<br>• 220 kV Transfer Bus Coupler (TBC) Bay – 2 Nos.<br>• 400kV Bus Sectionalizer: 1 set | • 765/400kV, 1500 MVA, ICTs – 4 Nos. (13x500 MVA incl. 1 spare unit)<br>• 765kV ICT bays – 4 Nos.<br>• 400kV ICT bays – 4 Nos.<br>• 765kV line bays – 4 Nos. (at Kadapa-II PS for termination of Kadapa-II –Thiruvalam and Kadapa-II – Ananthapuram-III 765kV D/c lines)<br>• 765 kV, 330 MVAr Bus Reactor – 2 Nos. (7x110 MVAr inc. 1 switchable spare unit for both bus reactor and line reactor)<br>• 765 kV Bus Reactor bays – 2 Nos.<br>• 400/220kV, 500 MVA, ICTs – 4 Nos.<br>• 400kV ICT bays – 4 Nos.<br>• 220kV ICT bays – 4 Nos.<br>• 220kV line bays – 6 Nos.<br>• 220kV Bus Sectionalizer: 1 set<br>• 220 kV Bus Coupler (BC) Bay – 2 Nos.<br>• 220 kV Transfer Bus Coupler (TBC) Bay – 2 Nos.. |
| 2. | Kadapa-II – Thiruvalam 765 kV D/c line (about 250 km) with 240 MVAr SLR (convertible) at both ends on both circuits | ~ 250 km<br>• 7765 kV line bays – 2 Nos. of complete diameters (GIS) at Thiruvalam<br>• 765 kV, 240 MVAr SLR at Kadapa-II PS – 2 Nos. (7x80 MVAr inc. 1 switchable spare unit) |

| Sl. No. | Scope of the Transmission Scheme | Capacity /km |
|---|---|---|
| | | • Switching Equipment for 765 kV SLR at Kadapa-II PS – 2 Nos.<br>• 765 kV, 240 MVAr SLR at Thiruvalam – 2 Nos. (7x80 MVAr inc. 1 switchable spare unit)<br>• Switching Equipment for 765 kV SLR at Thiruvalam – 2 Nos |
| 7. | Kadapa-II – Ananthapuram-III 765 kV D/c line (about 220 km) with 330 MVAr SLR (convertible) at Kadapa-II end on both circuits | ~ 220 km<br>• 765 kV line bays – 2 Nos. (at Ananthapuram-III)<br>• 765 kV, 330 MVAr SLR at Kadapa-II PS – 2 Nos. (6x110 MVAr switchable units)<br>• Switching Equipment for 765 kV SLR at Kadapa-II PS – 2 Nos. |
| 8. | ± 300 MVAr STATCOM at t Kadapa-II PS | • 400 kV bay – 1 no.<br>• ± 300 MVAr STATCOM – 1 set |

**Implementation Timeframe:** 30 months from the date of SPV transfer

**Estimated Cost:** Rs. 5105 Crs.

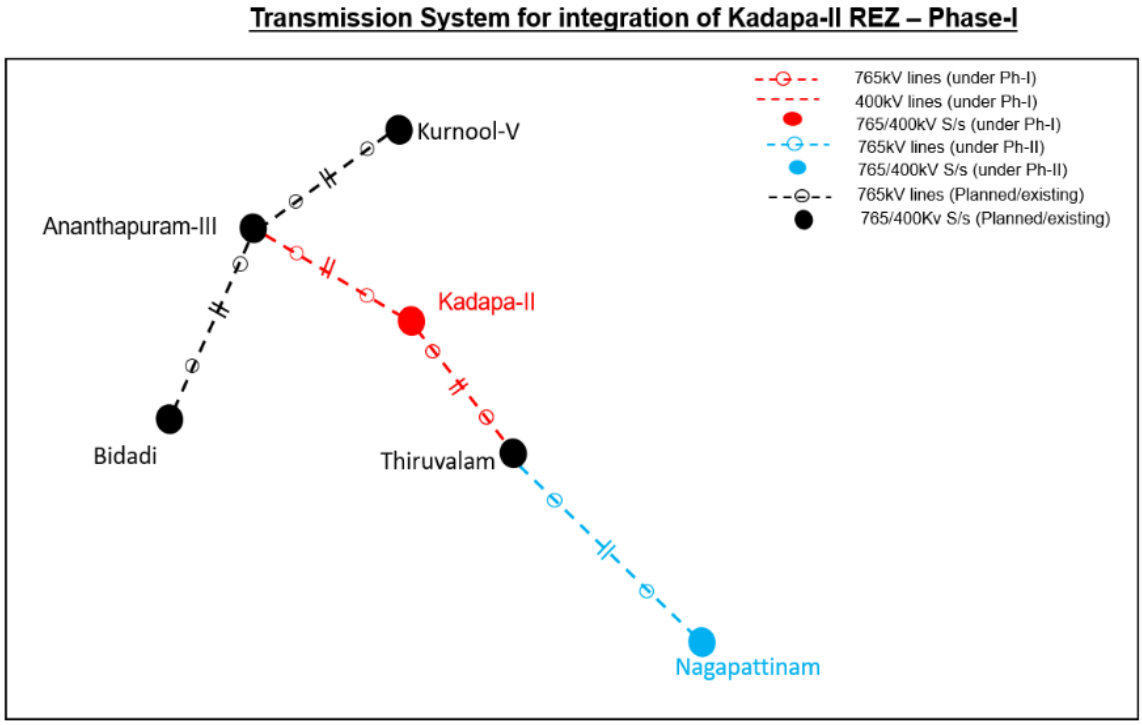



*Figure 6-8:Transmission System for Integration of Kadapa-II REZ*

## C. Transmission system for proposed Green Hydrogen / Green Ammonia projects in Vizag area, Andhra Pradesh (Phase-I)

As per the Communication from MNRE, about 5000 MW demand at Vizag area and 6000 MW at Kakinada area has been envisaged for the Green Hydrogen / Green Ammonia projects. The transmission system for proposed Green Hydrogen / Green Ammonia projects in Kakinada area, Andhra Pradesh (Phase-I) is presently under bidding. Further, a comprehensive Transmission system for Green Hydrogen / Green Ammonia projects at Kakinada (Ph-II) and Pendurthi was evolved during the Joint Study meeting conducted from 23rd to 25th April 2025

**Detailed scope of the scheme is given below:**

**Phase-I (for AP loads & GH loads at Pendurthi)**

- Establishment of 4x1500 MVA, 765/400 kV Pendurthi (Vizag) GIS substation with 1x330 MVAr bus reactor and space provision for establishment of 400/220 kV switchyard
- Establishment of 3x1500 MVA, 765/400 kV Khammam-II substation with 1x330 MVAr bus reactor and space provision for establishment of 400/220 kV switchyard
- ± 300 MVAr STATCOM at Pendurthi and space provision for additional 2nd STATCOM
- Pendurthi – Srikakulam 765 kV D/c line (200 km) 1x330 MVAr SLR at Pendurthi end on both circuits
- Khammam-II – Warangal (new) 765 kV D/c line (100 km)
- Khammam-II – Pendurthi 765 kV D/c line (350 km) with 1x330 MVAr SLR on both circuits on both ends
- Khammam-II – Khammam (existing) 400 kV (quad) D/c line (20 km)
- LILO of Kalpakka – Maradam 400 kV (quad) D/c line at Pendurthi (20 km)

**Phase-II (for GH loads at Kakinada & Pendurthi)**

- Augmentation of 2x1500 MVA, 765/400 kV ICTs at Pendurthi (Vizag)
- Augmentation of 3x1500MVA, 765/400 kV ICTs at Kakinada GH
- Sagar – Kakinada 765 kV D/c line (320 km) 1x330 MVAr SLR on both circuits on both ends
- Pendurthi – Kakinada GH 765 kV D/c line (120 km) 1x240 MVAr SLR at Pendurthi end on both circuits

*Note: Above transmission system shall be taken-up in phases based on receipt of GNA applications*

Further, a number of datacentre loads are envisaged near Pendurthi / Vizag area. In APTRANSCO informed that applications have already been received from certain developers at Pendurthi. Further as per the requirement of data centres, reliable power supply from two sources is required to be provided. In view of the above, LILO of Kalpakka – Maradam 400 kV D/c line at Pendurthi has been proposed. Further reliable power supply from ISTS shall be ensured with proposed interconnection of Pendurthi substation.

CTU has already received applications from M/s NTPC Green Energy Limited seeking GNARE for 2500 MW as "Bulk Consumer seeking to connect to ISTS" in Vizag area as per below details:

| Name of the Applicant | Application for | GNA Breakup (Within & outside region) | Location details of Connectivity / GNA requested | Start date of Connectivity/ GNA (requested) |
|---|---|---|---|---|
| NTPC Green Energy Limited | $GNA_{RE}$ | 2500 (within the region) | Pudimadaka, Andhra Pradesh | 01.09.2028 |

The application is under process for grant of GNA in CMETS-SR meeting.

The above transmission scheme was discussed and agreed in the 38th CMETS-SR held on 2nd June 2025 wherein it was decided that initially transmission system for Phase-I of Pendurthi GH may be taken up for implementation and Phase-II transmission system for Pendurthi GH may be taken up subsequently based on the receipt of further applications. This scheme also discussed and agreed in 55th SRPC held on 26th Jul,2025 and 32nd NCT held on 12th Aug 2025. Schematic is shown in **Figure 6-9**.

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of the Transmission Scheme | Capacity /km |
|---|---|---|
| 1. | Establishment of 4x1500 MVA, 765/400 kV Pendurthi (Vizag) GIS substation with 1x330 MVAr (765 kV) bus reactor with space provision for establishment of 220 kV switchyard<br>**Future Space Provisions:**<br>• 765/400kV, 1500 MVA, ICTs – 2 Nos.<br>• 765kV ICT bays – 2 Nos<br>• 400kV ICT bays – 2 Nos.<br>• 765kV line bays – 8 Nos. (with provision for SLR)<br>• 400kV line bays – 12 Nos. (with provision for SLR)<br>• 400kV Bus Sectionalizer : 1 set<br>**Future Space Provisions for 220kV switchyard**:<br>• 400/220kV, 500 MVA, ICTs – 10 Nos.<br>• 400kV ICT bays – 10 Nos.<br>• 220kV ICT bays – 10 Nos.<br>• 220kV line bays – 16 Nos.<br>• 220kV Bus Sectionalizer : 3 set<br>• 220 kV Bus Coupler (BC) Bay – 4 Nos.<br>• 220 kV Transfer Bus Coupler (TBC) Bay – 4 Nos. | • 765/400kV, 1500 MVA, ICTs – 4 Nos. (13x500 MVA incl. 1 spare unit)<br>• 765kV ICT bay – 4 Nos.<br>• 400kV ICT bay – 4 Nos.<br>• 765kV line bays – 2 Nos. (at Pendurthi (Vizag) GIS for termination of Pendurthi (Vizag) – Srikakulam 765 kV D/c line)<br>• 220 kV Bus Coupler (BC) Bay – 2 Nos.<br>• 220 kV Transfer Bus Coupler (TBC) Bay – 2 Nos.<br>• 765kV line bays – 2 Nos. with provision of SLR (at Pendurthi (Vizag) GIS for termination of Khammam-II – Pendurthi (Vizag) –765 kV D/c line)<br>• 765 kV, 330 MVAr Bus Reactors – 1 no. (4x110 MVAr inc. 1 switchable spare unit for both bus reactor and line reactor)<br>• 765 kV Bus Reactor bays – 1 no. |

| Sl. No. | Scope of the Transmission Scheme | Capacity /km |
|---|---|---|
| | | • 400kV line bays – 4 Nos. (at Pendurthi (Vizag) GIS for termination of LILO of Kalpakka – Maradam 400 kV (quad) D/c line at Pendurthi) |
| 2. | Pendurthi (Vizag) – Srikakulam 765 kV D/c line (about 200 km) with 330 MVAr SLR (convertible) at Srikakulam end on both circuits | ~ 200 km<br>• 765 kV line along with SLR GIS bays at Srikakulam - The D/c line to be terminated in the future line bays with SLR proposed under the scheme "Inter<br>• Regional Strengthening between SR Grid and ER Grid" 765 kV, 330 MVAr SLR at Srikakulam – 2 Nos. (7x110 MVAr switchable units inc. 1 switchable spare unit) |
| 3. | LILO of Kalpakka – Maradam 400 kV (quad) D/c line at Pendurthi (about 20 km) | ~ 20 km |
| 4. | • ±300 MVAr STATCOM with 2x125 MVAr MSC at Pendurthi (Vizag) GIS with control switching arrangement for proposed 1x330 MVAr bus reactor<br>• Space provision for 2nd + 300 MVAr STATCOM with 2x125 MVAr MSC at Pendurthi (Vizag) GIS | • 400kV bay – 1 no.<br>• ± 300 MVAr STATCOM with 2x125 MVAr MSC at Pendurthi (Vizag) GIS with control switching arrangement for proposed 1x330 MVAr bus reactor – 1 set |
| 5. | Establishment of 3x1500 MVA, 765/400 kV Khammam-II substation with 1x330 MVAr (765 kV) bus reactor with space provision for establishment of 220 kV switchyard<br>**Future Space Provisions for 220kV switchyard:**<br>• 400/220kV, 500 MVA, ICTs – 10 Nos.<br>• 400kV ICT bays – 10 Nos.<br>• 220kV ICT bays – 10 Nos.<br>• 220kV line bays – 16 Nos.<br>• 220kV Bus Sectionalizer : 3 set<br>• 220 kV Bus Coupler (BC) Bay – 4 Nos.<br>• 220 kV Transfer Bus Coupler (TBC) Bay – 4 Nos. | • 765/400kV, 1500 MVA, ICTs – 3 Nos. (10x500 MVA incl. 1 spare unit)<br>• 765kV ICT bay – 3 Nos.<br>• 400kV ICT bay – 3 Nos.<br>• 765kV line bays – 4 Nos. (at Khammam-II for termination of Khammam-II – Pendurthi and Khammam-II – Warangal New 765 kV D/c lines)<br>• 765 kV, 330 MVAr Bus Reactors – 1 no. (4x110 MVAr inc. 1 switchable spare unit for both bus reactor and line reactor)<br>• 765 kV Bus Reactor bays – 1 no.<br>• 400kV line bays – 2 Nos. (at Khammam-II for termination of Khammam-II – Khammam (existing) 400 kV (quad) D/c line) |

| Sl. No. | Scope of the Transmission Scheme | Capacity /km |
|---|---|---|
| 6. | Khammam-II – Warangal New 765 kV D/c line (about 100 km) | ~ 100 km<br>• 765 kV line bays – 2 Nos. (at Warangal New) |
| 7. | Khammam-II – Pendurthi (Vizag) 765 kV D/c line (about 350 km) with 330 MVAr SLR (convertible) at both ends on both circuits | ~ 350 km<br>• 765 kV line bays – 2 Nos. (GIS) (at Pendurthi(Vizag))<br>• 765 kV, 330 MVAr SLR at Pendurthi(Vizag) – 2 Nos. (6x110 MVAr switchable units)<br>• Switching Equipment for 765 kV SLR at Kadapa-II PS – 2 Nos.<br>• 765 kV, 330 MVAr SLR at KhammamII – 2 Nos. (6x110 MVAr switchable units)<br>• Switching Equipment for 765 kV SLR at Kadapa-II PS – 2 Nos. |
| 8. | Khammam-II – Khammam (existing) 400 kV (quad) D/c line (about 20 km) | ~ 20 km<br>• 400kV line bays – 2 Nos. (at Khammam (existing)) |

**Implementation Timeframe:** 30 months from the date of SPV transfer

**Estimated Cost:** Rs. 8386 Crs.

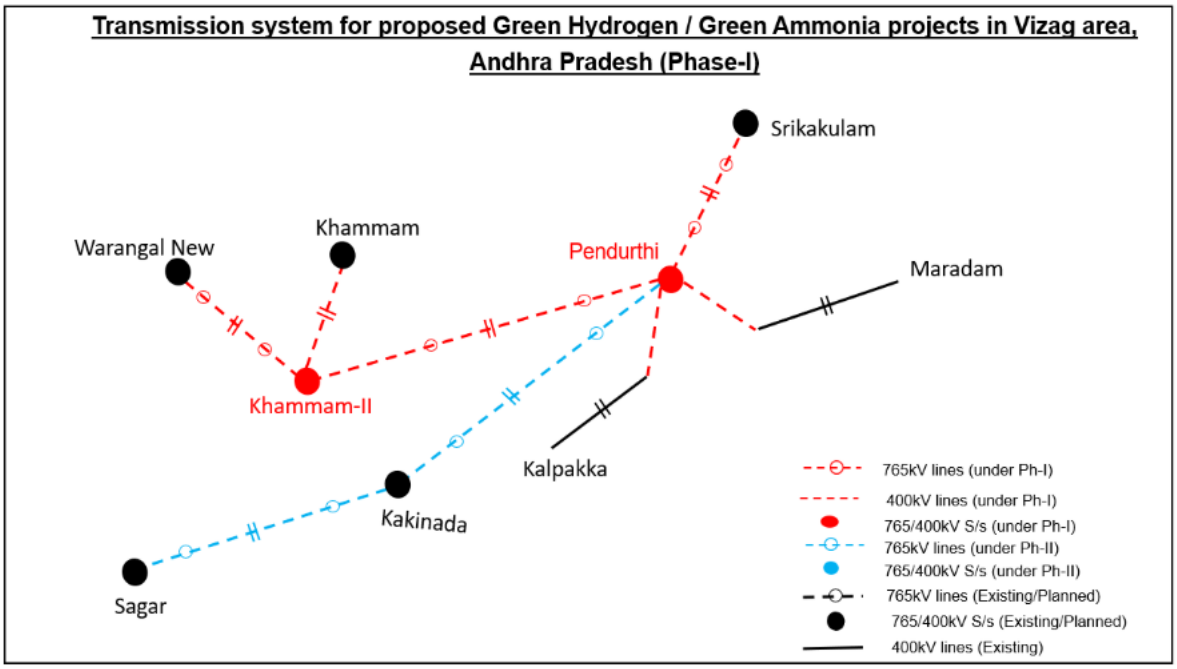



*Figure 6-9:Transmission system for proposed Green Hydrogen / Green Ammonia projects in Vizag area, Andhra Pradesh*

**D. Transmission system for proposed Green Hydrogen / Green Ammonia projects in Ramayapatnam area (4 GW):**

**Phase-I**

- Establishment of 3x1500 MVA, 765/400 kV Ramayapatnam substation with 1x330 MVAr bus reactor and space provision for establishment of 400/220 kV switchyard
- ±300 MVAr STATCOM at Ramayapatnam and space provision for additional 2nd STATCOM
- Ramayapatnam – Kadapa-II 765 kV D/c line (220 km) 1x330 MVAr SLR at Kadapa-II end on both circuits
- Ramayapatnam – Sagar 765 kV D/c line (200 km) 1x330 MVAr SLR at Ramayapatnam end on both circuits

**Phase-II:**

- Augmentation of 2x1500 MVA, 765/400 kV ICTs at Ramayapatnam
- LILO of Kurnool-V – Nellore PS 765 kV D/c line at Ramayapatnam (50 km)

Scheme was discussed and agreed in 38th CMETS held on 2nd June,2025. The scheme shall be taken up for further after receipt of GNA applications at Ramayapatnam.

Implementation Timeframe: 30 months from the date of SPV transfer

Estimated Cost: Rs. 5000 Crs.

### 6.4.3 Kerala

**A. Augmentation of 1x500 MVA,400/220kV ICT (3rd) at Thrissur VSC HVDC Station in Kerala**

Thrissur VSC HVDC Station is under operation with 2x315 MVA, 400/220 kV ICTs and 400kV & 220kV switchyards are owned by POWERGRID. The proposal for augmentation of 1x500 MVA, 400/220kV ICT (3rd) at Thrissur VSC HVDC Station in Kerala was discussed in the 36th CMETS-SR held on 19.12.2024 and same was agreed to meet the increasing demand of Kerala and based on the observations of SRLDC. A Joint site visit for assessment of space availability for additional 1x500 MVA ICT (3rd) at Thrissur VSC HVDC was held on 26th April 2025 with participation of officials from SRPC, CEA, CTUIL, POWERGRID & KSEB. Subsequently, the augmentation of 1x500 MVA, 400/220kV ICT (3rd) at Thrissur VSC HVDC Station in Kerala was discussed and agreed in the 38th CMETS-SR held on 2nd June, 2025.Schematic is shown in ***Figure 6-10***

**Detailed scope of the scheme is given below:**

| Sl. No. | Description of Transmission Element | Scope of work (Type of Substation / Conductor capacity / km / no. of bays etc.) |
|---|---|---|
| 1 | Augmentation of 1x500 MVA, 400/220kV ICT (3rd) at Thrissur VSC HVDC station along with 33kV tertiary power supply and associated ICT bays | • 1x500 MVA, 400/220kV ICT<br>• 400kV ICT bay – 1 No. (GIS)<br>• 220kV ICT bay – 1 No. (GIS)<br>• 400 kV & 220 kV GIS duct – 1 Lot<br>• Tertiary arrangement with 33 kV cable – 1 se |
| 2 | 2 Nos. of 220kV line bays for termination of 220kV transmission lines along with 220kV bus sectionaliser | • 220kV line bays – 2 Nos. (GIS)<br>• 220kV bus sectionaliser – 1 set<br>• 220 kV Bus Coupler (BC) Bay – 1 no |
| 3 | Extension of 220kV GIS hall to accommodate 6 Nos. of 220kV bays (2 Nos. of 220kV ICT bays and 4 Nos. of 220kV line bays) and associated 220kV bus sectionaliser | • Extension of 220kV GIS hall to accommodate 6 Nos. of 220kV bays and associated 220kV bus sectionaliser |

**Implementation Timeframe:** 24 months from the date of allocation
**Estimated Cost:** Rs. 170 Crs.

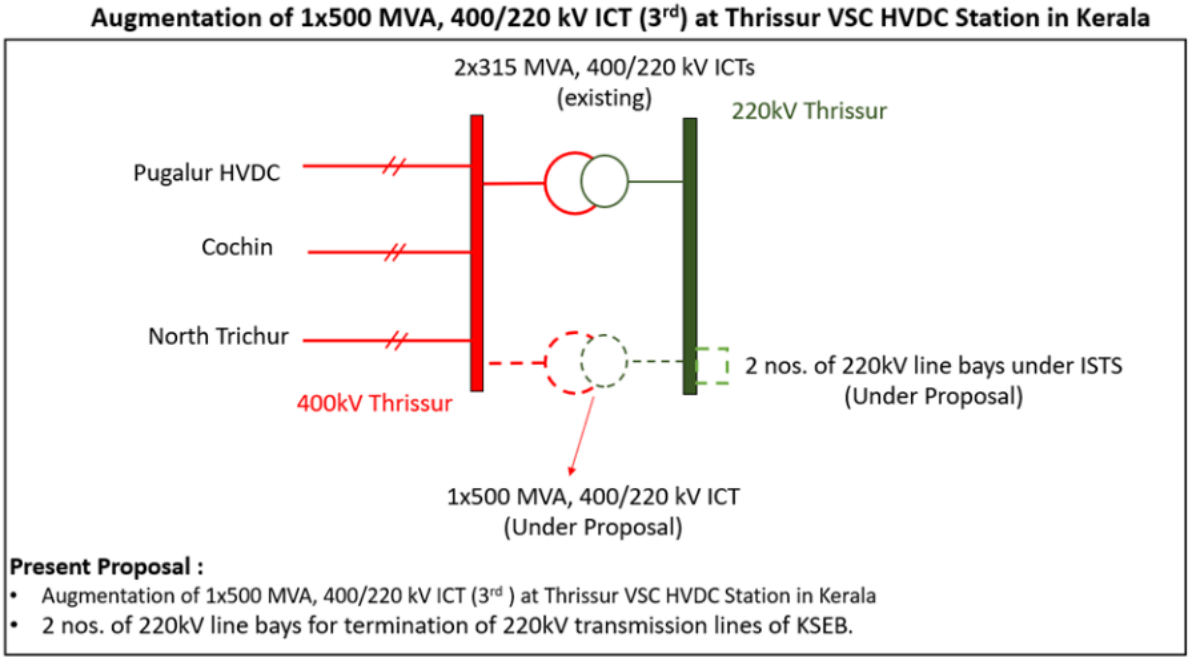



*Figure 6-10: Augmentation of 1x500 MVA,400/220kV ICT (3rd) at Thrissur VSC HVDC Station in Kerala*

### 6.4.4 Tamil Nadu

**A. <u>Augmentation of 1x500 MVA, 400/230kV ICT (4th) at Kalivanthapattu S/s</u>**

Kalivanthapattu 400/230kV substation is under operation with 1130 MVA (2x315 MVA + 1x500 MVA) transformation capacity and 400kV & 220kV switchyards are owned by POWERGRID. In the 195th and 216th OCC meetings of SRPC, the overloading of ICTs (2x315 MVA + 1x500 MVA) at Kalivanthapattu was discussed and it was observed that ICTs are not meeting N-1 criteria. The augmentation of 1x500 MVA, 400/230kV ICT (4th) at Kalivanthapattu S/s was discussed and agreed in the 54th SRPC meeting held on 22.03.2025. Same was discussed and agreed in the 38th CMETS-SR held on 02.06.2025. It was also agreed to allocate 2 nos. of 230kV line bays at Kalivanthapattu for termination of 230kV transmission lines of TANTRANSCO. Schematic is shown in **Figure 6-11.**

**Detailed scope of the scheme is given below:**

| Sl. No. | Description of Transmission Element | Scope of work (Type of Substation / Conductor capacity / km / no. of bays etc.) |
|---|---|---|
| 1 | Augmentation of Transformation capacity by 1x500 MVA, 400/230 kV ICT (4th) at Kalivanthapattu S/s in Tamil Nadu | • 500 MVA, 400/230 kV ICT – 1 No<br>• 400 kV ICT Bay -1 No. Main Bay (along with associated Tie Bay))<br>• 220kV ICT bay – 1 No. (GIS)<br>• 230 kV ICT Bay- 1 No. |

| | | |
|---|---|---|
| | | 245 kV, 2500 Sq.mm XLPE Cable (To connect LV side 400/230 kV Transformer to 230 kV Bay) – 1200m (approx.) along with associated cable termination<br>• 230 kV line Bays – 2 Nos |

**Implementation Timeframe:** 21 months from the date of allocation

**Estimated Cost:** Rs. 73.57 Crs.

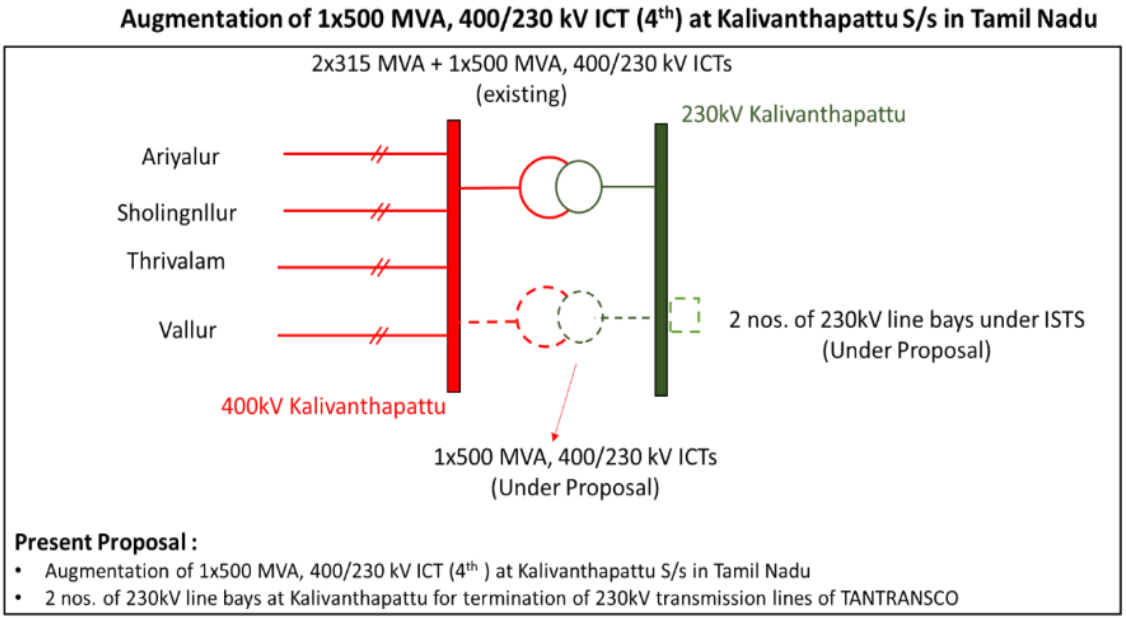



*Figure 6-11:Augmentation of Transformation capacity by 1x500 MVA, 400/230 kV ICT (4th) at Kalivanthapattu S/s in Tamil Nadu*

## B. Transmission System strengthening at Karur PS for integration of RE generation capacity within the declared potential

Karur REZ (2.5 GW) was identified as a part of 18.5 GW RE potential in SR. Karur PS was implemented by M/s Adani through LILO of Pugalur (HVDC) – Pugalur (Existing) 400kV (Quad) D/c line at Karuru PS and presently is under operation with 2x500 MVA, 400/230kV ICTs. Further, the pooling station is being augmented with 2x500 MVA, 400/230kV ICTs expected by Sep'25. Connectivity of about 1739.1 MW has been granted / agreed for grant at Karur PS with above system.

Further, additional Connectivity of 1030 MW has been received at Karur PS. With this, the total connectivity granted / agreed for grant / received shall be about 2769.1 MW (including 500 MW at 400 kV level). For grant of additional connectivity, augmentation of 2x500 MVA, 400/230kV ICTs (5th & 6th) and strengthening of transmission system beyond Karur PS is required. Further, SRLDC in various forums and in its operational feedback has highlighted the high loading on Karur PS – Pugalur HVDC 400kV (Quad) D/c line and Karur PS – Pugalur (existing) 400kV (Quad) D/c lines under N-1 conditions.

The scheme was deliberated in 37th CMETS-SR held on 17th April, 2025 and following has been agreed.

- Augmentation of 2x500 MVA, 400/230kV ICTs (5th & 6th) at Karur PS
- Karur PS – Pugalur HVDC 400kV (Quad) 2nd D/c line
- Karur PS – Pugalur (existing) 400kV (Quad) 2nd D/c line

**Implementation Timeframe:** 24 months from the date of SPV transfer
Estimated Cost: Rs. 400 Crs.

## C. Upgradation of Udumalpet – Madurai 400kV S/c line

Proposal for upgradation of Udumalpet – Madurai 400kV S/c line was discussed in the 39th CMETS-SR held on 18th July,2025 and 221st OCC meeting of SRPC held on 10.12.2024. Udumalpet – Madurai 400kV S/c line (127 km) is commissioned in April, 1993 and the line is operating close to the SIL limits during peak wind demand season. POWERGRID proposed to upgrade the of Udumalpet – Madurai 400kV S/c line to D/c line. SRLDC highlighted the high loading on the line in its operational feedback and suggested for reconductoring of Udumalpet – Madurai 400kV S/c line.

After detailed deliberations in 39th CMETS-SR held on 18th July 2025, following transmission scheme was agreed:

- Upgradation/conversion of Udumalpet – Madurai 400kV S/c line to Udumalpet – Madurai 400kV (quad) D/c line along with associated bay upgradation works at Udumalpet and Madurai substations

Implementation Timeframe: 24 months from the date of allocation
Estimated Cost: Rs. 600 Crs.

## D. Reconductoring of Tirunelveli – Udumalpet and Pugalur – Madurai 400kV D/c lines with HTLS conductor

The proposal for reconductoring Pugalur – Madurai 400kV D/c was discussed in the 221st OCC meeting of SRPC held on 10.12.2024. SRLDC proposed for reconductoring of 400kV Udumalpet – Madurai S/c and 400kV Madurai-Pugalur D/c line and highlighted the high loading on Tirunelveli – Udumalpet and Pugalur – Madurai 400kV D/c lines during high RE season in Tamil Nadu in its operational feedback and informed in 221st OCC meeting of SRPC held on 10.12.2024 that further addition of RE generation in the south Tamil Nadu and Kundankulam 3&4, this issue may become severe. High loading on Tirunelveli – Udumalpet and Pugalur – Madurai 400kV D/c lines was also discussed during the Joint Study meeting of SR held from 23rd – 25th April 2025. The high loading on the above lines was also highlighted in the CTU Rolling Plan reports. After detailed deliberations in 39th CMETS-SR 18th July 2025. following transmission scheme was agreed:

- Reconductoring of Tirunelveli – Udumalpet 400kV D/c line with HTLS conductor along with associated bay upgradation works at Tirunelveli and Udumalpet substations

- Reconductoring of Pugalur – Madurai 400kV D/c line with HTLS conductor along with associated bay upgradation works at Pugalur and Madurai substation

**Implementation Timeframe:** 24 months from the date of allocation

**Estimated Cost:** Rs. 1200 Crs.

### 6.4.5 Telangana

**A. <u>Proposal for reduction of High Short Circuit level at 400kV Maheshwaram (TG) bus</u>**

Transmission system for control of High Short Circuit level at 400kV Maheshwaram (TGTRANSCO) bus was discussed and agreed in the meeting convened by CEA on 19.09.2022 through VC for Intra-state proposals of APTRANSCO and TGTRANSCO:

- To install 12 ohms fault limiting series reactor at one end of both the ckts of 400 kV Maheshwaram (PGCIL) to Maheswaram (TGTRANSCO) line
- Bus Split arrangement at 400/220kV Maheshwaram (TGTRANSCO) S/s

Proposal was discussed in the 36th CMETS-SR wherein it was decided that a joint site visit for assessment of feasibility for installation of series reactor at Maheshwaram (PGCIL) end may be planned with participation from CTU, CEA, SRPC, POWERGRID & TGTRANSCO and the proposal will be discussed in the next CMETS-SR meeting based on the outcome of joint site visit. Accordingly, joint site visit was held on 07.02.2025, wherein after detailed deliberations following was concluded:
After detailed deliberations, following were agreed for control of high short circuit levels at Maheshwaram (TGTRANSCO) and Maheshwaram (PGCIL) substations:

**Scheme for reduction of high short circuit levels at Maheshwaram (TGTRANSCO) and Maheshwaram (PGCIL) substations ISTS Scope:**

- Installation of 12 ohms fault limiting series reactor on Line-1 at Maheshwaram (TGTRANSCO) end of Maheshwaram (PGCIL) – Maheshwaram (TGTRANSCO) 400kV (Quad) D/c line
- Installation of 12 ohms fault limiting series reactor on line-2 at Maheshwaram (PGCIL) end of Maheshwaram (PGCIL) – Maheshwaram (TGTRANSCO) 400kV (Quad) D/c line

**TGTRANSCO Scope:**

- Bus Split arrangement at 400/220kV Maheshwaram (TGTRANSCO) substation

**Implementation Timeframe:** 24 months from the date of allocation

**Estimated Cost:** Rs. 200 Crs.

**B. <u>Augmentation of transformation capacity by 1x500 MVA (5th), 400/220kV ICT at Hyderabad (Ghanapur) S/s in Telangana</u>**

Hyderabad (Ghanapur) S/s is under operation with 3x315 + 1x500 MVA, 400/220kV ICTs, feeding multiple downstream 220kV substations of TGTRANSCO including Nagole, Chandrayangutta, Moulali, Pocharam, and Hayathnagar. Recent loading data indicates significant utilization of existing ICTs, with peak loads approaching operational limits. While no N-1 contingency violations were observed during the Joint Study and

Rolling Plan 2029–30 exercise, TGTRANSCO emphasized the need for proactive capacity planning considering future demand and implementation timelines.

After detailed deliberations in the 39th CMETS-SR meeting held on 18th Jul, 2025. augmentation of transformation capacity by 1x500 MVA, 400/220kV ICT (5th) at Hyderabad (Ghanapur) S/s was agreed.

**Implementation Timeframe:** 21 months from the date of allocation

**Estimated Cost:** Rs. 75 Crs.

### 6.4.6 Puducherry

**A. Transmission system for reliable power supply to Puducherry and Tamil Nadu**

Transmission system for reliable power supply to Puducherry was discussed in the Joint Study meeting held from 21st to 23rd Nov'24. Further Puducherry has already submitted application in Sept, 2024 for grant of additional GNA of 80 MW. In addition, CTU has also received application for grant of GNA-RE in Feb, 2025 from M/s Chemfab Alkalis Limited for 10 MW connected in Puducherry network.

Transmission system for reliable power supply to Puducherry was deliberated in joint study Joint Study meeting of SR constituents was held from 23rd to 25th April, 2025 at Thrissur. The Scheme was also discussed and agreed in 38th CMETS held on 2nd June, 2025. After detailed deliberations, following transmission system was agreed:

**Reliable power supply to Puducherry and Tamil Nadu – Under ISTS**

- Establishment of 230kV level at Nagapattinam 765/400kV GIS (presently charged at 400kV) with 3x500 MVA, 400/230kV ICTs
- Nagapattinam – Bahoor 230kV S/c high capacity line (70 km)
- Nagapattinam – Karaikal 230kV S/c high capacity line (60 km)
- Nagapattinam – Villianur 230kV S/c high capacity line (85 km)
- Nagapattinam – Thondamanatham 230kV S/c high capacity line (85 km)
- 4 nos. of 230kV line bays at Nagapattinam GIS
- 4 nos. 230kV line bays one each at Bahoor, Karaikal, Villianur & Thondamanatham substations

**Reliable power supply to Puducherry and Tamil Nadu – Under STU scope**

- Nagapattinam – Kumbakonam 230kV S/c line (50 km)
- Nagapattinam – Thiruvarur 230kV S/c line (70 km)
- LILO of Kadalangudy – Neyveli TS-II 230kV S/c line (85 km) at Nagapattinam (12 km LILO length)
- LILO of Kadalangudy – Neyveli Auto S/s 230kV S/c line (75 km) at Nagapattinam (6 km LILO length)
- 6 nos. of 230kV line bays at Nagapattinam GIS for termination of above lines – **Under ISTS**

The scheme was also discussed and agreed in the 55th SRPC meeting held on 25.07.2025.

**Implementation Timeframe:** 24 months from the date of allocation

**Estimated Cost:** Rs. 1100 Crs.

# Chapter 7: Eastern Region

Eastern Region is stretching from Sikkim in the southern Himalayas to the coast of the Bay of Bengal. In this region, the states of Bihar and West Bengal lie on the Indo - Gangetic plain and Jharkhand lies on the Chota-Nagpur Plateau. Odisha lies on the Eastern Ghats and the Deccan Plateau. The region is bounded by Bhutan & Nepal in the north, the states of Uttar Pradesh & Chhattisgarh on the west, the state of Andhra Pradesh in the south and the state of Assam and country of Bangladesh in the east. It has a very important narrow corridor between international border of Nepal and Bangladesh, called "Chicken's Neck", with a size of 18km by 22km, which connects the north Bengal, Sikkim and entire North Eastern Region with the remaining part of National Grid.

The generating stations of Eastern Regions are predominantly concentrated in the coal rich states of Jharkhand, Odisha and West Bengal and hydro generations are concentrated in Sikkim and southern part of Odisha. Cross-border interconnection in the Eastern Region facilitates in optimal utilization of energy resources in South Asian region in a cost-effective manner. During wet season (Monsoon period) hydro power is imported from Bhutan and Nepal and during dry season (Winter period), surplus power is exported to these countries to meet their energy requirement. Cross-border interconnection with Bangladesh in Eastern region helps Bangladesh in meeting its energy requirement throughout the year.

## 7.1 Power Supply Scenario as on July'25

As on July'2025, total Installed Capacity (IC) of Eastern Region was about 37.4 GW and the peak demand met was about 33.5 GW. The state-wise breakup of installed capacity and peak demand is summarised at **Table 7-1** below.

*Table 7-1: ER Installed Capacity and Peak Demand (as on July'25)*

*(All Fig in GW)*

| State | Generation | | | | | | | | Peak Demand |
|---|---|---|---|---|---|---|---|---|---|
| | Fossil | | | Non-Fossil | | | | Grand Total | |
| | Thermal | Gas | Total | Nuclear | Hydro | RES* (MNRE) | Total | | |
| **Bihar** | 7.6 | 0 | 7.6 | 0 | 0.07 | 0.6 | 0.7 | **8.3** | 8.7 |
| **DVC** | 3 | 0 | 3 | 0 | 0.2 | 0 | 0.2 | **3.2** | 3.5 |
| **Jharkhand** | 2.8 | 0 | 2.8 | 0 | 0.2 | 0.2 | 0.4 | **3.2** | 2.2 |
| **Odisha** | 5.9 | 0 | 5.9 | 0 | 2.2 | 0.9 | 3.1 | **9** | 7 |
| **Sikkim** | 0.08 | 0 | 0.08 | 0 | 0.6 | 0.06 | 0.7 | **0.8** | 0.1 |
| **West Bengal** | 8.4 | 0 | 8.4 | 0 | 1.4 | 0.7 | 2.2 | **10.7** | 13.1 |
| **Central unallocated** | 2 | 0 | 2 | 0 | 0.08 | 0 | 0.08 | **2.1** | 0.05 |
| **ER** | **30** | **0** | **30** | **0** | **4.8** | **2.5** | **7.4** | **37.4** | **33.4** |

*Source: CEA monthly report*

## 7.2 Envisaged Power Supply Scenario by 2030-31

As per the 20th EPS, Eastern Region peak demand for 2030-31 Timeframe is expected to increase to about 48.1 GW. As per the inputs received from various stakeholders, total installed

capacity of Eastern Region for 2030-31 is expected to be about 86.3GW. The state wise bifurcation of installed capacity and peak demand is summarized below at **Table 7-2.**

*Table 7-2: ER Installed Capacity and Peak Demand (2030-31)*

*(All Fig in GW)*

| State | Generation | | | | | | | | | Peak Demand |
|---|---|---|---|---|---|---|---|---|---|---|
| | Fossil | | | Non-Fossil | | | | ESS / PSS/ Rooftop | Grand Total | |
| | Thermal | Gas | Total | Nuclear | Hydro | RES | Total | | | |
| **Bihar** | 4.5 | 0 | 4.5 | 0 | 0 | 1 | 1 | 0.1 | 5.6 | 14.3 |
| **DVC** | 1.2 | 0 | 1.2 | 0 | 0 | 1.6 | 1.6 | 0 | 2.8 | 5.4 |
| **Jharkhand** | 4.7 | 0 | 4.7 | 0 | 0.3 | 0.9 | 1.1 | 0.05 | 5.9 | 4.8 |
| **Odisha** | 9.1 | 0 | 9.1 | 0 | 2.1 | 2 | 4.2 | 0.6 | 13.9 | 9.4 |
| **Sikkim** | 0 | - | 0 | - | 0.01 | 0 | 0.01 | 0 | 0.01 | 0.2 |
| **West Bengal** | 8.7 | 0 | 8.7 | 0 | 0.6 | 0 | 0.6 | 1.9 | 11.2 | 16.2 |
| **Central** | 31.2 | 0 | 31.2 | 0 | 5.8 | 0 | 5.8 | 0 | 37 | - |
| **IPP** | 5 | 0 | 5 | 0 | 5.1 | 0 | 5.1 | 0 | 10 | - |
| **ER** | **64.2** | **0** | **64.2** | **0** | **13.9** | **5.5** | **19.4** | **2.7** | **86.3** | **48.1** |

There is a growth in peak demand of Eastern Region from present Timeframe (2025-26) to 2030-31 with a CAGR of 7.5%. The state wise peak demand growth is given at **Table 7-3**.

*Table 7-3: Increase in Peak Demand of Various States of ER (as on July 2025)*

*(All Fig in MW)*

| State | 2025-26 | 2030-31 | Increase in demand | CAGR |
|---|---|---|---|---|
| **Bihar** | 8,741 | 14301 | 5,560 | 10.3% |
| **DVC** | 3,520 | 5409 | 1,889 | 9.0% |
| **Jharkhand** | 2,258 | 4800 | 2,542 | 16.3% |
| **Odisha** | 6,964 | 9456 | 2,492 | 6.3% |
| **Sikkim** | 104 | 227 | 123 | 16.9% |
| **West Bengal** | 13,108 | 16164 | 3,056 | 4.3% |
| **Andaman** | 58 | 73 | 15 | 4.7% |
| **ER** | **33,452** | **48,131** | **14,654** | **7.5%** |

From the above data, it is observed that the CAGR growth of peak demand is maximum for Sikkim (16.9%) and minimum for West Bengal (4.3%). The CAGR of demand of ER is about 7.5% which is more than the National Average of 6%. In addition to above, bulk power demand of about 7033MW has been considered at various upcoming green hydrogen/ green ammonia, bulk consumers/distribution licensees directly connected to ISTS in the following areas: Paradeep (ISTS): 3000MW, Gopalpur (ISTS): 3000MW, Tata Steel: 212MW, Vedanta: 180MW, Hindalco Industries Limited (HIL): 100MW, India Power Corporation Limited (IPCL):100MW and various bulk consumers.

The hydro generations of Bhutan (about 4500MW) and Nepal (3200MW) and demand of Bangladesh (1000MW) have been considered in 2030-31 Timeframe as a part of Eastern Region for study purpose.

## 7.3 Load Generation Balance for 2030-31 Timeframe

In the chapter 3, All India Load Generation Balance (LGB) for identified nine scenarios was prepared as per the methodology finalized in a meeting among CTU, CEA and Grid-India. This section elaborates the Eastern Region Load Generation Balance (LGB) for 2030-31 Timeframe. For Eastern Region also, three points on the daily load curve i.e. Solar max (afternoon), Peak load (evening) and Off-peak load (night) for three seasons viz. Monsoon (August), Summer (June) and Winter (February) have been considered.

Load generation balance has been prepared considering the generation despatch factors as mentioned at **Table 7-4** for the 9 scenarios. Further, thermal generators have been despatched as per the merit order.

*Table 7-4: Eastern Region Generation Dispatch and Demand Factors*

| Scenario No & Name | Generation Dispatch Factors | | | Demand Factors |
|---|---|---|---|---|
| | Hydro | Solar | Pump storage | |
| 1-Aug Solar Max | 70% | 75% | -100% | 81% |
| 2-Aug Peak Load | 90% | 0% | 60% | 86% |
| 3-Aug Night Off Peak | 70% | 0% | 40% | 71% |
| 4-Jun Solar Max | 70% | 85% | -100% | 91% |
| 5-Jun Peak Load | 90% | 0% | 50% | 97% |
| 6-Jun Night Off Peak | 70% | 0% | 0% | 77% |
| 7-Feb Solar Max | 30% | 90% | -100% | 64% |
| 8-Feb Peak Load | 60% | 0% | 100% | 68% |
| 9-Feb Night Off Peak | 30% | 0% | 40% | 47% |

## 7.4 ISTS Network Expansion Schemes Evolved from Feb'25 to July'25

Various transmission schemes have been discussed/finalized in the Consultative Meeting for Evolution of Transmission System of Eastern Region (CMETS-ER) from Feb'25 to July'25. The brief of all such transmission schemes is tabulated below in **Table 7-5:**

*Table 7-5: Approved Transmission Schemes in this Rolling Plan*

| Sl. No. | Name of the Transmission Scheme | Scheme Type (RE/Conventional/Drawal incl strengthening) | Expected Timeframe | Tentative Cost (in ₹Cr.) | Quantum (in MW) |
|---|---|---|---|---|---|
| **Jharkhand, West Bengal & Chhattisgarh** | | | | | |
| 1. | WR-ER Inter-Regional Network Expansion Scheme (Part-A) | Conventional | 24 months from date of allocation | 6272.3 | - |

| Sl. No. | Name of the Transmission Scheme | Scheme Type (RE/Conventional/Drawal incl strengthening) | Expected Timeframe | Tentative Cost (in ₹Cr.) | Quantum (in MW) |
|---|---|---|---|---|---|
| **Jharkhand & West Bengal** | | | | | |
| 1. | WR-ER Inter-Regional Network Expansion Scheme (Part-B) | strengthening | 24 months from date of allocation | 80.05 | - |
| **Jharkhand & Odisha** | | | | | |
| 1. | WR-ER Inter-Regional Network Expansion Scheme (Part-C) | strengthening | 31-03-2029 | 912.6 | - |
| | | | **Total** | **~7264.95** | |

### 7.4.1 Jharkhand, West Bengal, Odisha & Chhattisgarh:

### A. WR-ER Inter-Regional Network Expansion Scheme (Part-A)

From the Grid India operational feedback, critical overloading was observed on the existing WR-ER Inter Regional and nearby lines viz. Ranchi – Dharamjaygarh 765kV 2XS/c line, Ranchi – Sipat 400kV D/c line, Ranchi New – New PPSP 400kV D/c lines and Raigarh (Tamnar) – D'jaigarh (Sec-B) 765kV D/c line specially in the solar hours.

The following ISTS connectivity applications has been processed/ under process in Chhattisgarh area:

- ➔ Adani Power Limited has been granted connectivity for 1600MW quantum for its 2x800MW Raigarh TPS on 29.01.2025 under GNA in Pussore, Raigarh, Chhattisgarh
- ➔ Korba Power Limited (Erstwhile Lanco Amarkantak) (2x660MW) is proposed for grant at Champa 400kV Sec-B (with KSK 3x600MW Units & Lara-II (2x800MW) generations)
- ➔ Korba Power Limited (2x800MW) is proposed for grant at Dharamjaigarh 400kV Sec-B

Currently, there is no margin for injection left at Raigarh(Kotra) substation for injection of power, as any injection at 400kV level of Raigarh(Kotra) S/s leads to N-1 non-compliance of 765/400kV ICTs [especially under Raigarh-Pugalur HVDC reverse power flow scenario (3000MW reversal)] and any additional interconnection of generation project shall lead to increase in fault level at Raigarh (Kotra) S/s beyond its design limits of 50kA. Further, there is no space available at Raigarh (Kotra) S/s for any augmentation.

In order to alleviate overloading issues in WR – ER corridors and as well as to facilitate evacuation of power from 2x800MW Raigarh TPS of APL at Raigarh (Kotra)-II, Korba Power Limited (2x660MW) at Champa and & Korba Power Limited (2x800MW) at Dharamjaygarh Substation, subject scheme in WR as well as IR link between WR & ER have been planned which comprises of Part-A of this Scheme.

With the growing demand of West Bengal area, the power flow on Jeerat-New 765/400kV, 2x 1500MVA ICTs are getting critically loaded under N-1 contingency. Accordingly,

augmentation of 3rd 765/400kV, 1500MVA ICT has been included in the part-A of this scheme in the 32nd NCT meeting held on 12-08-2025.

There is Part-B of the scheme which includes reconductoring of LILO point to New PPSP line section of Ranchi (New) – New PPSP 400kV D/c line with Twin HTLS (ampacity of single HTLS as 1574A at nominal voltage level), which is being taken up with commissioning matching with Part-A of the scheme.

Further, OPTCL is planning a new 400/220kV S/s at Balasore. Jamshedpur (New) – Balasore 400kV D/c (Quad) line has also been planned to alleviate the critical loading of Jamshedpur – Baripada 400kV D/c line under N-1 contingency, which comprises of Part-C of this Scheme.

The said scheme has been agreed in the 36th CMETS-WR meeting held from 26.05.2025 to 28.05.2025 & in 43rd CMETS-ER held on 29.05.2025.

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of works | Capacity (MVA) / Line length (km)/ Nos. |
|---|---|---|
| 1. | Establishment of 2x1500MVA, 765/400kV S/s at Jamshedpur (New) in Jharkhand<br><br>**Additional space for future expansion**:<br>- 765/400kV, 4x1500MVA (12x500MVA single phase units) ICTs along with associated ICT bays at both voltage levels<br>- 400/220kV, 6x500MVA ICTs along with associated ICT bays at both voltage levels<br>- 765kV, 2x330MVAr (6x110MVAr single phase units) bus reactor along with associated bay<br>- 420kV, 2x125MVAr bus reactor along with associated bay<br>- 765kV line bays (along with space for switchable line reactor) for future lines: 8 nos.<br>- 400kV line bays (along with space for switchable line reactor) for future lines: 10 nos.<br>- 220kV line bays for future lines: 12 nos.<br>- 765kV bus sectionaliser bay: 1 set<br>- 400kV bus sectionaliser bay: 1 set<br>- 220kV bus sectionaliser bay: 1 set<br>- 220kV bus coupler bay: 2 set<br>- 220kV transfer bus coupler bay: 2 set | - 765/400kV, 2x1500MVA ICT (7x500MVA single phase units)<br>- 765kV, 2x330MVAr bus reactor (7x110MVAr single phase units)<br>- 420kV, 125MVAr bus reactor: 2 nos.<br>- 765kV ICT bays: 2 nos.<br>- 765kV Bus reactor bays: 2 nos.<br>- 400kV ICT bays: 2 nos.<br>- 400kV Bus reactor bays: 2 nos.<br>- 765kV line bays: 6 nos. (2 nos for Jamshedpur – Tamnar 765kV D/c line and 4 nos for LILO of Ranchi (New) – Medinipur 765kV D/c line)<br>- 400kV line bays: 4 nos. [for LILO of Ranchi (New) – New PPSP 400kV D/c line]<br>- 765kV, 330MVAr (3x110MVAR single phase units) switchable line reactor along with associated bays in each circuit of Raigarh (Tamnar) – Jamshedpur 765kV D/c line |

| Sl. No. | Scope of works | Capacity (MVA) / Line length (km)/ Nos. |
|---|---|---|
| 2. | Establishment of 3x1500MVA, 765/400kV S/s (on 765kV Bus section-II & 400kV Bus Section-II) at Raigarh (Kotra)-II S/s in Chhattisgarh with 2x330 MVAR, 765 kV bus reactor and 2x125 MVAR, 420 kV bus reactor (on 765kV Bus section-II & 400kV Bus Section-II) | |
| 2A | **Additional space for future expansion**:<br>- Creation of 1100kV level<br>- 1100kV bus sectionaliser bay: 1 set (to establish Sec-I & Sec-II)<br>- 400kV bus sectionaliser bay :3 sets (to establish Sec-I, Sec-III & Sec-IV)<br>- 1100/400kV, 6x3000MVA (19x1000 MVA single phase units) ICTs along with associated ICT bays.<br>• 1100kV side: - 3 nos. on Bus Sec-I & 3 nos on Bus Sec-II)<br>• 400kV side: 3 nos. on Bus Sec-III & 3 nos. on Bus Sec-IV)<br>- 1100kV line bays (along with space for switchable line reactor) for future lines: 12 nos. (6 nos. on Bus Sec-I & 6 nos. on Bus Sec-II)<br>- 1200kV, 4x660MVAr (13 x 220MVAR single phase units) bus reactor along with associated bays (2 nos. on Bus Sec-I & 2 nos. on Bus Sec-II)<br>- 765kV bus sectionaliser bay: 1 set (to establish Sec-I)<br>- 765/400kV, 5x1500MVA (15 x 500 MVA single phase units) ICTs along with associated ICT bays<br>• 765kV side: - 4 nos. on Bus Sec-I & 1 nos. on Bus Sec-II)<br>• 400kV side: - 4 nos. on Bus Sec-I & 1 nos. on Bus Sec-II)<br>- 765kV, 2x330MVAr (6 x 110MVAr single phase units) bus reactor along with associated bay (on Bus Sec-I)<br>- 420kV, 6x125MVAr bus reactor along with associated bay (2 on Bus Sec-I; 2 on Bus Sec-III & 2 on Bus Sec-IV) | **Common Transmission System Augmentation:**<br>- 765kV, 2x330MVAr bus reactor (7x110MVAr single phase units)<br>- 420kV, 125MVAr bus reactor: 2 nos.<br>- 765kV Bus reactor bays: 2 nos.<br>- 400kV Bus reactor bays: 2 nos.<br>- 765kV line bays: 6 nos. (2 nos for Raigarh (Tamnar) – Raigarh (Kotra)-II 765kV D/c line and 4 nos. for LILO of LILO of Dharamjaygarh (Sec-B) – Jharsuguda (Sec-A) 765kV D/c line 765kV D/c line)<br>- 765kV, 240MVAr (3x80MVAr single phase units) switchable line reactor along with associated bays in each circuit of Raigarh (Kotra)-II – Jharsuguda (Sec-A) 765kV D/c section along with 1x80MVAr 765kV spare reactor |

| Sl. No. | Scope of works | Capacity (MVA) / Line length (km)/ Nos. |
|---|---|---|
| | - 765kV line bays (along with space for switchable line reactor) for future lines: 6 nos. (6 on Bus Sec-I)<br>- 400kV line bays (along with space for switchable line reactor) for future lines: 10 nos. (6 on Bus Sec-I; 4 on Bus Sec-II, (6 on Bus Sec-III & 6 on Bus Sec-IV,)<br>- Establishment of 6000 MW, ± 800 kV Raigarh (HVDC) [LCC] terminal station (4x1500 MW) along with associated interconnections with 400 kV HVAC Switchyard (2x1500 MW on 400 kV Sec-III along with associated 4 no. bays & 2x1500 MW on 400 kV Sec-IV along with associated 4 no. bays) & all associated equipment (incl. filters)/bus extension, etc. | |
| 2B | | **ATS incl. terminal bays identified for Adani Power Limited (appl. No.2200001709):**<br>- 765/400kV, 3x1500MVA ICT (10x500MVA single phase units)<br>- 765kV ICT bays: 3 nos.<br>- 400kV ICT bays: 3 nos.<br>- 400kV line bays: 2 nos. [for interconnection of 2x800MW Raigarh TPS of APL to Raigarh(Kotra)-II 400kV D/c line] |
| 3. | Bypassing of Raigarh (Tamnar) – Dharamjaygarh (Sec-B) 765kV D/c line & Raigarh(Kotra) – Raigarh (Tamnar) 765kV D/c line at Raigarh (Tamnar) S/s so as to form at Raigarh (Kotra) – Dharamjaygarh (Sec-B) 765kV D/c line | 10km (Route length) |
| 4. | LILO of Dharamjaygarh (Sec-B) – Jharsuguda (Sec-A) 765kV D/c line at Raigarh (Kotra)-II S/s | LILO length ~40 km |
| 5. | Raigarh (Tamnar)[@]- Raigarh(Kotra)-II S/s 765kV D/c line | 50km |
| 6. | 765kV, 330MVAr switchable line reactor along with associated bays in each line of Raigarh(Tamnar) – Jamshedpur 765kV D/c line at Raigarh(Tamnar) end | - 765kV, 330MVAr switchable line reactors – 2 Nos.<br>- Switching equipment for line reactors – 2 Nos.<br>- 765kV spare reactor: 1x110MVAr |

| Sl. No. | Scope of works | Capacity (MVA) / Line length (km)/ Nos. |
|---|---|---|
| 7. | Raigarh(Tamnar)[@] – Jamshedpur (New) 765kV D/c line | 315km |
| 8. | LILO of Ranchi (New) – Medinipur 765kV D/c line at Jamshedpur (New) | 51km and 49km |
| 9. | LILO of Ranchi (New) – New PPSP 400kV D/c line at Jamshedpur (New)<br>(b) Jamshedpur (New) to LILO section towards Ranchi (New) needs to be implemented with Twin Moose<br>(b) Jamshedpur (New) to LILO section towards New PPSP needs to be implemented with Twin HTLS (ampacity of single HTLS as 1574A at nominal voltage) | 63km Twin Moose<br>63km Twin HTLS |
| 10. | Installation of new 765/400kV, 1x1500MVA (3x500MVA single phase units) ICT (3rd) at Jeerat (New) S/s of M/s POWERGRID Medinipur Jeerat Transmission Limited (PMJTL) along with associated bays at both ends | - 765/400kV, 1x1500MVA (3x500MVA single phase units) ICT: 1 no.<br>- 765kV ICT bay: 1 no.<br>- 400kV ICT bay: 1 no |

***Note:***

1. *@4 Nos. 765kV line bays vacated at Raigarh (Tamnar) S/s after bypass arrangement mentioned at sl. no. 3 of the scope of works [i.e. bypassing of Raigarh (Tamnar) – Dharamjaygarh (Sec -B) 765kV D/c line & Raigarh (Kotra) – Raigarh (Tamnar) 765kV D/c at Raigarh (Tamnar)] to be utilized for termination of 765kV lines at Raigarh (Tamnar) S/s i.e. 2 nos. for Raigarh (Tamnar) – Raigarh (Kotra-II) 765kV D/c proposed line and 2 nos. for Raigarh (Tamnar) – Jamshedpur (New) 765kV D/c proposed line.*

   *Further, after the implementation of subject bypassing arrangement at the outskirts of Raigarh (Tamnar) S/s, the existing unutilized portions of Raigarh (Kotra) – Raigarh (Tamnar) and Raigarh (Tamnar) – Dharamjaygarh (Sec -B) 765kV D/c line sections at Raigarh (Tamnar) end may be utilized for termination of proposed 765kV D/c lines under the subject scheme i.e. proposed 765kV D/c lines may be terminated at bypassing points. This shall ensure utilization of existing ISTS transmission infrastructure. However, if the said existing ISTS transmission line sections remain unutilized at Raigarh (Tamnar) end, due to any reason, the same shall be dismantled by the TSP of the subject scheme and cost of scrapped assets may be adjusted under subject transmission scheme. In both cases (viz. utilization of existing line sections or its scarping), the original tariff of Raigarh (Tamnar) – Dharamjaygarh (Sec -B) 765kV D/c line & Raigarh (Kotra) – Raigarh (Tamnar) 765kV D/c line shall remain unaffected.*

   *Also, TSP of Raigarh (Tamnar) S/s shall provide space for above scope of work at the existing Raigarh (Tamnar) S/s free of cost*

2. *TSP shall implement Inter-tripping scheme on D'jaygarh (Sec-B) – Raigarh (Kotra)-II 765 kV D/c line (for tripping of the switchable line reactor at D'jaygarh (Sec-B) end along with the main line breaker).*

3. *TSP of the subject scheme shall implement Inter-tripping scheme on Raigarh (Kotra)-II – Jharsuguda 765 kV D/c line (for tripping of the switchable line reactor at Raigarh (Kotra)-II end along with the main line breaker).*
4. *LILO of Ranchi (New) – Medinipur 765kV D/c line at Jamshedpur (New) shall be carried out such that one circuit of Ranchi (New) – Jamshedpur (New) 765kV D/c line and one circuit of Jamshedpur (New) – Medinipur 765kV D/c line are terminated in same diameter. Similarly, second circuit of both line sections may also be terminated in bays of the same diameter.*
5. *LILO of Ranchi (New) – New PPSP 400kV D/c line at Jamshedpur (New) shall be carried out such that one circuit of Ranchi (New) – Jamshedpur (New) 400kV D/c line and one circuit of Jamshedpur (New) – New PPSP 400kV D/c line are terminated in same diameter. Similarly, second circuit of both line sections may also be terminated in bays of the same diameter.*
6. *M/s POWERGRID Medinipur Jeerat Transmission Limited (PMJTL) shall provide space for above scope of work at the existing Jeerat (New) S/s free of cost.*

**Completion Schedule:** 24 months from date of allocation.

**Estimated Cost:** ₹6272.3 Cr

### 7.4.2 Jharkhand & West Bengal

**A. <u>WR-ER Inter-Regional Network Expansion Scheme (Part-B):</u>**

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of works | Capacity (MVA) / Line length (km)/ Nos. |
|---|---|---|
| 1. | Reconductoring of LILO point to New PPSP line section of Ranchi (New) – New PPSP 400kV D/c line with Twin HTLS (ampacity of single HTLS as 1574A at nominal voltage level) | About 27 km |

**Completion Schedule:** 24 months from date of allocation [matching with WR-ER Inter-Regional Network Expansion Scheme (Part-A)
**Estimated Cost:** ₹80.05 Cr.

### 7.4.3 Jharkhand & Odisha

**A. <u>WR-ER Inter-Regional Network Expansion Scheme (Part-C)</u>**

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of works | Capacity (MVA) / Line length (km)/ Nos. |
|---|---|---|
| 1. | Jamshedpur (New) – Balasore 400kV D/c (Quad) line | 174km |
| 2. | Extension at Jamshedpur (New) 765/400kV (ISTS) substation | 400kV line bays: 2 Nos. [for Jamshedpur – Balasore 400kV D/c (Quad) line] |

**Note:**

1. *OPTCL shall implement 2 Nos. 400kV line bays along with 1x80MVAr switchable line reactor at its planned Balasore 400/220kV S/s for termination of Jamshedpur (New) – Balasore 400kV D/c (Quad) line. Balasore (OPTCL) 400/220kV S/s is yet to be awarded. However, the expected commissioning schedule is 31.03.2029, as per OPTCL.*

2. *TSP of Jamshedpur (New) S/s [a new 765/400kV S/s being implemented under WR-ER Inter-Regional Network Expansion Scheme-Part A scheme] shall provide space for above scope of work at Jamshedpur (New) S/s free of cost.*

**Completion Schedule:** 31.03.2029

**Estimated Cost:** ₹912.6 Cr.

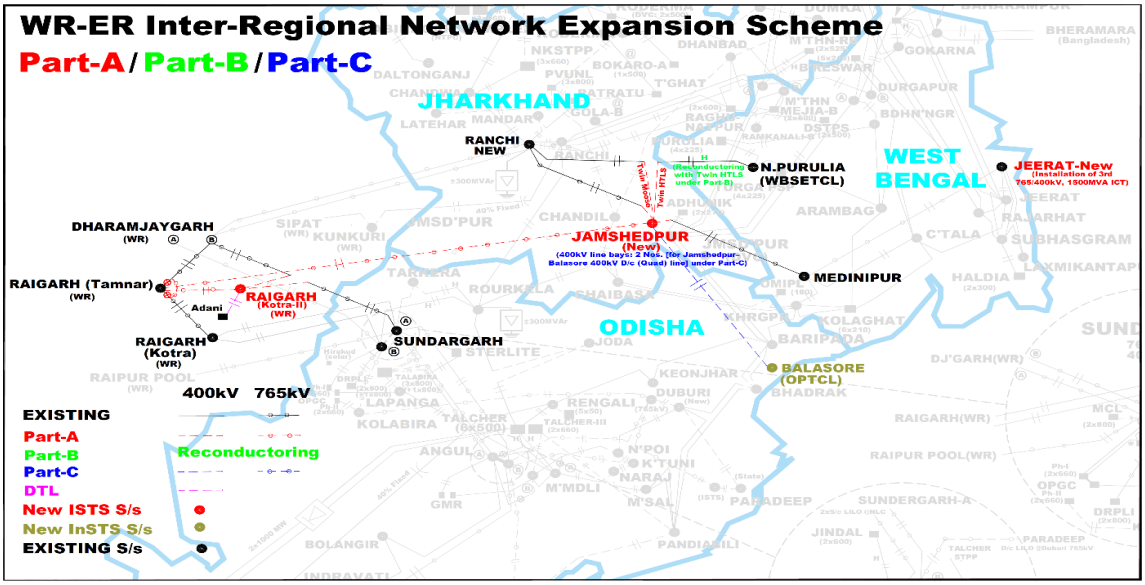



*Figure 7-1: Schematic of WR- ER Inter-Regional Network Expansion Scheme*

# Chapter 8: North Eastern Region

North Eastern Region is the eastern-most region of India. It comprises seven states, the contiguous Seven Sister States. The region shares an international border with several neighbouring countries, China in the north, Myanmar in the east, Bangladesh in the south-west and Bhutan in the north-west. The NER has immense natural resources, accounting for 34% of the country's water resources and almost 40% of India's hydropower potential. The states in NER are well connected through EHV transmission links at 400kV level. The NER grid is further connected to other parts of the National Grid through 400kV HVAC lines as well as ±800kV, 6000MW Multi terminal Biswanath Chariali – Alipurduar – Agra HVDC link. During wet season (Monsoon period) hydro power is imported from Bhutan and during dry season (Winter period), surplus power is exported to meet their energy requirement. Cross-border interconnection with Bangladesh & Myanmar in North Eastern region helps these countries in meeting their energy requirement throughout the year.

## 8.1 Power Supply Scenario as on July'25

As on July'25, total Installed Capacity (IC) of North Eastern Region was 5575MW and the peak demand met was 4088MW. The state-wise breakup of installed capacity and peak demand is summarised at **Table 8-1** below:

*Table 8-1: NER Installed Capacity and Peak Demand as on July'25*

*(All Fig in GW)*

| State | Generation | | | | | | | | Peak Demand |
|---|---|---|---|---|---|---|---|---|---|
| | Fossil | | | Non-Fossil | | | | Grand Total | |
| | Thermal | Gas | Total | Nuclear | Hydro | RES (MNRE) | Total | | |
| **Assam** | 0.9 | 0.7 | 1.6 | 0 | 0.5 | 0.3 | 0.8 | **2.4** | 2.8 |
| **Arunachal Pradesh** | 0.03 | 0.05 | 0.08 | 0 | 0.5 | 0.1 | 0.7 | **0.8** | 0.2 |
| **Meghalaya** | 0.05 | 0.1 | 0.2 | 0 | 0.4 | 0.07 | 0.5 | **0.6** | 0.3 |
| **Tripura** | 0.05 | 0.5 | 0.5 | 0 | 0.07 | 0.04 | 0.1 | **0.6** | 0.4 |
| **Manipur** | 0.08 | 0.08 | 0.2 | 0 | 0.09 | 0.02 | 0.1 | **0.3** | 0.2 |
| **Nagaland** | 0.03 | 0.07 | 0.1 | 0 | 0.06 | 0.04 | 0.1 | **0.2** | 0.2 |
| **Mizoram** | 0.03 | 0.06 | 0.09 | 0 | 0.1 | 0.08 | 0.2 | **0.3** | 0.1 |
| **Central unallocated** | 0.1 | 0.06 | 0.2 | 0 | 0.1 | 0 | 0.1 | **0.3** | |
| **NER** | **1.3** | **1.7** | **2.9** | **0** | **1.9** | **0.7** | **2.6** | **5.6** | **4** |

*Source: CEA monthly report*

## 8.2 Envisaged Power Supply Scenario by 2030-31

As per the 20th EPS, North Eastern Region peak demand for 2030-31 Timeframe is expected to increase to 6176MW. As per the inputs received from various stakeholders, total installed capacity of North Eastern Region for 2030-31 is expected to be 13312MW. The state wise bifurcation of installed capacity and peak demand is summarized below at **Table 8-2.**

*Table 8-2: NER Installed Capacity and peak demand (2030-31)*

*(All Fig in GW)*

| State | Generation | | | | | | | | | Peak Demand |
|---|---|---|---|---|---|---|---|---|---|---|
| | Fossil | | | Non-Fossil | | | | ESS | Grand Total | |
| | Thermal | Gas | Total | Nuclear | Hydro | RES | Total | | | |
| **Arunachal Pradesh** | 0 | 0 | 0 | 0 | 0.2 | 0.1 | 0.3 | 0 | **0.3** | 0.7 |
| **Assam** | 0 | 0.9 | 0.9 | 0 | 0.9 | 3.9 | 4.8 | 2.9 | **8.6** | 4.7 |
| **Manipur** | 0 | 0 | 0 | 0 | 0.1 | 0 | 0.1 | 0 | **0.1** | 0.4 |
| **Meghalaya** | 0 | 0 | 0 | 0 | 0.6 | 0 | 0.6 | 0 | **0.6** | 0.5 |
| **Mizoram** | 0 | 0 | 0 | 0 | 0.03 | 0 | 0.03 | 0 | **0.03** | 0.3 |
| **Nagaland** | 0 | 0 | 0 | 0 | 0.05 | 0.02 | 0.07 | 0 | **0.07** | 0.4 |
| **Tripura** | 0 | 0.5 | 0.3 | 0 | 0 | 0 | 0 | 0 | **0.3** | 0.5 |
| **Central** | 0.7 | 1.2 | 2 | 0 | 4 | 0 | 4 | 0 | **6** | - |
| **NER** | **0.7** | **2.5** | **3.3** | **0** | **6** | **4** | **10** | **2.9** | **16.2** | **7.5** |

There is a massive growth in peak demand of North Eastern Region from present Timeframe (July 2025) to 2030-31 with a CAGR of 8.6%. The state wise peak demand growth is given at **Table 8-3.**

*Table 8-3: Increase in Peak Demand of Various States of NER*

*(All Fig in MW)*

| State | 2025-26 | 2030-31 | Increase in demand | CAGR |
|---|---|---|---|---|
| **Assam** | 2,805 | 4,772 | 1,967 | 11.2% |
| **Arunachal Pradesh** | 223 | 734 | 511 | 26.9% |
| **Meghalaya** | 340 | 542 | 202 | 9.8% |
| **Tripura** | 374 | 557 | 183 | 8.3% |
| **Manipur** | 248 | 443 | 195 | 12.3% |
| **Nagaland** | 191 | 382 | 191 | 14.9% |
| **Mizoram** | 138 | 312 | 174 | 17.7% |
| **NER** | **4,088** | **7,529** | **3,441** | **13.0%** |

From the above data it is observed that the CAGR growth of peak demand is maximum for Arunachal Pradesh (26.9%) and minimum for Tripura (8.3%). The CAGR of demand of NER is about 13% which is more than the National Average of 6%. In addition to above, 250MW demand of Myanmar & 160MW demand of Bangladesh is also considered as a part of North Eastern Region for study purpose.

### 8.3 Load Generation Balance for 2030-31 Timeframe:

In the chapter 3, All India Load Generation Balance (LGB) for identified nine scenarios was prepared as per the methodology finalized in consultation with CTU, CEA and Grid India. This section elaborates the North Eastern Region Load Generation Balance (LGB) for 2030-31 Timeframe. For North Eastern Region also, three points on the daily load curve i.e. Solar max (afternoon), Peak load (evening) and Off-peak load (night) for three seasons viz. Monsoon (August), Summer (June) and Winter (February) have been considered.

Load generation balance has been prepared considering the generation despatch factors as mentioned at **Table 8-4** for the 9 scenarios. Further, thermal generators have been despatched as per the merit order.

*Table 8-4: North Eastern Region Generation Dispatch and Demand Factors*

| Scenario No & Name | Generation Dispatch Factors | | | | Demand Factors |
|---|---|---|---|---|---|
| | Hydro | Solar | ESS | Gas | |
| 1-Aug Solar Max | 70% | 75% | -100% | 0% | 71% |
| 2-Aug Peak Load | 90% | 0% | 60% | 50% | 89% |
| 3-Aug Night Off Peak | 70% | 0% | 40% | 50% | 68% |
| 4-Jun Solar Max | 70% | 85% | -100% | 0% | 56% |
| 5-Jun Peak Load | 90% | 0% | 50% | 50% | 66% |
| 6-Jun Night Off Peak | 70% | 0% | 0% | 50% | 58% |
| 7-Feb Solar Max | 30% | 90% | -100% | 0% | 59% |
| 8-Feb Peak Load | 60% | 0% | 100% | 50% | 72% |
| 9-Feb Night Off Peak | 30% | 0% | 40% | 30% | 38% |

## 8.4 ISTS Network Expansion Schemes evolved from Feb'25 to Jul'25

Various transmission schemes have been discussed/finalized in the Consultative Meeting for Evolution of Transmission System of North Eastern Region (CMETS-NER) from Feb'25 to July'25. The details of the schemes are summarized below in **Table 8-5**:

*Table 8-5: Approved Transmission Schemes in this Rolling Plan*

| Sl. No. | Name of the Transmission Scheme | Expected Timeframe | Scheme Type (RE/Conventional/Drawal incl strengthening) | Quantum (in MW) | Tentative Cost (in ₹Cr.) |
|---|---|---|---|---|---|
| **Arunachal Pradesh** | | | | | |
| **1.** | NERES-31 | 24 months from date of allocation | Strengthening | - | 19.05 |
| **Assam & Arunachal Pradesh** | | | | | |
| **1.** | NERGS-III Siang Basin | 28-02-2029 | Hydro | 426 | 1804.3 |
| | **Total** | **426** | **~1823** | | |

### 8.4.1 Arunachal Pradesh

### A. NERES-31

DoP, Arunachal Pradesh had informed that due to critical loading of existing 1x15MVA (4x5 MVA single phase units), 132/33 kV ICT at Ziro (POWERGRID) S/s, constraints are being faced in meeting the power drawl requirement during peak hours. The situation is expected to

continue even after commissioning of Ziro (New)/Yachuli 132/33kV S/s. Therefore, augmentation of transformation capacity is required at Ziro (POWERGRID) S/s.

Based on the recommendation of 221st OCC, the matter was deliberated in the 39th & 40th CMETS-NER held on 29-01-2025 & 27-02-2025 respectively. A joint site visit among CTUIL, DoP AP and POWERGRID at Ziro (POWERGRID) S/s was held on 25-03-2025. During the joint site visit DoP, AP informed that presently, there are 3 nos. of 33kV feeders at Ziro (POWERGRID) S/s with cumulative demand of about 18MW. Out of 3 nos. of 33kV feeders, one feeder is catering around 14MW and the remaining two feeders are catering 4MW (2MW each). The 2 nos. of 33kV feeders catering 4MW will be shifted to under implementation Yachuli 132/33kV S/s. Thus, the available ICT (3x5MVA) shall be just sufficient to meet the total remaining demand of about 14MW. Further, the load demand at Ziro (POWERGRID) S/s is expected to reach around 29-30MW in 2031-32, due to upcoming industrial demand and increase in domestic load. Thus, there is a need for augmentation of transformation capacity by installation of 2nd 132/33kV ICT at Ziro (POWERGRID) S/s. It was found that due to space and layout constraints, installation of 2nd ICT of 31.5MVA is feasible, however, it shall require use of GIS and cable. After detailed deliberation in the 43rd CMETS-NER held on 29-05-2025, the scheme was agreed to be implemented as North Eastern Region Expansion Scheme-31 (NERES-31) with completion schedule of 24 months from date of allocation.

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of works | Details |
|---|---|---|
| **1** | **I**nstallation of 1x31.5MVA, 3-Phase 132/33kV 2nd ICT at Ziro (POWERGRID) S/s along with associated GIS bays at both ends | • 132/33kV, 31.5MVA ICT: 1 no.<br>• 132kV ICT bay (Outdoor GIS with Single Bus Arrangement): 1 no.<br>• 33kV ICT bay: 1 no. (Indoor GIS)<br>• 132kV GIS duct (3-Phase): Approx. 50 meters<br>• Associated 33kV cable & accessories for interconnection from ICT LV to 33kV indoor switchgear: (1R, 3Cx400 Sq.mm): 500 meters |

**Implementation Timeframe:** 24 months from date of allocation.

**Estimated Cost:** ₹ 19.05 Cr.

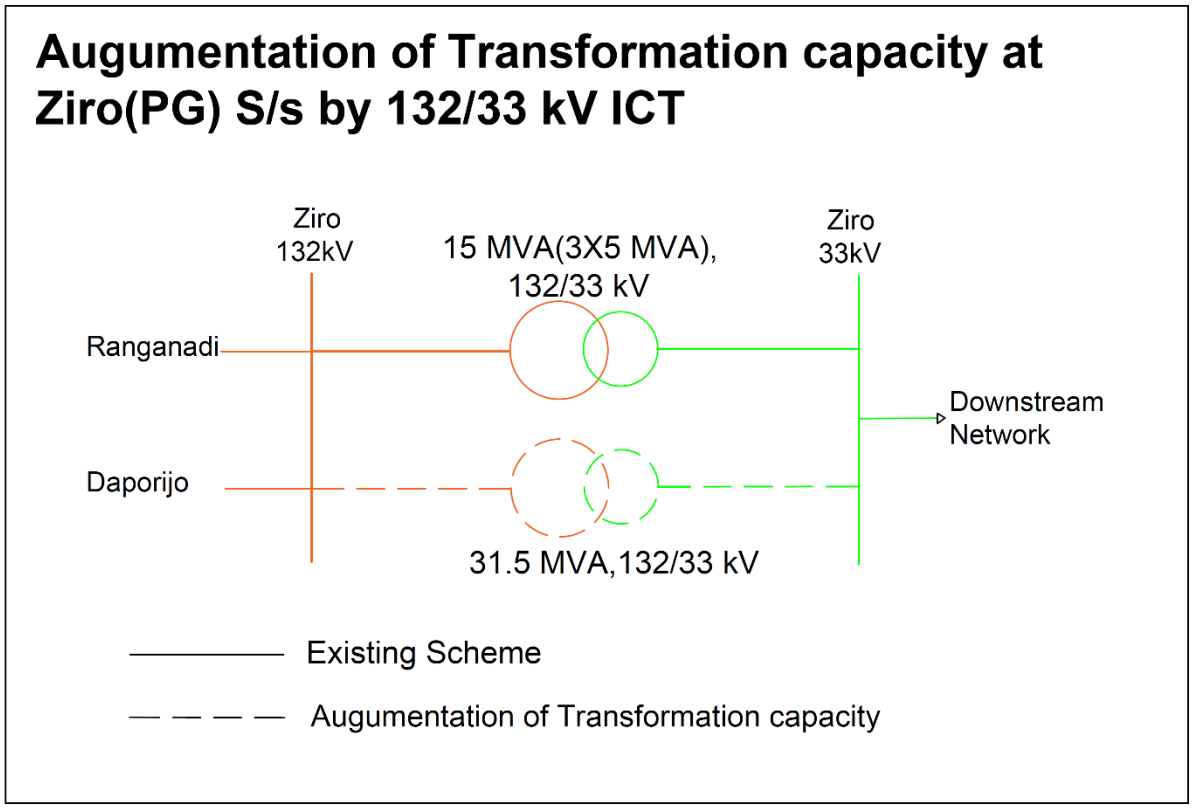



*Figure 8-1: Schematic of NERES-XXXI*

### 8.4.2 Arunachal Pradesh and Assam

**A. <u>NERGS-III Siang Basin</u>**

North Eastern Electric Power Corporation Ltd (NEEPCO) had applied for ISTS Connectivity of 426MW for its Heo Hydro Electric Project (3x80 MW) and Tato-I Hydro Electric Project (3x62 MW) in Shi-Yomi, Arunachal Pradesh. These two power houses are planned in a master slave relationship, the Tato-I HEP & Heo HEP may be considered a single power house with six generating units for the purpose of connectivity. Tato-I shall be the lead generator.

Based on multiple meetings among CEA, CTU, hydro project developers and NER states, a draft of the Master Plan Report for power evacuation from potential HEPs in Brahmaputra basin has been prepared by CEA. The said draft Master Plan includes the said HEPs as well. Considering the expected potential of about 5604MW including Heo and Tato-I HEPs in the Siang sub-basin by 2035, evacuation system has been planned.

Based on the evacuation system mentioned in the draft Master Plan, the said 426MW connectivity application was agreed to be granted ISTS Connectivity in the 42$^{nd}$ CMETS-NER held on 29-04-2025 and 44$^{th}$ CMETS-NER held on 26-06-2025 with NERGS-III Siang Basin to be implemented under ISTS as common augmentation for subject and potential HEPs in Siang basin.

**Detailed scope of the scheme is given below:**

| Sl. No. | Scope of works | Capacity (MVA) / Line length (km)/ Nos. |
|---|---|---|
| **1.** | Establishment of new 2x500MVA, 400/220kV GIS Pooling station at Kaying in Arunachal Pradesh<br><br>**Additional space for future expansion:**<br><br>– 400/220kV, 2x500MVA ICTs along with associated ICT bays at both voltage levels<br>– 420kV, 1x80MVAr bus reactor along with associated bay<br>– 10 nos. of 400kV line bays (along with space for switchable line reactor) for future lines<br>– 8 nos. of 220kV line bays for future lines<br>– 400kV bus sectionaliser bay: 1 set<br>– 220kV bus sectionaliser bay :1 set<br>– 220kV bus coupler bay: 1 no. | • 420kV, 80MVAr bus reactor: 2 nos.<br>• 400kV GIS Bus reactor bays: 2 nos.<br>• 400/220kV, 500MVA ICT: 2 nos<br>• 400kV GIS ICT bays: 2 nos.<br>• 220kV GIS ICT bays: 2 nos.<br>• 220kV bus coupler bay: 1 no.<br>• 400kV GIS line bays: 2 nos. [for Kaying PS – Niglok PS 400kV D/c (Quad) line]<br>• 220kV GIS line bays: 2 nos. [for termination of DTL of 1840A or more per circuit]<br>• 420kV, 50MVAr switchable line reactor with GIS bays: 2 nos. [one in each circuit of Kaying PS – Niglok PS 400kV D/c (Quad) line] |
| 2. | Establishment of new 400kV GIS Switching station at Niglok in Arunachal Pradesh (with a provision for 400/220kV level and 6000MW LCC HVDC station)<br><br>Additional space for future expansion:<br><br>– Establishment of ±800 kV, 6000 MW, Niglok (HVDC) [LCC] terminal station (4x1500 MW) along with associated interconnections with 400 kV HVAC Switchyard & all associated equipment (incl. filters)/bus extension, etc.<br>– 400/220kV, 4x500MVA ICTs along with associated ICT bays at both voltage levels<br>– 420kV, 1x80MVAr bus reactor along with associated bays | • 420kV, 80MVAr bus reactor: 2 nos.<br>• 400kV GIS Bus reactor bays: 2 nos.<br>• 400kV GIS line bays: 4 nos. [2 for Kaying PS – Niglok PS 400kV D/c (Quad) line & 2 for Niglok PS – Gogamukh 400kV D/c (Quad) line]<br>• 420kV, 50MVAr switchable line reactor with GIS bays: 2 nos. [one in each circuit of Niglok PS - Gogamukh 400kV D/c (Quad) line] |

| | | |
|---|---|---|
| | – 12 nos. of 400kV line bays (along with space for switchable line reactor) for future lines<br>– 8 nos. of 220kV line bays for future lines<br>– 400kV bus sectionaliser bay: 1 set<br>– 220kV bus sectionaliser bay :1 set<br>– 220kV bus coupler bay: 2 no. | |
| 3. | Extension at Gogamukh 400/220/132kV (ISTS) substation | • 400kV line bays: 2 nos. [for Niglok PS – Gogamukh PS 400kV D/c (Quad) line] |
| 4. | Kaying PS – Niglok PS 400kV D/c (Quad) line | • 100km |
| 5. | Niglok PS – Gogamukh 400kV D/c (Quad) line | • 125km |

***Note:***

1. *Gogamukh 400/220/132kV (ISTS) S/s is under implementation under North Eastern Region Expansion Scheme-XVI (NERES-XVI) scheme through TBCB route by M/s NERES XVI Power Transmission Limited (wholly owned subsidiary of Techno Electric and Engineering Company Limited). SCoD as per TSA is 30-11-2026*
2. *M/s NERES XVI Power Transmission Limited shall provide space for above scope of work at under implementation 400/220/132kV Gogamukh S/s free of cost.*

**Implementation Timeframe:** 28.02.2029

**Estimated Cost:** ₹1804.3 Cr

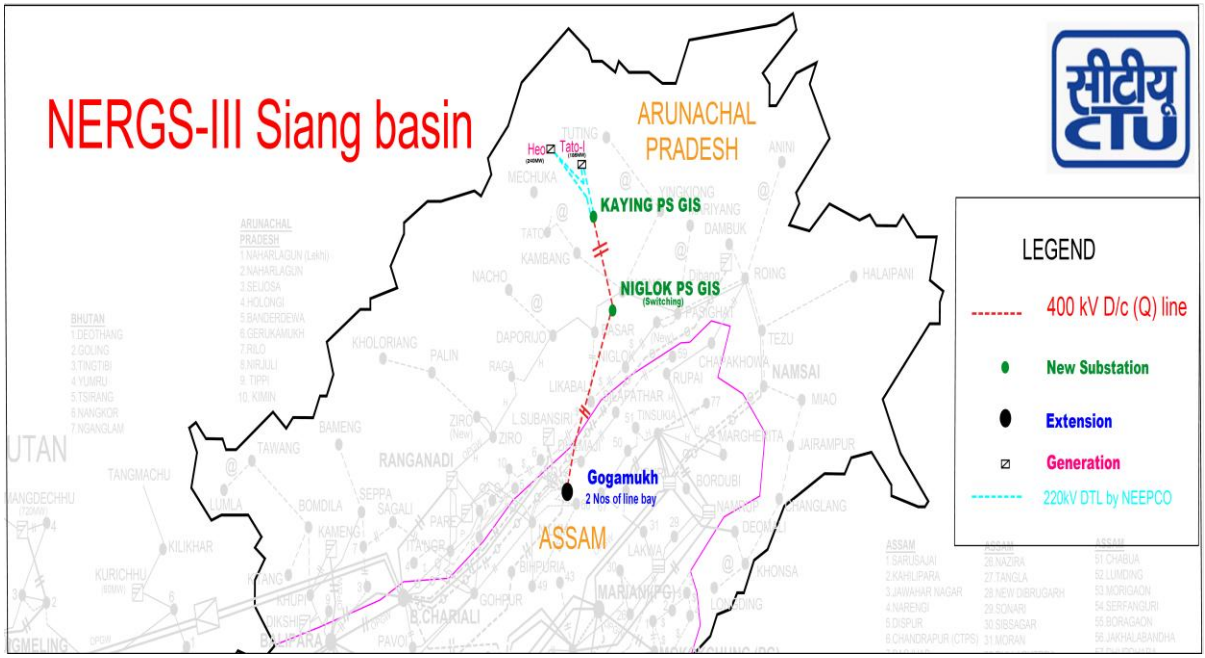



*Figure 8-2: Schematic of NERGS-III Siang basin*

# Chapter 9: Cross-Border Interconnection

Due to geographical location, India shares its boundaries with many South Asian countries and can play an important role in exchange of power to these countries for optimal utilisation of resources in particular and development of economy in general. Transmission of power is economical than transportation of fuel. Towards this, it is important to establish electrical interconnections with neighbouring countries which would be beneficial in meeting growing power demand, sharing of various types of energy resources, decreasing operational cost through better resource management, utilizing renewable energy resources and deferring investment by optimizing spinning reserve.

The details of existing, under-construction and under-discussion interconnections with the neighbouring countries viz. Bangladesh, Bhutan, Myanmar, Nepal, Sri Lanka, Saudi Arabia & UAE with Indian grid to facilitate transfer of power for the benefit of both sides is given below:

## 9.1 India-Bangladesh

### A. Present interconnection

- 1160MW is being transferred to Bangladesh through following two links:
  - ***1000MW*** *through Baharampur (India) – Bheramara (Bangladesh) 400kV 2xD/c line along with 2x500MW HVDC Back-to-Back terminal at Bheramara.*
  - ***160MW*** *through Surajmaninagar (Tripura) – North Comilla (Bangladesh) – South Comilla 400kV D/c radial interconnection (operated at 132kV).*
- M/s Adani, India has established a 1600MW (2x800MW) generation plant in India at Godda, Jharkhand for dedicated power supply to Bangladesh through 400kV D/c line (in radial mode without interconnection with Indian grid

### B. Planned interconnection

- Additional 1000MW can be transferred from India to Bangladesh through following links:

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

  India is going ahead with the financing and construction of the entire cross border link. The Bangladesh side may synchronize through this link at Parbotipur at an appropriate time for 1000MW drawl of power.

## 9.2 India-Bhutan

### A. Present interconnection

- 7560 MW can be transferred from Bhutan to India through following lines in synchronous mode of operation
  - *Kurichu HEP – Geylephu (Bhutan) – Salakati 132kV S/c*
  - *Deothang/Motonga – Rangia 132kV S/c*

- *Chukha HEP – Birpara 220kV D/c*
- *Malabase – Birpara 220kV S/c*
- *Tala HEP – Siliguri 400kV 2xD/c*
- *Mangdechu HEP (Bhutan) – Jigmeling (Bhutan) – Punatsangchuu-I&II HEP (bypassed as generations are delayed) – Alipurduar 400kV D/c (Quad) line*
- *Jigmeling (Bhutan) – Alipurduar 400kV D/c (Quad) line*

**B. Under Construction interconnection**

- No additional interconnection is under implementation. The existing lines would be able to evacuate power upon commissioning of Punatsangchu-I (6x200MW) and Punatsangchu-II (5 units out of 6x170MW already commissioned) generation by 2026-27.

### 9.3 India-Myanmar

**A. Present interconnection**

- About 2-3 MW power is being supplied to Tamu (Myanmar) from Moreh (Manipur) 33/11kV, 5MVA substation through 11kV line in radial mode.

**B. Under Discussion interconnection**

- Additional 504MW can be transferred from India to Myanmar through following links:
  - Imphal (India) - Tamu (Myanmar) high-capacity AC line along with 1x500MW HVDC back-to-back
  - Nampong (Arunachal Pradesh, India) - Pansong (Myanmar) 11kV S/c radial line
  - Behiang (Manipur, India) - Chikha (Myanmar) 11kV S/c radial line
  - Zokhawthar (Mizoram, India) - Rikhawdar (Myanmar) 11kV S/c radial line
  - Radial 11kV lines from Nagaland to neighbouring villages in Myanmar

### 9.4 India-Nepal

**A. Present interconnection**

- 1600MW can be transferred from India to Nepal through following links in radial mode of operation:
  - *About 600MW through 132kV & below radial lines*
  - *About 1000MW of power through the first high-capacity link i.e., 400kV D/c Dhalkebar (Nepal) – Muzaffarpur (India) line.*

**B. Under Construction interconnection**

- Additional 8100MW can be transferred from Nepal to India through following links:

- Sitamarhi (POWERGRID) – Dhalkebar (Nepal) 400kV D/c (Quad) line (associated with Arun-3 HEP, Nepal): Expected by Mar 2026
- Gorakhpur (India) – New Butwal (Nepal) 400kV D/c (Quad) line: Expected by May 2026
- Nanpara (India) - Kohlapur (Nepal) 132kV D/c line: Expected by Dec 2025
- New Purnea (India) - Inaruwa (Nepal) 400kV (Quad) D/c line
- Bareilly New (India) - Dododhara (Nepal) 400kV (Quad) D/c line

**C. Under Discussion interconnection**

- Additional 5350MW can be transferred from Nepal to India through following links:
  - Chameliya (Nepal) – Jauljivi (lndia) 220kV D/c (Twin Moose) line
  - Motihari (India) - Nijgad / Harnaiya (Nepal) 400kV D/c (Quad Moose) line
  - Lucknow (India) - Kohalpur (Nepal) 400kV D/c (Quad Moose) line
  - Reconductoring of Muzaffarpur (India) – Dhalkebar (Nepal) 400kV D/c line with HTLS conductor equivalent to Quad Moose lines

### 9.5 India-Sri Lanka

**A. Under Discussion interconnection: 500 MW**

- ±320kV, 1000MW (Phase 1: 500MW, Phase 2: 500MW) Madurai-New (India) to Mannar (Sri Lanka) HVDC line (overhead) along with 500MW VSC based HVDC terminals at both ends

The cross-border transmission capacity of India with neighbouring countries in present Timeframe and through under construction interconnections is summarized below in **Table 9-1**:

*Table 9-1: Cross-border power transfer capacity by 2030-31*

*(All fig in MW)*

| Country | Existing | Under Construction (By 2027-28) | Planned (by 2030-31) | Total |
|---|---|---|---|---|
| **India-Bangladesh** | 1160 | 0 | 1000 | **2160** |
| **India-Bhutan** | 7560 | 0 | 0 | **7560** |
| **India-Myanmar** | 3 | 0 | 504 | **507** |
| **India-Nepal** | 1600 | 8100 | 5350 | **15050** |
| **India-Sri Lanka** | 0 | 0 | 500 | **500** |
| **Total** | **10323** | **8100** | **7354** | **25777** |

A schematic of the existing, under-construction and proposed cross-border interconnections is given in Figure 9-1 below:

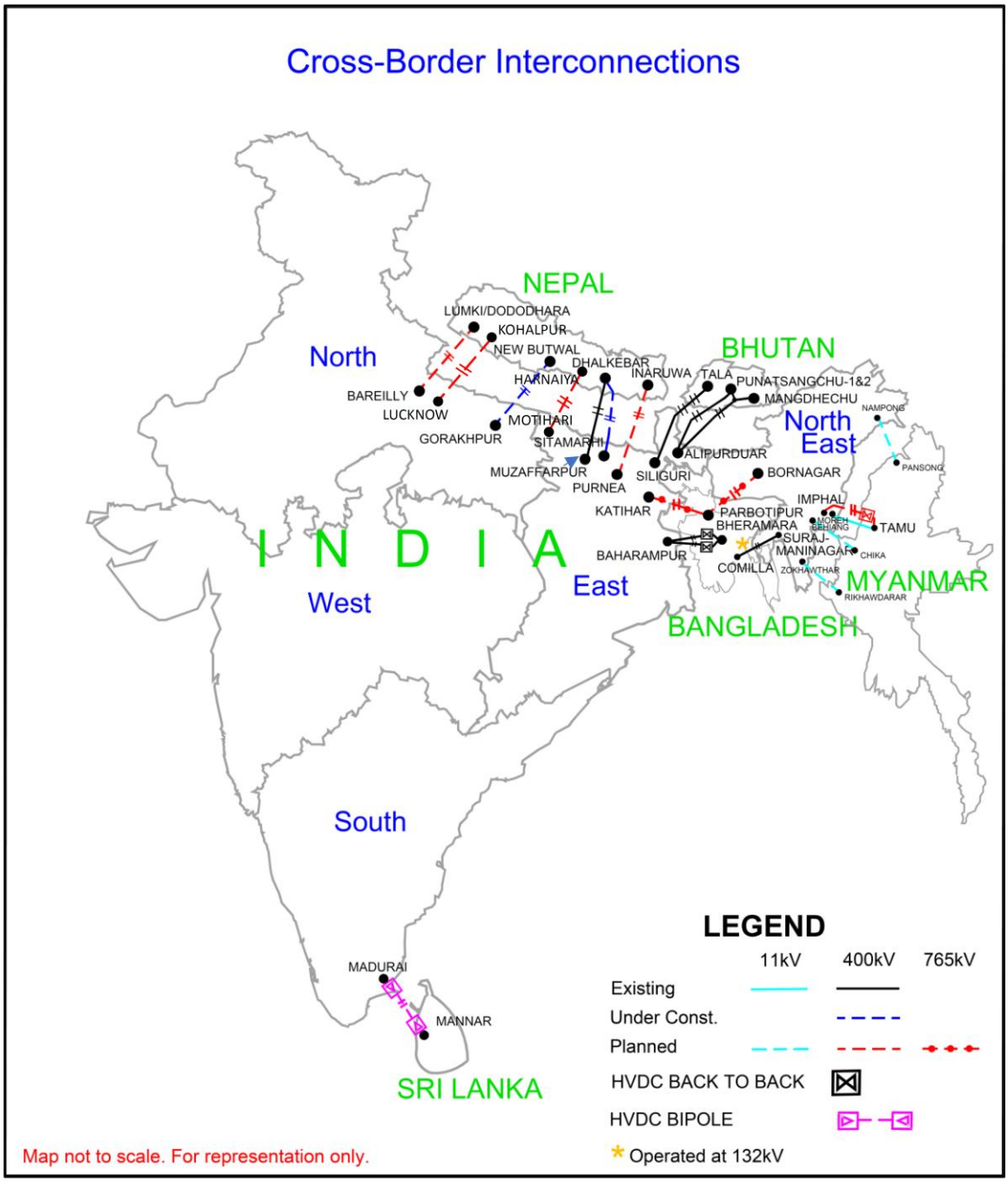



*Figure 9-1: Cross-Border interconnections*

# Chapter 10: Conclusion

The installed capacity of generation in Indian grid is expected to increase to about 917 GW including ESS (51 GW) by 2030-31 from 490 GW as on Jul'25. It will witness an increase in contribution of non-fossil fuel-based energy sources from 50.3% to 62%, whereas contribution of fossil fuel-based energy source will see a decline from 49.7% to 38% in total installed capacity in same Timeframe. This will create a pathway for India's commitment in COP26, wherein India is projected to have total installed capacity of non-fossil fuel-based generation of 500 GW by the year 2030.

Power scenario of the country is quite diverse and varies continuously. RE integration with grid further enhance its complexity. Large RE complexes are being established in Northern, Western, and Southern regions and are further going to expand by 2030-31 time-frame. The transmission system for integrating the same into the grid has already been planned and is currently under various stages of approval/implementation. As substantial solar generation addition has been envisaged in Rajasthan, this has resulted in NR becoming exporter of power around noon solar max period and importer during the evening peak demand period. Further due to large RE integration in SR also, it is expected to export RE power in maximum scenarios except winter season. Similar situations have been witnessed in other regions as well i.e. the region is surplus under certain load-generation scenario and deficit in other. To study the seasonal and diurnal variations of generations including demand, load generation balance has been prepared for three seasons (Monsoon, Summer, and Winter) in a year with three load conditions (Solar max, Evening peak demand, and Night off-peak demand) of daily load curve for each season. All India maximum and minimum demand of 366 GW and 211 GW after accounting an additional demand of about 35 GW including Green Hydrogen/Ammonia as direct drawl from ISTS has been considered while working out the LGBs for 2030-31 Timeframe.

While preparing the LGB, it has been observed that to dispatch maximum RE generation during the noon time, on bar thermal units required to meet evening peak demand are to be operated below the present technical minimum of 40% which highlights the need of energy storage in the grid to facilitate the RE integration by 2030-31. After considering the flexibility exhibited by gas and hydro generation between the evening peak and solar max scenario the surplus generation of about **37 GW, 53 GW** and **24 GW** was observed in solar max scenarios of monsoon, summer and winter scenarios respectively. To absorb the maximum RE generation during the daytime most of the thermal units are required to shut down necessitating the requirement of two-shift operation of thermal generation or more energy storage plants in the grid.

Brief of transmission systems evolved for each region are as below:

## Northern Region (NR)

The total installed generation capacity of NR as on July'25 is about 143.2 GW which constitute capacity from fossil sources (47% share) & balance from non-fossil sources in which (51.53%)

contribution in total regional IC is from renewable generation capacity including hydro and balance (1.47%) is from nuclear.

NR is connected to WR and ER through 765kV & 400kV high capacity corridors along with HVDC Back to Back / HVDC Bipoles. The thermal generating stations of NR are predominantly located in Uttar Pradesh, Punjab, Rajasthan and Haryana, whereas hydro generation is concentrated in Jammu & Kashmir, Himachal Pradesh and Uttarakhand. Further, Rajasthan is a RE rich state comprising of large Solar & Wind capacity.

To meet the growing demand, NR is continuously progressing in generation capacity addition majorly through hydro and non-conventional/renewable sources. As per the 20th EPS, NR demand for 2030-31 Timeframe is expected to increase to about 122.1 GW. As per the inputs received from various stakeholders, total installed capacity of NR for 2030-31 is expected to be about 231.7 GW.

Various transmission schemes i.e. Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-5 :6 GW) [Barmer Complex] Barmer-II: 6GW (Solar) and augmentation of transformation capacity at various stations of Northern Region has been planned in the Consultation Meeting for Evolution of Transmission System in Northern Region (CMETS-NR) from Feb'25 to July'25 for implementation. In this Rolling Plan, 14 nos. of transmission schemes of about 1900 ckm of transmission lines and 12315 MVA of transformation capacity has been formulated at an estimated cost of Rs. 25567.18 Cr.

Thus, cumulatively by 2030-31, transmission schemes comprising of 22,406 ckm of transmission lines and transformation capacity of 1,43,435 MVA at estimated cost of ₹ 1,49,781 Cr. is expected to be added in the grid.

**Western Region (WR)**

The total installed generation capacity of WR as on Jul'25 is about 165GW which constitute capacity from fossil sources (51.18% share) & balance (48.82% share) from Non-fossil sources comprising of nuclear, renewable generation capacity including hydro.

Western Region is connected to Northern, Southern and Eastern Regions through 765kV & 400kV high-capacity corridors along with Back to Back HVDCs and Bi-Pole HVDC links. The thermal generating stations of Western Regions are predominantly concentrated in the coal rich states of Chhattisgarh, Eastern part of Maharashtra and Madhya Pradesh. Further, Gujarat, Maharashtra and Madhya Pradesh are RE rich states comprising of large Solar & Wind capacity. Western part of Maharashtra, southern Gujarat and DD & DNH have high demand and less internal generation.

To meet the growing demand, Western region is continuously progressing in generation capacity addition majorly through thermal and non-conventional/renewable sources. The peak demand of Western Region for 2030-31 Timeframe is expected to increase to about 123.4 GW. In addition to above, the demand of about 20 GW corresponding to green hydrogen/ green ammonia, bulk consumer / distribution licensees is expected to be added to the grid by 2030-

31. As per the inputs received from various stakeholders, total installed capacity of Western Region for 2030-31 is expected to be about 328 GW.

Various transmission schemes from Feb'25 to Jul'25 have been evolved such as, WR-ER Inter-Regional Network Expansion Scheme which will relieve critical overloading observed on WR-ER corridors & also facilitate evacuation of power from upcoming thermal generation projects in Chhattisgarh. Transmission system for providing connectivity to PSPs upto 4500MW in Satara area of Maharashtra is expected to play a major role in fulfilling India's vision of generating 500 GW of non-fossil generation capacity by 2030. Network expansion scheme for drawal of power at South Kalamb S/s in the area of Maharashtra will help in the evacuation of non-fossil power directly to the load connected through South Kalamb S/s. Additionally, augmentation of transformation capacity in various S/s like Pirana (PG), Navi Mumbai (GIS), Raipur (PG), Champa PS and Dharamjaigarh S/s will strengthen the transmission system and will cater to the power requirement of the upcoming thermal & non-fossil generation projects in Western Region .

In this Rolling Plan (up to Jul'2025), 10 nos. of transmission schemes of about 590 ckm of transmission lines and transformation capacity of 21,000 MVA have been formulated at an estimated cost of about Rs.5701 Crs. which will cater to evacuation of 8070 MW power from various RE/Conventional generation projects in WR. These schemes are at various stages of implementation/bidding/approval. Further, new network expansions in Western Region are being taken up on a continuous basis for smooth, reliable and secure grid operation to facilitate supply of quality power to stakeholders/consumers.

Thus, cumulatively by 2030-31, transmission schemes comprising of 19,908 ckm of transmission lines and transformation capacity of 2,41,730 MVA at an estimated cost of Rs 1,73,047 Cr. is expected to be added in the WR ISTS grid.

**Southern Region (SR)**

The total generation installed capacity of SR as on Aug'25 is 138.8 GW which comprises of 42.6 % from fossil fuel sources & 57.4 % from Non-fossil sources. Further, Non-fossil fuel comprises of 55% contribution from renewable generation which also including hydro and 2.4 % from nuclear sources.

Southern Region is connected to Western and Eastern Regions through high capacity 765kV AC links, Back-to-Back HVDC and Bi-pole HVDC links. The thermal generating stations of Southern Region are predominantly concentrated in the States of Tamil Nadu, Karnataka, Andhra Pradesh and Telangana. Further, Tamil Nadu, Karnataka and Andhra Pradesh are RE rich states comprising of large-scale Solar & Wind capacity. Southern part of Karnataka (Bangalore), Kerala and Central part of Telangana (Hyderabad) has high demand and less internal generation.

It is observed that Southern Region demand is growing at a rapid pace of more than 10% on annual basis and similar growth in demand is expected in future as well. Southern Region

demand is expected to increase to about 102 GW by 2030-31. To meet such growing demand, Southern Region is continuously adding generation capacity predominantly from renewable energy sources/nuclear. Further, thermal based generation projects to meet the peak demand are also envisaged. As per the inputs received from various stakeholders, total installed capacity of Southern Region for 2030-31 is expected to be about 264 GW.

To facilitate integration and evacuation of power within and outside the Southern Grid, transmission system is being identified in consultation with stakeholders through regularly held Consultation Meeting for Evolution of Transmission System (CMETS). Various transmission systems have been identified through Consultation Meeting for Evolution of Transmission System in SR (CMETS-SR) from Feb'25 to July'25 for implementation. These schemes are under various stages of implementation / approval.

Transmission system for integration of RE of about 27 GW in Kurnool, Ananthapur, Kadapa, Davanagere, Bellary, Tumkur areas have been identified during this period. The proposed schemes shall facilitate in integration and evacuation of RE of Karnataka and Andhra Pradesh which are under various stages of approval. Further, transmission system for 12 GW has been evolved for facilitating integration of Green hydrogen/ Green ammonia based bulk consumers in Vizag, Kakinada & Ramayapatnam areas. In addition to the above schemes for RE based generation and GH projects, system strengthening of ISTS transmission system in the form of ICT augmentations at Narendra(existing), NP Kunta, Kalivanthapattu, Thrissur VSC HVDC, and Hyderabad (Ghanapur) have been identified for addressing constraints and reliable supply of power.

In this Rolling Plan, 22 nos. of transmission schemes of about 8,441 ckm of transmission lines and transformation capacity of 94,000 MVA have been formulated at an estimated cost of Rs. 49,994 Cr. These schemes are under various stages of implementation / approval. Further, the identification of network expansion is a continuous process and being undertaken for smooth, reliable and secure grid operation to facilitate supply of quality power to stakeholders/ consumers.

In addition to the existing ISTS network in Southern Region, 16,155 ckm of transmission lines and transformation capacity of 2,24,630 MVA at estimated cost of ₹ 1,03,483 Cr. is expected to be added in the SR ISTS grid by 2030-31.

**Eastern Region (ER)**

The total installed generation capacity of ER as on Jan'25 is about 36GW which constitute capacity from fossil sources (80% share) & balance (20% share) from Non-fossil sources comprising of renewable generation capacity including hydro.

Eastern Region is connected to all other regions though 765kV & 400kV high-capacity corridors along with HVDC Back to Back/ HVDC Bipole lines. The thermal generating stations of ER are predominantly located in Bihar, Jharkhand and Odisha whereas hydro generation are concentrated primarily in Sikkim. Eastern region is also connected to other countries such as Nepal, Bhutan and Bangladesh through high-capacity AC and HVDC links.

To meet the growing demand, Eastern region is continuously progressing in generation capacity addition majorly through thermal and hydro generation sources. The peak demand of Eastern Region for 2030-31 Timeframe is expected to increase to about 45.8 GW. In addition to above, the demand of about 6.3GW corresponding to bulk consumer / distribution licencees is expected to added to the grid by 2030-31. As per the inputs received from various stakeholders, total installed capacity of Eastern Region for 2030-31 is expected to be about 69 GW (including 3.2GW in Nepal and 4.5GW in Bhutan), which constitute capacity from fossil sources (74% share) & balance (26% share) from Non-fossil sources.

Various transmission schemes such as establishment of HVDC station each at Paradeep (Odisha) & Andaman & Nicobar Islands including HVDC undersea cable link, ICT Augmentation at Pandiabili (POWERGRID) S/s, LILO of one ckt of existing Chaibasa (POWERGRID) – Kharagpur (WBSETCL) 400kV D/c line at Odisha Metallurgical Industries Private Limited (OMIPL) for grant of ISTS Connectivity to M/s OMIPL, Shifting of existing lines at Koderma generation switchyard for grant of new Connectivity to DVC for its Koderma Phase-II generation & Reconductoring of various 400kV lines viz. Farakka – Kahalgaon and Talcher – Meramunduli 400kV D/c lines & 220kV lines viz. Alipurduar (POWERGRID) – Falakata (WBSETCL) – Birpara (POWERGRID) – Binaguri (POWERGRID) – Siliguri (POWERGRID) – Kishanganj (POWERGRID) – Dalkhola (POWERGRID) – Gazole (WBSETCL) – Malda (POWERGRID), comprising of ISTS and intra-state sections (WBSETCL) owned have been evolved in the Consultation Meeting for Evolution of Transmission System in Eastern Region (CMETS-ER) from Feb/Mar'24 to Feb'25. In this Rolling Plan, 6 nos. of transmission schemes of about 3,452 ckm of transmission lines and 500 MVA of transformation capacity and Paradeep – Andaman – Nicobar ±320kV, 250MW VSC based HVDC link have been formulated at an estimated cost of Rs. 38,773 Cr. These schemes either have been approved or are under various stages of approval. Further, new network expansions in Eastern Region are being taken up on a continuous basis and the mitigation measures identified would be taken up for detailed analysis in the subsequent rolling plan.

Thus, cumulatively by 2030-31, transmission schemes comprising of 6,435 ckm of transmission lines and transformation capacity of 17,000 MVA at estimated cost of Rs 53,040 Cr. is expected to be added in the grid.

**North Eastern Region (NER)**

The total installed generation capacity of NER as on Jan'25 is about 5.5GW which constitute capacity from fossil sources (53% share) & balance (47% share) from Non-fossil sources comprising of renewable generation capacity including hydro.

North Eastern Region is connected to Eastern Region and North Region though 400kV high-capacity corridors along with multi-terminal HVDC. The thermal generating stations of Northern Eastern Region are located in Assam, gas generations are situated in Assam and Tripura whereas hydro generation is concentrated primarily in Arunachal, Manipur & Meghalaya.

To meet the growing demand, NER is continuously progressing in generation capacity addition majorly through hydro generation sources. The peak demand of North Eastern Region for 2030-31 Timeframe is expected to increase to about 5.8 GW. As per the inputs received from various stakeholders, total installed capacity of Northern Eastern Region for 2030-31 is expected to be about 10.7 GW, which constitute capacity from fossil sources (28% share) & balance (72% share) from Non-fossil sources.

Various transmission schemes i.e. Stringing of 2nd circuit of Pasighat – Roing – Tezu – Namsai 132kV corridor, Reconductoring of (a) Balipara – Sonabil 220kV D/c line, (b) Silchar – Srikona 132kV S/c line and (c) Ranganadi – Ziro 132kV S/c line, installation of 50MVA ICT at Namsai, 125MVAR Variable Shunt Reactor (VSR) at Misa, 125MVAR bus reactor at Balipara and Biswanath Chariali have been approved in the Consultation Meeting for Evolution of Transmission System in North Eastern Region (CMETS-NER) from Feb/Mar'24 to Feb'25. In this Rolling Plan, 7 nos. of transmission schemes of about 335 ckm of transmission lines, augmentation of 50MVA of transformation capacity and reconductoring of 65 ckm of transmission lines have been formulated at an estimated cost of Rs. 252 Cr. These schemes have either been approved or are under various stages of approval.

Thus, cumulatively by 2030-31, transmission schemes comprising of 2,359 ckm of transmission lines and transformation capacity of 2,802 MVA at estimated cost of Rs 6,241 Cr. is expected to be added in the grid.

Further, evacuation of power from future hydro projects primarily in Arunachal Pradesh would be planned after firm commission schedule and significant progress in the hydro generation projects. New network expansion schemes in North Eastern Region are being taken up on a continuous basis and the mitigation measures identified would be taken up for detailed analysis in the subsequent rolling plan.

**Cross Border Interconnections (CB)**

The existing cross-border interconnections facilitate power transfer of about 5414MW (2651MW: Bhutan, 1160MW: Bangladesh, 1600MW: Nepal and 3MW: Myanmar) with the neighbouring countries. With the commissioning of under-construction cross-border interconnections which are expected in 2-3 years, the power transfer would enhance by about 3780MW resulting in total of about 9194MW (4531MW: Bhutan, 1160MW: Bangladesh, 3500MW: Nepal and 3MW: Myanmar).

# Annexures

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**Annex-3.1**

## Load Generation Balance (LGB)

## Monsoon (Aug'30)

### All India Revised LGB 2030-31

Installed Capacity

| Region | Thermal Central | Thermal State | Thermal IPP | Thermal | Nuclear | Hydro | Solar | Roof top | Wind | EPS Peak Demand | App. Peak Demand | ISTS Demand | GH Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 11880 | 51344 | 0 | 63224 | 3020 | 25269 | 101767 | 0 | 7401 | 122134 | 106129 | **0** | **0** |
| WR | 24420 | 37880 | 39972 | 102272 | 3240 | 6078 | 127669 | 0 | 62553 | 123381 | 107212 | **10642** | **9250** |
| SR | 15270 | 34448 | 4780 | 54498 | 5820 | 13985 | 100686 | 0 | 73026 | 102379 | 88963 | **0** | **8250** |
| ER | 31229 | 28152 | 4850 | 64231 | 0 | 13946 | 5498 | 0 | 0 | 48131 | 41824 | **5583** | **1450** |
| NER | 750 | 0 | 0 | 750 | 0 | 6030 | 4013 | 0 | 0 | 7529 | 6542 | **0** | **0** |
| | **83549** | **151823** | **49602** | **284974** | **12080** | **65307** | **339632** | **0** | **142980** | **350670** | 350670 | 16225 | 18950 |
| | | **284974** | | | | | | **551399** | | 403554 | | **385845** | |

Scenario 1 : Solar Max Aug 2029

| g factor | Thermal | Thermal | Thermal | Thermal | Nuclear | Hydro | Solar | Roof | Wind | National DF | Regional DF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 6% | 1% | 0% | -13% | 80% | 70% | 75% | 0% | 50% | 73% | 78% |
| WR | 10% | 2% | 11% | 9% | 80% | 40% | 75% | 0% | 50% | 72% | 77% |
| SR | 0% | 0% | 0% | 12% | 80% | 40% | 75% | 0% | 50% | 79% | 84% |
| ER | 5% | 3% | 27% | 2% | 80% | 70% | 75% | 0% | 0% | 77% | 81% |
| NER | 40% | 0% | 0% | 459% | 80% | 70% | 75% | 0% | 0% | 67% | 71% |
| | 6% | 1% | 12% | 4% | | | | | | 86% | 301780 |

| Availabilit g | Central | State | IPP | Reqd Thermal | Nuclear | Hydro | Solar | Solar | Wind | Demand | Surplus/Defi cit | Net Availabi lity | Net Demand | ISTS Dema nd |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 714 | 500 | 0 | -8434 | 2416 | 17688 | 76325 | 0 | 3701 | 89464 | -5236 | 101344 | 89464 | 0 |
| WR | 2480 | 652 | 4404 | 9526 | 2592 | 2431 | 95752 | 0 | 31277 | 109165 | 14387 | 139588 | 89273 | 19892 |
| SR | 0 | 0 | 0 | 6383 | 4656 | 5594 | 75514 | 0 | 36513 | 89383 | 20587 | 122277 | 81133 | 8250 |
| ER | 1704 | 790 | 1304 | 1507 | 0 | 9762 | 4123 | 0 | 0 | 43895 | -28877 | 17683 | 36862 | 7033 |
| NER | 300 | 0 | 0 | 3445 | 0 | 4221 | 3010 | 0 | 0 | 5049 | -439 | 7531 | 5049 | 0 |
| Total | **5198** | **1942** | **5708** | **12427** | **9664** | **39696** | **254724** | **0** | **71490** | **336955** | **421** | **388423** | **301780** | **35175** |
| | | **12848** | | | | | **365911** | | | 320950 | | | | |
| 15% | StateTh | | | | | | | | | | | | | |

Scenario 2 : Peak load Aug 2029

| Availabilit g factor | Thermal Central | Thermal State | Thermal IPP | Thermal | Nuclear | Hydro | Solar | Roof top | Wind | National DF | Regional DF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 48% | 42% | 0% | 44% | 80% | 95% | 0% | 0% | 70% | 76% | 81% |
| WR | 42% | 36% | 48% | 35% | 80% | 70% | 0% | 0% | 75% | 76% | 80% |
| SR | 13% | 32% | 30% | 30% | 80% | 70% | 0% | 0% | 75% | 68% | 72% |
| ER | 26% | 32% | 60% | 36% | 80% | 90% | 0% | 0% | 0% | 81% | 86% |
| NER | 40% | 0% | 0% | 174% | 80% | 90% | 0% | 0% | 0% | 84% | 89% |
| | 32% | 36% | 48% | 37% | | | | | | 86% | **300795** |

| Availabilit g | Thermal Central | Thermal State | Thermal Private | Reqd Thermal | Nuclear | Hydro | Solar | Sola r | Wind | Demand | Surplus/Defi cit | Availabi lity | Net Demand | Dema nd |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 5673 | 21738 | 0 | 28044 | 2416 | 24005 | 0 | 0 | 5181 | 92647 | -21572 | 71074 | 92647 | 0 |
| WR | 10314 | 13628 | 19197 | 36264 | 2592 | 4254 | 0 | 0 | 46915 | 103888 | 7703 | 111591 | 93246 | 10642 |
| SR | 2040 | 10881 | 1432 | 16493 | 4656 | 9789 | 0 | 0 | 54770 | 69645 | 22063 | 91708 | 69645 | 0 |
| ER | 8272 | 9001 | 2934 | 22852 | 0 | 12552 | 0 | 0 | 0 | 44508 | -10149 | 34358 | 38925 | 5583 |
| NER | 300 | 0 | 0 | 1307 | 0 | 5427 | 0 | 0 | 0 | 6332 | 2406 | 8738 | 6332 | 0 |
| Total | **26599** | **55248** | **23563** | **104960** | **9664** | **56028** | **0** | **0** | **106865** | **317020** | **450** | **317470** | **300795** | **16225** |
| | | **105410** | | | | | **162893** | | | 319828 | | | | |
| 52% | StateTh | | | | | | | | | | | | | |

Scenario 3 : off peak load Aug 2029

| Availabilit g factor | Thermal Central | Thermal State | Thermal IPP | Thermal | Nuclear | Hydro | Solar | Roof top | Wind | National DF | Regional DF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 48% | 28% | 0% | 32% | 80% | 70% | 0% | 0% | 60% | 59% | 63% |
| WR | 41% | 17% | 38% | 19% | 80% | 40% | 0% | 0% | 65% | 52% | 55% |
| SR | 13% | 26% | 30% | 35% | 80% | 40% | 0% | 0% | 65% | 61% | 64% |
| ER | 22% | 26% | 34% | 32% | 80% | 70% | 0% | 0% | 0% | 67% | 71% |
| NER | 40% | 0% | 0% | 102% | 80% | 70% | 0% | 0% | 0% | 64% | 68% |
| | 30% | 24% | 37% | 28% | | | | | | 67% | 235112 |

| Availabilit g | Thermal Central | Thermal State | Thermal Private | Reqd Thermal | Nuclear | Hydro | Solar | Sola r | Wind | Demand | Surplus/ Deficit | Availabi lity | Net Demand | Dema nd |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 5673 | 14492 | 0 | 20394 | 2416 | 17688 | 0 | 0 | 4441 | 72148 | -18801 | 53348 | 72148 | 0 |
| WR | 10064 | 6403 | 15263 | 19629 | 2592 | 2431 | 0 | 0 | 40659 | 74580 | 14317 | 88897 | 63938 | 10642 |
| SR | 2040 | 8931 | 1432 | 18875 | 4656 | 5594 | 0 | 0 | 47467 | 61978 | 13821 | 75799 | 61978 | 0 |
| ER | 6776 | 7286 | 1654 | 20450 | 0 | 9762 | 0 | 0 | 0 | 37802 | -11257 | 26545 | 32219 | 5583 |
| NER | 300 | 0 | 0 | 766 | 0 | 4221 | 0 | 0 | 0 | 4829 | 2119 | 6948 | 4829 | 0 |
| Total | **24853** | **37113** | **18349** | **80115** | **9664** | **39696** | **0** | **0** | **92567** | **251337** | **200** | **251537** | **235112** | **16225** |
| | | **80315** | | | | | **132263** | | | 249642 | | | | |
| 46% | StateTh | | | | | | | | | | | | | |

## Summer (Jun'30)

# All India Revised LGB 2030-31

Installed Capacity

| Region | Thermal Central | Thermal State | Thermal IPP | Thermal | Nuclear | Hydro | Solar | Roof top | Wind | EPS Peak | App. Peak Demand | ISTS Demand | GH Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 11880 | 51344 | 0 | 63224 | 3020 | 25269 | 101767 | 0 | 7401 | 122134 | 106129 | 0 | 0 |
| WR | 24420 | 37880 | 39972 | 102272 | 3240 | 6078 | 127669 | 0 | 62553 | 123381 | 107212 | 10642 | 9250 |
| SR | 15270 | 34448 | 4780 | 54498 | 5820 | 13985 | 100686 | 0 | 73026 | 102379 | 88963 | 0 | 8250 |
| ER | 31229 | 28152 | 4850 | 64231 | 0 | 13946 | 5498 | 0 | 0 | 48131 | 41824 | 5583 | 1450 |
| NER | 750 | 0 | 0 | 750 | 0 | 6030 | 4013 | 0 | 0 | 7529 | 6542 | 0 | 0 |
| | **83549** | **151823** | **49602** | **284974** | **12080** | **65307** | **339632** | **0** | **142980** | **350670** | 350670 | 16225 | 18950 |
| | | **284974** | | | | | | **551399** | | 403554 | | **385845** | |

Scenario 4 : Solar Max Jun 2029

| Availability factor | Thermal Central | Thermal State | Thermal IPP | Thermal | Nuclear | Hydro | Solar | Roof top | Wind | National DF | Regional DF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 1% | 0% | 0% | 5% | 80% | 70% | 85% | 0% | 50% | 91% | 97% |
| WR | 10% | 1% | 10% | 7% | 80% | 40% | 85% | 0% | 50% | 79% | 84% |
| SR | 0% | 0% | 0% | -12% | 80% | 40% | 85% | 0% | 50% | 75% | 79% |
| ER | 2% | 0% | 11% | 3% | 80% | 70% | 85% | 0% | 0% | 86% | 91% |
| NER | 40% | 0% | 0% | 262% | 80% | 70% | 85% | 0% | 0% | 53% | 56% |
| | 4% | 0% | 9% | 3% | | | | | | 94% | 331215 |

| Availability | Central | Thermal State | Thermal Private | Reqd Thermal | Nuclear | Hydro | Solar | Solar rooft | Wind | Demand | Surplus/Deficit | Net Availability | Net Demand | ISTS Demand |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 100 | 110 | 0 | 3325 | 2416 | 17688 | 86502 | 0 | 3701 | 111675 | -18274 | 110517 | 111675 | 0 |
| WR | 2480 | 500 | 4092 | 7323 | 2592 | 2431 | 108519 | 0 | 31277 | 117458 | 18396 | 151890 | 97566 | 19892 |
| SR | 0 | 0 | 0 | -6587 | 4656 | 5594 | 85583 | 0 | 36513 | 84826 | 35212 | 132346 | 76576 | 8250 |
| ER | 640 | 0 | 544 | 1871 | 0 | 9762 | 4673 | 0 | 0 | 48440 | -35487 | 15619 | 41407 | 7033 |
| NER | 300 | 0 | 0 | 1966 | 0 | 4221 | 3411 | 0 | 0 | 3990 | 1022 | 7932 | 3990 | 0 |
| **Total** | **3520** | **610** | **4636** | **7898** | **9664** | **39696** | **288687** | **0** | **71490** | **366390** | **869** | **418304** | **331215** | **35175** |
| | | **8766** | | | | | **399874** | | | 349970 | | | | |
| 7% | StateTh | | | | | | | | | | | | | |

Scenario 5 : Peak Load Jun 2029

| Availability factor | Thermal Central | Thermal State | Thermal IPP | Thermal | Nuclear | Hydro | Solar | Roof top | Wind | National DF | Regional DF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 62% | 53% | 0% | 68% | 80% | 95% | 0% | 0% | 70% | 87% | 92% |
| WR | 59% | 41% | 59% | 39% | 80% | 70% | 0% | 0% | 75% | 77% | 81% |
| SR | 13% | 35% | 30% | 33% | 80% | 70% | 0% | 0% | 75% | 68% | 72% |
| ER | 40% | 35% | 60% | 44% | 80% | 90% | 0% | 0% | 0% | 92% | 97% |
| NER | 40% | 0% | 0% | -4% | 80% | 90% | 0% | 0% | 0% | 62% | 66% |
| | 44% | 42% | 56% | 45% | | | | | | **91%** | **319360** |

| Availability | Thermal Central | Thermal State | Thermal Private | Reqd Thermal | Nuclear | Hydro | Solar | Solar rooft | Wind | Demand | Surplus/Deficit | Net Availability | Net Demand | ISTS Demand |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 7377 | 26967 | 0 | 42797 | 2416 | 24005 | 0 | 0 | 5181 | 105688 | -29392 | 76296 | 105688 | 0 |
| WR | 14382 | 15401 | 23643 | 39536 | 2592 | 4254 | 0 | 0 | 46915 | 105557 | 14718 | 120274 | 94915 | 10642 |
| SR | 2040 | 12069 | 1432 | 17928 | 4656 | 9789 | 0 | 0 | 54770 | 69849 | 21816 | 91666 | 69849 | 0 |
| ER | 12624 | 9910 | 2934 | 28399 | 0 | 12552 | 0 | 0 | 0 | 49788 | -10435 | 39353 | 44205 | 5583 |
| NER | 300 | 0 | 0 | -31 | 0 | 5427 | 0 | 0 | 0 | 4703 | 3744 | 8446 | 4703 | 0 |
| **Total** | **36723** | **64347** | **28009** | **128629** | **9664** | **56028** | **0** | **0** | **106865** | **335585** | **450** | **336035** | **319360** | **16225** |
| | | **129079** | | | | | **162893** | | | 338050 | | | | |
| 50% | StateTh | | | | | | | | | | | | | |

Scenario 6 : Off peak Load Jun 2029

| Availability factor | Thermal Central | Thermal State | Thermal IPP | Thermal | Nuclear | Hydro | Solar | Roof top | Wind | National DF | Regional DF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 75% | 31% | 0% | 36% | 80% | 70% | 0% | 0% | 60% | 56% | 60% |
| WR | 59% | 41% | 59% | 52% | 80% | 40% | 0% | 0% | 65% | 74% | 79% |
| SR | 18% | 28% | 67% | 36% | 80% | 40% | 0% | 0% | 65% | 56% | 60% |
| ER | 51% | 27% | 60% | 37% | 80% | 70% | 0% | 0% | 0% | 72% | 77% |
| NER | 90% | 0% | 0% | 155% | 80% | 70% | 0% | 0% | 0% | 54% | 58% |
| | 51% | 32% | 60% | 42% | | | | | | 73% | 255868 |

| Availability | Thermal Central | Thermal State | Thermal Private | Reqd Thermal | Nuclear | Hydro | Solar | Solar rooft | Wind | Demand | Surplus/Deficit | Net Availability | Net Demand | ISTS Demand |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 8859 | 16070 | 0 | 22949 | 2416 | 17688 | 0 | 0 | 4441 | 68028 | -16591 | 51436 | 68028 | 0 |
| WR | 14382 | 15401 | 23643 | 53426 | 2592 | 2431 | 0 | 0 | 40659 | 102123 | 2215 | 104338 | 91481 | 10642 |
| SR | 2790 | 9814 | 3222 | 19536 | 4656 | 5594 | 0 | 0 | 47467 | 57838 | 16583 | 74422 | 57838 | 0 |
| ER | 15839 | 7600 | 2934 | 23705 | 0 | 9762 | 0 | 0 | 0 | 40017 | -3855 | 36162 | 34434 | 5583 |
| NER | 675 | 0 | 0 | 1163 | 0 | 4221 | 0 | 0 | 0 | 4087 | 2098 | 6185 | 4087 | 0 |
| **Total** | **42546** | **48884** | **29799** | **120779** | **9664** | **39696** | **0** | **0** | **92567** | **272093** | **450** | **272543** | **255868** | **16225** |
| | | **121229** | | | | | **132263** | | | 273775 | | | | |
| 40% | StateTh | | | | | | | | | | | | | |

## Winter (Feb'31)

# All India Revised LGB 2030-31

Installed Capacity

| Region | Thermal Central | Thermal State | Thermal IPP | Thermal | Nuclear | Hydro | Solar | Roof top | Wind | EPS Peak Demand | App. Peak Demand | ISTS Demand | GH Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 11880 | 51344 | 0 | 63224 | 3020 | 25269 | 101767 | 0 | 7401 | 122134 | 106129 | **0** | **0** |
| WR | 24420 | 37880 | 39972 | 102272 | 3240 | 6078 | 127669 | 0 | 62553 | 123381 | 107212 | **10642** | **9250** |
| SR | 15270 | 34448 | 4780 | 54498 | 5820 | 13985 | 100686 | 0 | 73026 | 102379 | 88963 | **0** | **8250** |
| ER | 31229 | 28152 | 4850 | 64231 | 0 | 13946 | 5498 | 0 | 0 | 48131 | 41824 | **5583** | **1450** |
| NER | 750 | 0 | 0 | 750 | 0 | 6030 | 4013 | 0 | 0 | 7529 | 6542 | **0** | **0** |
| | **83549** | **151823** | **49602** | **284974** | **12080** | **65307** | **339632** | **0** | **142980** | **350670** | 350670 | 16225 | 18950 |
| | | **284974** | | | | | | **551399** | | 403554 | **385845** | | |

Scenario 7 : Solar max Feb 2030

| Availability factor | Thermal Central | Thermal State | Thermal IPP | Thermal | Nuclear | Hydro | Solar | Roof top | Wind | National DF | Regional DF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 18% | 7% | 0% | -19% | 80% | 30% | 90% | 0% | 10% | 62% | 66% |
| WR | 31% | 16% | 28% | 35% | 80% | 20% | 90% | 0% | 10% | 84% | 90% |
| SR | 23% | 25% | 40% | 50% | 80% | 20% | 90% | 0% | 0% | 91% | 97% |
| ER | 13% | 8% | 27% | -3% | 80% | 30% | 90% | 0% | 0% | 60% | 64% |
| NER | 40% | 0% | 0% | 399% | 80% | 30% | 90% | 0% | 0% | 55% | 59% |
| | 21% | 13% | 29% | 18% | | | | | | 87% | 305291 |

| Availability | Thermal Central | Thermal State | Thermal Private | Reqd Thermal | Nuclear | Hydro | Solar | Solar rooft | Wind | Demand | Surplus/Deficit | Net Availability | Net Demand | ISTS Demand |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 2100 | 3378 | 0 | -11772 | 2416 | 7581 | 91590 | 0 | 740 | 75153 | 15536 | 107805 | 75153 | 0 |
| WR | 7672 | 6157 | 11108 | 35349 | 2592 | 1216 | 114902 | 0 | 6255 | 123967 | 9899 | 149902 | 104075 | 19892 |
| SR | 3532 | 8457 | 1912 | 27218 | 4656 | 2797 | 90617 | 0 | 0 | 101382 | -1720 | 111970 | 93132 | 8250 |
| ER | 4174 | 2116 | 1304 | -2192 | 0 | 4184 | 4948 | 0 | 0 | 35805 | -21745 | 16726 | 28772 | 7033 |
| NER | 300 | 0 | 0 | 2996 | 0 | 1809 | 3612 | 0 | 0 | 4159 | -1358 | 5721 | 4159 | 0 |
| **Total** | **17778** | **20108** | **14324** | **51598** | **9664** | **17586** | **305669** | **0** | **6995** | **340466** | **612** | **392124** | **305291** | **35175** |
| | | **52210** | | | | **330250** | | | | 327088 | | | | |
| 39% | StateTh | | | | | | | | | | | | | |

Scenario 8 : Peak Load Feb 2030

| Availability factor | Thermal Central | Thermal State | Thermal IPP | Thermal | Nuclear | Hydro | Solar | Roof top | Wind | National DF | Regional DF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 66% | 45% | 0% | 51% | 80% | 60% | 0% | 0% | 35% | 60% | 64% |
| WR | 75% | 64% | 80% | 64% | 80% | 40% | 0% | 0% | 20% | 80% | 86% |
| SR | 39% | 67% | 55% | 70% | 80% | 40% | 0% | 0% | 20% | 70% | 75% |
| ER | 40% | 33% | 64% | 40% | 80% | 60% | 0% | 0% | 0% | 64% | 68% |
| NER | 40% | 0% | 0% | 12% | 80% | 60% | 0% | 0% | 0% | 67% | 72% |
| | 54% | 52% | 76% | 57% | | | | | | 80% | **279693** |

| Availability | Thermal Central | Thermal State | Thermal Private | Reqd Thermal | Nuclear | Hydro | Solar | Solar rooft | Wind | Demand | Surplus/Deficit | Net Availability | State Demand | ISTS Demand |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 7854 | 23318 | 0 | 32007 | 2416 | 15161 | 0 | 0 | 2590 | 73295 | -3049 | 70246 | 73295 | 0 |
| WR | 18221 | 24068 | 31786 | 65576 | 2592 | 2431 | 0 | 0 | 12511 | 109324 | 3390 | 112714 | 98682 | 10642 |
| SR | 5948 | 22977 | 2638 | 38109 | 4656 | 5594 | 0 | 0 | 14605 | 71902 | -2420 | 69482 | 71902 | 0 |
| ER | 12382 | 9316 | 3097 | 25671 | 0 | 8368 | 0 | 0 | 0 | 36325 | -497 | 35828 | 30742 | 5583 |
| NER | 300 | 0 | 0 | 91 | 0 | 3618 | 0 | 0 | 0 | 5072 | 3025 | 8097 | 5072 | 0 |
| **Total** | **44704** | **79678** | **37521** | **161454** | **9664** | **35172** | **0** | **0** | **29706** | **295918** | **450** | **296368** | **279693** | 16225 |
| | | **161904** | | | | **64878** | | | | 299458 | | | | |
| 49% | StateTh | | | | | | | | | | | | | |

Scenario 9: Offpeak Load Feb 2030

| Availability factor | Thermal Central | Thermal State | Thermal IPP | Thermal | Nuclear | Hydro | Solar | Roof top | Wind | National DF | Regional DF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 63% | 23% | 0% | 26% | 80% | 30% | 0% | 0% | 10% | 30% | 32% |
| WR | 71% | 60% | 75% | 64% | 80% | 20% | 0% | 0% | 20% | 62% | 67% |
| SR | 40% | 63% | 77% | 74% | 80% | 20% | 0% | 0% | 0% | 56% | 61% |
| ER | 40% | 27% | 60% | 34% | 80% | 30% | 0% | 0% | 0% | 44% | 47% |
| NER | 40% | 0% | 0% | 49% | 80% | 30% | 0% | 0% | 0% | 36% | 38% |
| | 52% | 42% | 74% | 51% | | | | | | 55% | 194314 |

| Availability | Thermal Central | Thermal State | Thermal Private | Reqd Thermal | Nuclear | Hydro | Solar | Solar rooft | Wind | Demand | Surplus/Deficit | Net Availability | Net Demand | ISTS Demand |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 7525 | 11948 | 0 | 16295 | 2416 | 7581 | 0 | 0 | 740 | 36121 | 2010 | 38131 | 36121 | 0 |
| WR | 17262 | 22820 | 30177 | 65786 | 2592 | 1216 | 0 | 0 | 12511 | 87364 | 8670 | 96034 | 76722 | 10642 |
| SR | 6178 | 21870 | 3670 | 40093 | 4656 | 2797 | 0 | 0 | 0 | 57765 | -13217 | 44548 | 57765 | 0 |
| ER | 12420 | 7640 | 2934 | 21752 | 0 | 4184 | 0 | 0 | 0 | 26616 | 1629 | 28244 | 21033 | 5583 |
| NER | 300 | 0 | 0 | 368 | 0 | 1809 | 0 | 0 | 0 | 2673 | 1359 | 4033 | 2673 | 0 |
| **Total** | **43685** | **64279** | **36781** | **144294** | **9664** | **17586** | **0** | **0** | **13251** | **210539** | **450** | **210989** | **194314** | 16225 |
| | | **144744** | | | | **30837** | | | | 210349 | | | | |
| 44% | StateTh | | | | | | | | | | | | | |

**Annex 3.2**

## ISTS Network Expansion Plan upto 2030-31

### 1. Transmission lines

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 1. | 2025-26 | NR | LILO of one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line | 400 | D/c | 20 | | |
| 2. | 2025-26 | NR | Stringing of 2nd circuit of Kishenpur – Dulhasti 400kV D/c line (Kishtwar – Kishenpur Section) | 400 | D/c | 130 | | |
| 3. | 2025-26 | NR | LILO of both 400 kV D/c Amargarh - Samba line at 400/220 kV Siot S/s | 400 | D/c | 30 | | |
| 4. | 2025-26 | NR | Nange (GIS) Pooling Station – Koldam 400 kV D/c line (Triple snowbird) | 400 | D/c | 80 | | |
| 5. | 2025-26 | NR | LILO of one ckt of 400kV Koldam (NTPC) – Ropar (Triple snowbird) D/c line at Pooling Station near Bilaspur (GIS) | 400 | S/c | 1 | | 50 |
| 6. | 2025-26 | NR | LILO of both ckts of 400kV Bikaner (PG)-Bikaner-II D/c line at Bikaner-III PS | 400 | D/c | 80 | | |
| 7. | 2025-26 | NR | Bikaner-II PS – Bikaner-III PS 400 kV D/c line (Quad) | 400 | D/c | 60 | | |
| 8. | 2025-26 | NR | LILO of both ckts of 400 kV Sohna Road (GPTL)-Gurgaon (PG) D/c line at Neemrana-II S/s | 400 | D/c | 340 | | |
| 9. | 2025-26 | NR | Neemrana-II -Kotputli 400 kV D/c line (Quad | 400 | D/c | 140 | | |
| 10. | 2025-26 | NR | Bikaner-III – Neemrana-II 765 kV 2xD/c line | 765 | D/c | 1400 | 660 | 660 |
| 11. | 2025-26 | NR | Neemrana-II- Bareilly (PG) 765 kV D/c line | 765 | D/c | 700 | 330 | 330 |
| 12. | 2025-26 | NR | Fatehgarh-IV (Section-2) PS – Bhinmal (PG) 400 kV D/c line (Twin HTLS) | 400 | D/c | 400 | 50 | 50 |
| 13. | 2025-26 | NR | LILO of both ckts of 765 kV Fatehgarh-III- Beawar D/c line(2nd) at Fatehgarh-IV (Section-2) PS along with 330 MVAr switchable line reactors at Fatehgarh-IV PS end of each ckt | 765 | D/c | 60 | 330 | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| | | | of 765 kV Fatehgarh-IV- Beawar D/c line (formed after LILO) | | | | | |
| 14. | 2025-26 | NR | Fatehgarh-III (Section-2) PS – Barmer-I PS 400 kV D/c line (Quad) | 400 | D/c | 100 | | |
| 15. | 2025-26 | NR | Fatehgarh-IV (Section-2) PS – Sirohi PS 765 kV D/c line | 765 | D/c | 480 | 240 | 240 |
| 16. | 2025-26 | NR | Barmer-I PS– Sirohi PS 765 kV D/c line | 765 | D/c | 400 | 240 | 240 |
| 17. | 2025-26 | NR | Sirohi PS-Chittorgarh (PG) 400 kV D/c line | 400 | D/c | 320 | 80 | |
| 18. | 2025-26 | NR | Sirohi PS- Rishabdeo/Salumbar 765 kV D/c line | 765 | D/c | 340 | 330 | |
| 19. | 2025-26 | NR | Rishabdeo/Salumbar - Mandsaur PS 765 kV D/c line | 765 | D/c | 320 | | 330 |
| 20. | 2025-26 | NR | LILO of one circuit of 765 kV Chittorgarh-Banaskanta D/c line at Rishabdeo/Salumbar S/s | 765 | S/c | 20 | | |
| 21. | 2025-26 | NR | Beawar- Mandsaur PS 765 kV D/c line | 765 | D/c | 520 | 240 | 240 |
| 22. | 2025-26 | NR | Generation switchyard of Shongtong HEP to Wangtoo (HPPTCL) 400 kV D/c [Quad] line | 400 | D/c | 36 | | |
| 23. | 2025-26 | NR | Extension of Wangtoo (HPPTCL) - Shongtong HEP 400 kV (Quad)$ D/c line upto Jhangi PS with one circuit through Shongtong HEP generation switchyard | 400 | D/c | 74 | | |
| 24. | 2025-26 | NR | Wangtoo (HPPTCL) - Panchkula (PG) 400 kV D/c (Twin HTLS) | 400 | D/c | 420 | | 80 |
| 25. | 2025-26 | NR | 765 kV Bhadla-III – Bikaner-III D/c line | 765 | D/c | 300 | 240 | |
| 26. | 2025-26 | NR | Reconductoring of 220 kV Hisar (PG) - Hisar (IA) D/c line with HTLS conductor (with minimum 1050 ampere current requirement) along with bay equipment upgradation at 220kV Hisar (PG) end | 220 | D/c | 28 | | |
| 27. | 2025-26 | NR | 400 kV Bareilly(765/400kV) – Bareilly (PG) D/c line (Quad) (2nd) | 400 | D/c | 4 | | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 28. | 2025-26 | NR | Reconductoring of 220 kV Hisar (PG) - Hisar (IA) D/c line (Single Zebra) with HTLS conductor (with minimum 1050Ampere/ckt requirement) along with bay equipment upgradation at 220kV Hisar (PG) end | 220 | D/c | 28 | | |
| 29. | 2025-26 | WR | LILO of one ckt. of KPS1- Bhuj PS 765 kV D/c line at KPS2 | 765 | D/c | 2 | | |
| 30. | 2025-26 | WR | Navsari (new) (South Gujarat) (GIS)- Kala (GIS) 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage) with 63MVAr switchable line reactor on each ckt at Navsari (new) (GIS) end. | 400 | D/c | 220 | 63 | |
| 31. | 2025-26 | WR | Navsari(New) (South Gujarat) (GIS) – Magarwada (GIS) 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage) | 400 | D/c | 160 | | |
| 32. | 2025-26 | WR | 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 | D/c | 400 | 330 | |
| 33. | 2025-26 | WR | Ahmedabad – South Gujarat/Navsari (new) 765 kV D/c line with 240 MVAr switchable line reactor at both ends (~line length 220 km) | 765 | D/c | 440 | 240 | 240 |
| 34. | 2025-26 | WR | Lakadia PS – Ahmedabad 765kV D/c line with 240 MVAR switchable line reactors on both ends (500ckm) | 765 | D/c | 500 | 240 | 240 |
| 35. | 2025-26 | WR | LILO of Pirana (PG) – Pirana (T) 400kV D/c line at Ahmedabad S/s with twin HTLS along with reconductoring of Pirana (PG) – Pirana(T) line with twin HTLS conductor | 400 | D/c | 88 | | |
| 36. | 2025-26 | WR | Banaskantha – Ahmedabad 765 kV D/c line with 330MVAr, 765 kV Switchable line reactor on each ckt at Ahmedabad S/s end | 765 | D/c | 400 | | |
| 37. | 2025-26 | WR | Solapur pooling point - Solapur (PG) 400 kV D/c line (twin HTLS) (with minimum capacity of 2100 MVA/ckt at nominal voltage) - 50KM | 400 | D/c | 100 | | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 38. | 2025-26 | WR | LILO of Satna-Gwalior 765 kV S/c line at Karera | 765 | S/c | 140 | 330 | |
| 39. | 2025-26 | WR | LILO of one circuit of Jabalpur - Orai 765 kV D/c line at Ishanagar 765 kV S/s (New) | 765 | D/c | 10 | | |
| 40. | 2025-26 | WR | Pachora PS – Ujjain (MPPTCL) 400kV D/c line (Quad ACSR/AAAC/AL59 Moose equivalent) | 400 | D/c | 120 | | |
| 41. | 2025-26 | WR | Dhule PS – Dhule (BDTCL) 400 kV D/c Line (Quad Moose) (60 km) | 400 | D/c | 120 | | |
| 42. | 2025-26 | WR | (i) LILO of Tarapur/Velgaon – Padghe (M) 400kV D/c line at Kudus(M) S/s in following manner so as to form Padghe(PG)(GIS) – Padghe(M) 400kV D/c line and Tarapur/Velgaon - Kudus(M) 400kV D/c line:<br>1. Line-out portion for interconnection of Padghe(M) with Kudus(M) S/s to be constructed with twin HTLS conductor with minimum capacity of 2100MVA per ckt at nominal voltage and terminated directly into Padghe(PG)(GIS) – Kudus(M) 400kV D/c (quad) line at outskirts of Kudus(M) S/s (with bypassing at Kudus(M) end) so as to form Padghe(PG)(GIS) – Padghe(M) 400kV D/c line(2 nos. 400kV bays at Kudus(M) shall get vacated with above arrangement). (Length ~10km.)<br>2. Reconductoring of Padghe(M) – Kudus (outskirt) 400kV D/c balance line section (i.e. of existing line portion upto the proposed LILO point) with twin HTLS conductor with minimum capacity of 2100MVA per ckt at nominal voltage (Length : ~20km.)<br>3. Line-in portion for interconnection of Tarapur/Velgaon with Kudus(M) S/s to be terminated into 2 nos. bays vacated at Kudus (M) S/s (at | 400 | D/c | 40 | | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| | | | Sl. 1 above) (Length ~10km.)<br>3. (ii) Shifting of Padghe(PG)(GIS) – Padghe(M) 400kV D/c line from 400kV Section A to Section B(GIS) at Padghe(M) end and termination into 2 nos. 400kV line bays to be constructed at Padghe(M) Section B(GIS) under ISTS | | | | | |
| 43. | 2025-26 | ER | NKSTPP – Jharkhand Pool 400kV D/c (quad) line (50ckm) | 400 | D/c | 50 | | |
| 44. | 2025-26 | ER | NKSTPP – Gaya 400kV D/c (quad) line (185ckm) | 400 | D/c | 185 | | |
| 45. | 2025-26 | ER | Angul - Paradeep 765 kV D/c line | 765 | D/c | 380 | | 330 |
| 46. | 2025-26 | ER | Paradeep - Paradeep (OPTCL) 400kV D/c (Quad) line | 400 | D/c | 20 | | 330 |
| 47. | 2025-26 | ER | Line reactor at Malda end of Malda - New Purnea 400kV D/c line | 400 | D/c | 0 | 126 | |
| 48. | 2025-26 | ER | Shifting of Ranchi (POWERGRID) – Raghunathpur (DVC) 400kV D/c (Quad) line to bays 431 and 434 in diameters 431-432-433 and 434-435-436 at Ranchi | 400 | D/c | 2.54 | | |
| 49. | 2025-26 | ER | Installation of 420kV, 1x80MVAr switchable line reactor, one each in both circuits of Raghunathpur (DVC) – Ranchi-New (POWERGRID) 400kV D/c (Quad) line at Ranchi New end | 400 | D/c | 0 | | 160 |
| 50. | 2025-26 | NER | Kathalguri (NEEPCO) – Namsai (POWERGRID) 220kV D/c line | 220 | D/c | 150 | | |
| 51. | 2025-26 | NER | Gogamukh - Gerukamukh 132kV D/c line | 132 | D/c | 40 | | |
| 52. | 2025-26 | NER | LILO of one D/c (ckt-1 & ckt-2 of line-1) of Lower Subansiri – Biswanath Chariali 400kV (Twin Lapwing) 2xD/c lines at Gogamukh S/s | 400 | D/c | 40 | | |
| 53. | 2025-26 | NER | LILO of both circuits of Misa - Mariani 400kV D/c line at Bokajan | 400 | D/c | 20 | | 100 |
| 54. | 2025-26 | SR | Mangalore (Udupi PCL) – Kasargode 400kV (Quad) D/c line | 400 | D/c | 231 | | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 55. | 2025-26 | SR | Narendra New (GIS) - Pune (GIS) 765 kV D/c line with 1x330 MVAr switchable Line Reactor on each circuit at both end | 765 | D/c | 680 | 330 | 330 |
| 56. | 2025-26 | SR | Bidar PS – Maheshwaram (PG) 765kV D/C line along with 1x240 MVAr switchable Line Reactor on Bidar end of both ckts | 765 | D/c | 320 | 240 | |
| 57. | 2025-26 | SR | Ananthpuram PS - Kurnool-III PS 400 kV (High capacity equivalent to quad moose) D/c Line | 400 | D/c | 200 | | |
| 58. | 2025-26 | SR | Anantapuram PS - Cuddapah 400 kV (High capacity equivalent to quad moose) D/c Line with 80 MVAr switchable line reactor on Ananthapuram PS end of each circuit | 400 | D/c | 300 | 80 | |
| 59. | 2025-26 | SR | Koppal-II - Narendra New 765kV D/c line with 240 MVAr SLR at Koppal-II PS end | 765 | D/c | 150 | 240 | |
| 60. | 2025-26 | SR | Gadag-II PS - Koppal-II PS 400kV (Quad Moose) D/c line | 400 | D/c | 100 | | |
| 61. | 2025-26 | SR | Koppal-II - Raichur 765kV D/c linw with 330 MVAr SLR at Koppal-II PS end | 765 | D/c | 190 | 240 | |
| 62. | 2025-26 | SR | Tumkur-II PS - Tumkur (Pavagada) 400kV (QM equivalent) D/c line | 400 | D/c | 200 | | |
| 63. | 2026-27 | NR | 400kV Kishenpur Kishtwar D/c (2nd) (Quad) | 400 | D/c | 260 | | |
| 64. | 2026-27 | NR | 400 kV New Wanpoh - Samba D/c (existing) line (bypassing of 400kV New Wanpoh – Kishenpur D/c & Samba – Kishenpur D/c at Kishenpur) | 400 | D/c | 1 | | |
| 65. | 2026-27 | NR | LILO of both ckts of 400kV Bikaner II PS- Bikaner III PS (Quad) direct line at Bikaner-IV PS | 400 | D/c | 20 | | |
| 66. | 2026-27 | NR | Bikaner-IV PS – Siwani 765 kV 2xD/c line along with 240 MVAr switchable line reactor for each circuit at each end | 765 | D/c | 1040 | 240 | 240 |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 67. | 2026-27 | NR | 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 | D/c | 300 | 63 | |
| 68. | 2026-27 | NR | Siwani – Fatehabad (PG) 400 kV D/c line (Quad) | 400 | D/c | 160 | | |
| 69. | 2026-27 | NR | Siwani – Jind (PG) 400 kV D/c line (Quad Moose) | 400 | D/c | 220 | | |
| 70. | 2026-27 | NR | Siwani – Patran (Indi Grid) 400 kV D/c line (Quad) (~160 km) (400kV GIS duct :700m) along with 80 MVAr switchable line reactor for each circuit at Siwani S/s end | 400 | D/c | 320 | 80 | |
| 71. | 2026-27 | NR | Fatehgarh-IV PS (Sec-2) – Barmer-I PS 400kV D/c line (Quad) | 400 | D/c | 90 | | |
| 72. | 2026-27 | NR | Barmer-I PS – Merta-II 765 kV D/c line along with 330MVAr switchable line reactor for each circuit at each end of Barmer-I PS – Merta-II 765 kV D/c line | 765 | D/c | 690 | 330 | 330 |
| 73. | 2026-27 | NR | Merta-II – Beawar 400 kV D/c line (Quad) (~55 km) | 400 | D/c | 110 | | |
| 74. | 2026-27 | NR | 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 765 kV D/c line line (~250 km) | 765 | D/c | 500 | 240 | 240 |
| 75. | 2026-27 | NR | Dausa - Ghiror 765 kV D/c line along with 330MVAr 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 (~305 km) | 765 | D/c | 610 | 240 | 330 |
| 76. | 2026-27 | NR | LILO of both ckt of 765 kV Aligarh (PG) -Orai (PG) D/c line (~15 km) at Ghiror S/s along with 240 MVAr switchable line reactor for each circuit at Ghiror S/s end of 765 kV Ghiror -Orai D/c line | 765 | D/c | 60 | 240 at Ghiror end | |
| 77. | 2026-27 | NR | LILO of one ckt of 765kV Agra (PG) – Fatehpur (PG) 2xS/c line at Ghiror along with 240 MVAr switchable line reactor at Ghiror S/s end of 765 kV Ghiror - Fatehpur line (~30 kms) | 765 | S/c | 60 | 240 at Ghiror end | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 78. | 2026-27 | NR | 400kV Ghiror-Firozabad (UPPTCL) D/c line (Quad) | 400 | D/c | 100 | | |
| 79. | 2026-27 | NR | 400 kV Kishenpur-Samba D/c line (Quad) (2nd) | 400 | D/c | 70 | | |
| 80. | 2026-27 | NR | Bypassing of 400 kV Kishtwar – Kishenpur line (Quad) (Under implementation as part of Pakaldul transmission scheme) at Kishenpur and connecting it with one of the circuits of Kishenpur-Samba 400kV D/c line (Quad), thus forming 400kV Kishtwar-Samba (Quad) direct line (one ckt) | 400 | | | | |
| 81. | 2026-27 | NR | Termination of another circuit of 400 kV Kishenpur-Samba D/c line (Quad) at Kishenpur at 400kV bay vacated at Kishenpur (After bypassing of one ckt of 400 kV Kishtwar-Kishenpur at Kishenpur) –160km | 400 | | | | |
| 82. | 2026-27 | NR | 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 | | | | |
| 83. | 2026-27 | NR | 400kV 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 400kV D/c line) – 205km | 400 | | 205 | | |
| 84. | 2026-27 | NR | 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 Samba –Nakodar line | 400 | | | | |
| 85. | 2026-27 | NR | Termination of another circuit of 400 kV Samba -Jalandhar D/c line (Quad) at Jalandhar at bay vacated at Jalandhar (After bypassing of one ckt of 400 kV Jalandhar - Nakodar at Jalandhar)-177km | 400 | | | | |
| 86. | 2026-27 | NR | LILO of 400 kV Kishenpur-Dulhasti line (Twin Zebra) at Kishtwar S/s (one ckt already LILOed as part of Pakaldul transmission system) | 400 | | 20 | | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 87. | 2026-27 | NR | Reconductoring of 400 kV Kishenpur-Kishtwar line (Twin HTLS) (minimum 2100 MVA capacity) (formed after LILO of Kishenpur-Dulhasti line at Kishtwar S/s) along with bay upgradation works (2000A to 3150A) at Kishenpur end for above line. | 400 | | | | |
| 88. | 2026-27 | NR | 400 kV Bareilly (765/400 kV) – Bareilly (PG) D/c line (Quad) (2nd ) | 400 | D/c | 8 | | |
| 89. | 2026-27 | NR | Fatehgarh-IV PS (Sec-2) – Barmer-I PS 400kV D/c line (Quad) | 400 | D/c | 90 | | |
| 90. | 2026-27 | NR | Dausa - Ghiror 765 kV D/c line along with 330MVAr 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 | D/c | 610 | 240 | 330 |
| 91. | 2026-27 | NR | 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 | D/c | 60 | 240 MVAr switchable line reactor for each circuit at Ghiror S/s end of 765 kV Ghiror - Orai (PG) D/c line | |
| 92. | 2026-27 | NR | LILO of one ckt of 765kV 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 | S/c | 60 | 240 MVAr switchable line reactor at Ghiror end of 765 kV Ghiror - Fatehpur (PG) line | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 93. | 2026-27 | NR | 400kV Ghiror-Firozabad (UPPTCL) D/c line (Quad) | 400 | D/c | 100 | | |
| 94. | 2026-27 | NR | 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 | D/c | 690 | 330 | 330 |
| 95. | 2026-27 | NR | Merta-II – Beawar 400 kV D/c line (Quad) | 400 | D/c | 110 | | |
| 96. | 2026-27 | NR | 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 | 765 | D/c | 500 | 240 | 240 |
| 97. | 2026-27 | NR | Sirohi – Mandsaur PS 765KV D/c line (~ 320kms) along with 240 MVAr switchable line reactor at Sirohi S/s end 330MVAr switchable line reactor at Mandsaur PS end for each circuit of Sirohi – Mandsaur PS 765KV D/c line | 765 | D/c | 640 | 240 | 330 |
| 98. | 2026-27 | NR | Mandsaur PS – Khandwa (New) 765kV D/c line (~230km.) along with 240MVAr switchable line reactor for each circuit at each end of Mandsaur PS – Khandwa (New) 765kV D/c line | 765 | D/c | 460 | 240 | 240 |
| 99. | 2026-27 | NR | LILO of 400 kV Kishenpur-Dulhasti line (Twin) at Kishtwar S/s along with associated bays at Kishtwar S/s | 400 | D/c | 6 | | |
| 100. | 2026-27 | NR | 400 kV Kishenpur-Samba D/c line (Quad)<br>(only one circuit is to be terminated at Kishenpur utilizing 1 no.<br>of 400kV vacated line bay at Kishenur S/s (formed with bypassing of one ckt of 400kV Kishtwar – Kishenpur 400kV D/c line (Quad) at Kishenpur) while second circuit would be connected to bypassed circuit of 400kV Kishtwar – Kishenpur line (Quad)) | 400 | D/c | 72 | | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 101. | 2026-27 | NR | 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) | 400 | D/c | | | |
| 102. | 2026-27 | NR | 400kV Samba- Jalandhar D/c line(Quad)<br>(only one circuit is to be terminated at Jalandhar utilizing 1 no.<br>of 400kV vacated line bay at Jalandhar S/s (formed with bypassing of 400kV Jalandhar – Nakodar line (Quad) at Jalandhar) while second circuit would be connected to bypassed circuit of Jalandhar – Nakodar 400kV line (Quad)) | 400 | D/c | 290 | | |
| 103. | 2026-27 | NR | 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)<br>(4 Nos. of vacated 400 kV line bays at Samba S/s will be utilized for 400 kV Kishenpur-Samba D/c line (Quad) &<br>400 kV Samba- Jalandhar D/c line(Quad), | 400 | D/c | 2 | | |
| 104. | 2026-27 | WR | Mandsaur PS – Indore(PG) 765 kV D/c Line (200km) along with 1x330MVAr **switchable line reactor (SLR)** on each ckt at Mandsaur end | 765 | D/c | 400 | 330 | |
| 105. | 2026-27 | WR | Mandsaur – Kurawar 765kV D/c line (~235km.) with 240MVAr **switchable line reactors (SLRs) at both ends** | 765 | D/c | 470 | 240 | 240 |
| 106. | 2026-27 | WR | LILO of Indore – Bhopal 765kV 765kV S/c line at Kurawar (LILO length 15km.) | 765 | S/c | 30 | | |
| 107. | 2026-27 | WR | Kurawar – Ashtha 400kV D/c (Quad ACSR/AAAC/AL59 moose equivalent) line (65km.) | 400 | D/c | 130 | | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 108. | 2026-27 | WR | LILO of one circuit of Indore – Itarsi 400kV D/c line at Astha (LILO length 30km.) | 400 | D/c | 60 | | |
| 109. | 2026-27 | WR | Shujalpur – Kurawar 400kV D/c (Quad ACSR/AAAC/AL59 moose equivalent) line (40km.) | 400 | D/c | 80 | | |
| 110. | 2026-27 | WR | KPS2- Halvad 765 kV D/c line (~220 km length) with 240 MVAr switchable line reactor at both ends and 80 MVAr single phase spare reactor unit at KPS2 end. | 765 | D/c | 440 | 320 | 240 |
| 111. | 2026-27 | WR | LILO of Lakadia – Ahmedabad 765 kV D/c line at Halvad (LILO length~50 km) | 765 | D/c | 100 | | |
| 112. | 2026-27 | WR | Halvad – Vataman 765 kV D/c line (~170 km length) with 1x330 MVAr switchable line reactor at Vatman end on each ckt | 765 | D/c | 340 | 330 | 330 |
| 113. | 2026-27 | WR | LILO of Lakadia – Vadodara 765 kV D/c line at Vataman 765 kV switching station (~10 km LILO length). | 765 | D/c | 40 | | |
| 114. | 2026-27 | WR | Vataman switching station – Navsari (New) 765 kV D/c line (~200 km length) with 330MVAr switchable line reactors on each ckt at Navsari (New) end | 765 | D/c | 400 | | 330 |
| 115. | 2026-27 | WR | Halvad – Jamnagar 765kV D/c line (170km.) with 330MVAr switchable line reactors on each ckt at Jamnagar end | 765 | D/c | 340 | | 330 |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 116. | 2026-27 | WR | LILO of Jam Khambhaliya PS – Lakadia 400kV D/c (triple snowbird) line at Jamnagar with conductor having ampacity equivalent to triple snowbird at nominal voltage] (LILO route length: 5 km] with 50MVAr, 420kV switchable line reactors on each ckt at Jamnagar end of Jamnagar – Lakadia 400kV D/c line (with NGR bypass arrangement) | 400 | D/c | 20 | 50 | |
| 117. | 2026-27 | WR | Jamnagar – Jam Khambhaliya 400kV D/c (Quad ACSR/AAAC/AL59 moose equivalent) line (50km.) | 400 | D/c | 100 | | |
| 118. | 2026-27 | WR | LILO of CGPL – Jetpur 400kV D/c (triple snowbird) line at Jamnagar with conductor having ampacity equivalent to triple snowbird at nominal voltage] (LILO route length: 65 km] with 80MVAr, 420kV switchable line reactors on each ckt at Jamnagar end of Jamnagar – CGPL 400kV D/c line (with NGR bypass arrangement) | 400 | D/c | 260 | 80 | |
| 119. | 2026-27 | WR | LILO of both ckts of Kalavad – Bhogat 400kV D/c line (Twin AL-59) at Jam Khambhaliya PS with Twin AL59 Moose equivalent conductor | 400 | D/c | 40 | | |
| 120. | 2026-27 | WR | LILO of both circuits of Parli(M) –Karjat(M)/Lonikand-II (M) 400 kV D/c alongwith 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 (~140km.) | 400 | D/c | 60 | 63 | |
| 121. | 2026-27 | WR | KPS3 (GIS) – Lakadia (AIS) 765 kV D/C line | 765 | D/c | 370 | 330 | |
| 122. | 2026-27 | WR | KPS1 (GIS)– Bhuj PS 765 kV 2nd D/C line | 765 | D/c | 220 | | |
| 123. | 2026-27 | WR | Vadodara (GIS) –South Olpad (GIS) 765 kV D/C line | 765 | D/c | 280 | 240 | |
| 124. | 2026-27 | WR | 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 | D/c | 40 | | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 125. | 2026-27 | WR | Ahmedabad – South Olpad (GIS) 765 kV D/c line | 765 | D/c | 500 | 240 | 240 |
| 126. | 2026-27 | WR | South Olpad (GIS) – Boisar-II (GIS) 765 kV D/c line | 765 | D/c | 450 | 240 | 240 |
| 127. | 2026-27 | WR | LILO of Navsari (New) – Padghe (PG) 765 kV D/c line at Boisar-II | 765 | D/c | 100 | | |
| 128. | 2026-27 | WR | Boisar-II (Sec-II) – Velgaon (MH) 400 kV D/c (Quad ACSR/AAAC/AL59 moose equivalent) line | 400 | D/c | 20 | | |
| 129. | 2026-27 | WR | LILO of Babhaleswar – Padghe (M) 400 kV D/c line at Boisar-II (Sec-I) using twin HTLS conductor with a minimum capacity of 1700 MVA per ckt at nominal voltage | 400 | D/c | 260 | 80 | |
| 130. | 2026-27 | WR | Boisar-II – Pune-III 765 kV D/c line | 765 | D/c | 400 | 330 | |
| 131. | 2026-27 | WR | LILO of Narendra (New) – Pune (GIS) 765 kV D/c line at Pune-III | 765 | D/c | 40 | 330 | |
| 132. | 2026-27 | WR | LILO of Hinjewadi-Koyna 400 kV S/c line at Pune-III (GIS) S/s | 400 | S/c | 80 | 80 | |
| 133. | 2026-27 | WR | LILO of Bhuj-II – Lakadia 765 kV D/c line at Navinal(Mundra) (GIS) S/s with associated bays at Navinal (Mundra) (GIS) S/s | 765 | D/c | 70 | 330 | |
| 134. | 2026-27 | NER | Stringing of 2nd circuit of Pasighat (Arunachal Pradesh) – Roing (POWERGRID) 132kV S/c on D/c line with ACSR Panther conductor commensurate with rating and maximum operating temperature of 1st circuit | 132 | S/c | 103 | | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 135. | 2026-27 | NER | Stringing of 2nd circuit of Roing (POWERGRID) – Tezu (POWERGRID) 132kV S/c on D/c line with ACSR Panther conductor commensurate with rating and maximum operating temperature of 1st circuit | 132 | S/c | 73 | | |
| 136. | 2026-27 | NER | Stringing of 2nd circuit of Tezu (POWERGRID) – Namsai (POWERGRID) 132kV S/c on D/c line with ACSR Panther conductor commensurate with rating and maximum operating temperature of 1st circuit | 132 | S/c | 95.24 | | |
| 137. | 2026-27 | SR | Bijapur PS - Koppal-II PS 400kV (QM equivalent) D/c line | 400 | D/c | 200 | | |
| 138. | 2026-27 | SR | Kurnool-IV - Bidar PS 765kV D/c line with 240 MVAr SLR at both ends | 765 | D/c | 660 | 330 | 330 |
| 139. | 2026-27 | SR | Anantapur-II - Cuddapah 765kV D/c line with 240 MVAr SLR at Anantapur-II PS | 765 | D/c | 400 | 330 | |
| 140. | 2026-27 | SR | Anantapur-II - Davangere 765kV D/c line | 765 | D/c | 300 | 240 | |
| 141. | 2026-27 | SR | KNPP 3&4 – Tuticorin-II GIS PS 400kV (quad) D/c line | 400 | D/c | 240 | | |
| 142. | 2026-27 | SR | Gadag-II PS - Koppal-II PS 400kV (Quad Moose) 2nd D/c line | 400 | D/c | 90 | | |
| 143. | 2026-27 | SR | Reconductoring of Somanahalli – Bidadi 400kV D/c line with HTLS conductor | 400 | D/c | 17 | | |
| 144. | 2026-27 | SR | Reconductoring of Maheshwaram(PG) – Hyderabad 400kV S/c line with HTLS conductor | 400 | D/c | 56 | | |
| 145. | 2026-27 | SR | Kurnool-IV - Kurnool-III PS 765kV D/c line | 765 | D/c | 300 | 240 | |
| 146. | 2026-27 | SR | Kurnool-III PS – Chilakaluripeta 765 kV D/c line | 765 | D/c | 520 | 240 | 240 |
| 147. | 2026-27 | SR | LILO of Vijaywada-Nellore 400 kV D/c line at C'Peta | 400 | D/c | 80 | | |
| 148. | 2026-27 | SR | LILO of Narendra New – Madhugiri 765kV D/c line at Davanagere / Chitradurga 765/400kV PS | 765 | D/c | 80 | 480 | 660 |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 149. | 2027-28 | NR | LILO of both circuits of 765 kV VaranasiGaya 2xS/c line at Robertsganj PS along with 240 MVAr switchable line reactor at each ckt of Robertsganj PS end of 765 kV Robertsganj PS - Gaya 2xS/c line (after LILO) | 765 | S/c | 280 | 480 | |
| 150. | 2027-28 | NR | Robertsganj PS – Prayagraj S/s 765 kV D/c line along with 330 MVAr line reactor at each circuit of Robertsganj end of Robertsganj PS – Prayagraj S/s 765 kV D/c line | 765 | D/c | 370 | 330 | |
| 151. | 2027-28 | NR | LILO of 765 kV Fatehpur-Varanasi S/c line at Prayagraj | 765 | S/c | 30 | 330 | |
| 152. | 2027-28 | NR | LILO of 765 kV Fatehpur-Sasaram S/c line at Prayagraj | 765 | S/c | 28 | | |
| 153. | 2027-28 | NR | 765 kV Vindhyachal Pool - Prayagraj D/c line along with 330MVAr line reactor (switchable) at Prayagraj end on each ckt of 765 kV Vindhyachal Pool - Prayagraj D/c line | 765 | D/c | 440 | | 660 |
| 154. | 2027-28 | NR | 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 | S/c | 1 | | |
| 155. | 2027-28 | WR | Halvad – Kandla(GIS) 765kV D/c line | 765 | D/c | 280 | | |
| 156. | 2027-28 | WR | Navinal(Mundra) (GIS) – Bhuj 765kV D/c line | 765 | D/c | 140 | | |
| 157. | 2027-28 | WR | Navinal-II (Mundra) (GIS) – Bhuj-II (GIS) 765kV D/c line | 765 | D/c | 160 | | |
| 158. | 2027-28 | WR | LILO of KPS3 (GIS) – Lakadia 765kV D/c line at Navinal-II (Mundra) (GIS) S/s | 765 | D/c | 280 | | |
| 159. | 2027-28 | WR | LILO of Pune-III – Boisar-II 765 kV D/c line at South Kalamb S/s | 765 | D/c | 160 | | 240 |
| 160. | 2027-28 | WR | ` | 400 | D/c | 380 | 50 | 50 |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 161. | 2027-28 | WR | Pachora PS – Handiya 400kV D/c line (Quad ACSR/ AAAC/ AL59 Moose equivalent) along with associated bays at Pachora PS end and 50MVAr Sw LR on each ckt at both ends | 400 | D/c | 380 | 50 | 50 |
| 162. | 2027-28 | WR | LILO of Khandwa (PG) – Itarsi (PG) 400kV D/c (Twin Moose) line at Handiya S/s | 400 | D/c | 80 | | |
| 163. | 2027-28 | WR | Pachora PS – Rajgarh(PG) 400 kV D/c line (Quad ACSR/ AAAC/ AL59 Moose equivalent) along with associated bays at both ends (180km.) and 50MVAr Sw LR on each ckt at both ends | 400 | D/c | 360 | 50 | 50 |
| 164. | 2027-28 | WR | Mahan (existing bus) – Rewa PS (PG) 400 kV D/c (Quad ACSR/AAAC/AL59 moose equivalent) line | 400 | D/c | 220 | | |
| 165. | 2027-28 | WR | Kalyanpur (GIS) – Jamnagar (GIS) 765 kV D/c line | 765 | D/c | 190 | | |
| 166. | 2027-28 | WR | Kalyanpur (GIS) – Saurashtra (near Rajkot) (GETCO) 765 kV D/c line | 765 | D/c | 360-380 | 660 | 660 |
| 167. | 2027-28 | WR | KPS5 – Lakadia-II 765kV 2xD/c line & 765kV, 330MVAr Switchable line reactors on each circuit at Lakadia-II end of KPS5 – Lakadia-II 765kV 2xD/c line | 765 | D/c | 640 | | 1320 |
| 168. | 2027-28 | WR | LILO of Halvad – Kandla 765kV D/c line at Lakadia-II | 765 | D/c | 40 | | |
| 169. | 2027-28 | WR | Lakadia-II – Ahmedabad 765kV D/c line & 765kV, 330MVAr Switchable line reactors on each circuit at Ahmedabad end of Lakadia-II – Ahmedabad 765kV D/c line | 765 | D/c | 360 | | 660 |
| 170. | 2027-28 | WR | Lakadia-II – Vataman 765kV D/c line & 765kV, 240MVAr Switchable line reactors on each circuit at both ends of Lakadia-II – Vataman 765kV D/c line | 765 | D/c | 440 | | 960 |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 171. | 2027-28 | WR | Vadodara(GIS) – Halvad 765kV D/c line to be terminated into Lakadia – Vadodara(GIS) 765kV D/c line & 765kV, 330MVAr Switchable line reactors on each circuit at Vadodara(GIS) end of Lakadia – Vadodara(GIS) 765kV D/c line . **Note:** 765kV, 330MVAr Switchable Mid-point reactors at bypass point near Halvad S/s on Lakadia – Vadodara(GIS) 765kV D/c line | 765 | D/c | 520 | 660 | 660 |
| 172. | 2027-28 | WR | Navsari(New) – Nasik 765kV D/c line & 765kV, 330MVAr Switchable line reactors on each circuit at Nasik end of Navsari(New) – Nasik 765kV D/c line | 765 | D/c | 380 | | 660 |
| 173. | 2027-28 | WR | Nasik – Pimpalgaon (MSETCL) 400kV D/c line (Quad ACSR/AAAC/AL59 moose equivalent) (~50km.) | 400 | D/c | 100 | | |
| 174. | 2027-28 | WR | Alephata – Lonikand-I 400kV D/c line (Quad ACSR/AAAC/AL59 moose equivalent) (~80km.) | 400 | D/c | 160 | | |
| 175. | 2027-28 | WR | LILO of A'bad – Pune(GIS)(Shikrapur) 765kV line and Padghe(GIS) – Pune(GIS) 765kV line at Alephata S/s (LILO route length ~ 20km.) | 765 | | 80 | | |
| 176. | 2027-28 | WR | Nasik – Alephata 765kV D/c line (~100km.) | 765 | D/c | 200 | | |
| 177. | 2027-28 | WR | Raghanesda (GIS) – Banaskantha (PG) 765 kV D/c line | 765 | D/c | 190 | | |
| 178. | 2027-28 | WR | Solapur PS (Sec-II) – Jejuri (MSETCL) 400 kV D/c line (Quad ACSR/ AAAC/ AL59 Moose equivalent) & 63MVAr, 420kV Switchable line reactors on each circuit at both ends of Solapur PS (Sec-2) – Jejuri (MSETCL) 400 kV D/c line (with NGR bypass arrangement) | 400 | D/c | 480 | 126 | 100 |
| 179. | 2027-28 | WR | Jejuri (M) – Pune-III 400 kV D/c line (Quad ACSR/ AAAC/ AL59 Moose equivalent) (~20km.) | 400 | D/c | 40 | | |
| 180. | 2027-28 | WR | Morena PS (South of Sabalgarh) – Karera (near Datia) 765 kV D/c line | 765 | D/c | 180 | | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 181. | 2027-28 | WR | LILO of Nagothane – Padghe 400 kV D/c line at South Kalamb with Quad ACSR/AAAC/AL59 moose equivalent conductor | 400 | D/c | 40 | | |
| 182. | 2027-28 | WR | LILO of Pune (AIS) – Navi Mumbai 400 kV line at South Kalamb with Quad ACSR/AAAC/AL59 moose equivalent conductor | 400 | D/c | 20 | | |
| 183. | 2027-28 | WR | LILO of Pune (AIS) – Vikhroli 400 kV line at South Kalamb with Quad ACSR/AAAC/AL59 moose equivalent conductor | 400 | D/c | 20 | | |
| 184. | 2027-28 | ER | Angul - Gopalpur 765 kV D/c line | 765 | D/c | 410 | | 330 |
| 185. | 2027-28 | ER | Gopalpur - Gopalpur (OPTCL) 400kV D/c (Quad) line | 400 | D/c | 40 | | 330 |
| 186. | 2027-28 | ER | LILO of both circuits of Angul – Sundargarh (Jharsuguda) 765kV 2xS/c lines at NLC-Talabira generation switchyard | 765 | 2xS/c | 50 | | |
| 187. | 2027-28 | ER | Shifting of one circuit each of existing Biharsharif – Koderma Ph-I 400kV D/c (Quad) line and Gaya – Koderma Ph-I 400kV D/c (Quad) line from Koderma Ph-I to Koderma Ph-II switchyard so as to form Biharsharif – Koderma Ph-II 400kV S/c (Quad) line and Gaya – Koderma Ph-II 400kV S/c (Quad) line | 400 | D/c | 10 | | |
| 188. | 2027-28 | ER | Angul - Gopalpur 765kV D/c line | 765 | D/c | 205 | | |
| 189. | 2027-28 | ER | Gopalpur - Gopalpur (OPTCL) 400kV D/c (Quad) line | 400 | D/c | 10 | | |
| 190. | 2027-28 | ER | LILO of one circuit of Chaibasa (POWERGRID) – Kharagpur (WBSETCL) 400kV D/c ISTS line at OMIPL generation switchyard | 400 | S/c | 18 | | |
| 191. | 2027-28 | ER | Bypassing of Raigarh (Tamnar) – Dharamjaygarh (Sec-B) 765kV D/c line & Raigarh(Kotra) – Raigarh (Tamnar) 765kV D/c line at Raigarh (Tamnar) S/s so as to form at Raigarh (Kotra) – Dharamjaygarh (Sec-B) 765kV D/c line | 765 | D/c | 20 | | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 192. | 2027-28 | ER | LILO of Dharamjaygarh (Sec-B) – Jharsuguda (Sec-A) 765kV D/c line at Raigarh (Kotra)-II S/s | 765 | D/c | 80 | | |
| 193. | 2027-28 | ER | Raigarh (Tamnar)@-Raigarh(Kotra)-II S/s 765kV D/c line | 765 | D/c | 100 | | |
| 194. | 2027-28 | ER | Raigarh(Tamnar)@ – Jamshedpur (New) 765kV D/c line with 765kV, 330MVAr switchable line reactor along with associated bays in each line of Raigarh(Tamnar) – Jamshedpur 765kV D/c line at Raigarh(Tamnar) end | 765 | D/c | 630 | 660 | |
| 195. | 2027-28 | ER | LILO of Ranchi (New) – Medinipur 765kV D/c line at Jamshedpur (New) | 765 | D/c | 200 | | |
| 196. | 2027-28 | ER | LILO of Ranchi (New) – New PPSP 400kV D/c line at Jamshedpur (New) (Ranchi section with twin moose & PPSP section with HTLS) | 400 | D/c | 252 | | |
| 197. | 2027-28 | NER | LILO of both circuits of existing Bongaigaon (POWERGRID) – Balipara (POWERGRID) 400kV D/c (Quad) line at Bornagar (ISTS) | 400 | D/c | 4 | | 126 |
| 198. | 2027-28 | NER | extension of Alipurduar (POWERGRID) – Bongaigaon (POWERGRID) 400kV D/c line for termination at Bornagar (ISTS) S/s | 400 | D/c | 110 | | 160 |
| 199. | 2027-28 | NER | Reconductoring of ISTS portion of Balipara (POWERGRID) – Sonabil (POWERGRID) ckt-I 220kV line owned by POWERGRID with HTLS conductor of ampacity 1050A (at nominal voltage level. | 220 | S/c | 8.623 | | |
| 200. | 2027-28 | NER | Reconductoring of ISTS portion of Balipara (POWERGRID) – Sonabil (POWERGRID) ckt-II 220kV line owned by POWERGRID with HTLS conductor of ampacity 1050A (at nominal voltage level) | 220 | S/c | 9.205 | | |
| 201. | 2027-28 | NER | Reconductoring of Silchar (POWERGRID) – Srikona (AEGCL) 132kV D/c line owned by POWERGRID with HTLS conductor of ampacity 900A (at nominal voltage level) | 132 | D/c | 1.119 | | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 202. | 2027-28 | NER | Reconductoring of Ranganadi (NEEPCO) – Ziro (POWERGRID) 132kV S/c line owned by POWERGRID with HTLS conductor of ampacity 900A (at nominal voltage level) | 132 | D/c | 44.52 | | |
| 203. | 2027-28 | SR | Upgradation/charging of Tuticorin PS - Dharmapuri (Salem New) 765 kV D/c line (initially charged at 400 kV) to its rated voltage of 765 kV along with 1x330 MVAr switchable Line Reactor on both end of each circuit | 765 | D/c | | 330 | 330 |
| 204. | 2027-28 | SR | Upgradation/charging of Dharmapuri (Salem New) - Madhugiri (Tumkur) 765 kV 2xS/c line (initially charged at 400 kV) to its rated voltage of 765 kV along with 1x330 MVAr switchable Line Reactor on Dharampuri (Salem New) end of both ckts | 765 | 2XS/c | | 330 | |
| 205. | 2027-28 | SR | Bellary PS – Davanagere / Chitradurga 400kV (Quad ACSR moose) D/c line | 400 | D/c | 200 | | |
| 206. | 2027-28 | SR | Tuticorin PS - Tuticorin (GH) | 765 | D/c | 100 | | |
| 207. | 2027-28 | SR | LILO of Vemagiri – Srikakulam 765 kV D/c line at Kakinada GH substation with 240 MVAr SLR at Kakinada GH end on Srikakulam – Kakinada GH section | 765 | D/c | 80 | 240 | |
| 208. | 2027-28 | SR | Anantapur-II – CN'Halli 765kV D/c line with 330 MVAR SLR at Anatpur-II end on both circuits | 765 | D/c | 360 | 330 | |
| 209. | 2027-28 | SR | LILO of one circuit of Talaguppa-Neelmangala 400 kV D/c line at CN'Halli (25 KM) | 400 | D/c | 50 | | |
| 210. | 2027-28 | SR | Bellary – Davanagare 2nd 400kV (Quad) D/c line | 400 | D/c | 160 | | |
| 211. | 2027-28 | SR | Angul – Srikakulam 765 kV 2nd D/c line (about 275 km) with 240 MVAR SLR at both ends on both circuits | 765 | D/c | 550 | 480 | 480 |
| 212. | 2027-28 | SR | Parli New – Bidar 765kV D/c line (about 120 km) with 240 MVAR SLR at Bidar end on both circuits | 765 | D/c | 240 | 480 | 480 |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 213. | 2027-28 | SR | Mangalore GH – Davanagare / Chitradurga 765 kV D/c line (~280 km) with 240 MVAr SLR at both ends on both circuits | 765 | D/c | 560 | 480 | 480 |
| 214. | 2027-28 | SR | Tumkur-II – Madhugiri 400kV (Quad) D/c line | 400 | D/c | 200 | | |
| 215. | 2027-28 | SR | LILO at CN'Halli of already LILOed section of one circuit of Talaguppa - Neelmangala 400 kV line at Hassan (25 KM) or ii) LILO of another circuit of Talaguppa-Neelmangala 400 kV D/c line at CN'Halli (25 KM) and extension of LILOed section of one circuit of Talaguppa - Neelmangala 400 kV line at Hassan to CN'Halli to make Hassan - CN'Halli 400kV D/c line (25 KM) | 400 | D/c | 100 | | |
| 216. | 2028-29 | NR | Bhadla-3 - Bhadla(HVDC) 400kV 2xD/c quad moose line(2km) | 400 | D/c | 4 | | |
| 217. | 2028-29 | NR | ±800 kV HVDC line (Hexa lapwing) (4x1500 MW) between Bhadla-3 & Fatehpur (950km) with DMR. | ±800 | D/c | 1900 | | |
| 218. | 2028-29 | NR | LILO of both ckts of 765kV Varanasi – Kanpur (GIS) D/c at Fatehpur(30km) | 765 | D/c | 60 | | |
| 219. | 2028-29 | NR | 400kV PS-1 - Pang D/c (quad moose) line | 400 | D/c | 14 | | |
| 220. | 2028-29 | NR | 400kV PS-2 -Pang D/c (quad moose) line | 400 | D/c | 54 | | |
| 221. | 2028-29 | NR | 400kV PS-3 -Pang D/c (quad moose) line | 400 | D/c | 82 | | |
| 222. | 2028-29 | NR | 220kV Pang – Leh (Phyang) S/c line (Deer conductor) (S/c line on D/c tower) | 220 | S/c | 158 | | |
| 223. | 2028-29 | NR | Kaithal – Bahadurgarh (PG) 400 kV D/c Line (Twin HTLS) | 400 | D/c | 340 | | |
| 224. | 2028-29 | NR | Kaithal-Modipuram (Meerut) (UPPTCL) 765 kV D/c Line | 400 | D/c | 420 | | 240 |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 225. | 2028-29 | NR | ±350 kV HVDC line between Pang & Kaithal PS (combination of 465km overhead line (Quad) and 15 km underground cable) | ±350 | D/c | 960 | | |
| 226. | 2028-29 | WR | Mahuva Onshore PS (GIS) – Vataman 400 kV D/c line | 400 | D/c | 380 | 126 | 100 |
| 227. | 2028-29 | WR | B3-OSS-1 – Mahuva Onshore PS (GIS) 220 kV two nos. (3 core) cables (45 km- undersea cable of about 35 km & underground cable of about 10 km) | 220 | D/c | 90 | | |
| 228. | 2028-29 | WR | Kolhapur – Satara 765kV D/c line (125km.) | 765 | D/c | 250 | | |
| 229. | 2028-29 | WR | LILO of Pune-III – Karjat-II(M)/Pune (GIS) 765kV D/c line at Satara | 765 | D/c | 260 | | |
| 230. | 2028-29 | ER | Jamshedpur (New) – Balasore 400kV D/c (Quad) line | 400 | D/c | 348 | | |
| 231. | 2028-29 | NER | Kaying PS – Niglok PS 400kV D/c (Quad) line | 400 | D/c | 200 | | |
| 232. | 2028-29 | NER | Niglok PS – Gogamukh 400kV D/c (Quad) line | 400 | D/c | 250 | 100 | |
| 233. | 2028-29 | SR | LILO of Kurnool-IV – Bidar 765kV D/c line at Shadnagar | 765 | D/c | 200 | | 480 |
| 234. | 2028-29 | SR | Shadnagar – Shadnagar (TGTRANSCO) 400 kV quad D/c line | 400 | D/c | 100 | | 480 |
| 235. | 2028-29 | SR | Shadnagar – Kethredipally (TGTRANSCO) 400 kV quad D/c line | 400 | D/c | 120 | | 480 |
| 236. | 2028-29 | SR | Bellary – Davanagare 2nd 400kV (Quad) D/c line | 400 | D/c | 160 | | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 237. | 2028-29 | SR | Tumkur-II – Madhugiri 400kV (Quad) D/c line | 400 | D/c | 200 | | |
| 238. | 2028-29 | SR | Kurnool-V – Shadnagar 765 kV D/c line (about 240 km) with 240 MVAr SLR (convertible) at both ends on both circuits | 765 | D/c | 480 | 480 | |
| 239. | 2028-29 | SR | Kurnool-V – Raichur New 765 kV D/c line (about 150 km) with 240 MVAr SLR (convertible) at Raichur New end on both circuits | 765 | D/c | 300 | 480 | |
| 240. | 2028-29 | SR | Kurnool-V – Sagar 765 kV D/c line (about 240 km) with 240 MVAr SLR (convertible) at both ends on both circuits | 765 | D/c | 480 | 480 | |
| 241. | 2028-29 | SR | Sagar – Nagarjunasagar 400 kV quad D/c line (about 25 km) | 400 | D/c | 50 | | |
| 242. | 2028-29 | SR | Pendurthi (Vizag) – Srikakulam 765 kV D/c line (about 200 km) with 330 MVAr SLR (convertible) at Srikakulam end on both circuits | 765 | D/c | 400 | | |
| 243. | 2028-29 | SR | LILO of Kalpakka – Maradam 400 kV (quad) D/c line at Pendurthi (about 20 km) | 400 | D/c | 40 | | |
| 244. | 2028-29 | SR | Khammam-II – Warangal New 765 kV D/c line (about 100 km) | 765 | D/c | 200 | | |
| 245. | 2028-29 | SR | Khammam-II – Pendurthi (Vizag) 765 kV D/c line (about 350 km) with 330 MVAr SLR (convertible) at both ends on both circuits | 765 | D/c | 700 | 660 | 480 |
| 246. | 2028-29 | SR | Khammam-II – Khammam (existing) 400 kV (quad) D/c line (about 20 km) | 400 | D/c | 40 | | 480 |
| 247. | 2028-29 | SR | Kadapa-II – Thiruvalam 765 kV D/c line (about 250 km) with 240 MVAr SLR (convertible) at both ends on both circuits | 765 | D/c | 500 | 480 | 480 |
| 248. | 2028-29 | SR | Kadapa-II – Ananthapuram-III 765 kV D/c line (about 220 km) with 330 MVAr SLR (convertible) at Kadapa-II end on both circuits | 765 | D/c | 440 | 660 | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 249. | 2028-29 | SR | Nagapattinam – Bahoor 230kV S/c high capacity line (70 km) | 230 | D/c | 140 | | 660 |
| 250. | 2028-29 | SR | Nagapattinam – Karaikal 230kV S/c high capacity line (60 km) | 230 | D/c | 120 | | |
| 251. | 2028-29 | SR | Nagapattinam – Villianur 230kV S/c high capacity line (85 km) | 230 | D/c | 170 | | |
| 252. | 2028-29 | SR | Nagapattinam – Thondamanatham 230kV S/c high capacity line (85 km) | 230 | D/c | 170 | | 660 |
| 253. | 2028-29 | SR | Ramayapatnam – Kadapa-II 765 kV D/c line (220 km) 1x330 MVAr SLR at Kadapa-II end on both circuits | 230 | D/c | 440 | | |
| 254. | 2028-29 | SR | Ramayapatnam – Sagar 765 kV D/c line (200 km) 1x330 MVAr SLR at Ramayapatnam end on both circuits | 230 | D/c | 400 | 660 | 480 |
| 255. | 2028-29 | SR | Karur PS – Pugalur HVDC 400kV (Quad) 2nd D/c line | 400 | D/c | 80 | | |
| 256. | 2028-29 | SR | Upgradation / Conversion of Udumalpet – Madurai 400kV S/c line to Udumalpet – Madurai 400kV (quad) D/c line | 400 | D/c | 254 | | |
| 257. | 2028-29 | SR | Reconductoring of Tirunelveli – Udumalpet 400kV D/c line with HTLS conductor. | 400 | D/c | 530 | | |
| 258. | 2028-29 | SR | Reconductoring of Pugalur – Madurai 400kV D/c line with HTLS conductor. | 400 | D/c | 247 | | |
| 259. | 2028-29 | SR | Sagar – Kakinada 765 kV D/c line (320 km) 1x330 MVAr SLR (convertible) on both circuits on both ends | 765 | D/c | 640 | 660 | |
| 260. | 2028-29 | SR | Pendurthi – Kakinada GH 765 kV D/c line (120 km) 1x240 MVAr SLR (convertible) at Pendurthi end on both circuits | 765 | D/c | 220 | 480 | 660 |
| 261. | 2028-29 | SR | LILO of Kurnool-V – Nellore PS 765 kV D/c line at Ramayapatnam (50 km) | 765 | D/c | 100 | | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 262. | 2028-29 | SR | Karur PS – Pugalur (existing) 400kV (Quad) 2nd D/c line | 400 | D/c | 40 | | |
| 263. | 2029-30 | WR | ±800 kV HVDC Bipole line (Hexa lapwing) between KPS2 (HVDC) and Nagpur (HVDC) (1200 km) | ±800 | | 1200 | | |
| 264. | 2029-30 | WR | LILO of Wardha – Raipur 765 kV one D/c line (out of 2xD/c lines) at Nagpur | 765 | D/c | 120 | 240 | |
| 265. | 2029-30 | WR | KPS3 – KPS3 (HVDC) 400 kV 2xD/c (Quad ACSR/AAAC/AL59 moose equivalent) line along with the line bays at both substations | 400 | D/c | 8 | | |
| 266. | 2029-30 | WR | ±500 kV HVDC Bipole line between KPS3 (HVDC) and South Olpad (HVDC) (with Dedicated Metallic Return) (capable to evacuate 2500 MW) | ±500 | | 600 | | |
| 267. | 2029-30 | WR | ±350 k800 kV (in case of LCC, with (Hexa lapwing)) OR ± 600 kV (in case of VSC with Quad Lapwing on same tower) HVDC Bipole line between Lakadia-II (HVDC) and Alephata (HVDC) (800 km) (with Dedicated Metallic Return) (capable to evacuate 6000 MW (with overload as specified) | ±800 or ±600 | | 1600 | | |
| 268. | 2029-30 | ER | Paradeep (HVDC) - Andaman HVDC interconnection (Undersea Cable) | 320 | Bipole | 2300 | | |
| 269. | 2029-30 | ER | Andaman - Nicobar HVDC interconnection (Undersea Cable) | 320 | Bipole | 1100 | | |
| 270. | 2029-30 | ER | Paradeep (HVDC) - Paradeep (ISTS) 400kV D/c line | 400 | D/c | 24 | | |
| 271. | 2029-30 | NER | Dibang - Gogamukh 400kV 2xD/c line | 400 | 2xD/c | 860 | 252 | 252 |
| 272. | 2029-30 | NER | Gogamukh- Lower Subansiri 400kV D/c line | 400 | D/c | 350 | 160 | |
| 273. | 2029-30 | SR | Avaraikulam Onshore PS – Tuticorin PS 400 kV D/c quad line | 400 | D/c | 200 | | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c, M/c | Line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 274. | 2029-30 | SR | Offshore substation 1 (OSS-1) – Avaraikulam Onshore PS 2 nos. 230kV (atleast 300 MVA capacity) Submarine cables (~35 - 40 km) with 2x50MVAr switchable line reactors at OSS-1 end | 230 | S/c | 80 | 100 | |
| 275. | 2030-31 | NR | LILO of both ckts of 400 kV Fatehgarh-IV PS - Barmer-I PS at Barmer-II PS | 400 | D/c | 40 | | |
| 276. | 2030-31 | NR | 400 kV Barmer-II PS - Barmer-I PS D/c line (Quad) | 400 | D/c | 60 | | |
| 277. | 2030-31 | NR | ±800 kV HVDC Bipole line (Hexa lapwing) between Barmer-II (HVDC) & South Kalamb (HVDC) (with parallel Dedicated Metallic Return) (capable to evacuate 6000MW) [with 100% reverse power capability] | ±800 | | 1800 | | |

## 2. Transformers

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| 1. | 2025-26 | NR | Implementation of 2x200 MVA, 400/132 kV transformer at Kishtwar Pooling Station along with 4 no. of 132 kV line bays | 400/132 | 2 | 200 | 400 |
| 2. | 2025-26 | NR | Establishment of 2x315MVA, 400/220kV Siot(Rajouri) S/s with 1x125 MVAR (420 kV) bus reactors | 400/220 | 2 | 315 | 630 |
| 3. | 2025-26 | NR | Establishment of 7x105 MVA, 400/220kV Nange GIS Pooling Station | 400/220 | 2 | 315 | 630 |
| 4. | 2025-26 | NR | Establishment of 6x1500 MVA, 765/400kV & 5x500 MVA 400/220kV Bikaner-III Pooling Station at a suitable location near Bikaner | 765/400 | 6 | 1500 | 9000 |
| 5. | 2025-26 | NR | Establishment of 6x1500 MVA, 765/400kV & 5x500 MVA 400/220kV Bikaner-III Pooling Station at a suitable location near Bikaner | 400/220 | 5 | 500 | 2500 |
| 6. | 2025-26 | NR | Establishment of 765/400 kV, 4x1500 MVA Neemrana-II S/s at a suitable location near Neemrana | 765/400 | 4 | 1500 | 6000 |
| 7. | 2025-26 | NR | Augmentation with 400/220 kV, 5x500 MVA^ ICT at Bikaner-II PS | 400/220 | 5 | 500 | 2500 |
| 8. | 2025-26 | NR | Augmentation with 765/400 kV, 1x1500MVA ICT (4th) at Bikaner (PG) | 765/400 | 1 | 1500 | 1500 |
| 9. | 2025-26 | NR | Augmentation by 400/220 kV, 1x500 MVA (3rd) ICT at Kotputli (PG) | 400/220 | 1 | 500 | 500 |
| 10. | 2025-26 | NR | Establishment of 4x1500 MVA, 765/400 kV & 5x500 MVA, 400/220 kV Fatehgarh- IV (Section-2) Pooling Station | 765/400 | 4 | 1500 | 6000 |
| 11. | 2025-26 | NR | Establishment of 4x1500 MVA, 765/400 kV & 5x500 MVA, 400/220 kV Fatehgarh- IV (Section-2) Pooling Station | 400/220 | 5 | 500 | 2500 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| 12. | 2025-26 | NR | Establishment of 3x1500 MVA, 765/400 kV & 2x500 MVA, 400/220 kV Barmer-I Pooling Station | 765/400 | 3 | 1500 | 4500 |
| 13. | 2025-26 | NR | Establishment of 3x1500 MVA, 765/400 kV & 2x500 MVA, 400/220 kV Barmer-I Pooling Station | 400/220 | 2 | 500 | 1000 |
| 14. | 2025-26 | NR | Establishment of 2x1500 MVA, 765/400 kV Substation at suitable location near Sirohi PS | 765/400 | 2 | 1500 | 3000 |
| 15. | 2025-26 | NR | Augmentation by 1x1500 MVA, 765/400 kV ICT at Fatehgarh-II PS (7th) | 765/400 | 1 | 1500 | 1500 |
| 16. | 2025-26 | NR | Establishment of 2x315 MVA (7x105 MVA 1-ph units including a spare unit) 400/220 kV GIS Pooling Station at Jhangi | 400/220 | 2 | 315 | 630 |
| 17. | 2025-26 | NR | Augmentation of 400/220 kV, 1x500 MVA (4th) ICT at 400/220 kV Allahabad (PG) substation | 400/220 | 1 | 500 | 500 |
| 18. | 2025-26 | NR | Augmentation of 400/220 kV, 1x500 MVA ICT at 400/220 kV Malerkotla substation | 400/220 | 1 | 500 | 500 |
| 19. | 2025-26 | NR | Augmentation of Transformation capacity at 400/220kV Fatehgarh-III PS by 400/220kV 1x500MVA ICT (3rd) | 400/220 | 1 | 500 | 500 |
| 20. | 2025-26 | NR | Augmentation of 400/220 kV, 1x500 MVA (4 th) ICT at 400/220kV Kankroli substation | 400/220 | 1 | 500 | 500 |
| 21. | 2025-26 | NR | Augmentation with 1x1500 MVA, 765/400 kV ICT(3rd) at Bareilly (765/400kV) S/s | 765/400 | 1 | 1500 | 1500 |
| 22. | 2025-26 | NR | Augmentation of 2x500 MVA (4th & 5th) 400/220 kV ICTs at Bhadla-III PS | 400/220 | 2 | 500 | 1000 |
| 23. | 2025-26 | NR | Augmentation of 2x1500 MVA 765/400kV (3rd & 4th) ICTs at Bhadla-III PS | 765/400 | 2 | 1500 | 3000 |
| 24. | 2025-26 | NR | Replacement of 1x315 MVA (ICT-3), 400/220 kV ICT to 500 MVA at 400/220 kV Bawana S/s | 400/220 | 1 | 315 | 315 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| 25. | 2025-26 | NR | Augmentation of Transformation Capacity at 400/220 kV Bassi (PG) S/s in Rajasthan by 400/220 kV, 1x500 MVA ICT (4th ) | 400/220 | 1 | 500 | 500 |
| 26. | 2025-26 | NR | Augmentation of Transformation Capacity at 400/220 kV Bhiwadi (PG) S/s in Rajasthan by 400/220 kV, 1x500 MVA ICT (4th ) | 400/220 | 1 | 500 | 500 |
| 27. | 2025-26 | NR | Augmentation of Transformation Capacity at 400/220 kV Bikaner-II PS in Rajasthan by 400/220 kV, 1x500 MVA ICT (9th) | 400/220 | 1 | 500 | 500 |
| 28. | 2025-26 | NR | Augmentation of 400/220kV, 1x500 MVA ICT (4th) to cater the N-1 contingency requirement at 765/400/220kV Bikaner PS | 400/220 | 1 | 500 | 500 |
| 29. | 2025-26 | NR | Augmentation with 400/220 kV, 1x500 MVA Transformer (11th) at Fatehgarh-2 PS | 400/220 | 1 | 500 | 500 |
| 30. | 2025-26 | NR | Augmentation of 400/220 kV ,1x500 MVA (4th) ICT at Hissar (PG) S/s along with transformer bays | 400/220 | 1 | 500 | 500 |
| 31. | 2025-26 | WR | Establishment of 765/400 kV, 4x1500MVA, KPS2 (GIS) | 765/400 | 4 | 1500 | 6000 |
| 32. | 2025-26 | WR | Augmentation of transformation capacity at Padghe (GIS) 765/400 kV substation by 1x1500 MVA ICT | 765/400 | 1 | 1500 | 1500 |
| 33. | 2025-26 | WR | Establishment of 765/400/220 kV Navsari (new) (South Gujarat) S/s (GIS) | 765/400 | 2 | 1500 | 3000 |
| 34. | 2025-26 | WR | Establishment of 765/400/220 kV Navsari (new) (South Gujarat) S/s (GIS) | 400/220 | 3 | 500 | 1500 |
| 35. | 2025-26 | WR | Augmentation of transformation capacity at Raigarh(Kotra) by 1x1500MVA, 765/400kV ICT at Section-A (3rd ICT on | 765/400 | 3 | 1500 | 4500 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| | | | Section A) and by 2x1500MVA, 765/400kV ICTs at Section-B (3rd & 4th ICTs on Section B) along with associated ICT bays | | | | |
| 36. | 2025-26 | WR | Establishment of 3x1500 MVA, 765/400 kV Ahmedabad S/s | 765/400 | 3 | 1500 | 4500 |
| 37. | 2025-26 | WR | Augmentation of 765/400 kV Navsari (new) (South Gujarat) S/s (GIS) | 765/400 | 1 | 1500 | 1500 |
| 38. | 2025-26 | WR | Establishment of 400/220 kV, 3x500 MVA at Solapur PP (near Mohol) | 400/220 | 3 | 500 | 1500 |
| 39. | 2025-26 | WR | Creation of 220 kV level at 765/400 kV Jabalpur PS with Installation of 2x500 MVA, 400/220 kV ICTs along with associated ICT bays | 400/220 | 2 | 500 | 1000 |
| 40. | 2025-26 | WR | Establishment of 765/400 kV, 2x1500 MVA | 765/400 | 2 | 1500 | 3000 |
| 41. | 2025-26 | WR | Establishment of 400/220 kV, 2x500 MVA ICTs at Karera (near Datiya) | 400/220 | 2 | 500 | 1000 |
| 42. | 2025-26 | WR | Establishment of 765/400 kV, 2x1500 MVA ICTs at Ishanagar (New) | 765/400 | 2 | 1500 | 3000 |
| 43. | 2025-26 | WR | Establishment of 400/220 kV, 2x500 MVA ICTs at Ishanagar (New) | 400/220 | 2 | 500 | 1000 |
| 44. | 2025-26 | WR | Installation of 1x500 MVA, 400/220 kV ICT (4th) along with associated ICT bays at Satna(PG) | 400/220 | 1 | 500 | 500 |
| 45. | 2025-26 | WR | 400/220 kV, 3x500 MVA ICT augmentation (4th 5th & 6th) at Pachora PS | 400/220 | 3 | 500 | 1500 |
| 46. | 2025-26 | WR | Augmentation of transformation | 765/400 | 1 | 1500 | 1500 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| | | | capacity at Pune (GIS) 765/400 kV substation by 1x1500 MVA ICT (3rd) | | | | |
| 47. | 2025-26 | WR | Establishment of 4x500 MVA, 400/220kV ICTs in pooling station near Dhule, Maharashtara. | 400/220 | 4 | 500 | 2000 |
| 48. | 2025-26 | WR | Augmentation of transformation capacity at KPS1 (GIS) by 1x1500 MVA, 765/400 kV ICT (8th) on bus section-I | 765/400 | 1 | 1500 | 1500 |
| 49. | 2025-26 | WR | Augmentation of transformation capacity at KPS2 (GIS) by 2x1500 MVA, 765/400 kV ICT on Bus section-I (5th & 6th) | 765/400 | 2 | 1500 | 3000 |
| 50. | 2025-26 | WR | Augmentation of transformation capacity at KPS2 (GIS) by 2x1500 MVA, 765/400 kV ICT on Bus section-II (7th & 8th) | 765/400 | 2 | 1500 | 3000 |
| 51. | 2025-26 | WR | Augmentation of transformation capacity at KPS3 (GIS) by 1x1500 MVA, 765/400 kV ICT (7th) on Bus section-I | 765/400 | 1 | 1500 | 1500 |
| 52. | 2025-26 | WR | Augmentation of transformation capacity at Padghe (PG) (GIS) by 1x1500 MVA, 765/400 kV ICT (4th) | 765/400 | 1 | 1500 | 1500 |
| 53. | 2025-26 | WR | Augmentation of Transformation capacity at 400/220kV Bhachau S/s in Gujarat by 400/220kV 1x500MVA ICT (3rd) | 400/220 | 1 | 500 | 500 |
| 54. | 2025-26 | WR | Augmentation of Transformation capacity at 400/220kV Magarwarda GIS S/s by 400/220kV 1x500MVA ICT (3rd) | 400/220 | 1 | 500 | 500 |
| 55. | 2025-26 | WR | Augmentation of transformation capacity at Boisar (PG) S/s by 1x500MVA, 400/220kV ICT (5th) | 400/220 | 1 | 500 | 500 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| 56. | 2025-26 | WR | Augmentation of Transformation capacity at 400/220kV Rajgarh S/s by 1x500MVA ICT (3rd) (terminated on the sectionalized 220kV bus) | 400/220 | 1 | 500 | 500 |
| 57. | 2025-26 | WR | Augmentation of transformation capacity at Bhuj-I PS by 1x500MVA, 400/220kV ICT (9th) | 400/220 | 1 | 500 | 500 |
| 58. | 2025-26 | WR | Installation of 2x500 MVA, 400/220 kV ICTs (1st & 2nd) at Lakadia PS along with associated ICT bays | 400/220 | 2 | 500 | 1000 |
| 59. | 2025-26 | WR | Augmentation of Transformation capacity at 765/400kV Indore S/s by 1x1500MVA, 765/400kV ICT (3rd) [terminated on 400kV Bus section A with Indore & Khandwa 400kV D/c lines] | 765/400 | 1 | 1500 | 1500 |
| 60. | 2025-26 | WR | Creation of 400kV switchyard along with Installation of 2x1500 MVA, 765/400 kV ICTs at Vataman (AIS) with 2x125 MVAr (420 kV) Bus Reactors | 765/400 | 2 | 1500 | 3000 |
| 61. | 2025-26 | WR | Creation of 220kV switchyard along with Installation of 2x500 MVA, 400/220 kV ICTs at Vataman (AIS) | 400/220 | 2 | 500 | 1000 |
| 62. | 2025-26 | WR | Augmentation of Transformation Capacity at 765/400/220kV Vadodara (GIS) S/s in Gujarat by 400/220kV, 1x500MVA ICT (3rd) | 400/220 | 1 | 500 | 500 |
| 63. | 2025-26 | ER | Establishment of Paradeep 765/400kV, 2x1500MVA GIS substation | 765/400 | 2 | 1500 | 3000 |
| 64. | 2025-26 | ER | Installation of 400/220kV, 2x500MVA ICTs along with | 400/220 | 2 | 500 | 1000 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| | | | associated bays at Lakhisarai (POWERGRID) 400/132kV S/s. | | | | |
| 65. | 2025-26 | ER | Augmentation of 1x500MVA (3rd) ICT at Rajarhat | 400/220 | 1 | 500 | 500 |
| 66. | 2025-26 | NER | Upgradation of existing 132kV Namsai (POWERGRID) S/s to 220kV (with 220kV side as GIS) | 220/132 | 2 | 160 | 320 |
| 67. | 2025-26 | NER | 400/220kV, 2x500MVA ICTs at Gogamukh | 400/220 | 2 | 500 | 1000 |
| 68. | 2025-26 | NER | 220/132kV, 2x200MVA ICTs at Gogamukh | 220/132 | 2 | 200 | 400 |
| 69. | 2025-26 | SR | Establishment of 2x500MVA, 400/220 kV GIS substation at Kasargode | 400/220 | 2 | 500 | 1000 |
| 70. | 2025-26 | SR | Augmentation of 400/220 kV, 3x500 MVA Gadag Pooling Station | 400/220 | 3 | 500 | 1500 |
| 71. | 2025-26 | SR | Upgradation of Narendra (New) (GIS) to its rated voltage of 765kV level alongwith 4x1500 MVA, 765/400kV ICTs and 2x330 MVAr Bus Reactor | 765/400 | 4 | 1500 | 6000 |
| 72. | 2025-26 | SR | Establishment of 3x1500MVA (765/400kV) Bidar PS | 765/400 | 3 | 1500 | 4500 |
| 73. | 2025-26 | SR | Establishment of 5x500MVA (400/220kV) Bidar PS | 400/220 | 5 | 500 | 2500 |
| 74. | 2025-26 | SR | Establishment of 400/220 kV, 7x500 MVA, Ananthpuram pooling station at suitable location between Anantapur & Kurnool Distt | 400/220 | 7 | 500 | 3500 |
| 75. | 2025-26 | SR | Establishment of 765/400kV , 2X1500 MVA transformer at Koppal-II | 765/400 | 2 | 1500 | 3000 |
| 76. | 2025-26 | SR | Establishment of 400/220kV , 2X500 MVA transformer at Koppal-II | 400/220 | 2 | 500 | 1000 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| 77. | 2025-26 | SR | Establishment of 400/220kV , 2X500 MVA transformer at Gadag-II | 400/220 | 2 | 500 | 1000 |
| 78. | 2025-26 | SR | Augmentation of transformation capacity at Koppal-II with 765/400kV , 2X1500 MVA transformers | 765/400 | 2 | 1500 | 3000 |
| 79. | 2025-26 | SR | Augmentation of transformation capacity at Koppal-II with 400/220kV , 2X500 MVA transformers | 400/220 | 2 | 500 | 1000 |
| 80. | 2025-26 | SR | Augmentation of transformation capacity at Maheshwaram by 1x1500 MVA, 765/400 kV ICT (3rd) | 765/400 | 1 | 1500 | 1500 |
| 81. | 2025-26 | SR | Establishment of 400/220kV 4x500 MVA Tumkur-II Pooling Station | 400/220 | 4 | 500 | 2000 |
| 82. | 2025-26 | SR | Augmentation of 1x1500 MVA (3rd), 765/400kV transformation capacity at Kurnool New S/s | 765/400 | 1 | 1500 | 1500 |
| 83. | 2025-26 | SR | Augmentation of 2x500 MVA, 400/220kV transformation capacity at Tumkur (Pavagada) PS | 400/220 | 2 | 500 | 1000 |
| 84. | 2025-26 | SR | Augmentation of 1x500 MVA, 400/220kV ICT(6th) at Koppal PS | 400/220 | 1 | 500 | 500 |
| 85. | 2025-26 | SR | Augmentation of 1x500 MVA, 400/220kV ICT(6th) at Gadag PS | 400/220 | 1 | 500 | 500 |
| 86. | 2025-26 | SR | Augmentation of 1x500 MVA, 400/220kV ICT(3rd) at Hassan S/s | 400/220 | 1 | 500 | 500 |
| 87. | 2025-26 | SR | Augmentation of 1x500 MVA, 400/230kV ICT (6th) at Tuticorin-II GIS | 400/230 | 1 | 500 | 500 |
| 88. | 2025-26 | SR | Augmentation of 2x500 MVA, 400/230 kV transformation capacity (3rd & 4th ICTs) at Karur PS | 400/230 | 2 | 500 | 1000 |
| 89. | 2025-26 | SR | Augmentation of 1x500 MVA, 400/220 kV ICT (5th) at NP Kunta Pooling Station | 400/220 | 1 | 500 | 500 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| 90. | 2026-27 | NR | Upgradation of Kishenpur S/s at 765kV level (4x800MVA) | 765/400 | 4 | 800 | 3200 |
| 91. | 2026-27 | NR | 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 | 6 | 1500 | 9000 |
| 92. | 2026-27 | NR | 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 | 400/220 | 6 | 500 | 3000 |
| 93. | 2026-27 | NR | Establishment of 765/400 kV, 6x1500 MVA S/s at suitable location near Siwani (Distt. Bhiwani) along with 2x240 MVAr (765kV) Bus Reactor & 2x125 MVAr (420kV) Bus Reactor | 765/400 | 6 | 1500 | 9000 |
| 94. | 2026-27 | NR | Establishment of 765/400kV, 2x1500 MVA S/s at suitable location near Merta (Merta-II Substation) along with 2x125 MVAr & 2x240 MVAr bus reactor at Merta-II S/s | 765/400 | 2 | 1500 | 3000 |
| 95. | 2026-27 | NR | Augmentation with 765/400 kV, 2x1500 MVA Transformer (4th & 5th) at Barmer-I PS | 765/400 | 2 | 1500 | 3000 |
| 96. | 2026-27 | NR | Augmentation of 5x500 MVA ($5^{th}$ to $9^{th}$), 400/220 kV ICTs at Barmer-I PS | 400/220 | 5 | 500 | 2500 |
| 97. | 2026-27 | NR | Establishment of 765/400kV, 2x1500 MVA S/s at suitable location near Ghiror (Distt. Mainpuri) along with 2x125 MVAr & 2x240 MVAr bus reactor at Ghiror S/s (UP) | 765/400 | 2 | 1500 | 3000 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| 98. | 2026-27 | NR | Augmentation with 1x1500 MVA, 765/400 kV ICT (3rd) at Bareilly (765/400 kV) S/s | 765/400 | 1 | 1500 | 1500 |
| 99. | 2026-27 | NR | Augmentation with 400/220 kV, 3x500 MVA (6th ,7th & 8th) ICTs at Fatehgarh-IV PS(Sec-II) | 400/220 | 3 | 500 | 1500 |
| 100. | 2026-27 | NR | Augmentation with 400/220 kV, 2x500 MVA (3rd & 4th ) ICTs at Barmer-I PS | 400/220 | 2 | 500 | 1000 |
| 101. | 2026-27 | NR | Augmentation with 765/400 kV, 2x1500 MVA Transformer (4th & 5th) at Barmer-I PS | 765/400 | 2 | 1500 | 3000 |
| 102. | 2026-27 | NR | Augmentation of 5x500 MVA (5th to 9th), 400/220 kV ICTs at Barmer-I PS | 400/220 | 5 | 500 | 2500 |
| 103. | 2026-27 | NR | Establishment of 765/400kV, 2x1500 MVA S/s at suitable location near Ghiror (Distt. Mainpuri) along with 2x240 MVAr (765kV) & 2x125 MVAr (420kV) bus reactor at Ghiror S/s (UP) | 765/400 | 2 | 1500 | 3000 |
| 104. | 2026-27 | NR | Establishment of 765/400 kV, 2x1500 MVA S/s at suitable location near Merta (Merta-II Substation) along with 2x240 MVAr (765kV) & 2x125 MVAr (420kV) bus reactor at Merta-II S/s | 765/400 | 2 | 1500 | 3000 |
| 105. | 2026-27 | NR | 5x500MVA, 400/220kV ICTs at Sirohi S/s along with associated transformer bays | 400/220 | 5 | 500 | 2500 |
| 106. | 2026-27 | NR | 3x500MVA, 400/220kV ICTs at Merta-II S/s along with associated transformer bays | 400/220 | 3 | 500 | 1500 |
| 107. | 2026-27 | NR | Augmentation of 400/220 kV, 1x500 MVA (10th) ICT at Bikaner-II PS along with associated transformer bays | 400/220 | 1 | 500 | 500 |
| 108. | 2026-27 | NR | Augmentation of 400/220 kV, 1x500 MVA (6th) ICT at Bikaner-III PS along with associated transformer bays | 400/220 | 1 | 500 | 500 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| 109. | 2026-27 | NR | Augmentation of Transformation capacity by 1x500MVA ,400/220kV ICT (4th) at Bhadla-II PS (Section-1A) along with associated transformer bays | 400/220 | 1 | 500 | 500 |
| 110. | 2026-27 | NR | Augmentation of Transformation capacity by 1x500MVA ,400/220kV ICT (6th) at Bhadla-II PS (Section-1) along with associated transformer bays | 400/220 | 1 | 500 | 500 |
| 111. | 2026-27 | NR | Augmentation of 400/220 kV ,1x500 MVA (4th) ICT at Samba (PG) S/s along with associated transformer bays | 400/220 | 1 | 500 | 500 |
| 112. | 2026-27 | NR | Augmentation of 400/220 kV ,1x500 MVA (3rd) ICT at 765/400/220kV Agra (PG) S/s along with associated transformer bays | 400/220 | 1 | 500 | 500 |
| 113. | 2026-27 | NR | Augmentation of 400/220 kV ,1x500 MVA (5th) ICT at 400/220kV Mandola (PG) S/s along with associated transformer bays | 400/220 | 1 | 500 | 500 |
| 114. | 2026-27 | NR | Augmentation of 400/220 kV, 1x500 MVA (3rd) ICT at 400/220kV Lucknow (PG) S/s along with associated transformer bays (1 no. additional 400kV line bay is also being implemented for GIS diameter completion) | 400/220 | 1 | 500 | 500 |
| 115. | 2026-27 | WR | Installation of 3x1500MVA, 765/400kV at Mandasaur PS + 1 spare unit of 500MVA 765/400kV ICT | 765/400 | 3 | 1500 | 4500 |
| 116. | 2026-27 | WR | Installation of 5x500MVA, 400/220kV at Mandasaur PS | 400/220 | 5 | 500 | 2500 |
| 117. | 2026-27 | WR | Establishment of 2x1500MVA | 765/400 | 2 | 1500 | 3000 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| | | | 765/400kV ICTs at Kurawar | | | | |
| 118. | 2026-27 | WR | Establishment of 2x500MVA 400/220kV ICTs at Kurawar | 400/220 | 2 | 500 | 1000 |
| 119. | 2026-27 | WR | Establishment of 3x200MVA 220/132kV ICTs at Kurawar | 200/132 | 3 | 200 | 600 |
| 120. | 2026-27 | WR | Establishment of 2X1500 MVA 765/400 kV Jamnagar(GIS) with 2X330 MVAR 765 kV bus reactor and 2X125 MVAR 420 kV bus reactor | 765/400 | 2 | 1500 | 3000 |
| 121. | 2026-27 | WR | Creation of 765 kV bus section-II at KPS3 (GIS), 765/400kV ICT, 3x1500MVA | 765/400 | 3 | 1500 | 4500 |
| 122. | 2026-27 | WR | Establishment of 2x1500 MVA, 765/400 kV ICT GIS SS South Olpad | 765/400 | 2 | 1500 | 3000 |
| 123. | 2026-27 | WR | Establishment of 2x500 MVA, 400/220 kV ICT GIS SS South Olpad | 400/220 | 2 | 500 | 1000 |
| 124. | 2026-27 | WR | Establishment of 4x1500 MVA, 765/400 kV & 2x500 MVA, 400/220 kV Boisar-II (GIS) S/s | 765/400 | 4 | 1500 | 6000 |
| 125. | 2026-27 | WR | Establishment of 2x500 MVA, 400/220 kV Boisar-II (GIS) S/s | 400/220 | 2 | 500 | 1000 |
| 126. | 2026-27 | WR | Establishment of 2x1500 MVA, 765/400 kV Pune-III (GIS) S/s | 765/400 | 2 | 1500 | 3000 |
| 127. | 2026-27 | WR | Establishment of 3x500 MVA, 400/220 kV Pune-III (GIS) S/s | 400/220 | 3 | 500 | 1500 |
| 128. | 2026-27 | WR | Augmentation of Transformation capacity at 400/220kV Rajgarh S/s by 1x500MVA ICT (4th) (terminated on the sectionalized 220kV bus) | 400/220 | 1 | 500 | 500 |
| 129. | 2026-27 | WR | Augmentation of transformation capacity at at Jam Khambhaliya PS (GIS) by 2x500MVA, | 400/220 | 2 | 500 | 1000 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| | | | 400/220kV ICT (5th & 6th) terminated on New 220kV bus section | | | | |
| 130. | 2026-27 | WR | Augmentation of transformation capacity at Jam Khambhaliya PS (GIS) by 1x500MVA, 400/220kV (7th) ICT terminated on New 220kV bus section-2 | 400/220 | 1 | 500 | 500 |
| 131. | 2026-27 | WR | Augmentation of transformation capacity at Jam Khambhaliya PS (GIS) by 2x500MVA, 400/220kV ICT (8th & 9th) terminated on New 220kV bus section-3 | 400/220 | 2 | 500 | 1000 |
| 132. | 2026-27 | WR | Augmentation of transformation capacity at Bhuj-II PS (GIS) by 2x500MVA, 400/220kV ICT (5th & 6th) (to be terminated at New 220kV Bus Section) | 400/220 | 2 | 500 | 1000 |
| 133. | 2026-27 | WR | Augmentation of transformation capacity at Bhuj-II PS (GIS) by 1x1500MVA, 765/400kV ICT (3rd) | 765/400 | 1 | 1500 | 1500 |
| 134. | 2026-27 | WR | Augmentation of transformation capacity at Bhuj-II PS (GIS) by 3x500MVA, 400/220kV ICT (7th, 8th & 9th) | 400/220 | 3 | 500 | 1500 |
| 135. | 2026-27 | WR | Augmentation of transformation capacity at Bhuj-II PS (GIS) by 1x1500MVA, 765/400kV ICT (4th) | 765/400 | 1 | 1500 | 1500 |
| 136. | 2026-27 | WR | Installation of 2x500 MVA, 400/220 kV ICTs (3rd & 4th) at Lakadia PS along with associated ICT bays | 400/220 | 2 | 500 | 1000 |
| 137. | 2026-27 | WR | Augmentation of transformation capacity at Lakadia PS by 4x500MVA, 400/220kV ICTs (5th 6th, 7th & 8th) terminated on new 220kV Bus Section | 400/220 | 4 | 500 | 2000 |
| 138. | 2026-27 | WR | Augmentation of transformation capacity at Lakadia PS by | 765/400 | 1 | 1500 | 1500 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| | | | 1x1500MVA, 765/400kV ICT (3rd) | | | | |
| 139. | 2026-27 | WR | Augmentation of transformation capacity at KPS1 by 1x1500MVA, 765/400kV ICT (9th) on Bus Section II | 765/400 | 1 | 1500 | 1500 |
| 140. | 2026-27 | WR | Augmentation of transformation capacity at KPS2 by 1x1500MVA, 765/400kV ICT (9th) on Bus Section I | 765/400 | 1 | 1500 | 1500 |
| 141. | 2026-27 | WR | Augmentation of transformation capacity at KPS3 by 1x1500MVA, 765/400kV ICT (8th) on Bus Section II | 765/400 | 1 | 1500 | 1500 |
| 142. | 2026-27 | WR | Establishment of 4x1500 MVA, 765/400 kV Navinal (Mundra) S/s (GIS) | 765/400 | 4 | 1500 | 6000 |
| 143. | 2026-27 | WR | Augmentation of transformation capacity at Banaskantha (Raghanesda) PS (GIS) by 2x500 MVA 400/220 kV ICTs (3rd & 4th) | 400/220 | 2 | 500 | 1000 |
| 144. | 2026-27 | WR | Augmentation of transformation capacity at 400/220kV Bhuj PS in Gujarat by 1x500 MVA, 400/220kV ICT (10th) | 400/220 | 1 | 500 | 500 |
| 145. | 2026-27 | ER | Installation of new 1x500MVA, 400/220kV (3rd) ICT at Pandiabili (POWERGRID) S/s along with associated bay at 220kV level [using the bay no. 413 at 400kV level, which is already under implementation under ERBS-I scheme]. | 400/220 | 1 | 500 | 500 |
| 146. | 2026-27 | NER | Installation of new 1x50MVA, 132/33kV (3rd) ICT at Namsai (POWERGRID) S/s along with associated bays. | 132/33 | 1 | 50 | 50 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| 147. | 2026-27 | SR | Establishment of 765/400kV 4x1500 MVA, 400/220kV 4x500 MVA Pooling Station near Davanagere / Chitradurga, Karnataka | 765/400 | 4 | 1500 | 6000 |
| 148. | 2026-27 | SR | Establishment of 765/400kV 4x1500 MVA, 400/220kV 4x500 MVA Pooling Station near Davanagere / Chitradurga, Karnataka | 400/220 | 4 | 500 | 2000 |
| 149. | 2026-27 | SR | Upgradation of Madhugiri {Tumkur(Vasantnarsapura)} to its rated voltage of 765kV level alongwith 3x1500 MVA, 765/400kV ICTs | 765/400 | 3 | 1500 | 4500 |
| 150. | 2026-27 | SR | Establishment of 400/220kV 2x500 MVA Bijapur Pooling Station | 400/220 | 2 | 500 | 1000 |
| 151. | 2026-27 | SR | Establishment of 765/400kV 4x1500 MVA,5x500 MVA Kurnool-IV Pooling Station | 765/400 | 4 | 1500 | 6000 |
| 152. | 2026-27 | SR | Establishment of 765/400kV 4x1500 MVA Anantapur-II Pooling Station | 765/400 | 4 | 1500 | 6000 |
| 153. | 2026-27 | SR | Establishment of 400/220kV 5x500 MVA Anantapur-II Pooling Station | 400/220 | 6 | 500 | 3000 |
| 154. | 2026-27 | SR | Establishment of 765/400kV 4x1500 MVA,5x500 MVA Kurnool-IV Pooling Station | 400/220 | 4 | 500 | 2000 |
| 155. | 2026-27 | SR | Augmentation of 3x1500 MVA (5th, 6th & 7th), 765/400 kV ICTs at Koppal-II PS | 765/400 | 3 | 1500 | 4500 |
| 156. | 2026-27 | SR | Augmentation of additional 5x500 MVA, 400/220kV ICTs (5th, 6th, 7th, 8th & 9th) at Koppal-II PS | 400/220 | 5 | 500 | 2500 |
| 157. | 2026-27 | SR | Augmentation of additional 7x500 MVA, 400/220kV ICTs (3rd, | 400/220 | 7 | 500 | 3500 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| | | | 4th, 5th, 6th, 7th, 8th & 9th) at Gadag-II PS | | | | |
| 158. | 2026-27 | SR | Augmentation of transformation capacity at 765/400/220kV Kurnool-III by 4X1500 MVA | 765/400 | 4 | 1500 | 6000 |
| 159. | 2026-27 | SR | Augmentation of transformation capacity at 765/400 kV C'Peta by 1X1500 MVA | 765/400 | 1 | 1500 | 1500 |
| 160. | 2026-27 | SR | Augmentation of transformation capacity by 1x500 MVA (3rd), 400/220kV ICT at Bidadi S/s in Karnataka | 400/220 | 1 | 500 | 500 |
| 161. | 2026-27 | SR | Augmentation of transformation capacity by 1x500 MVA (3rd), 400/220kV ICT at Yelahanka 400/220kV GIS S/s in Karnataka | 400/220 | 1 | 500 | 500 |
| 162. | 2026-27 | SR | Augmentation of additional 400/220kV, 1x500 MVA ICT (4th) at Kozhikode | 400/220 | 1 | 500 | 500 |
| 163. | 2026-27 | SR | Augmentation / replacement of existing 400/230kV, 315 MVA ICT-2 with 1x500 MVA ICT at Udumalpet 400/230kV S/s | 400/220 | 1 | 500 | 500 |
| 164. | 2026-27 | SR | Augmentation of transformation capacity by 1x500 MVA, 400/230kV ICT (7th) at Tuticorin-II GIS PS in Tamil Nadu | 400/220 | 1 | 500 | 500 |
| 165. | 2026-27 | SR | Augmentation of 2x500 MVA, 400/230kV ICTs (5th & 6th) at Karur PS | 400/230 | 1 | 500 | 500 |
| 166. | 2027-28 | NR | Establishment of 4x1500 MVA 765/400 kV Robertsganj Pooling Station near Robertsganj area in Sonbhadra distt. (Uttar Pradesh) along with 2x240 MVAr 765 kV & 2x125 MVAr 400 kV bus reactors | 765/400 | 4 | 1500 | 6000 |
| 167. | 2027-28 | NR | Augmentation of 400/220 kV, 1x500 MVA (4th) ICT at 400/220kV Sikar | 400/220 | 1 | 500 | 500 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| | | | (PG) S/s along with transformer bays | | | | |
| 168. | 2027-28 | NR | Augmentation of 400/220 kV, 2x500 MVA (7th & 8th) ICTs at Bikaner-IV PS along with associated transformer bays | 400/220 | 2 | 500 | 1000 |
| 169. | 2027-28 | WR | 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 | 3 | 1500 | 4500 |
| 170. | 2027-28 | WR | Establishment of 3X1500 MVA 765/400 kV Kandla (GIS) with 2X330 MVAR 765 kV bus reactor and 2X125 MVAR 420 kV bus reactor | 765/400 | 3 | 1500 | 4500 |
| 171. | 2027-28 | WR | Augmentation of Transformation capacity at 765/400 kV Navinal(Mundra) S/s (GIS) by 2x1500 MVA ICTs (New Bus Section-II) | 765/400 | 2 | 1500 | 3000 |
| 172. | 2027-28 | WR | Establishment of 6x1500 MVA, 765/400 kV Navinal-II (Mundra) S/s (GIS) with 2x330 MVAR, 765 kV & 2x125MVAr, 420 kV bus reactors (In 2 bus sections) | 765/400 | 6 | 1500 | 9000 |
| 173. | 2027-28 | WR | 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 | 2 | 1500 | 3000 |
| 174. | 2027-28 | WR | Creation of New 220kV Bus Section-II at Neemuch PS with Augmentation of transformation capacity by 3x500MVA, 400/220kV ICTs (3rd, 4th & 5th) at Neemuch S/s | 400/220 | 3 | 500 | 1500 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| | | | along with associated bays. | | | | |
| 175. | 2027-28 | WR | Establishment of 2x500MVA, 400/220kV S/s at Handiya with 2x125MVAr 420kV Bus Reactors | 400/220 | 2 | 500 | 1000 |
| 176. | 2027-28 | WR | Creation of New 220kV Bus Section (3rd) with 220kV Bus Sectionaliser and 400/220kV, 3x500MVA ICT augmentation (7th, 8th & 9th) at Pachora PS terminated on 220kV Bus Section (3rd) | 400/220 | 3 | 500 | 1500 |
| 177. | 2027-28 | WR | Establishment 4x1500 MVA, 765/400 kV Substation near Kalyanpur (GIS) with 2x330 MVAR, 765 kV bus reactor | 765/400 | 4 | 1500 | 6000 |
| 178. | 2027-28 | WR | Establishment 7x500 MVA, 400/220kV Substation near Kalyanpur (GIS) with 2x125 MVAR, 420 kV bus reactor | 400/220 | 7 | 500 | 3500 |
| 179. | 2027-28 | WR | Creation of 220kV switchyard along with Installation of 3x500MVA, 400/220kV ICTs at Jamnagar (GIS) S/s | 400/220 | 3 | 500 | 1500 |
| 180. | 2027-28 | WR | Augmentation of transformation capacity at Bhuj-II PS by 1x1500MVA ICT (5th) | 765/400 | 1 | 1500 | 1500 |
| 181. | 2027-28 | WR | Establishment of 765/400 kV, 6x1500MVA Lakadia-II (Near Chitrod) with 2x330 MVAR 765kV bus reactor | 765/400 | 6 | 1500 | 9000 |
| 182. | 2027-28 | WR | Establishment of 10x500MVA, 400/220kV Lakadia-II (Near Chitrod) with 2x125 MVAR 400kV bus reactor. | 400/220 | 10 | 500 | 5000 |
| 183. | 2027-28 | WR | Augmentation of transformation capacity at South Olpad (GIS) S/s by 1x1500MVA, 765/400kV (3rd) ICT | 765/400 | 1 | 1500 | 1500 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| 184. | 2027-28 | WR | Establishment of 765/400 kV, 3x1500MVA Nasik S/s (towards South of Nasik) with 2x330 MVAR 765kV bus reactor | 765/400 | 3 | 1500 | 4500 |
| 185. | 2027-28 | WR | Establishment of 400/220kV, 3x500MVA Nasik S/s (towards South of Nasik) with 2x125 MVAR 400kV bus reactor. | 400/220 | 3 | 500 | 1500 |
| 186. | 2027-28 | WR | Establishment of 765/400 kV, 2x1500MVA Alephata S/s with 2x330 MVAR 765kV bus reactor | 765/400 | 2 | 1500 | 3000 |
| 187. | 2027-28 | WR | Establishment of 400/220kV, 3x500MVA Alephata S/s 2x125 MVAR 400kV bus reactor | 400/220 | 3 | 500 | 1500 |
| 188. | 2027-28 | WR | Establishment 4x1500 MVA, 765/400kV Substation near Raghanesda (GIS) with 2x330 MVAR, 765 kV bus reactor and 2x125 MVAR, 420 kV bus reactor | 765/400 | 4 | 1500 | 6000 |
| 189. | 2027-28 | WR | Creation of 220kV switchyard (Bus Sec-I) at Raghanesda PS (GIS) along with installation of 2x500MVA, 400/220 kV ICTs | 400/220 | 2 | 500 | 1000 |
| 190. | 2027-28 | WR | Installation of 2x500MVA, 400/220kV ICTs (5th & 6th) at Solapur PS | 400/220 | 2 | 500 | 1000 |
| 191. | 2027-28 | WR | 400/220 kV, 3x500 MVA ICT augmentation (8th ,9th & 10th) at Solapur PS on New 400kV Bus Section-2 and 220kV Bus Section-3 | 400/220 | 3 | 500 | 1500 |
| 192. | 2027-28 | WR | Augmentation of Transformation capacity by 1x1500MVA, 765/400kV ICT (4th) (Terminated at 400kV & 765kV Bus Section-II) | 765/400 | 1 | 1500 | 1500 |
| 193. | 2027-28 | WR | Augmentation of Transformation capacity by 1x500MVA, | 400/220 | 1 | 500 | 500 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| | | | 400/220kV ICT (6th) (Terminated on 400kV Bus Section-I & 220kV Bus Section-II) | | | | |
| 194. | 2027-28 | WR | Augmentation of Transformation capacity by 1x500MVA, 400/220kV ICT (7th) (Terminated on 400kV Bus Section-II & 220kV Bus Section-III) at Mandsaur PS | 400/220 | 1 | 500 | 500 |
| 195. | 2027-28 | WR | Establishment of 3x1500 MVA, 765/400 kV Morena PS (South of Sabalgarh) with 2x330 MVAR 765 kV bus reactor | 765/400 | 3 | 1500 | 4500 |
| 196. | 2027-28 | WR | Establishment of 2x500MVA, 400/220kV Morena PS (South of Sabalgarh) with 2x125 MVAR 420 kV bus reactor | 400/220 | 2 | 500 | 1000 |
| 197. | 2027-28 | WR | Augmentation of 400/220kV transformation capacity at 765/400/220kV Karera (near Datia) S/s (Sec-I) by 1x500MVA ICT (3rd) | 400/220 | 1 | 500 | 500 |
| 198. | 2027-28 | WR | 400/220kV, 1x500MVA ICT (3rd) at Pirana (PG) S/s along with associated bays at both ends | 400/220 | 1 | 500 | 500 |
| 199. | 2027-28 | WR | Augmentation of Transformation capacity at 400/220kV Navi Mumbai (GIS) (PG) S/s by 400/220kV 1x500MVA ICT (3rd) along with associated bays at both ends | 400/220 | 1 | 500 | 500 |
| 200. | 2027-28 | WR | Installation of 3x1500MVA, 765/400 kV ICTs at South Kalamb S/s (400 kV Sec-III & 765 kV Section-III) | 765/400 | 3 | 1500 | 4500 |
| 201. | 2027-28 | WR | Augmentation of Transformation capacity at 400/220kV Raipur (PG) S/s by 400/220kV 1x500MVA ICT (4th) along with associated bays at both ends | 400/220 | 1 | 500 | 500 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| 202. | 2027-28 | WR | Augmentation of Transformation capacity at Champa Sec-B by 765/400kV 1500MVA ICT (7th) (on Sec-B) with associated ICT bays including 500MVA single phase spare ICT bank | 765/400 | 1 | 1500 | 1500 |
| 203. | 2027-28 | ER | Establishment of Gopalpur 765/400kV, 2x1500MVA GIS substation | 765/400 | 2 | 1500 | 3000 |
| 204. | 2027-28 | ER | Establishment of 2x1500MVA, 765/400kV S/s at Jamshedpur (New) in Jharkhand | 765/400 | 2 | 1500 | 3000 |
| 205. | 2027-28 | ER | Establishment of 3x1500MVA, 765/400kV S/s (on 765kV Bus section-II & 400kV Bus Section-II) at Raigarh (Kotra)-II S/s in Chhattisgarh | 765/400 | 3 | 1500 | 4500 |
| 206. | 2027-28 | ER | Installation of new 765/400kV, 1x1500MVA (3x500MVA single phase units) ICT (3rd) at Jeerat (New) S/s of M/s POWERGRID Medinipur Jeerat Transmission Limited (PMJTL) along with associated bays at both ends | 765/400 | 1 | 1500 | 1500 |
| 207. | 2027-28 | NER | Installation of 1x31.5MVA, 3-Phase 132/33kV 2nd ICT at Ziro (POWERGRID) S/s along with associated GIS bays at both ends | 132/33 | 1 | 31.5 | 31.5 |
| 208. | 2027-28 | SR | Upgradation of Tuticorin PS to its rated voltage of 765kV level alongwith 2x1500 MVA, 765/400kV ICTs and 1x330 MVAr Bus Reactor | 765/400 | 3 | 1500 | 4500 |
| 209. | 2027-28 | SR | Upgradation of Dharmapuri (Salem New) to its rated voltage of 765kV level alongwith 2x1500 MVA, | 765/400 | 3 | 1500 | 4500 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| | | | 765/400kV ICTs and 1x240 MVAr Bus Reactor | | | | |
| 210. | 2027-28 | SR | Establishment of 3x1500 MVA, 765/400 kV Tuticorin (GH) S/s with 1x240 MVAR bus Reactor | 765/400 | 3 | 1500 | 4500 |
| 211. | 2027-28 | SR | Establishment of 3x1500 MVA, 765/400 kV Kakinada (GH) S/s with 1x240 MVAR bus Reactor | 765/400 | 3 | 1500 | 4500 |
| 212. | 2027-28 | SR | Establishment of 400/220kV 4x500 MVA Bellary Pooling Station | 400/220 | 4 | 500 | 2000 |
| 213. | 2027-28 | SR | Augmentation of transformation capacity at 765/400kV Anantapur-II by 2X1500 MVA | 765/400 | 2 | 1500 | 3000 |
| 214. | 2027-28 | SR | Augmentation of transformation capacity at 400/220kV Anantapur-II by 4X500 MVA | 400/220 | 4 | 500 | 2000 |
| 215. | 2027-28 | SR | Establishment of 3x1500 MVA, 765/400 kV CN'Halli Station with 2x330 MVAr (765 kV) bus reactors | 765/400 | 3 | 1500 | 4500 |
| 216. | 2027-28 | SR | Augmentation of transformation capacity by 3x500 MVA, 400/220 kV ICTs (6th – 8th) at Bidar PS | 400/220 | 3 | 500 | 1500 |
| 217. | 2027-28 | SR | Augmentation of transformation capacity by 1x1500 765/400kV ICT (4th) at Bidar PS | 765/400 | 1 | 1500 | 1500 |
| 218. | 2027-28 | SR | Augmentation of transformation capacity by 4x500 MVA, 400/220kV ICTs (5th – 8th) at Davanagere PS | 400/220 | 4 | 500 | 2000 |
| 219. | 2027-28 | SR | Augmentation of transformation capacity by 1x500 MVA (3rd), 400/220kV ICT at Yelahanka 400/220kV GIS S/s in Karnataka | 400/220 | 1 | 500 | 500 |
| 220. | 2027-28 | SR | Establishment of 3x1500 MVA, 765/400kV GH S/s near Mangalore with space provision for | 765/400 | 3 | 1500 | 4500 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| | | | establishment of 220kV switchyard | | | | |
| 221. | 2027-28 | SR | Augmentation of Tumkur-II PS by 400/220 kV, 3x500 MVA ICTs (5th to 7th) | 400/220 | 3 | 500 | 1500 |
| 222. | 2027-28 | SR | Augmentation of transformation capacity by 4x500 MVA, 400/220kV ICTs (5th – 8th) at Davanagere PS | 400/220 | 4 | 500 | 2000 |
| 223. | 2027-28 | SR | Augmentation of Davanagere / Chitradurga PS by 765/400kV, 1x1500 MVA ICTs | 765/400 | 1 | 1500 | 1500 |
| 224. | 2027-28 | SR | Augmentation of Transformation capacity by 1x500 MVA, 400/220 kV ICT (3rd) at Narendra (existing) S/s. | 400/220 | 1 | 500 | 500 |
| 225. | 2027-28 | SR | Augmentation of Transformation capacity by 1x500 MVA, 400/230 kV ICT (4th) at Kalivanthapattu S/s in Tamil Nadu. | 400/230 | 1 | 500 | 500 |
| 226. | 2027-28 | SR | Augmentation of 1x500 MVA, 400/220kV ICT (3rd) at Thrissur VSC HVDC Station in Kerala | 400/220 | 1 | 500 | 500 |
| 227. | 2028-29 | NR | Establishment of 5x1500MVA, 765/400KV ICTs at Fatehpur (HVDC) | 765/400 | 5 | 1500 | 7500 |
| 228. | 2028-29 | NR | 400/220/33kV, 315 MVA transformer at pang S/s | 400/220 | 2 | 315 | 630 |
| 229. | 2028-29 | NR | 765/400/33kV, 1500 MVA transformer at Kaithal S/s | 765/400 | 3 | 1500 | 4500 |
| 230. | 2028-29 | NR | Augmentation of 765/400kV, 1500 MVA transformer of Bhiwani S/s | 765/400 | 1 | 1500 | 1500 |
| 231. | 2028-29 | WR | Establishment of 2x500 MVA, 400/220 kV Mahuva Onshore Pooling Station (GIS) (Mahuva PS) | 400/220 | 2 | 500 | 1000 |
| 232. | 2028-29 | WR | Creation of 400kV switchyard along with Installation of 2x1500 | 765/400 | 2 | 1500 | 3000 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| | | | MVA, 765/400 kV ICTs at Vataman (AIS) | | | | |
| 233. | 2028-29 | WR | Establishment of 2x315 MVA, 220/66 kV Gujarat Offshore B3 Sub-Station Station-1 (B3-OSS-1) | 220/66 | 2 | 315 | 630 |
| 234. | 2028-29 | WR | Creation of 765kV level at Kolhapur with Installation of 2x1500MVA, 765/400kV ICTs at Kolhapur S/s along with upgradation of Kolhapur S/s to 765kV level | 765/400 | 2 | 1500 | 3000 |
| 235. | 2028-29 | WR | Establishment of 765/400 kV, 4x1500MVA Satara S/s with 2x330 MVAR 765kV bus reactor and 2x125 MVAR 400kV bus reactor. ***(3x1500MVA on Sec-I & 1x1500MVA on Sec-II)*** | 765/400 | 4 | 1500 | 6000 |
| 236. | 2028-29 | WR | Creation of 400kV Sec- B at D'jaigarh S/s along with Augmentation of Transformation capacity at D'jaigarh S/s by 3x1500MVA ICTs (on Sec-B) (with associated ICT bays) | 765/400 | 3 | 1500 | 4500 |
| 237. | 2028-29 | NER | Establishment of new 2x500MVA, 400/220kV GIS Pooling station at Kaying in Arunachal Pradesh | 400/220 | 2 | 500 | 1000 |
| 238. | 2028-29 | SR | Augmentation of 2x1500 MVA, 765/400 & 6x500 MVA, 400/220 kV Kurnool-IV Pooling Station | 765/400 | 2 | 1500 | 3000 |
| 239. | 2028-29 | SR | Augmentation of 2x1500 MVA, 765/400 & 6x500 MVA, 400/220 kV Kurnool-IV Pooling Station | 400/220 | 6 | 500 | 3000 |
| 240. | 2028-29 | SR | Establishment of 4x1500 MVA, 765/400 kV Shadnagar Station with 2x330 MVAr (765 kV) bus reactors with space provision for | 765/400 | 4 | 1500 | 6000 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| | | | establishment of 220 kV switchyard | | | | |
| 241. | 2028-29 | SR | Augmentation of transformation capacity by 2x1500 MVA, 765/400kV ICTs (6th & 7th) at Davanagere PS | 765/400 | 2 | 1500 | 3000 |
| 242. | 2028-29 | SR | Augmentation of Bellary PS by 400/220kV, 6x500 MVA ICTs | 400/220 | 6 | 500 | 3000 |
| 243. | 2028-29 | SR | Augmentation of Tumkur-II PS by 400/220 kV, 3x500 MVA ICTs (5th to 7th) | 400/220 | 1 | 500 | 500 |
| 244. | 2028-29 | SR | Establishment of 4x1500 MVA, 765/400 kV and 5x500 MVA, 400/220kV Kurnool-V Pooling Station near Kodumur in Kurnool district | 765/400 | 4 | 1500 | 6000 |
| 245. | 2028-29 | SR | Establishment of 4x1500 MVA, 765/400 kV and 5x500 MVA, 400/220kV Kurnool-V Pooling Station near Kodumur in Kurnool district | 400/220 | 5 | 500 | 2500 |
| 246. | 2028-29 | SR | Establishment of 3x1500 MVA, 765/400 kV Sagar substation | 765/400 | 3 | 1500 | 4500 |
| 247. | 2028-29 | SR | Establishment of 4x1500 MVA, 765/400 kV and 9x500 MVA, 400/220kV Ananthapuram-III Pooling Station near Urvakonda/Beluguppa/Kalyandurg areas in Anantapur district | 765/400 | 4 | 1500 | 6000 |
| 248. | 2028-29 | SR | Establishment of 4x1500 MVA, 765/400 kV and 9x500 MVA, 400/220kV Ananthapuram-III Pooling Station near Urvakonda/Beluguppa/Kalyandurg areas in Anantapur district | 765/400 | 9 | 500 | 4500 |
| 249. | 2028-29 | SR | Upgradation of existing 400/220kV Bidadi GIS to 765kV level GIS with 3x1500 MVA, 765/400 kV ICTs | 765/400 | 3 | 1500 | 4500 |
| 250. | 2028-29 | SR | Establishment of 4x1500 MVA, 765/400 kV | 765/400 | 4 | 1500 | 6000 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| | | | Pendurthi (Vizag) GIS substation | | | | |
| 251. | 2028-29 | SR | Establishment of 3x1500 MVA, 765/400 kV Khammam-II substation | 765/400 | 3 | 1500 | 4500 |
| 252. | 2028-29 | SR | Establishment of 4x1500 MVA, 765/400 kV and 5x500 MVA, 400/220kV Kadapa-II Pooling Station | 765/400 | 4 | 1500 | 6000 |
| 253. | 2028-29 | SR | Establishment of 230kV level at Nagapattinam 765/400kV GIS (presently charged at 400kV) with 3x500 MVA, 400/230kV ICTs | 400/230 | 3 | 500 | 1500 |
| 254. | 2028-29 | SR | Establishment of 230kV level at Nagapattinam 765/400kV GIS (presently charged at 400kV) with 3x500 MVA, 400/230kV ICTs | 400/230 | 3 | 500 | 1500 |
| 255. | 2028-29 | SR | Establishment of 3x1500 MVA, 765/400 kV Ramayapatnam substation with 1x330 MVAr bus reactor and space provision for establishment of 400/220 kV switchyard | 765/400 | 3 | 1500 | 4500 |
| 256. | 2028-29 | SR | Augmentation of transformation capacity by 1x500 MVA, 400/220kV ICT (5th) at Hyderabad (Ghanapur) S/s in Telangan | 400/220 | 1 | 500 | 500 |
| 257. | 2028-29 | SR | Augmentation of 2x500 MVA, 400/230kV ICTs (5th & 6th) at Karur PS | 400/230 | 2 | 500 | 1000 |
| 258. | 2028-29 | SR | Augmentation of 2x1500 MVA, 765/400 kV and 5x500 MVA, 400/220kV ICTs at Ananthapuram-III Pooling Station | 765/400 | 2 | 1500 | 3000 |
| 259. | 2028-29 | SR | Augmentation of 2x1500 MVA, 765/400 kV and 5x500 MVA, 400/220kV ICTs at Ananthapuram-III Pooling Station | 765/400 | 5 | 500 | 2500 |
| 260. | 2028-29 | SR | Augmentation of 2x1500 MVA, 765/400 kV ICTs at Pendurthi (Vizag) | 765/400 | 2 | 1500 | 3000 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor-mer | Rating of Transformer (MVA) | Total Transformat-ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| 261. | 2028-29 | SR | Augmentation of 3x1500MVA, 765/400 kV ICTs at Kakinada GH | 765/400 | 3 | 1500 | 4500 |
| 262. | 2028-29 | SR | Augmentation of 2x1500 MVA, 765/400 kV ICTs at Ramayapatnam | 765/400 | 2 | 1500 | 3000 |
| 263. | 2029-30 | WR | Establishment of 6x1500MVA, 765/400 kV ICT at Nagpur SS | 765/400 | 6 | 1500 | 9000 |
| 264. | 2029-30 | WR | Installation of additional 3x1500 MVA, 765/400 kV ICTs at Alephata S/s along with associated interconnections with HVDC Switchyard | 765/400 | 3 | 1500 | 4500 |
| 265. | 2029-30 | SR | Establishment of 3x500 MVA, 400/230 kV Onshore Pooling Station near Avaraikulam, Tirunelveli District in Tamil Nad + 300 MVAr STATCOM along with 2x125 MVAr MSR with provision of expansion upto 5 GW. | 400/220 | 2 | 500 | 1000 |
| 266. | 2029-30 | SR | Establishment of 2x315 MVA, 230/66kV Off-Shore Substation-1 with 10 nos. of 66kV line bays for RE integration Establishment of 2x315 MVA, 230/66kV Off-Shore Substation-2 with 10 nos. of 66kV line bays for RE integration | 400/220 | 2 | 315 | 630 |
| 267. | 2030-31 | NR | Establishment of 400/220kV, 6x500MVA S/s at suitable location near Barmer (Barmer-II Substation) along with 2x125 MVAr bus reactor | 400/220 | 6 | 500 | 3000 |
| 268. | 2030-31 | NR | Augmentation of South Kalamb S/s# by 4x1500MVA, 765/400kV ICTs (3 on 400kV & 765kV Section-II & 1 No. on 400kV & 765kV Section-I) along with 2x330 MVAR, 765 kV bus reactor & 2x125 MVAR, 420 kV bus reactor on Section-II. The Section-II will be established under a | 765/400 | 4 | 1500 | 6000 |

| Sl No. | Time Frame | Region | Transformers | Voltage Ratio (kV) | No. of Transfor -mer | Rating of Transformer (MVA) | Total Transformat- ion Capacity (MVA) |
|---|---|---|---|---|---|---|---|
| | | | different network expansion scheme in WR as per details given below | | | | |

## 3. Bus Reactors

| Sl No. | Time frame | Region | Bus Reactors | No of Reactor | Rating of Reactor | Total reactive compensation (MVAR) |
|---|---|---|---|---|---|---|
| 1. | 2025-26 | NR | Implementation of 2x200 MVA, 400/132 kV transformer at Kishtwar Pooling Station along with 4 no. of 132 kV line bays | 1 | 125 | 125 |
| 2. | 2025-26 | NR | Establishment of 2x315MVA, 400/220kV Siot (Rajouri) S/s with 1x125 MVAR (420 kV) bus reactors | 1 | 80 | 80 |
| 3. | 2025-26 | NR | 125 MVAR (420kV) Bus Reactor at Nange (GIS) PS (1-Ph units along with one spare unit) | 1 | 125 | 125 |
| 4. | 2025-26 | NR | 125 MVAR (420kV) Bus Reactor at Koldam S/s (1-Ph units along with one spare unit) | 1 | 125 | 125 |
| 5. | 2025-26 | NR | 2X330 MVAr Bus Reactors at 765kV Bikaner-III | 2 | 330 | 660 |
| 6. | 2025-26 | NR | 2X125MVAr Bus Reactors at 765kV Bikaner-III | 2 | 125 | 250 |
| 7. | 2025-26 | NR | 2X330 MVAr Bus Reactors at 765kV Neemrana-2 | 2 | 330 | 660 |
| 8. | 2025-26 | NR | 2X125MVAr Bus Reactors at 765kV Neemrana-2 | 2 | 125 | 250 |
| 9. | 2025-26 | NR | 2X240MVAr Bus Reactors at 765kV Fatehgarh- IV (Section-2) | 2 | 240 | 480 |
| 10. | 2025-26 | NR | 2X125MVAr Bus Reactors at 765kV Fatehgarh- IV (Section-2) | 2 | 125 | 250 |
| 11. | 2025-26 | NR | 2X240MVAr Bus Reactors at 765kV Barmer-I PS | 2 | 240 | 480 |
| 12. | 2025-26 | NR | 2X125MVAr Bus Reactors at 400kV Barmer-I PS | 2 | 125 | 250 |
| 13. | 2025-26 | NR | 2X240MVAr Bus Reactors at 765kV Jalore PS | 2 | 240 | 480 |
| 14. | 2025-26 | NR | 2X125MVAr Bus Reactors at 400kV Jalore PS | 2 | 125 | 250 |
| 15. | 2025-26 | NR | 1X125MVAr Bus Reactors at 400kV Jhangi | 1 | 125 | 125 |
| 16. | 2025-26 | WR | Establishment of 2x330 MVAR 765 kV bus reactor at KPS2 | 2 | 330 | 660 |

| Sl No. | Time frame | Region | Bus Reactors | No of Reactor | Rating of Reactor | Total reactive compensation (MVAR) |
|---|---|---|---|---|---|---|
| 17. | 2025-26 | WR | Establishment of 2x125 MVAR 400 kV bus reactor at KPS2 | 2 | 125 | 250 |
| 18. | 2025-26 | WR | 2x330 MVAr (765kV) bus reactor at Navsari (New) South Gujarat (GIS) S/s | 2 | 330 | 660 |
| 19. | 2025-26 | WR | 125 MVAr (400kV) bus reactor at Navsari (New) South Gujarat (GIS) S/s | 1 | 125 | 125 |
| 20. | 2025-26 | WR | Establishment of 1x330 MVAR 765 kV bus reactor at Ahmedabad S/s | 1 | 330 | 330 |
| 21. | 2025-26 | WR | Establishment of 1x125 MVAR 400 kV bus reactor at Ahmedabad S/s | 1 | 125 | 125 |
| 22. | 2025-26 | WR | Establishment of 125MVAR, 420kV Bus Reactor at Solapur PP (near Mohol) | 1 | 125 | 125 |
| 23. | 2025-26 | WR | 1x330 MVAr 765 kV bus reactor at Karera (near Datiya)+1 spare unit | 1 | 330 | 330 |
| 24. | 2025-26 | WR | 1x330 MVAr , 765 kV Bus reactor with 1 spare unit of 110MVAr at Ishanagar (New) | 1 | 330 | 330 |
| 25. | 2025-26 | WR | Establishment of 2x125MVAr, 420kV bus reactors at pooling station near Dhule, Maharashtra. | 2 | 125 | 250 |
| 26. | 2025-26 | WR | Replacement of 420kV, 63 MVAr Bus reactor with 420kV, 125MVAr bus reactor at Jabalpur (PG) S/s along with associated civil works | 1 | 125 | 125 |
| 27. | 2025-26 | WR | Creation of 400kV switchyard along with Installation of 2x1500 MVA, 765/400 kV ICTs at Vataman (AIS) with 2x125 MVAr (420 kV) Bus Reactors | 2 | 125 | 250 |
| 28. | 2025-26 | ER | 2X125MVAr Bus Reactors at 400kV Paradeep GIS substation | 2 | 125 | 250 |
| 29. | 2025-26 | ER | 2X330MVAr Bus Reactors at 765kV Paradeep GIS substation | 2 | 330 | 660 |
| 30. | 2025-26 | NER | 2x125 MVAr, 400 kV Bus reactors at Gogoamukh | 2 | 125 | 250 |
| 31. | 2025-26 | NER | 1 no 50MVAr Bus reactor at Namsai | 1 | 50 | 50 |
| 32. | 2025-26 | NER | 2X80MVAr Bus Reactors at 400kV Bokajan substation | 2 | 80 | 160 |

| Sl No. | Time frame | Region | Bus Reactors | No of Reactor | Rating of Reactor | Total reactive compensation (MVAR) |
|---|---|---|---|---|---|---|
| 33. | 2025-26 | NER | 1x125MVAr Bus Reactor at 400kV Bongaigaon | 1 | 125 | 125 |
| 34. | 2025-26 | NER | Decommissioning of 2x50MVAr Bus Reactor at 400kV Bongaigaon | -2 | 50 | -100 |
| 35. | 2025-26 | NER | Decommissioning of existing 420kV, 50MVAr (Bus Reactor-1) and installation of new 420kV, 125MVAr bus reactor in its place along with replacement of associated main and tie bay equipment at Balipara (POWERGRID) S/s | 1 | 125 | 125 |
| 36. | 2025-26 | NER | Installation of new 420 kV, 1x125 MVAr, 3-Ph Variable Shunt Reactor (VSR) having variable range from 63MVAr to 125MVAr (with at least 25 tap positions) along with associated GIS bay at Misa (POWERGRID) S/s | 1 | 125 | 125 |
| 37. | 2025-26 | SR | 2X63 MVAr bus reactors at Kasargode Ss | 2 | 63 | 126 |
| 38. | 2025-26 | SR | 2x330 MVAr (765kV) bus reactor at Narendra (New) (GIS) | 2 | 330 | 660 |
| 39. | 2025-26 | SR | 1x240 MVAr Bus Reactor at Bidar | 1 | 240 | 240 |
| 40. | 2025-26 | SR | 1x125 MVAr Bus Reactor at Bidar | 1 | 125 | 125 |
| 41. | 2025-26 | SR | 2x125 MVAr (400kV) bus reactor at Anantapur PS | 2 | 125 | 250 |
| 42. | 2025-26 | SR | 2X330 MVAr Bus Reactors at 765kV Koppal-II | 2 | 330 | 660 |
| 43. | 2025-26 | SR | 2X125 MVAr Bus Reactors at 400kV Koppal-II | 2 | 125 | 250 |
| 44. | 2025-26 | SR | 2X125 MVAr Bus Reactors at 400kV Gadag-II | 2 | 125 | 250 |
| 45. | 2025-26 | SR | 2X125MVAr Bus Reactors at 400kV Tumkur-II | 2 | 125 | 250 |
| 46. | 2026-27 | NR | 2x80 MVAr (420kV) Bus Reactors at Kaza PS | 2 | 80 | 160 |
| 47. | 2026-27 | NR | 2x240 MVAr (765kV) Bus Reactor at Bikaner-IV PS | 4 | 240 | 960 |

| Sl No. | Time frame | Region | Bus Reactors | No of Reactor | Rating of Reactor | Total reactive compensation (MVAR) |
|---|---|---|---|---|---|---|
| | | | 2x240 MVAr (765kV) Bus Reactor Bus Reactor at Siwani | | | |
| 48. | 2026-27 | NR | 2x125 MVAr (420kV) Bus Reactor at Bikaner-IV PS<br>2x125 MVAr (420kV) Bus Reactor at Siwani | 4 | 125 | 500 |
| 49. | 2026-27 | NR | 2x240 MVAr bus reactor at Merta-II S/s | 2 | 240 | 480 |
| 50. | 2026-27 | NR | 2x125 MVAr bus reactor at Merta-II S/s | 2 | 125 | 250 |
| 51. | 2026-27 | NR | 110MVAr spare reactor unit (1 no.) at Barmer-I PS (single phase) | 1 | 110 | 110 |
| 52. | 2026-27 | NR | 2x240 MVAr bus reactor at Ghiror S/s (UP) | 2 | 240 | 480 |
| 53. | 2026-27 | NR | 2x125 MVAr bus reactor at Ghiror S/s (UP) | 2 | 125 | 250 |
| 54. | 2026-27 | NR | 2x240 MVAr (765kV) bus reactor at Ghiror S/s (UP) | 2 | 240 | 480 |
| 55. | 2026-27 | NR | 2x125 MVAr (420kV) bus reactor at Ghiror S/s (UP) | 2 | 125 | 250 |
| 56. | 2026-27 | WR | Establishment of 765kV Mandsaur Pooling Station along with 2x330MVAr (765kV) Bus Reactor | 2 | 330 | 660 |
| 57. | 2026-27 | WR | Establishment of 2x125MVAr 765kV bus reactor at Mandsaur | 2 | 125 | 250 |
| 58. | 2026-27 | WR | Establishment of 1x125MVAr 420kV bus reactor at Kurawar | 1 | 125 | 125 |
| 59. | 2026-27 | WR | Establishment of 2x330MVAr, 765kV Bus reactor at Kurawar | 2 | 330 | 660 |
| 60. | 2026-27 | WR | Establishment of 765 kV Halvad switching station with 765 kV, 2x330 MVAr bus reactors [with 110 MVAr & 80 MVAr 765kV single phase reactor (spare unit for bus/line reactors at Halvad)] | 2 | 330 | 660 |
| 61. | 2026-27 | WR | Establishment of 765 kV switching station near Vataman with 2x330MVAr, 765 kV bus reactor [with 110 MVAr 765 kV single phase | 2 | 330 | 660 |

| Sl No. | Time frame | Region | Bus Reactors | No of Reactor | Rating of Reactor | Total reactive compensation (MVAR) |
|---|---|---|---|---|---|---|
| | | | reactor (spare unit for bus/line reactor)] | | | |
| 62. | 2026-27 | WR | 2X330MVAr Bus Reactors at 765kV Jamnagar GIS substation | 2 | 330 | 660 |
| 63. | 2026-27 | WR | 2X125MVAr Bus Reactors at 400kV Jamnagar GIS substation | 2 | 125 | 250 |
| 64. | 2026-27 | WR | 1x330MVAr Bus Reactor at KPS-3 (GIS) Section-II | 1 | 330 | 330 |
| 65. | 2026-27 | WR | 1x125MVAr Bus Reactor at KPS-3 (GIS) Section-II | 1 | 125 | 125 |
| 66. | 2026-27 | WR | 2x330MVAr Bus Reactor at South Olpad | 2 | 330 | 660 |
| 67. | 2026-27 | WR | 1x125MVAr Bus Reactor at at South Olpad | 1 | 125 | 125 |
| 68. | 2026-27 | WR | 2x330MVAr Bus Reactor at Boisar-II (GIS) SS | 2 | 330 | 660 |
| 69. | 2026-27 | WR | 2x125MVAr Bus Reactor at Boisar-II (GIS) SS | 2 | 125 | 250 |
| 70. | 2026-27 | WR | 2x330MVAr Bus Reactor at Pune-III (GIS) SS | 2 | 330 | 660 |
| 71. | 2026-27 | WR | 2x125MVAr Bus Reactor at Pune-III (GIS) SS | 2 | 125 | 250 |
| 72. | 2026-27 | WR | Installation of 1x330MVAr 765kV Bus Reactor (2nd) along-with associated bay | 1 | 330 | 330 |
| 73. | 2026-27 | WR | Installation of 2x330MVAr, 765kV Bus Reacto at Navinal (Mundra) S/s (GIS) | 2 | 330 | 660 |
| 74. | 2026-27 | WR | Installation of 1x125MVAr, 420kV Bus Reactor at Navinal (Mundra) S/s (GIS) | 1 | 125 | 125 |
| 75. | 2026-27 | WR | Installation of 1x330MVAr, 765kV switchable line reactor on each ckt at Navinal end of Lakadia – Navinal 765 kV D/c line formed after LILO | 1 | 330 | 330 |
| 76. | 2026-27 | NER | Installation of new 420kV, 125MVAr Bus Reactor at Biswanath Chariali (POWERGRID) S/s along with associated bays | 1 | 125 | 125 |

| Sl No. | Time frame | Region | Bus Reactors | No of Reactor | Rating of Reactor | Total reactive compensation (MVAR) |
|---|---|---|---|---|---|---|
| 77. | 2026-27 | SR | 2X330MVAr Bus Reactors at 765kV Davangere/Chitradurga | 2 | 330 | 660 |
| 78. | 2026-27 | SR | 2X330MVAr Bus Reactors at 765kV Madhugiri (upgradatoin) | 2 | 330 | 660 |
| 79. | 2026-27 | SR | 2X125MVAr Bus Reactors at 400kV Bijapur | 2 | 125 | 250 |
| 80. | 2026-27 | SR | 2X330MVAr Bus Reactors at 765kV Kurnool-IV | 2 | 330 | 660 |
| 81. | 2026-27 | SR | 2X330MVAr Bus Reactors at 765kV Anantapur-II | 2 | 330 | 660 |
| 82. | 2027-28 | NR | 2x240 MVAr 765 kV & 2x125 MVAr 400 kV bus reactors at Robertsganj Pooling Station | 2 | 240 | 480 |
| 83. | 2027-28 | NR | 2x240 MVAr 765 kV & 2x125 MVAr 400 kV bus reactors at Robertsganj Pooling Station | 2 | 125 | 250 |
| 84. | 2027-28 | NR | 2x330 MVAr 765 kV Bus reactors at Prayagraj Substation | 2 | 330 | 660 |
| 85. | 2027-28 | WR | Establishment 3x1500 MVA, 765/400 kV Substation near Raghanesda (GIS) with 2x330 MVAR, 765 kV bus reactor and 2x125 MVAR, 420 kV bus reactor | 2 | 330 | 660 |
| 86. | 2027-28 | WR | Establishment 3x1500 MVA, 765/400 kV Substation near Raghanesda (GIS) with 2x330 MVAR, 765 kV bus reactor and 2x125 MVAR, 420 kV bus reactor | 2 | 125 | 250 |
| 87. | 2027-28 | WR | Establishment of 3X1500 MVA 765/400 kV Kandla (GIS) with 2X330 MVAR 765 kV bus reactor and 2X125 MVAR 420 kV bus reactor | 2 | 330 | 660 |
| 88. | 2027-28 | WR | Establishment of 3X1500 MVA 765/400 kV Kandla (GIS) with 2X330 MVAR 765 kV bus reactor and 2X125 MVAR 420 kV bus reactor | 2 | 125 | 250 |
| 89. | 2027-28 | WR | Establishment of 6x1500 MVA, 765/400 kV Navinal-II (Mundra) S/s (GIS) with 2x330 MVAR, 765 kV & 2x125MVAr, 420 kV bus reactors (In 2 bus sections) | 2 | 330 | 660 |

| Sl No. | Time frame | Region | Bus Reactors | No of Reactor | Rating of Reactor | Total reactive compensation (MVAR) |
|---|---|---|---|---|---|---|
| 90. | 2027-28 | WR | Establishment of 6x1500 MVA, 765/400 kV Navinal-II (Mundra) S/s (GIS) with 2x330 MVAR, 765 kV & 2x125MVAr, 420 kV bus reactors (In 2 bus sections) | 2 | 125 | 250 |
| 91. | 2027-28 | WR | 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. | 2 | 330 | 660 |
| 92. | 2027-28 | WR | 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. | 2 | 125 | 250 |
| 93. | 2027-28 | WR | Installation of 1x125 MVAR, 420 kV bus reactor (2nd) at Neemuch PS | 1 | 125 | 125 |
| 94. | 2027-28 | WR | Establishment of 2x500MVA, 400/220kV S/s at Handiya with 2x125MVAr 420kV Bus Reactors | 2 | 125 | 250 |
| 95. | 2027-28 | WR | Installation of 1x125 MVAR, 420 kV bus reactor at Pachora PS (400kV Bus Section-II) | 1 | 125 | 125 |
| 96. | 2027-28 | WR | 2x330 MVAR, 765 kV bus reactor Substation near Kalyanpur (GIS) | 2 | 330 | 660 |
| 97. | 2027-28 | WR | 2x125 MVAR, 420 kV bus reactor Substation near Kalyanpur (GIS) | 2 | 125 | 250 |
| 98. | 2027-28 | WR | 2x330 MVAR 765kV bus reactor Lakadia-II (Near Chitrod) | 2 | 330 | 660 |
| 99. | 2027-28 | WR | 2x125 MVAR 400kV bus reactor Lakadia-II (Near Chitrod) | 2 | 125 | 250 |
| 100. | 2027-28 | WR | 2x330 MVAR 765kV bus reactor Nasik S/s (towards South of Nasik) | 2 | 330 | 660 |
| 101. | 2027-28 | WR | 2x125 MVAR 400kV bus reactor Nasik S/s (towards South of Nasik) | 2 | 125 | 250 |
| 102. | 2027-28 | WR | 2x330 MVAR 765kV bus reactor Alephata S/s | 2 | 330 | 660 |
| 103. | 2027-28 | WR | 2x125 MVAR 400kV bus reactor Alephata S/s | 2 | 125 | 250 |
| 104. | 2027-28 | WR | 2x330 MVAR, 765 kV bus reactor Substation near Raghanesda (GIS) | 2 | 330 | 660 |

| Sl No. | Time frame | Region | Bus Reactors | No of Reactor | Rating of Reactor | Total reactive compensation (MVAR) |
|---|---|---|---|---|---|---|
| 105. | 2027-28 | WR | 2x125 MVAR, 400 kV bus reactor Substation near Raghanesda (GIS) | 2 | 125 | 250 |
| 106. | 2027-28 | WR | 2x330 MVAR 765 kV bus reactor Morena PS (South of Sabalgarh) | 2 | 330 | 660 |
| 107. | 2027-28 | WR | 2x125 MVAR 400kV bus reactor Morena PS (South of Sabalgarh) | 2 | 125 | 250 |
| 108. | 2027-28 | WR | 2x330 MVAR, 765 kV bus reactor at South Kalamb S/s (765kV Bus section-III) | 2 | 330 | 660 |
| 109. | 2027-28 | WR | 2x125 MVAR, 420 kV bus reactor at South Kalamb S/s (400kV Bus section-III) | 2 | 125 | 250 |
| 110. | 2027-28 | ER | 2X125MVAr Bus Reactors at 400kV Gopalpur GIS substation | 2 | 125 | 250 |
| 111. | 2027-28 | ER | 2X330MVAr Bus Reactors at 765kV Gopalpur GIS substation | 2 | 330 | 660 |
| 112. | 2027-28 | ER | 2X125MVAr Bus Reactors at 400kV Bishnupur (ISTS) SWITCHING STATION | 2 | 125 | 250 |
| 113. | 2027-28 | ER | 2x330 MVAR, 765 kV bus reactor at Raigarh (Kotra)-II S/s in Chhattisgarh (765kV Bus section-II) | 2 | 330 | 660 |
| 114. | 2027-28 | ER | 2x125 MVAR, 420 kV bus reactor at Raigarh (Kotra)-II S/s in Chhattisgarh (on 400kV Bus Section-II) | 2 | 125 | 250 |
| 115. | 2027-28 | SR | 2X125MVAr Bus Reactors at 400kV Bellary-II | 2 | 125 | 250 |
| 116. | 2027-28 | SR | 1x330 MVAR, 765kV bus reactor ($3^{rd}$) at Angul Substation | 1 | 330 | 330 |
| 117. | 2027-28 | SR | 1x240 MVAr Bus reactor at 765/400kV Mangalore | 1 | 240 | 240 |
| 118. | 2027-28 | SR | 2x330 MVAr (765 kV) bus reactors at CN'Halli | 2 | 330 | 660 |
| 119. | 2027-28 | SR | 1x240 MVAr Bus reactor at 765/400kV Kakinda GH GIS | 1 | 240 | 240 |
| 120. | 2027-28 | SR | 1x240 MVAr Bus reactor at 765/400kV Tuticorin GH GIS | 1 | 240 | 240 |

| Sl No. | Time frame | Region | Bus Reactors | No of Reactor | Rating of Reactor | Total reactive compensation (MVAR) |
|---|---|---|---|---|---|---|
| 121. | 2027-28 | SR | 1x330 MVAr (765 kV) bus reactors at Tuticorin PS | 1 | 330 | 330 |
| 122. | 2027-28 | SR | 1x330 MVAr (765 kV) bus reactors at Dharmapuri (Salem New) | 1 | 330 | 330 |
| 123. | 2027-28 | SR | ± 300 MVAR STATCOM at Tumkur-II PS with switching arrangement of under implementation 2x125 MVAr bus reactors. | 2 | 125 | 250 |
| 124. | 2028-29 | NR | 2x330MVAr (765kV) bus reactor at Fatehpur | 2 | 330 | 660 |
| 125. | 2028-29 | WR | Establishment of 2x500 MVA, 400/220 kV Mahuva Onshore Pooling Station (GIS) (Mahuva PS) alongwith 1x125 MVAR, 420 kV bus reactor | 1 | 125 | 125 |
| 126. | 2028-29 | WR | Creation of 400kV switchyard along with Installation of 2x1500 MVA, 765/400 kV ICTs at Vataman (AIS) with 2x125 MVAr (420 kV) Bus Reactors | 2 | 125 | 250 |
| 127. | 2028-29 | WR | 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 | 1 | 125 | 125 |
| 128. | 2028-29 | WR | 245 kV, 3x50 MVAr Bus Reactors at 220 kV level of Mahuva PS (GIS) | 3 | 50 | 150 |
| 129. | 2028-29 | WR | Installation of 2x330 MVAR 765kV bus reactors at Kolhapur | 2 | 330 | 660 |
| 130. | 2028-29 | NER | 420kV, 80MVAr bus reactor: 2 nos | 2 | 80 | 160 |
| 131. | 2028-29 | SR | 2x330 MVAr Bus reactor at 765/400 kV Shadnagar Station | 2 | 330 | 660 |
| 132. | 2028-29 | SR | 2x330 MVAr (765 kV) bus reactors at Kurnool-V PS | 2 | 330 | 660 |
| 133. | 2028-29 | SR | 2x330 MVAr (765 kV) bus reactors at Sagar S/s | 2 | 330 | 660 |
| 134. | 2028-29 | SR | 2x330 MVAr (765 kV) bus reactors at Ananthapuram-III PS | 2 | 330 | 660 |
| 135. | 2028-29 | SR | 1x330 MVAr (765 kV) bus reactor at Pendurthi (Vizag) | 1 | 330 | 330 |

| Sl No. | Time frame | Region | Bus Reactors | No of Reactor | Rating of Reactor | Total reactive compensation (MVAR) |
|---|---|---|---|---|---|---|
| 136. | 2028-29 | SR | 1x330 MVAr (765 kV) bus reactor at Khammam-II | 1 | 330 | 330 |
| 137. | 2028-29 | SR | 2x330 MVAr (765 kV) bus reactors at Kadapa-II PS | 2 | 330 | 660 |
| 138. | 2029-30 | WR | 2x330MVAr Bus Reactor at Nagpur SS | 2 | 330 | 660 |
| 139. | 2029-30 | WR | 2x125MVAr Bus Reactor at Nagpur SS | 2 | 125 | 250 |
| 140. | 2029-30 | WR | 2x125MVAr Bus Reactor at KPS3 (HVDC) | 2 | 125 | 250 |
| 141. | 2030-31 | NR | 2x125 MVAr 400 kV Bus reactor at Bamer-II PS | 2 | 125 | 250 |
| 142. | 2030-31 | NR | 2x330 MVAR 765 kV Bus reactor & 2x125 MVAR 400 kV Bus reactor on Section-II at South Kalamb S/s. | 2 | 330 | 660 |
| 143. | 2030-31 | NR | 2x330 MVAR 765 kV Bus reactor & 2x125 MVAR 400 kV Bus reactor on Section-II at South Kalamb S/s. | 2 | 125 | 250 |

**Annex 3.3**

## Inter-Regional Transmission Capacity (MW)

**As on 31/08/2025**

| Transmission line | Present | Capacity at the End of 2031 |
|---|---|---|
| **EAST - NORTH** | | |
| Dehri/Sasaram - Sahupuri 220kV S/c | 130 | 130 |
| Sasaram HVDC back-to-back | 500 | 500 |
| Muzaffarpur - Gorakhpur 400kV D/c (with Series Comp.+TCSC) | 2000 | 2000 |
| Patna - Balia 400kV D/c (Quad) | 1600 | 1600 |
| Biharshariff - Balia 400kV D/c (Quad) | 1600 | 1600 |
| Barh/Patna - Balia 400kV D/c (Quad) | 1600 | 1600 |
| Gaya - Balia 765kV S/c | 2100 | 2100 |
| Sasaram bypassing (additional capacity) | 500 | 500 |
| Sasaram - Fatehpur 765kV S/c | 2100 | 2100 |
| Barh-II/Motihari - Gorakhpur 400kV D/c (Quad) | 1600 | 1600 |
| Gaya-Varanasi 765kV 2xS/c | 4200 | 4200 |
| Biharsharif-Varanasi 400kV D/c (Quad) | 1600 | 1600 |
| LILO of Biswanath Chariali - Agra ±800kV HVDC Bipole at new pooling station in Alipurduar and addition of 3000MW module | 3000 | 3000 |
| **Sub-total** | **22,530** | **22,530** |
| **EAST - WEST** | | |
| Budhipadar-Korba 220kV S/c | 130 | 130 |
| Budhipadar-Korba 220kV D/c | 260 | 260 |
| Rourkela/Jharsuguda - Raigarh/Raipur 400kV D/c (with Series Comp.+TCSC) | 1400 | 1400 |
| Ranchi - Dharamjayagarh/WR Pooling Station 765kV S/c | 2100 | 2100 |
| Rourkela/Jharsuguda - Raigarh/Raipur 400kV (2nd) D/c (with Series Comp.) | 1400 | 1400 |
| Ranchi - Dharamjaygarh 765kV (2nd) S/c | 2100 | 2100 |
| Ranchi - Sipat 400 kV D/c with series comp. | 1200 | 1200 |
| Jharsuguda - Dharamjaygarh 765kV D/c | 4200 | 4200 |
| Jharsuguda - Kotra II/Dharamjaygarh 765kV (2nd) D/c | 4200 | 4200 |
| Jharsuguda - Raipur Pool 765kV D/c | 4200 | 4200 |
| Jypore-Jagdalpur 400 kV D/c | 1600 | 1600 |
| Raigarh(Tamnar) – Jamshedpur (New) 765kV D/c line | | 4200 |
| **Sub-total** | **22,790** | **26,990** |
| **EAST - SOUTH** | | |
| Balimela - Upper Sileru 220kV S/c | 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 765kV D/c | 4200 | 4200 |
| Angul – Srikakulam 765kV 2nd D/c | | 4200 |
| **Sub-total** | **7,830** | **12,030** |
| **EAST - NORTH EAST** | | |
| Birpara/Alipurduar - Salakati 220kV D/c | 350 | 350 |
| Siliguri - Bongaigaon 400kV D/c | 1600 | 1600 |
| Siliguri/Alipurduar - Bongaigaon 400kV D/c (Quad) | 1600 | 1600 |
| Katihar - Parbotipur - Bornagar 765kV D/c line | | |
| **Sub-total** | **3,550** | **3,550** |
| **NORTH EAST - NORTH** | | |
| Biswanath Chariali - Agra ±800kV HVDC Bipole with 3000MW converter | 3000 | 3000 |
| **Sub-total** | **3,000** | **3,000** |
| **WEST - NORTH** | | |
| Auriya - Malanpur 220kV D/c | 260 | 260 |

| Transmission line | Present | Capacity at the End of 2031 |
|---|---|---|
| Kota - Ujjain 220kV D/c | 260 | 260 |
| Vindhyachal HVDC back-to-back | 500 | 500 |
| Gwalier - Agra 765kV 2xS/c | 4200 | 4200 |
| Zerda - Kankroli 400kV D/c | 1000 | 1000 |
| Gwalior - Jaipur 765kV 2xS/c | 4200 | 4200 |
| Adani (Mundra) - Mahendranagar ±500kV HVDC bipole | 2500 | 2500 |
| RAPP - Sujalpur 400kV D/c | 1000 | 1000 |
| Champa Pool - Kurukshetra ±800kV HVDC Bipole | 4500 | 4500 |
| Jabalpur - Orai 765kV D/c | 4200 | 4200 |
| LILO of Satna - Gwalior 765kV S/c line at Orai | 4200 | 4200 |
| Upgradation of Champa Pool - Kurukshetra ±800kV HVDC Bipole | 1500 | 1500 |
| Banaskantha - Chittorgarh 765kV S/c | 2100 | 2100 |
| LILO of one ckt of 765kV Banaskantha – Chittorgarh D/c at Rishabhdeo* | 2100 | 2100 |
| Vindhyachal - Varanasi 765kV D/c | 4200 | 4200 |
| Neemuch-Chittorgarh 400 kV D/c | 1,600 | 1600 |
| Mandsaur PS - Rishabhdeo 765 kV D/c | | 4200 |
| Mandsaur PS -Beawar 765 kV D/c | | 4200 |
| Sirohi (Rajasthan) – Mandsaur (MP) 765kV D/c line | | 4200 |
| Sasan- Prayagraj 765kV D/c | | 4200 |
| Barmer-II (Rajasthan) – South Kalamb (Maharashtra) 800 kV HVDC line | | 6000 |
| **Sub-total** | **38,320** | **61,120** |
| **WEST - SOUTH** | | |
| Chandrapur HVDC back-to-back | 1000 | 1000 |
| Kolhapur - Belgaum 220kV D/c | 260 | 260 |
| Ponda - Nagajhari 220kV D/c | 260 | 260 |
| Raichur - Sholapur 765kV S/c | 2100 | 2100 |
| Raichur - Sholapur 765kV (2nd) S/c | 2100 | 2100 |
| Narendra - Kolhapur 765kV D/c (Operated at 400kV) | 2200 | 2200 |
| Wardha - Nizamabad 765kV D/c | 4200 | 4200 |
| Warora Pool - Warangal (New) 765kV D/c | 4200 | 4200 |
| Raigarh - Pugulur ±800kV HVDC Bipole | 6000 | 6000 |
| LILO of Narendra - Narendra (New) 400kV (Quad) line at Xeldam (Goa) | | 1600 |
| Narendra-Pune-III 765 kV D/c | | 4200 |
| Parli - Bidar 765kV D/c line | | 4200 |
| **Sub-total** | **22,320** | **32,320** |
| **TOTAL** | **1,20,340** | **1,61,540** |
| ** Barsur (WR) – L. Sileru (SR) 220kV HVDC Monopole of 200MW capacity is currently not in operation.* | | |
| ** Banaskantha-Chhitorgarh is presently 765 D/c out of which one ckt is proposed to be LILOed at Rishabhdeo by 2027.* | | |