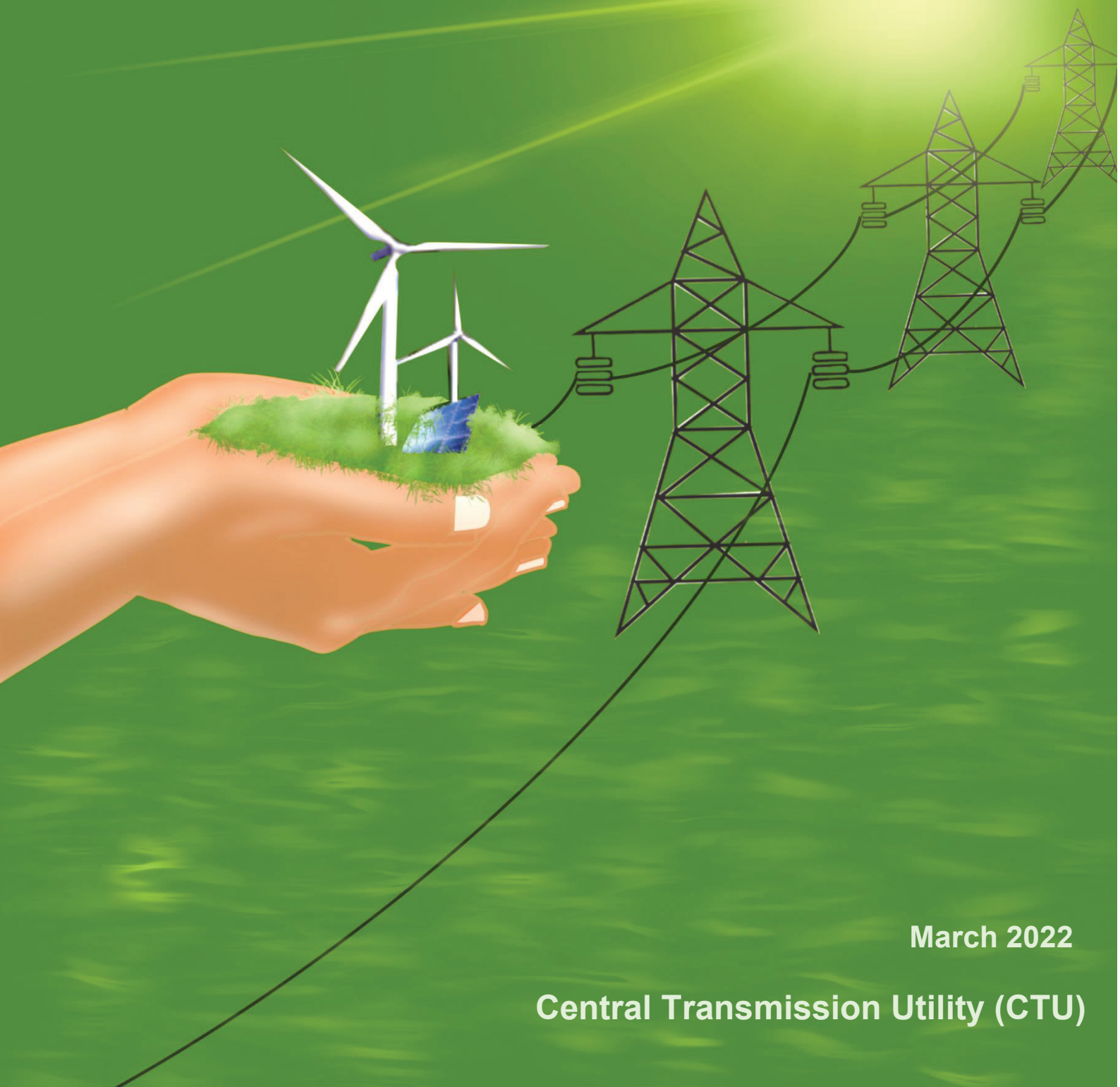
Rolling Plan 2026-27

Inter-State Transmission System (ISTS)



March 2022

Central Transmission Utility (CTU)

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Executive Summary

Today, India is on the path of high economic growth and is aiming to be a 5 trillion USD economy in coming years. Electricity sector is playing a very vital role in this economic development by acting as a secure and reliable source of energy. One of the emerging utilisations of electricity today is in the transportation sector with Central and State Governments promoting faster adoption of Electric Vehicles (EVs), to reduce emission of greenhouse gases. To meet the growing energy demand in sustainable and eco-friendly manner, India is going through a phase of energy transition at rapid pace with greater focus on development of new Renewable Energy (RE) resources. In this direction, at the COP26 climate conference in Glasgow, India has committed to achieve non-fossil energy capacity of 500GW by 2030 and to meet 50 per cent of its energy requirement through RE by 2030. Further, India has also set target of being a net zero emitter by 2070.

Now, large RE parks of GW capacities are being developed in the country in resources rich areas to meet the energy transitions goals. This huge quantum of RE needs to be transferred reliably and securely to all the major load centres of the country, which necessitates development of robust National Grid comprising of high capacity AC and HVDC systems along with state-of-the-art FACTS devices for controlling power system parameters. India's path and ways of RE integration to its National Grid can act as blue print for other countries for development of new age electricity grid. There is also a thrust on development and integration of Energy Storage devices in form of batteries, pumped hydro etc. in the National Grid, for providing balancing power during low or no RE period and also increasing utilisation of transmission system associated with RE projects.

Transmission system is acting as a growth engine of electricity sector and therefore should be planned and developed adequately so as enable seamless integration of generation projects and also facilitate availability of reliable, secure, and affordable power to all the consumers. In this direction, Ministry of Power, Govt. of India vide gazette notification dated 01st Oct 2021, has notified Electricity (Transmission System Planning, Development and Recovery of Inter-State Transmission Charges) Rules, 2021. As per the said rules CTU has to draw up plan for Inter-State Transmission System (ISTS) for up to next five years on rolling basis every year identifying specific transmission projects which are required to be taken up along with their implementation time lines. Accordingly, an ISTS Planning Procedure has been prepared and published by CTU on 16th Dec 2021 for the purpose of planning and coordination relating to ISTS. The entire process for transmission planning has been decided to be undertaken on continuous basis, involving two cycles i.e. from April to September and October to March. Thus, Network Plan reports would be brought out by CTU on half-yearly basis in the months of September and March in every financial year. In this direction, a report on Network Plan 2024-25 has already been brought out on 31st Dec 2021 and the same is available on CTU website. Further, this ISTS Rolling Plan report is being brought out wherein transmission system adequacy in ISTS has been assessed for 2026-27 time-frame.

In **Chapter-2,** installed capacity & peak demand as on Jan'22 and projected installed capacity & demand by FY 2026-27 have been presented. All India installed capacity & peak demand are expected to increase from 395GW (including about 106GW RE + 47GW Hydro) & 203GW respectively as on Jan'22 to about 568GW (including about 225GW RE + 71GW Hydro) & 299GW respectively by FY 2026-27.

In order to integrate the envisaged generation capacity, predominantly RE, and to meet the projected demand, comprehensive studies have been performed on the National Grid on All India and Regional basis 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 Off-peak demand.

Detailed overview of the load generation balance preparation and challenges observed while balancing the same and study results have been brought out in **Chapter-3.** While preparing LGB for nine scenarios, merit order economic dispatch of thermal generations and RPO obligations of states have been taken into consideration. Maximum and minimum demand of 299GW and 191GW respectively have been considered in 2026-27 timeframe while working out the LGBs.

Detailed system studies have been carried out for nine scenarios using PSS®E software after considering all the planned and under construction system, in line with provisions under CEA's Manual on Transmission Planning Criteria. Due to intermittent and variable nature of RE and with high penetration of RE in the Indian Grid, loading pattern on some of the lines is expected to change diurnally as well as seasonally. Further, transmission lines associated with thermal and hydro generations would be lightly loaded during high RE scenario. In the Chapter-3, study results have been presented for All India grid (above 400kV) including critically loaded lines & transformers under normal & N-1 condition, voltage violations, short circuit violations etc. Network expansion schemes have been planned and 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 2026-27, and its corresponding broad estimated cost has also been brought out in the report. In this Rolling Plan, transmission schems of about 3,772 ckm of transmission lines and 32,490 MVA of transformation capacity has been formulated at an estimated cost of Rs.14,646 Cr. Thus, cumulatively by 2026-27, transmission schemes comprising of 31,895 ckm of transmission lines and transformation capacity of 2,16,840 MVA at estimated cost of Rs 1,24,148 Cr. is expected to be added in the grid.

The Inter-Regional (IR) transmission capacity is expected to grow from present level of 1,12,250MW to about 1,18,740MW in next 2-3 years. Due to diurnal and seasonal variation in RE generation, power flow on all IR corridors except ER→SR, is observed in both directions. Maximum change is observed in WR→NR corridor, where power of the order of 24GW is flowing from WR to NR in Summer evening peak scenario and power of the order of 20GW is flowing from NR to WR in Winter solar max scenario. New high capacity links in WR-SR, WR-NR, and WR-ER corridors are under various stages of planning or approval to cater to increased inter-regional power transfer.

Chapter-4 to Chapter-8 are dedicated to detailed study results pertaining to each of the five regions, i.e. one Chapter for each Region. State wise LGBs have been prepared for all the regional grids for nine load-generation scenarios and outcomes of study results have been brought out. Critically loaded lines & transformers under normal & N-1 condition, voltage violations, short circuit violations etc. have been reported in both ISTS and STU network and possible reasons/cause for the same are also brought out in respective regional chapters. Further, detailed scope of works and implementation time-frame along with schematic of new ISTS schemes including schemes for RE evacuation for mitigating some of these violations have been brought out in these Chapters. For remaining violations, additional expansion schemes in ISTS are being planned after detailed studies, and accordingly the details of the same would be brought out in the subsequent Rolling Plan reports.

India being centrally places in South Asia is playing a vital role in establishment of interconnections between countries so as 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 studies carried out, new expansion schemes planned, way forward etc. have been mentioned in **Chapter-10.**

Chapter 1:
Background and Objective

India being an emerging-developing nation is ought to see the largest increase in energy demand in the years to come. Energy use has already been doubled since 2000, with 80% of demand still being met by conventional sources. In order to meet the increasing demand for electricity in the country, massive addition to the installed generating capacity is required. India's power sector is one of the most diversified in the world as sources of power generation range from conventional sources such as coal, lignite, natural gas, oil, hydro and nuclear to viable non-conventional sources such as wind, solar and agricultural & domestic waste.

Sustainable development being the need of the hour is emphasised around the world. In this regard, India is willing to increase the contribution of generation from renewable energy in the power sector. As committed in COP26, India will have total installed capacity of renewable of 500 GW by the year 2030 and about 225 GW RE (Solar & Wind) is expected to be integrated into the grid by 2026-27. Unlike conventional resources, renewable energy resources never run out and also contributes to negligible carbon emission that too at much cheaper cost. Despite so many pros, the large amount of integration of RE with grid comes with many challenges like low-capacity utilization factor (CUF), flexibility, intermittency etc. One of the solutions could be to implement energy storage systems which can store the excess electricity during off-peak period, moreover this can reduce the capex investment in transmission line if deployed smartly. Thus, network shall be planned in a manner that offers optimum techno-economical solution considering all the aspects without compromising the security, reliability and robustness of National Grid.

In this direction, Ministry of Power vide gazette notification dated 01st Oct 2021, has notified Electricity (Transmission System Planning, Development and recovery of Inter-State Transmission Charges) Rules, 2021. As per the said rules, CTU has to draw up plan for Inter-State Transmission System (ISTS) for up to next five years on rolling basis every year identifying specific transmission projects which are required to be taken up along with their implementation time lines. Accordingly, an ISTS planning procedure has been prepared and published by CTU in Dec'21 for the purpose of planning and coordination relating to ISTS.

As per the said ISTS Planning procedure, the entire process for transmission planning on rolling basis has been decided to be undertaken on continuous basis, involving two cycles i.e., from April to September and October to March. Thus, Rolling Plan reports would be brought out by CTU on half-yearly basis in the months of September and March every financial year. In this direction, a report on Network Plan 2024-25 has already been brought out on 31st Dec 2021 and the same is available on CTU website. This ISTS Rolling Plan report is being brought out wherein transmission system adequacy in ISTS has been ascertained for 2026-27 time-frame. This report covers year wise ISTS requirement on pan India basis to integrate the RE generation and also cater to the growing demand. To analyse the same, detailed studies including load flow, contingency analysis, voltage profile (reactive power management), short circuit studies etc have been carried out on all India basis for 2026-27 timeframe for nine perspective load-generation scenarios covering three seasons and three point on load curve (Solar max, evening peak and night off peak) of each season.

Counteractive measures for some of the identified issues in ISTS have been suggested in this report. However, ISTS planning being a continuous exercise, detailed studies are being carried out and new transmission elements, as required, would be planned to address the remaining issues. Details in this regard would be brought out in the next Rolling plan report to be published in September 2022.

Chapter 2:
Power Supply Scenario

India's power demand has substantially increased from 136 GW at the end of 2013-14 to 203 GW as on Jan'22, a growth of about 49%. As per the 19th EPS published by CEA, this demand is expected to further increase to about 299 GW by 2026-27, which translates to growth by about 47%. To meet this fast-growing demand, generation capacity is also being continuously added into the grid. The installed capacity of India at the end of 2013-14 was about 243 GW which increased to about 395 GW as on Jan'22, a growth of about 63%. Installed Capacity is further expected to be about 568 GW by 2026-27 thereby registering a growth of about 44%. Furthermore, presently RES excluding hydro generation is contributing around 106 GW (27% of installed capacity) which will increase to around 225 GW (40% of installed capacity) by 2026-27, a growth of 112%.

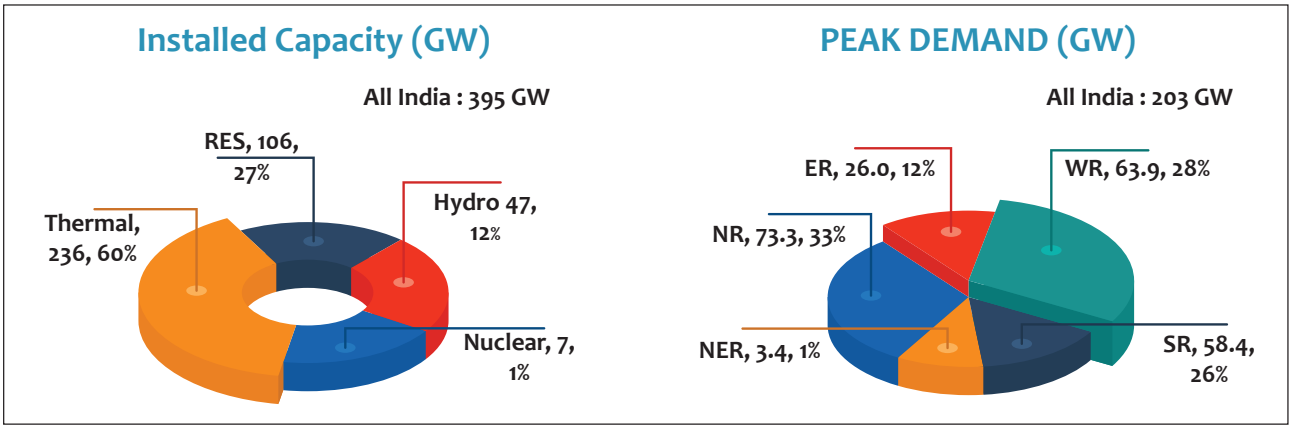
2.1 Present Power Supply Scenario

The total installed capacity as on Jan'22 was about 395 GW and the peak demand was about 203 GW. The region-wise breakup for the total installed capacity and peak demand on Jan'22 is given in the Table 2-1 & Figure 2-1

Table 2-1: Installed Capacity and Peak Demand as on Jan'22

	Generation (GW)								Demand
Region	Thermal				Nuclear	Hydro	RES	Total	(GW)
	Coal	*Lignite*	*Gas*	*Diesel*					
NR	56.19	1.58	5.78	0.00	1.62	20.43	24.78	110.39	73.31
WR	73.59	1.40	10.81	0.00	1.84	7.56	32.51	127.71	63.87
SR	45.70	3.64	6.49	0.43	3.32	11.82	46.37	117.78	58.43
ER	27.65	0.00	0.10	0.00	0.00	4.75	1.72	34.22	26.02
NER	0.77	0.00	1.72	0.04	0.00	1.94	0.42	4.89	3.42
All India	**203.90**	**6.62**	**24.90**	**0.47**	**6.78**	**46.51**	**105.82**	**394.99**	**203.01**

Figure 2-1: Installed Capacity and Peak Demand as on Jan'22



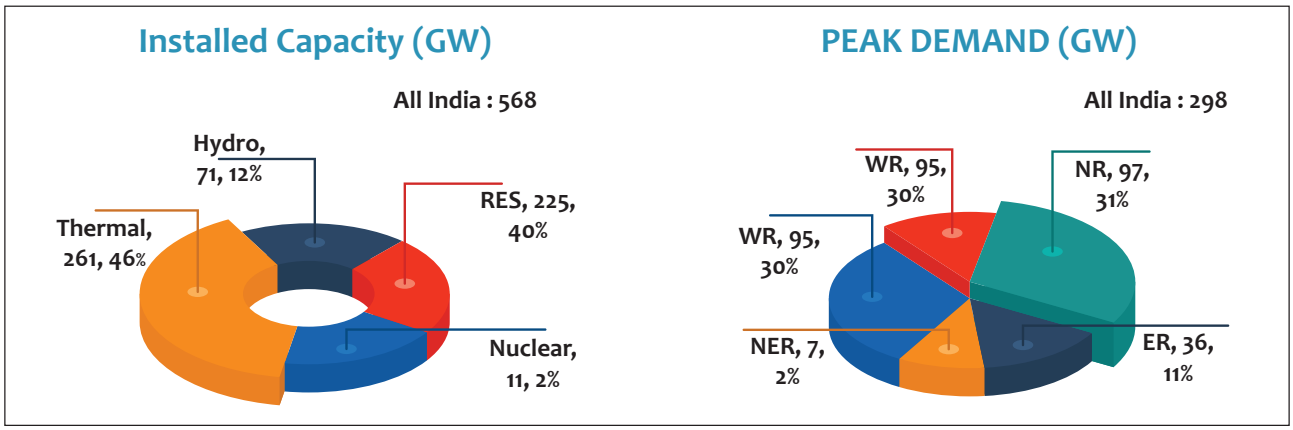
2.2 Envisaged Power Supply Scenario

As per the 19th EPS, all India peak demand for 2026-27 is expected to increase to 299 GW. To meet this increase in demand of about 95 GW from present, net 173 GW generation is envisaged to be added after considering the retirement of 15 GW of thermal generation by 2027. Details regarding the same are attached at Annex-2.1. Total installed capacity for 2027 shall be about 568 GW. The region-wise breakup for the installed capacity and projected peak demand for 2026-27 are tabulated in Table 2-2 & Figure 2-2:

Table 2-2: Projected Installed Capacity & Peak Demand by Mar'27

Region	Generation (GW)								Demand (GW)
	Thermal			*Diesel*	Nuclear	Hydro	RES	Total	
	Central	*State*	*IPP*						
NR	11.44	41.30	0.00	3.58	4.42	26.17	82.35	169.26	97.18
WR	19.00	35.95	36.85	10.14	3.24	8.17	70.44	183.78	94.82
SR	12.87	37.51	4.64	3.37	3.82	17.70	70.44	150.35	83.65
ER	24.44	12.78	4.15	0.00	0.00	14.69	1.50	57.55	35.67
NER	0.75	0.00	0.00	1.85	0.00	4.38	0.20	7.18	6.71
All India	**68.50**	**127.53**	**45.64**	**18.94**	**11.48**	**71.10**	**224.9**	**568.12**	**298.77**

Figure 2-2:Projected Installed Capacity & Peak Demand by Mar'27



The region wise growth in demand and fuel type wise increase in installed generation capacity for 2026-27 from present time-frame is tabulated below in Table 2-3.

Table 2-3:Peak demand & Generation IC in 2021-22 and 2026-27

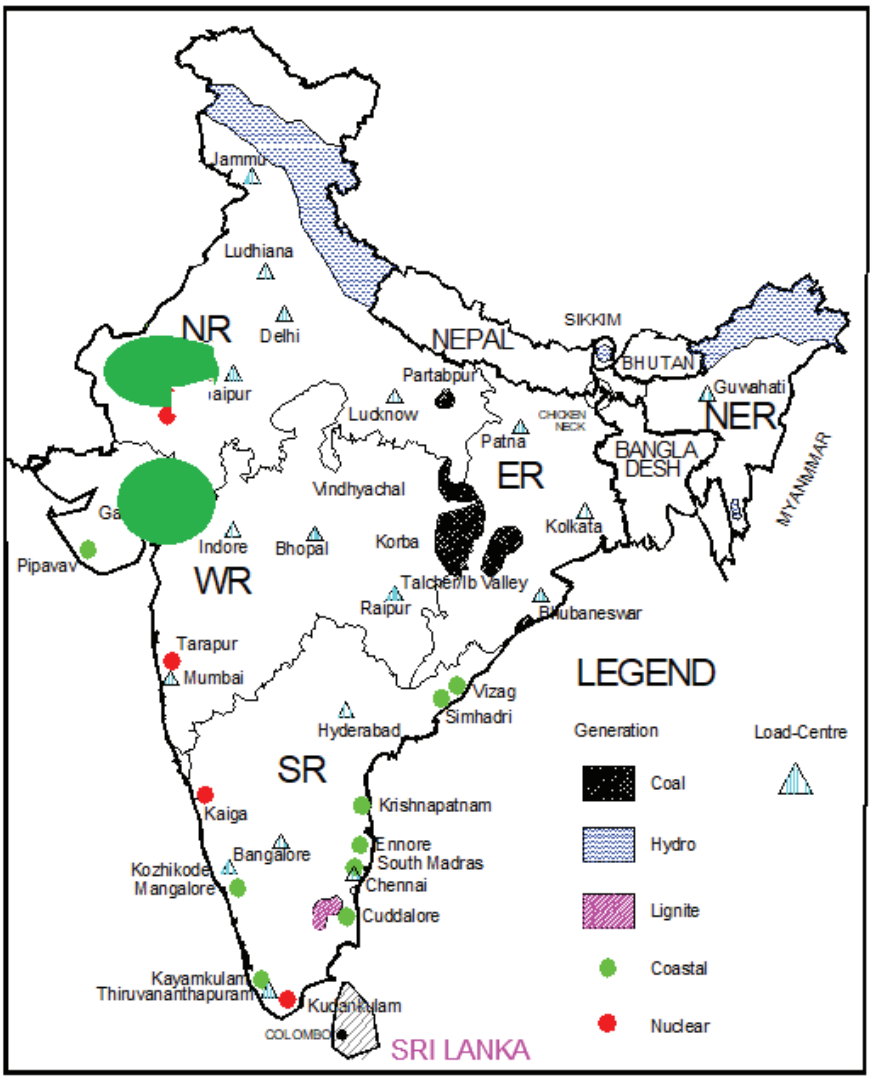
Peak Demand (GW)				
	2021-22	2026-27	*Diff*	*% Increase*
NR	73.30	97.18	23.88	33%
WR	63.87	94.82	30.95	48%
SR	58.43	83.65	25.22	43%
ER	26.00	35.67	9.67	37%
NER	3.42	6.71	3.29	96%
All India	**203.00**	**298.77**	**95.77**	**47%**

Generation IC (GW)				
	Present	2026-27	*Diff*	*% Change*
Thermal	210.52	241.67	31.16	15%
Gas	24.90	18.94	-5.96	-24%
Nuclear	6.78	11.48	4.70	69%
Hydro	46.51	71.10	24.59	53%
Solar	50.30	152.27	101.97	203%
Other RE	**55.52**	**72.65**	**17.14**	**31%**
Total	**394.52**	**568.12**	**173.60**	**44%**

Chapter 3:
All India Analysis

Installed Capacity mix of India is continuously changing with integration of renewable energy plants and in the future renewable generation installed capacity is going to share more and more portion of the total installed capacity. To plan transmission network for meeting 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, whereas new generation addition in the form of renewable energy is coming up in Northern, Western and Southern Part of India as depicted in Figure 3-1. To meet demand of country from conventional generation, strong backbone transmission system is already planned and implemented in past decade. With the advent of renewable energy generation addition mostly in Western and Southern Part of India, power flow pattern on existing transmission system are changing. It becomes important to understand diurnal and seasonal regional exchanges taking place depending upon the generation and demand of a region and plan any additional transmission system to cater the requirement keeping all India perspective in mind.

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



The present study has been carried out to identify adequacy of existing, approved and planned transmission systems to meet the power transfer requirement till the timeframe of 2026-27 with an all India perspective, highlight the challenges if any and possible solution to carry out periodic assessment of transmission requirement under ISTS. Here it is to mention that substantial solar generation capacity addition has been envisaged in future which shall only generate in day time. A region having a high solar installed capacity shall become exporter of power during the afternoon and importer of the power during evening.

To study such phenomenon and analyses, power flow patterns in transmission network under 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 are discussed in next section.

3.1 Load Generation Balance

To replicate and simulate seasonal power requirement variations on annual basis, 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'26: Solar max (Scenario-1), Evening Peak (Scenario-2) and Night off-peak (Scenario-3)
- Jun'26: Solar max (Scenario-4), Evening Peak (Scenario-5) and Night off-peak (Scenario-6)
- Feb'27: Solar max (Scenario-7), Evening Peak (Scenario-8) and Night off-peak (Scenario-9)

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. Load Generation Balance (LGB) for above mentioned nine scenarios considered for the study was prepared, (based on the discussions held on 11.03.2021 among CEA and POSOCO). To prepare load generation balance, details about the selection of points on load curve and generation despatching philosophies are discussed subsequently.

As per 19th EPS, All India peak demand is expected to be about 299 GW in 2026-27. To find out variation of this demand for nine scenarios, demand pattern of year 2019-20 for the three representative months was analysed and three points on the average demand curve of three months corresponding to solar max, evening peak and night off peak were selected, which are depicted in Figure 3-2, Figure 3-3 & Figure 3-4 below. Demand data of 2020-21 was not considered for above analysis due to impact of COVID epidemic.

Figure 3-2:Summer (June'19 Load Curve)

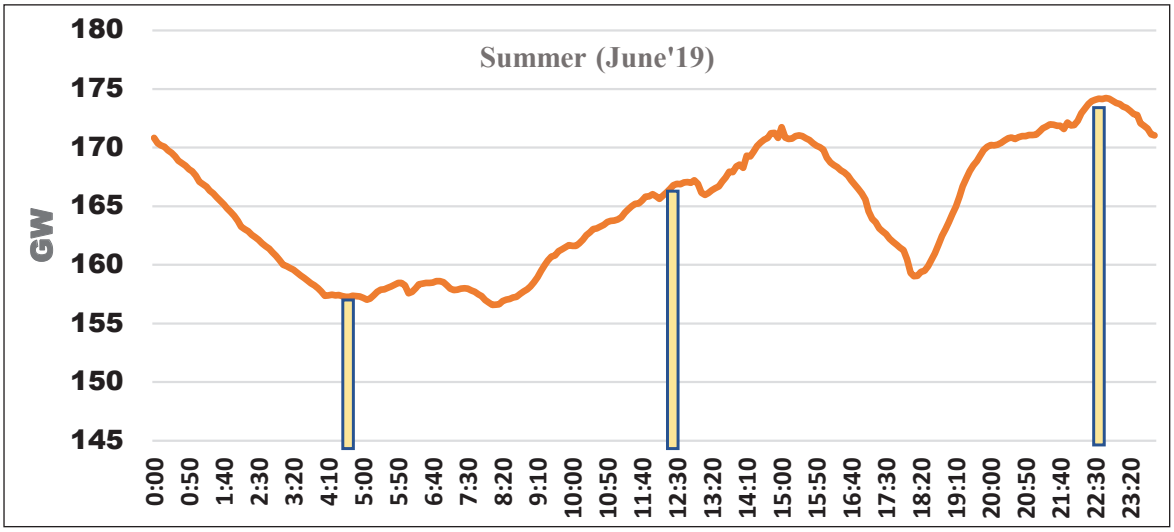


Figure 3-3: Monsoon (Aug'19) Load Curve

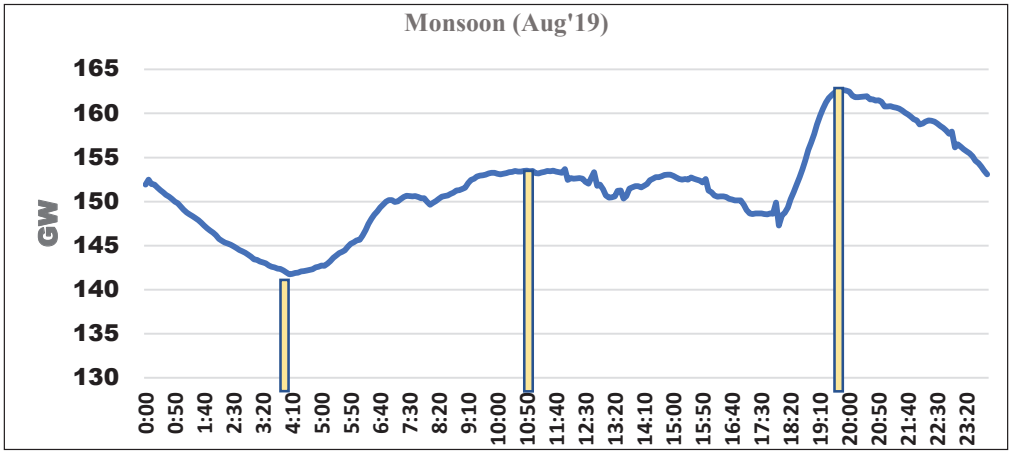
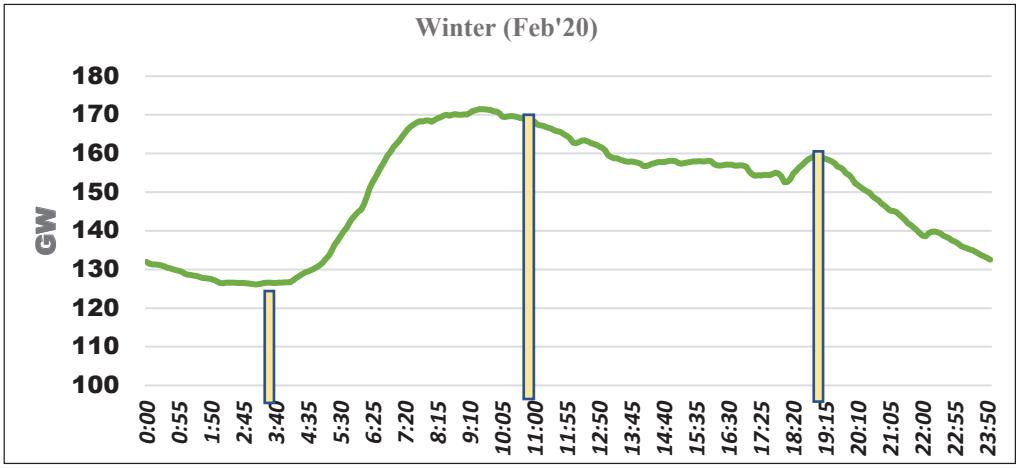
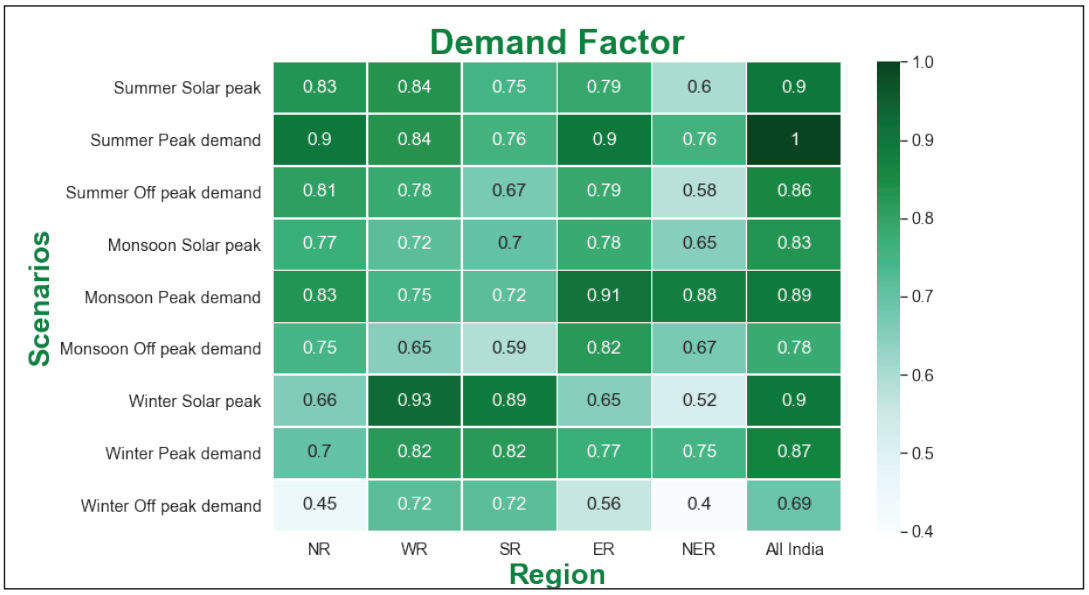


Figure 3-4:Winter (Feb'20) Load Curve



Demand corresponding to these points was divided by maximum All India/regional demand of the corresponding year to obtain the demand factors. The same has been used for calculating All India/regional demand for different scenarios of 2026-27 time-frame as shown in Figure 3-5.

Figure 3-5:Demand factors considered for 2026-27-time frame



To meet the anticipated demand in different scenarios, various sources of generations viz. Thermal, Nuclear, Hydro, Gas, Solar, Wind are available. However, despatch of some of these generators shall be as per their diurnal and seasonal variation. For this purpose, region wise load generation balancing philosophy was considered for the study. 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.

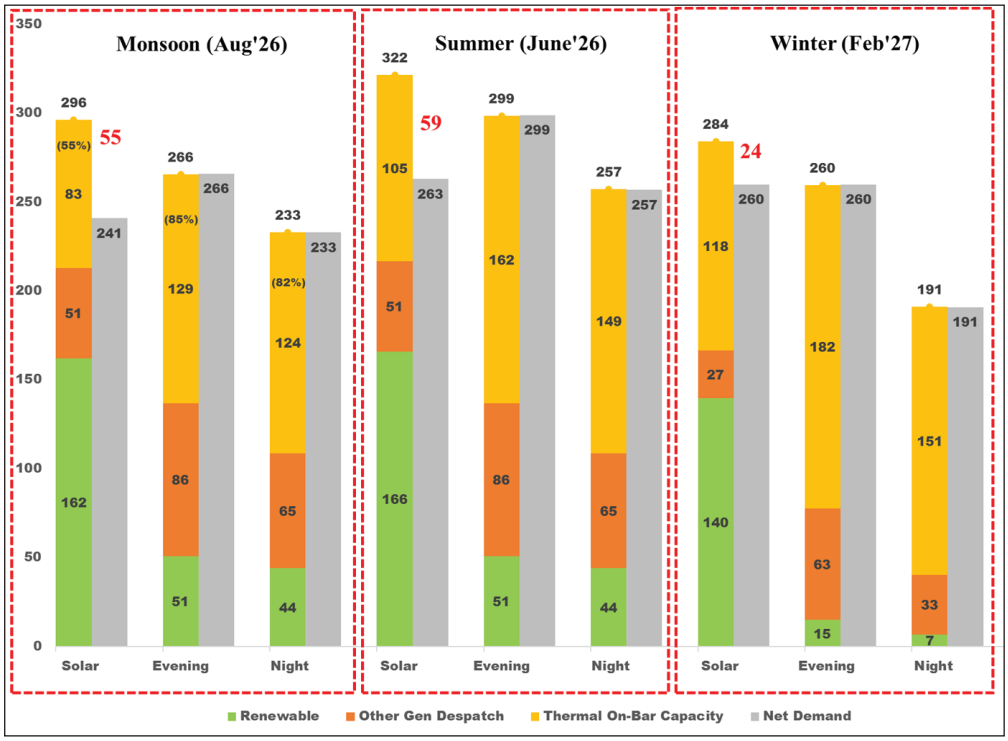
Evening peak scenario of each month was setup first as the number of thermal units required on bar shall be maximum. Total thermal generation requirement for the evening peak scenario was apportioned between State and Central sector thermal generations as per their installed capacity in each region. Further, state thermal generation requirement was divided among the states as per their maximum demand in respective month of 2019-20. After obtaining state thermal generation requirement, thermal units were dispatched at technical maximum (85%) in merit order for each state.

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

While preparing the present LGB for Solar max scenario, some plants were switched off to balance the load generation while running all the on-bar thermal plants at technical minimum of 55%. Accordingly, thermal plants with higher cost (on merit order basis) were switched off region wise progressively till the LGB is balanced.

It is observed that in the Solar max scenario there is 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 (55%) 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 surplus generation in terms of GW dispatches is given in Figure 3-6 below.

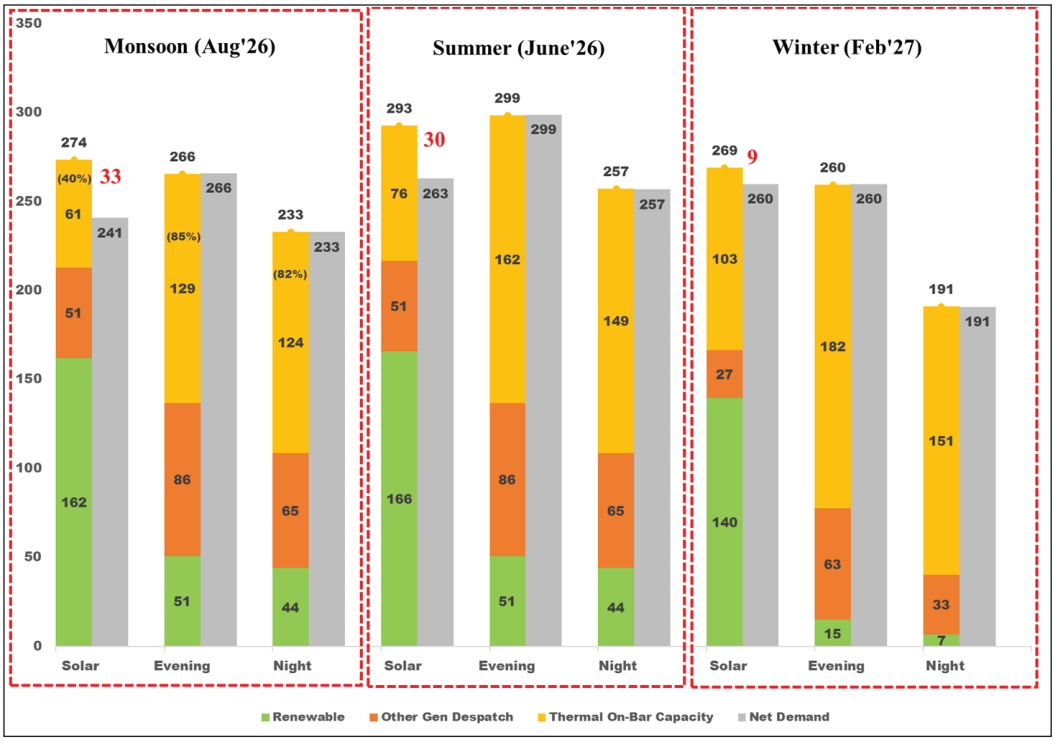
Figure 3-6:Generation surplus with Tech Min (55%) for Thermal Units



It may be observed that surplus generation of 55 GW, 59 GW, and 24 GW during Solar max in Monsoon, Summer, and Winter season respectively is available which needs to be stored using energy storage and consumed in other hours of the same day.

A sensitivity analysis is done to check the quantum of surplus generation, if thermal units are backed down to 40% of their capacity and the corresponding results are given in Figure 3-7 below:

Figure 3-7:Generation surplus with Tech Min (40%) for Thermal Units



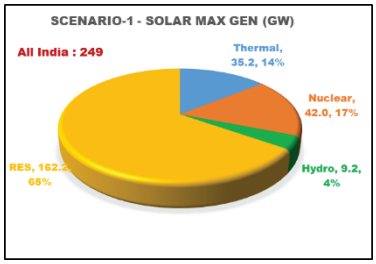
Even after backing down thermal units to 40%, surplus generation of the order of 33 GW, 30 GW and 9 GW are observed during Solar max in Monsoon, Summer and winter seasons respectively. Thus, energy storage system of about 33 GW capacity may be required to be installed in the grid to facilitate integration of about 225 GW of RE. In case, energy storage system not installed adequately and if the number of on bar thermal units are to be kept same throughout the day during 2026-27, then thermal unit may need to be backed down to 19% to 20% during Solar max scenario in Monsoon and Summer respectively, which may not be practically feasible.

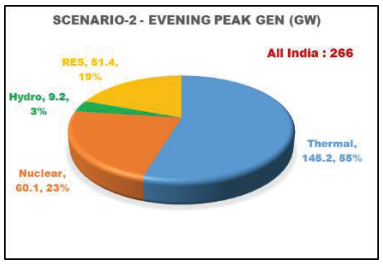
Based on above philosophy, LGB prepared for different scenarios are depicted in Figure 3-8, Figure 3-9, Figure 3-10 and details about the same are attached at Annex 2.2.

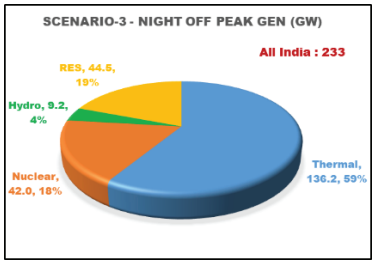
Out of these nine scenarios, Scenario-5(June'26 evening peak) and Scenario-9 (Feb'27 Night off peak) corresponds to two extreme cases with respect to demand i.e., highest demand (299 GW) and lowest demand (191 GW) scenarios respectively. In all other scenarios, all India demand is varying between these 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

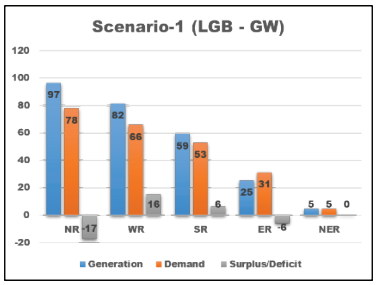
Monsoon Aug'2026

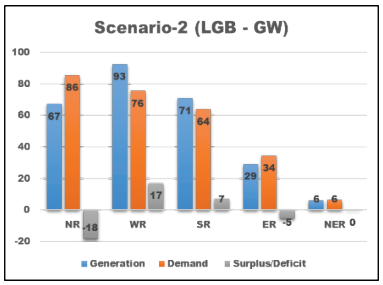
Figure 3-8:LGB for Monsoon Aug'2026

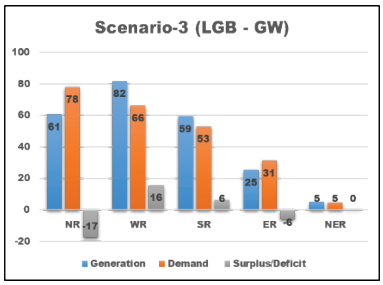






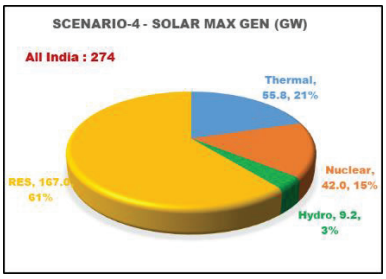


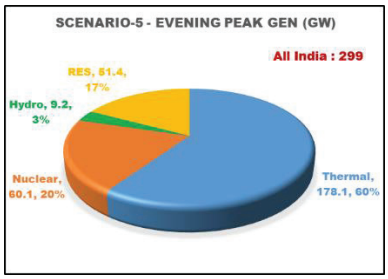


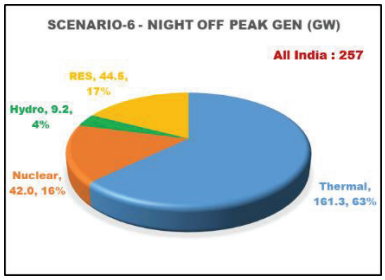


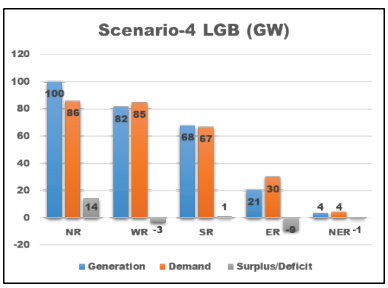
Summer June'2026

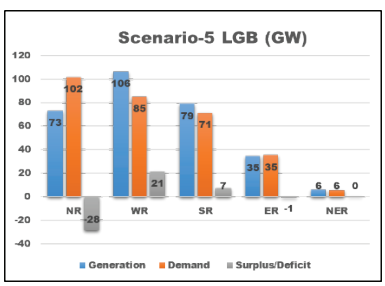
Figure 3-9: LGB for Summer June'2026

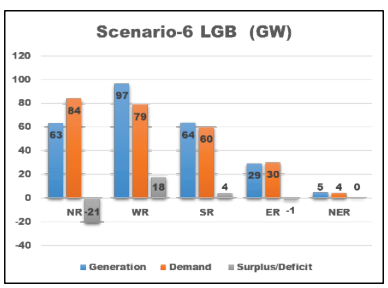












Winter Feb'2027

Figure 3-10:LGB for Winter Feb'2027

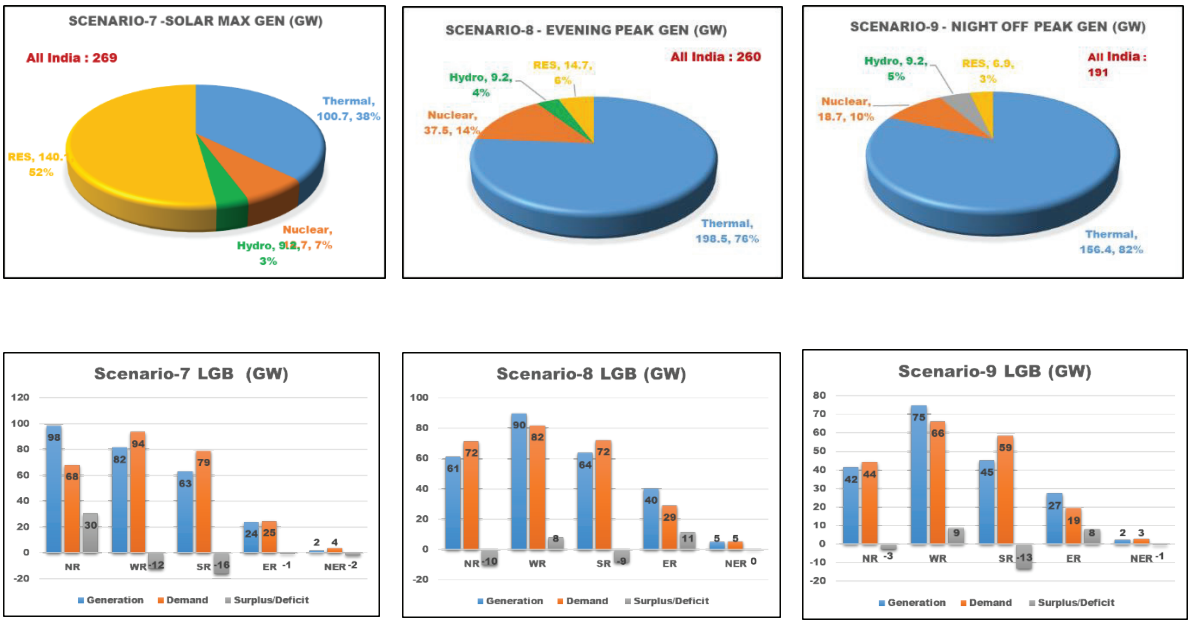


Table 3-1:Regional Surplus/Deficit summary in MW

Surplus (+) / Deficit (-)	Aug'26 (Monsoon)			Jun'26 (Summer)			Feb'27 (Winter)		
Scenario No. / Region	1	2	3	4	5	6	7	8	9
	Solar Max	Peak Load	Off Peak	Solar Max	Peak Load	Off Peak	Solar Max	Peak Load	Off Peak
NR	17317	-18302	-17347	14106	**-28391**	-20707	**30445**	-10390	-2738
WR	-2053	17079	15612	-3278	**21428**	17606	**-12060**	7989	8598
SR	-1263	6922	6477	1228	**7441**	3700	**-16002**	-8521	-13337
ER	-12370	-5354	-5948	-9270	-824	-1034	-746	**11383**	8040
NER	-1020	-346	91	-668	345	**434**	**-1827**	-461	-563

From the above table it may be inferred that :

- NR is importing as well as exporting power in different scenarios. Export of power is taking place in solar max scenarios due to high solar generation in NR, whereas maximum import of power is happening in Summer (June) evening peak load scenario.
- WR generally exports the power with a maximum export of 21 GW in Summer (June) evening peak scenario. Due to low availability of RE during Winter (Feb), WR becomes deficit to the tune of 12 GW.
- SR is importing as well as exporting power under various scenarios. Maximum export of power is 7 GW in Monsoon (August) evening peak scenario due to high wind generation in monsoon season, whereas maximum import of the order of 16 GW is taking place in the Winter (February) Solar max case due to very low wind generation at that time.
- ER is mostly importing power in high renewable generation scenarios due to RE RPO requirements of ER which it shall not be able to meet from its own regional RE and it has to import power from neighbouring regions. ER is exporting power during Monsoon (February) evening and night off peak scenarios due to absence of Solar as well as low Wind generation in other regions.
- NER also imports as well as exports power in different scenarios. Mostly export of power shall take place

in the Monsoon (August) and Summer (June) months due to high hydro generation during these seasons, whereas it shall import in Winter (February) scenario due to low hydro and RE RPO obligation.

Considering the above LGB for nine scenarios, load flow cases were prepared for detailed studies incorporating assessment of adequacy of Inter State Transmission System including inter-regional corridors planned to cater the power transfer requirement across the region in 2026-27 timeframe. Study results of the same have been discussed in subsequent sections.

3.2 Study Results and Analysis

Based on the load-generation scenarios for different regions, various studies have been carried out in PSSE. Transmission system planned and under implementation for various loads/generations scheduled to be commissioned for timeframe 2026-27 are also considered for conducting these studies. Based on the studies performed, results of the study are analysed and deliberated below-

3.2.1 Load Flow Studies

a) Inter-Regional Flows

Inter-regional flows between various regions, based on simulation studies for 2026-27 timeframe are summarised below in Table 3-2 for all the nine scenarios. Maximum and minimum flow between each inter-regional corridor are also highlighted in Table 3-2.

Table 3-2:IR flow summary in MW

IR Flows	Aug'26			Jun'26			Feb'27		
Scenario No. / Corridor	1	2	3	4	5	6	7	8	9
	Solar Max	Peak Load	Off Peak	Solar Max	Peak Load	Off Peak	Solar Max	Peak Load	Off Peak
WR-NR	-4993	18628	16980	-4505	**24235**	17642	**-19915**	4007	662
ER-NR	**-8876**	-949	-645	-5268	3114	1995	-5592	**5412**	1697
ER-WR	-4628	-4650	**-6229**	-4034	-5639	-5404	-417	**2354**	2116
ER-SR	3183	2692	**2537**	3379	2815	3386	**5007**	4107	4546
WR-SR	-1505	-8250	-8556	-3391	**-9851**	-6546	8466	4759	**8730**
NER-ER	272	-996	-501	**574**	-219	-148	-498	-1073	**-1164**

From the table it can be seen that -

- Power on WR-NR corridor is flowing in both directions in different scenarios. Maximum power of the order of 24 GW is flowing from WR to NR in June evening peak scenario whereas maximum power flow of the order of 20 GW is flowing from NR to WR in February solar max scenario.
- Power on ER-NR corridor is flowing from NR to ER in solar max scenarios with maximum power of about 9 GW in August.
- Power on ER-WR corridor is flowing in both the directions i.e. ER to WR and WR to ER with maximum flow of 6.2 GW and 2.3 GW respectively.
- Power on ER-SR corridor is always flowing towards SR in all the scenarios with maximum flow of 5 GW and minimum flow of 2.5 GW.
- Power on WR-SR is flowing towards WR in Monsoon and summer season with a maximum flow of 10 GW whereas in winter season power is flowing towards SR with maximum flow of 8.7 GW.

Each inter-regional corridor comprises of multiple HVDC, 765 kV, 400 kV, 220 kV transmission lines. Loading on these tie lines for all nine scenarios along with their design limit are tabulated in Annex-2.3. Power flow exceeding the thermal design limit are highlighted in yellow in the said annexure. While analysing the annexure, it is observed that the most of the tie lines between the regions are loaded well within their design limit.

b) Transmission Line Flows

All the ISTS and Intra-state 765 kV and 400 kV lines were monitored for any possible overloading in the base case prepared for nine scenarios. There are about 318 nos. of 765 kV lines and about 2281 nos. of 400 kV lines. Line flow pattern of these lines in all scenarios are tabulated at Annex-2.4 and flows exceeding the 70% of thermal limit are highlighted. Summary of the results is shown below in Figure 3-11 & Figure 3-12:

Figure 3-11:765kV Tr. line flow > 70% of thermal limit under base case

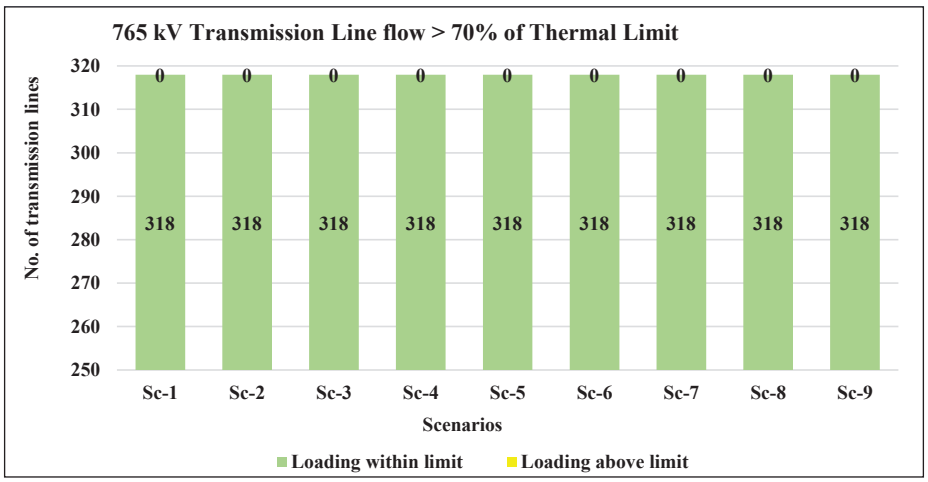
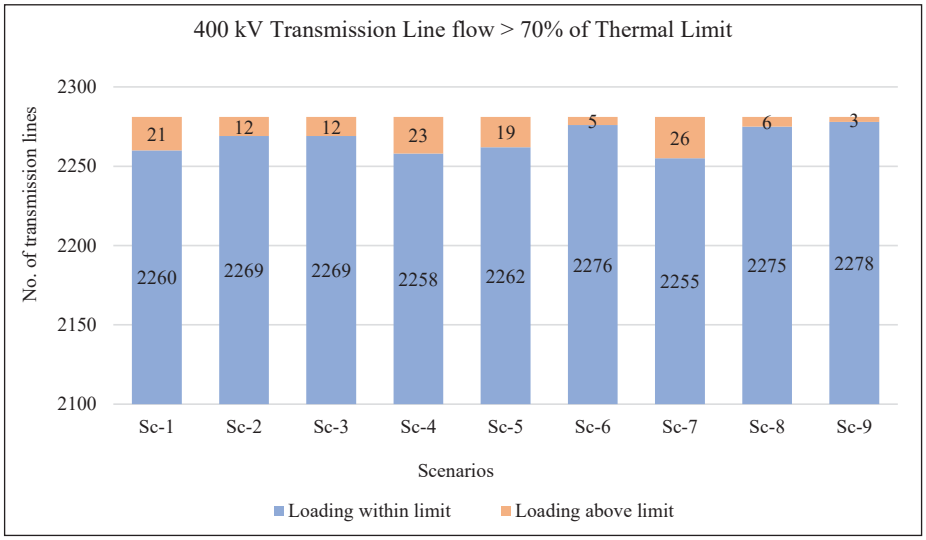
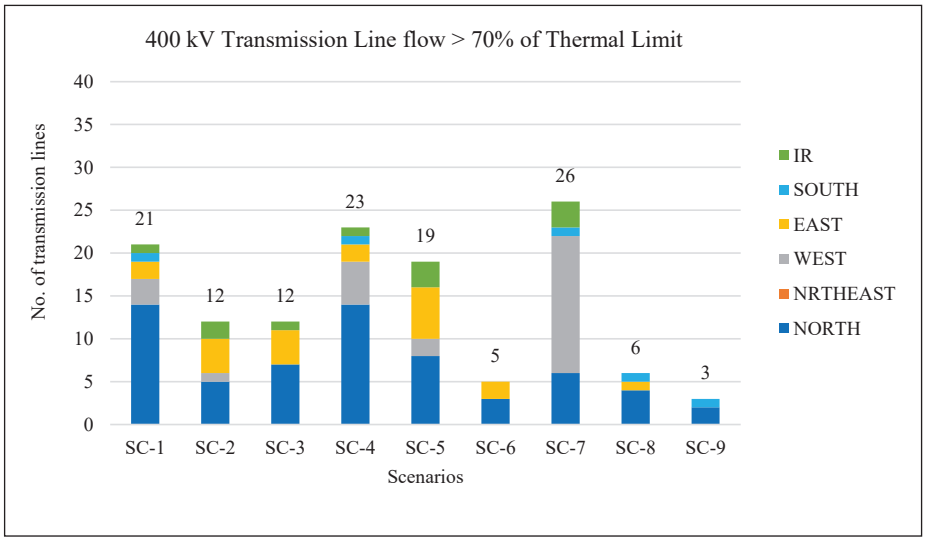


Figure 3-12:400kV Tr. line flow > 70% of thermal limit under base case



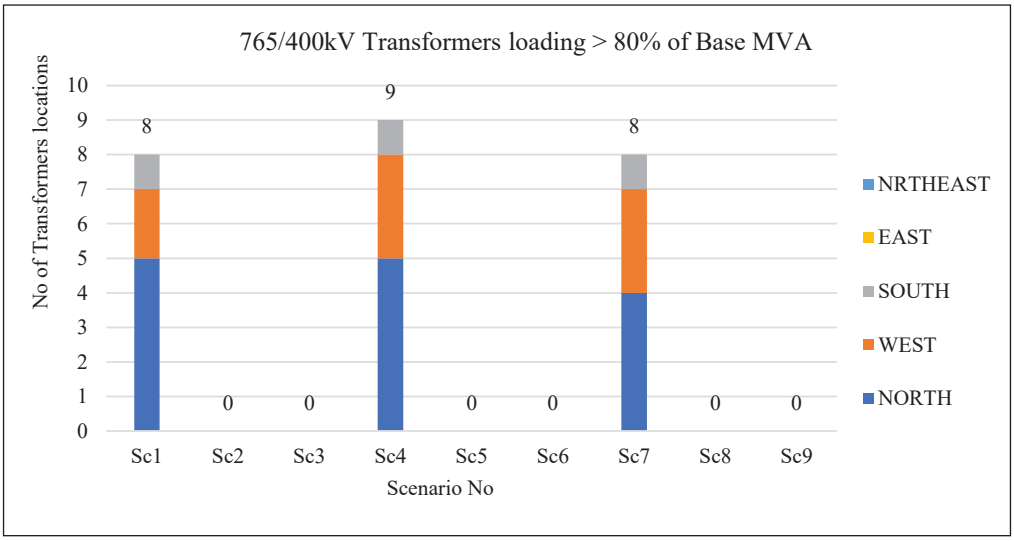


Power flow on all 765kV lines is below 70% of thermal limit in base case itself. About 21, 23 and 26 nos. of 400 kV lines in Scenarios-1, 4, and 7 (Solar max scenarios) respectively are loaded above 70% of the thermal limit. However, to understand the criticality of this loading, detailed contingency studies have been carried out, which are discussed in subsequent sections.

c) Transformer Loadings

In the time frame under study, there would be about 294 nos. of 765/400 kV transformer at 119 nos. of 765/400 kV substations. Loading patterns of these transformers obtained from simulation studies are tabulated in Annex 2.5 and loading more than 80% of their rating in any scenarios are also highlighted. Number of substations, where loading is more than 80% of rating in all scenarios are depicted in Figure 3-13 & Figure 3-14.

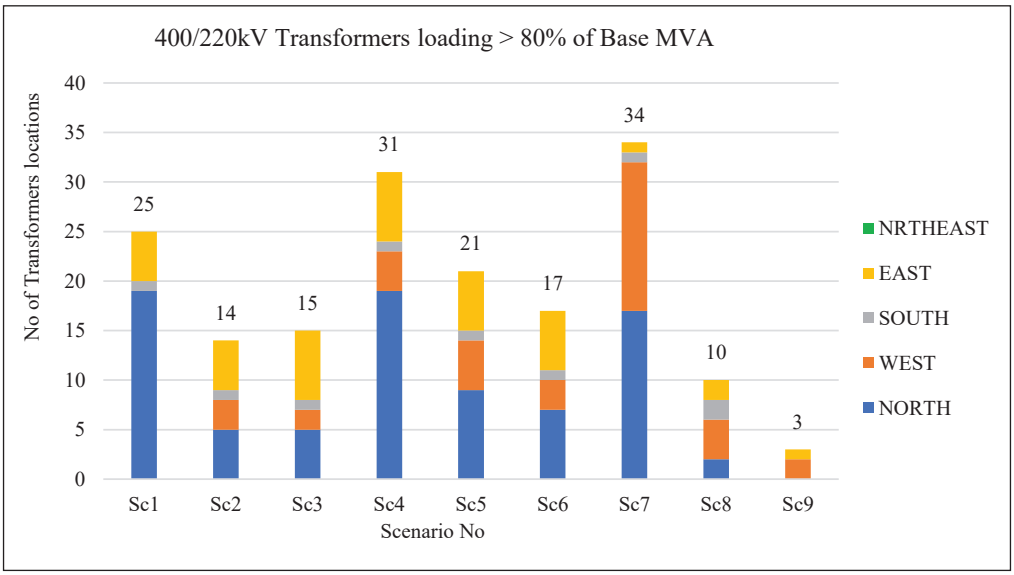
Figure 3-13:765/400kV ICT Loading under base case



Maximum number of substation where loading is above 80% of MVA rating are corresponding to solar max scenarios. These substations are located in northern, western and southern region due to non-availability of transformers under N-1 contingency at RE pooling stations.

Similar analysis was carried out for 400/220 kV transformers. There are 1401 nos. of transformers located at about 549 nos. of 400/220 kV stations.

Figure 3-14:400/220kV ICT loading under Base Case



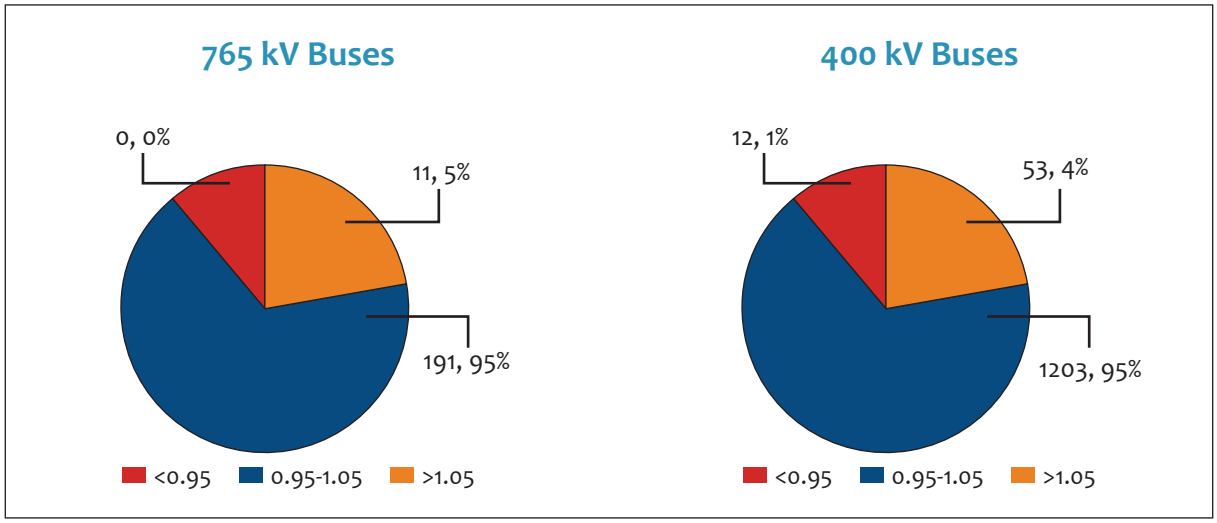
Under solar max scenarios viz. Scenarios 1, 4 and 7 about 25, 31 and 34 substations located in different region, where ICTs are getting loaded above 80% of MVA rating. The need for augmentation would depend upon the number of transformers, parallel paths availability etc. Hence simulation with contingencies is discussed in subsequent sections.

d) Voltage Profile Analysis

With injection of high amount of RE into the Indian Grid, it is expected that in the same day power flow on a line would reverse. Transmission lines associated with thermal and hydro would be lightly loaded in solar max scenarios. Though adequate reactive compensation is planned in the form of switchable line reactors, bus reactors, STATCOMs, SVCs at the time of inception of transmission projects. Impact of various shunt devices on voltages of all buses in all the scenarios are observed and analysed.

PU voltages of all 765 kV and 400 kV buses were observed in all the nine scenarios. Maximum and minimum voltage of each bus was identified from nine voltages available in nine scenarios. For voltage variation beyond ±0.05 pu from nominal voltage was considered as voltage violation. Maximum and minimum voltage of buses is considered to calculate the number of buses having voltage beyond 1 pu and voltage below 1 pu respectively. Results of the analysis is plotted below in Figure 3-15.

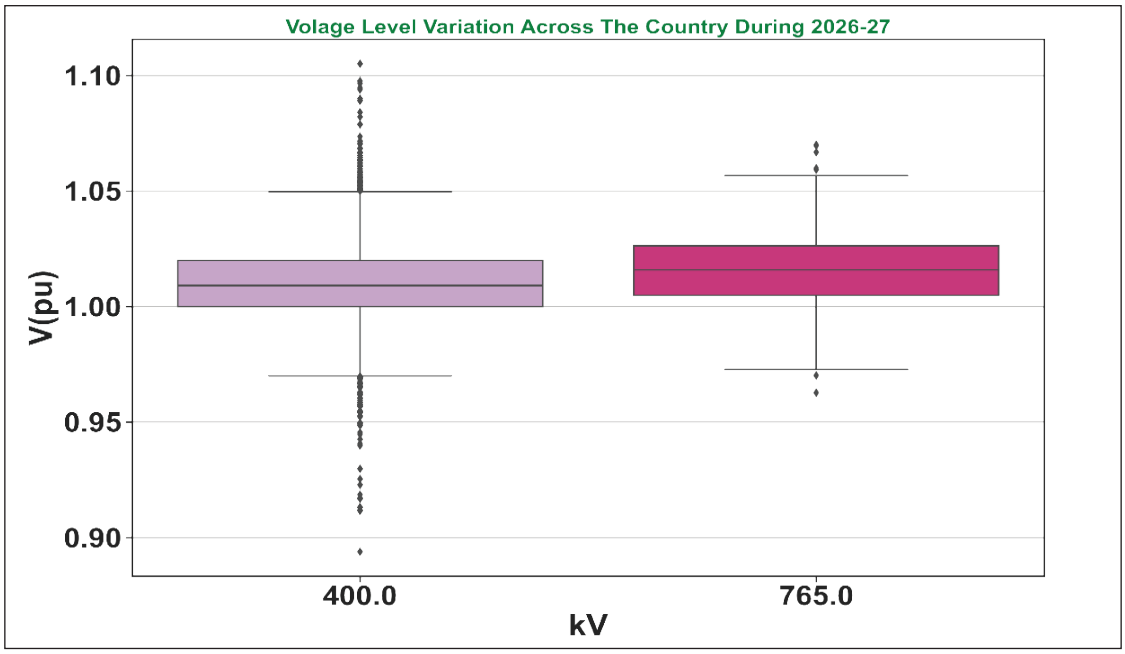
Figure 3-15: Pie-chart showing number of 765 KV & 400 KV buses beyond & below 1 pu



From the above voltage plots it can be seen that around 95% of the buses at 765 kV level as well as at 400 kV level voltage are found to be in the range of 0.95 to 1.05 pu in All India Base case scenarios. There are around 11 nodes of 765 kV voltage and 53 Nodes at 400 kV voltage are having voltage beyond 1.05 pu in any one of the scenarios. Similarly, around 12 nodes at 400 kV are facing low voltage in one of the scenarios.

In all India network simulation analysis for 2026-27 timeframe, 765kV and 400kV Bus voltage variations under nine scenarios is presented in the Figure 3-16, wherein it is observed that the median of the 400kV and 765 kV bus voltage are 1.009 pu and 1.0158 pu respectively. 50% of the bus voltages under various scenarios lies between 1.00-1.01 pu for 400 kV buses and 1.00-1.015 for 765 kV buses. Highest voltage observed in any scenario at 400kV & 765 kV are 1.105 & 1.07 pu respectively and minimum voltage for observed in any scenario at 400kV & 765 kV are 0.894 & 0.963 pu respectively.

Figure 3-16: Voltage level variation across the country during 2026-27



Region wise Bus voltage variation in all nine scenarios is plotted in Figure 3-17, except North East region all other Regions i.e., Northern, Western, Southern and Eastern are experiencing over and under voltage at some of the 400kV buses. However, at 765kV Buses, only over voltages is observed in West, South and North.

Figure 3-17: Region-wise voltage level variation profile during 2026-27

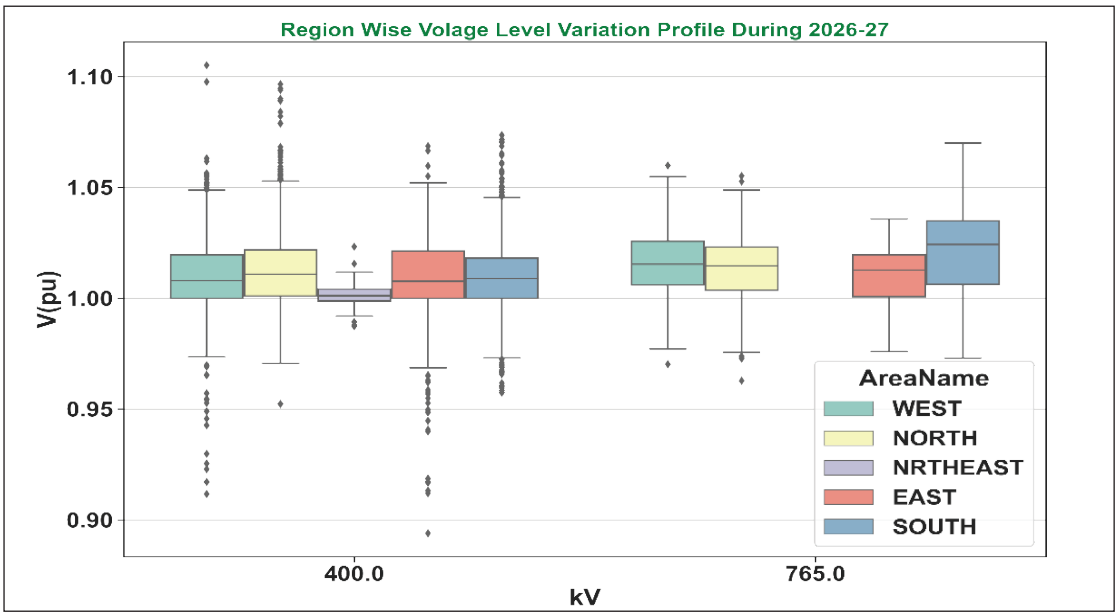
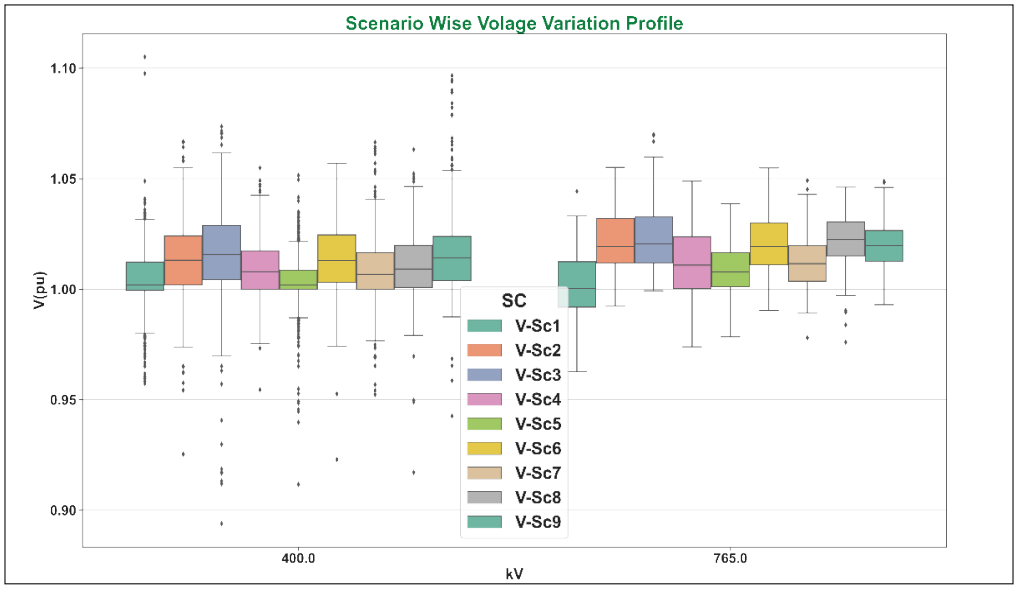


Figure 3-18: Scenario wise voltage variation profile



Scenario wise voltage variation for 400kV and 765kV bus is shown in Figure 3-18, wherein it is observed that voltage variation is relatively higher at 400 kV level. Further at 400 kV level maximum voltage is observed during winter night off peak scenario and at 765 kV level maximum voltage is observed during Monsoon night off peak scenario.

Details of the buses exceeding the voltage 1.05 pu and buses having voltage below the 0.95 pu in any of the scenario are enclosed at Annex 2.6. For buses experiencing low voltages, measures like switching of switchable line reactors, increasing operating voltage of nearby generators may be taken.

3.2.2 Contingency Analysis

Contingency analysis has been carried out on all the 765 kV & 400kV transmission lines, and 765/400 kV & 400/220 kV transformers to ascertain the loading levels under outage of any other 765 kV or 400 kV transmission element. Results of the analysis are discussed below:

a) Transmission Line

765kV line loadings beyond 3000 MW under N-1 was assessed first. Thereafter, to carry out a sensitivity analysis, number of lines loaded beyond 3200 MW and 3500 MW under N-1 contingency were also identified. The list of such lines is at Annex 2.7 and the same has been summarised below in Figure 3-19 Figure 3-20 & Figure 3-21.

Figure 3-19: 765kV Tr. line loadings>3000MW under N-1 Contingency

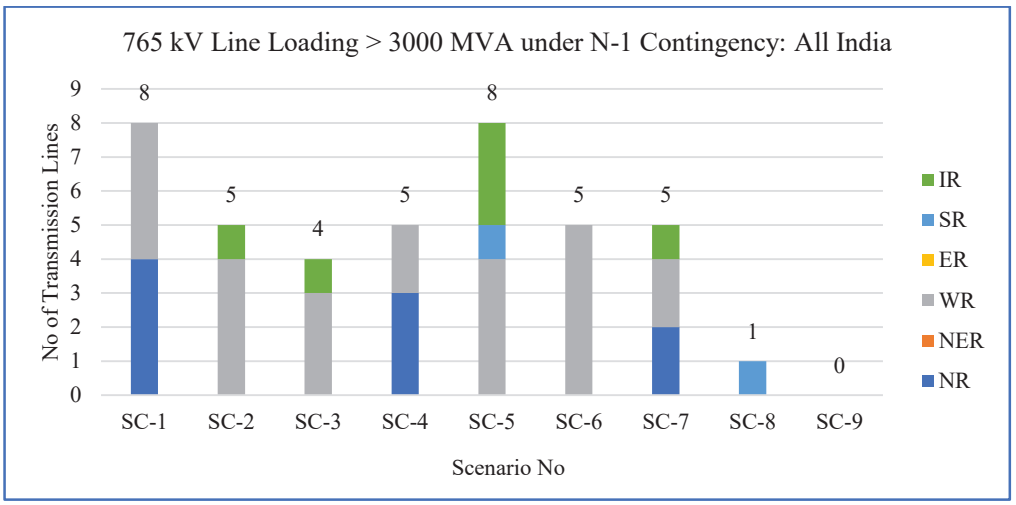


Figure 3-20:765kV line loading>3200 MW under N-1 Contingency

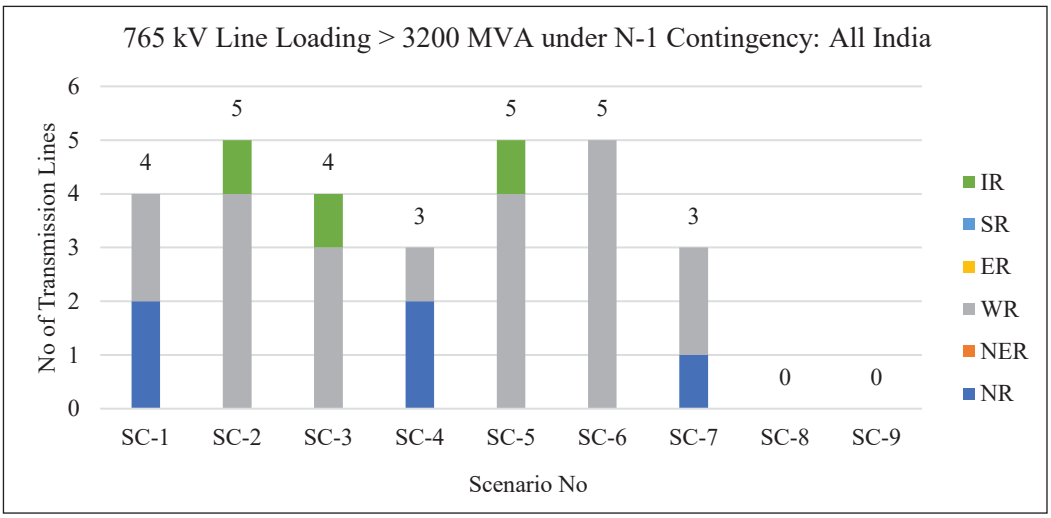
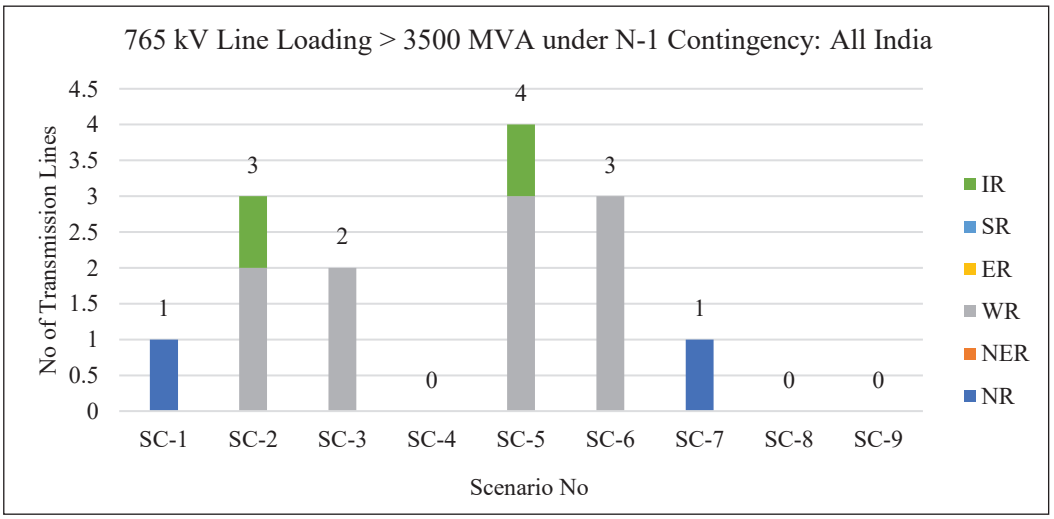


Figure 3-21:765kV line loading>3500 MW under N-1 Contingency



The most critical 765 kV lines are Champa-Kotra, Tamnar-Dharamjaygarh, Sasan-Vindhyachal Pool. Maximum loadings occurs during evening and night off peak scenarios. Detailed studies regarding the reason for the overloading and probable mitigation measures are discussed in respective regional chapters.

Further, for 400kV transmission lines, loading greater than 90% and 100% of thermal limit under N-1 Contingency has been assessed and the results are tabulated at Annex 2.7. The results are summarised below in Figure 3-22 & Figure 3-23.

Figure 3-22:400kV line loading>90% of thermal limit under N-1 Contingency

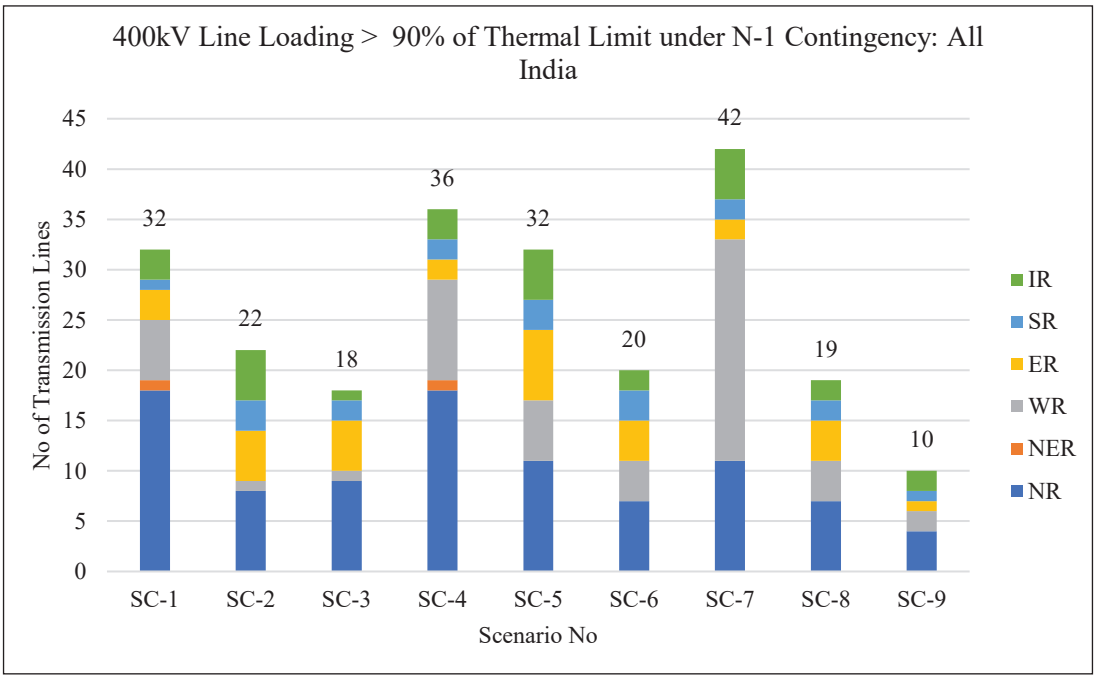
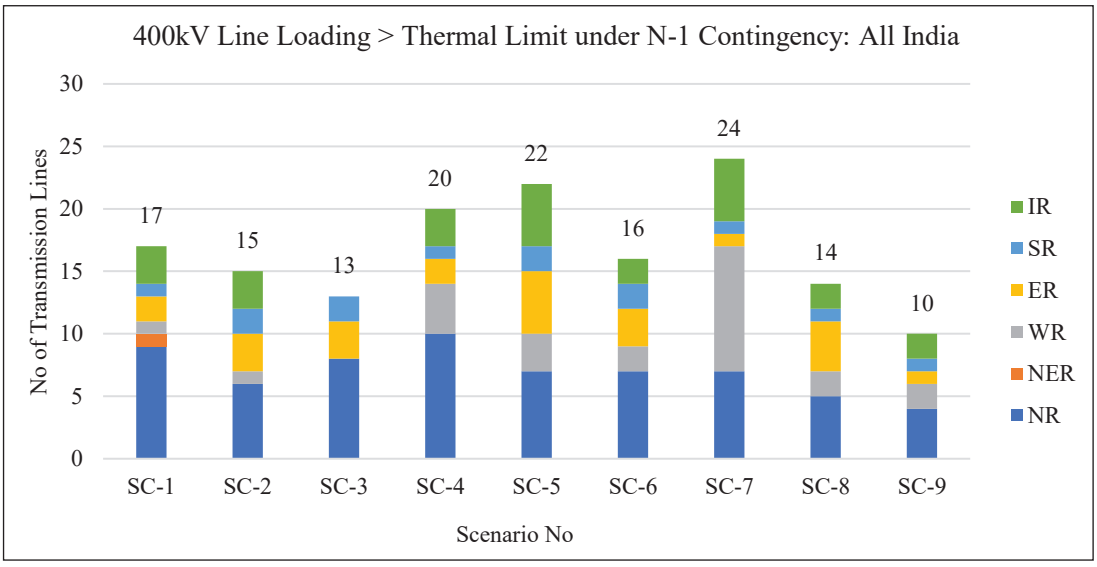


Figure 3-23:400kV line loading>thermal limit under N-1 Contingency



Max no. of 400kV lines on which loadings exceeds 90% and 100% of thermal limit are 42 and 24 respectively in Solar max scenarios i.e. Scenario-7. Further, detailed analysis and studies are being carried to plan additional systems, if any.

b) Transformers

Number of substations where ICTs shall get loaded above 90% and 100% of MVA rating under N-1 contingency are depicted below in Figure 3-24 & Figure 3-25 for 765/400 KV ICT and Figure 3-26 & Figure 3-27 for 400/220 KV ICT . Detailed results are attached at Annex 2.8.

Figure 3-24:765/400kV ICT loading≥90% of MVA rating under N-1 Contingency

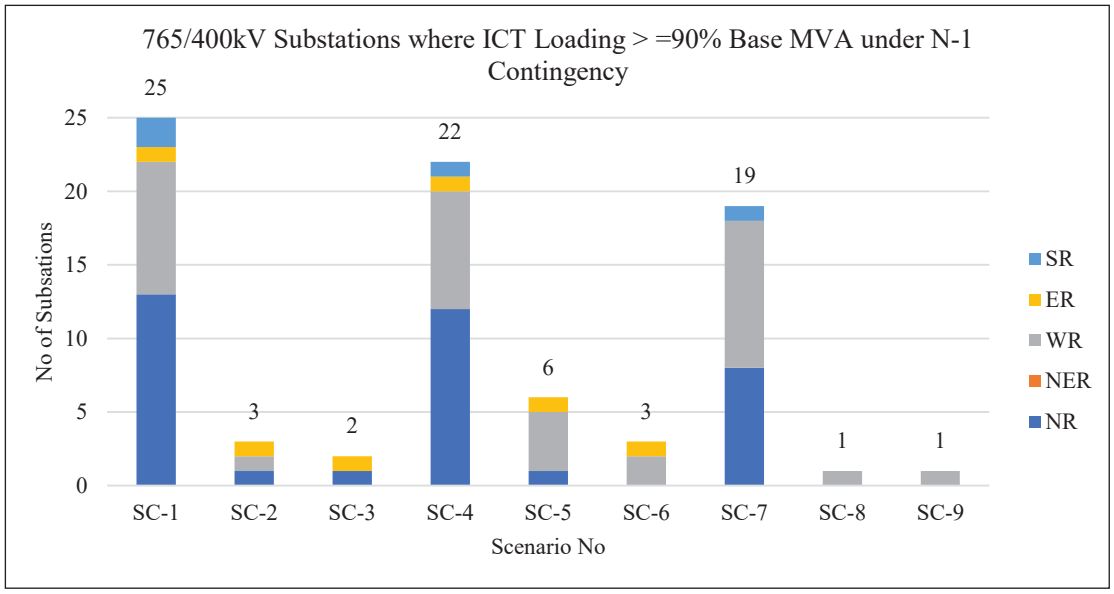
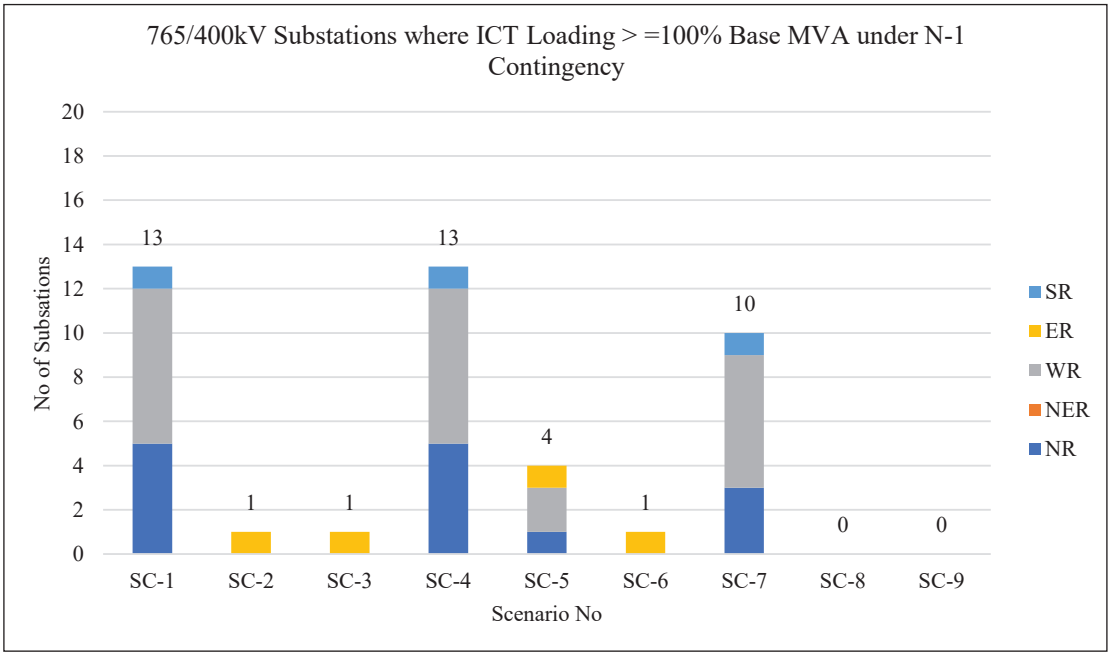


Figure 3-25:765/400kV ICT loading≥100% of MVA rating under N-1 Contingency



Maximum number of transformers exceeding the loading greater than MVA rating under N-1 contingency in each of the seasons are corresponding to Solar max scenarios viz. Scenarios-1, 4 and 7. Majority of these substations are RE pooling stations where ICTs have been planned considering N-0, as per Manual on Transmission Planning Criteria. The 13 locations corresponding to Scenario-4 where ICT loading violations have been observed are Bhiwani (PG), Khavda-I, II & III, Padghe(GIS), Navsari(New), Pune(PG), Kurnool, Bhadla-3, Fatehgarh-II, Bhiwani(SR). Thus, detailed studies are being carried out to plan for remedial measures.

Figure 3-26:400/220kV ICT loadings≥ 90% of MVA rating under N-1 Contingency

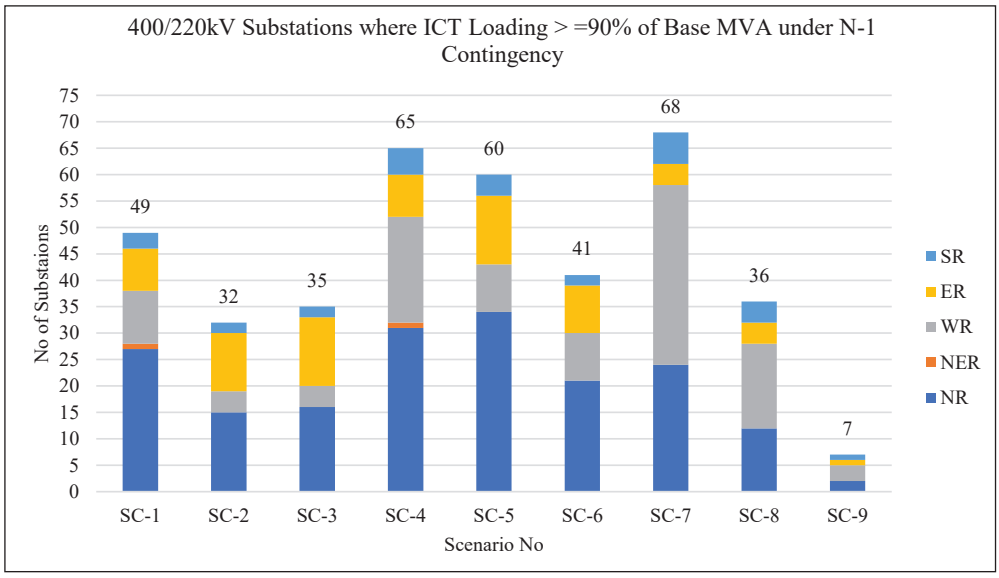
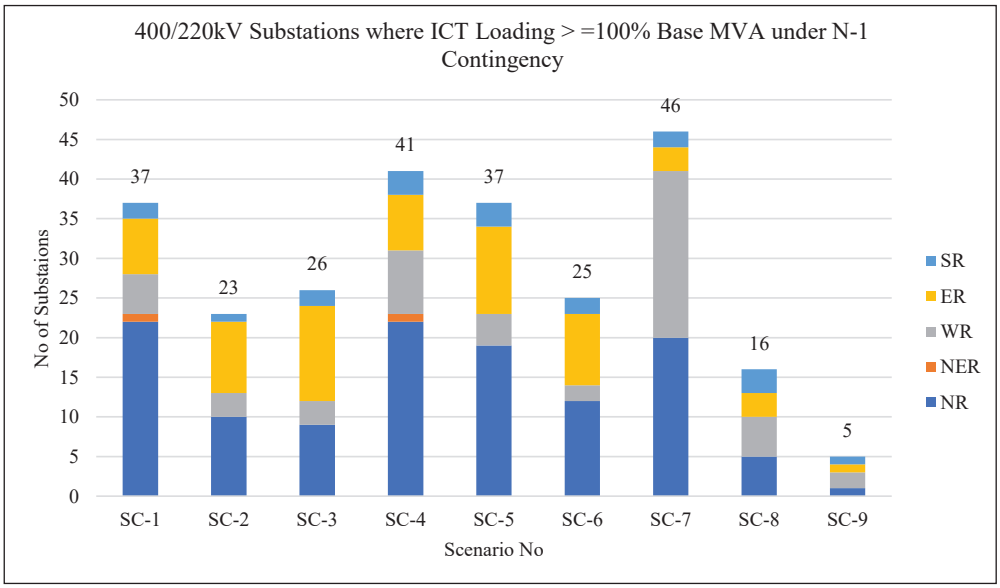


Figure 3-27:400/220kV ICT loadings≥ 100% of MVA rating under N-1 Contingency

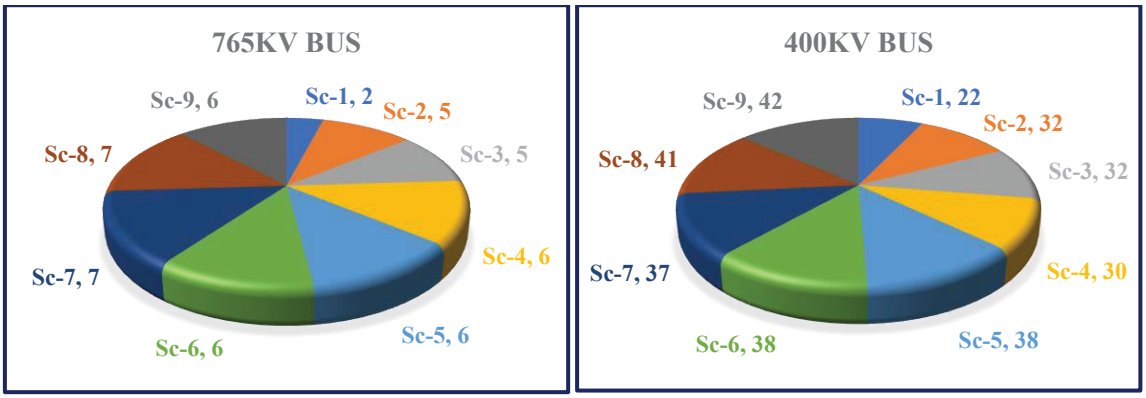


Maximum number of transformers exceeding the loading greater than MVA rating under N-1 contingency in each of the seasons are corresponding to Solar max scenarios viz. Scenarios-1, 4 and 7. Majority of these substations are RE pooling stations where ICTs have been planned considering N-0, as per Manual on Transmission Planning Criteria. Thus, some 46 no. of substations requires ICT augmentation, which are being studied in detail in respective regional chapters.

3.2.3 Short Circuit Analysis

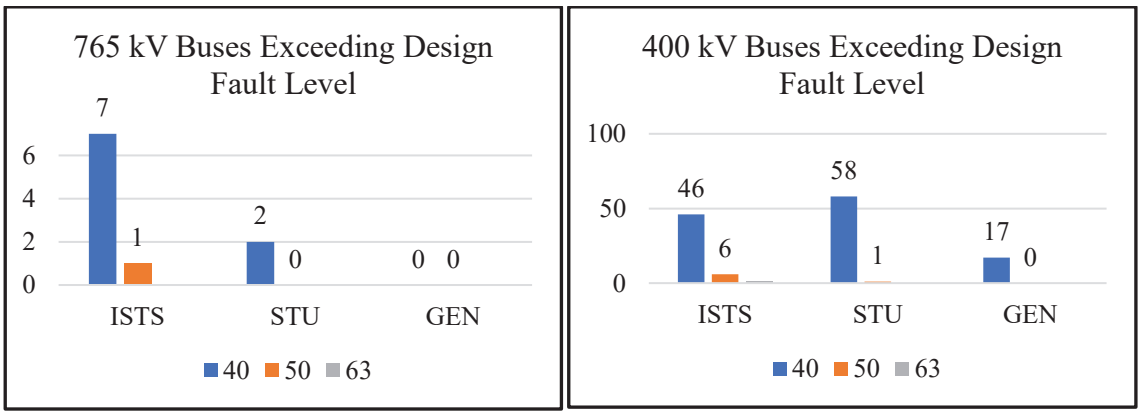
Short circuit level was calculated for all 765 and 400 kV buses on pan India basis. After finding the fault level for all buses exceeding the design fault level under any scenario were identified. Figure shows the number of 765 kV and 400 kV buses exceeding the design fault current under different scenarios. About 5 and 100 no. of 765 and 400 kV buses respectively were observed to be crossing the design fault current limit in Scenario-8 and Scenario-7 respectively. Details about the buses exceeding design fault current limit are attached at Annex 2.9 under various scenarios.

Figure 3-28: Pie-chart showing short circuit level 765 and 400 kV buses on pan India basis



From the above charts it can be seen that number of fault level violations are highest in February scenario i.e. scenario-7,8, and 9. While identifying the reason for the same it is noticed that number of thermal machines on bar are maximum in February scenario. Hence fault contribution from these machines shall be maximum under these scenarios. Accordingly, scenario-8 of February is chosen to identify the number of violation taking place at ISTS/STU/Gen buses and same is represented below-

Figure 3-29: Violation of fault level in Sc-8 at ISTS/STU/Gen buses at 765 kV & 400 kV levels



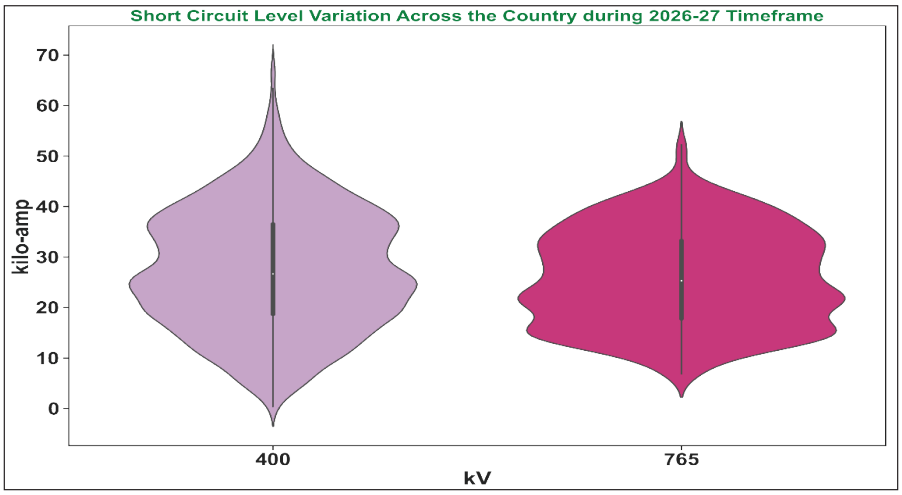
Further to understand the criticality of the case, maximum fault violation at buses are tabulated below in Table 3-3-

Table 3-3: Maximum violation of fault level at ISTS/STU/GEN buses

■ **765 kV ISTS** ■ Bilaspur WR (40kA): 44kA ■ Jabalpur Pool (50kA): 52kA	■ **400 kV ISTS** ■ Merrut(40kA): 64kA ■ Padghe(50kA): 60kA
■ **765 kV STU** ■ Jaipur (40kA): 41kA	■ **400 kV STU** ■ Kudus(40kA): 62KA ■ Maheshwaram-TS(50kA): 68kA

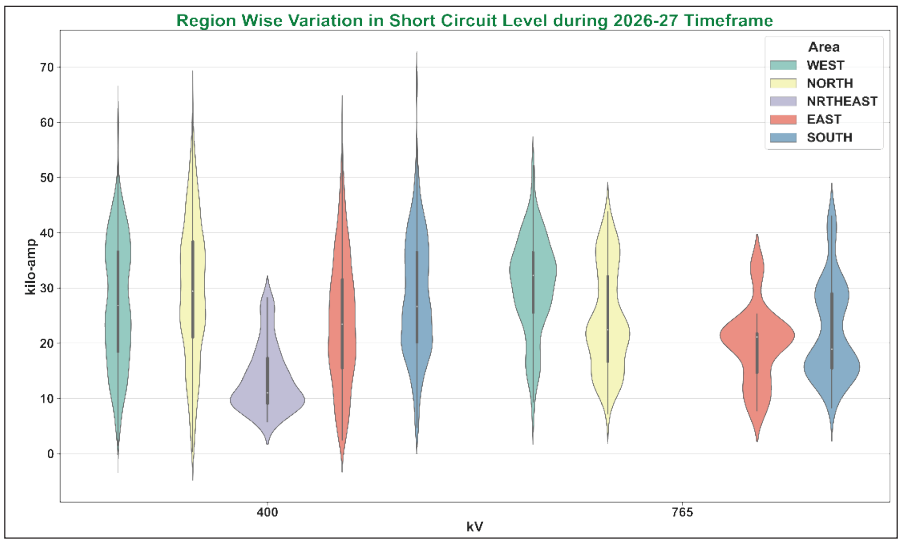
In all India network simulation analysis for 2026-27 timeframe, 765kV and 400kV buses short circuit levels under nine scenarios are presented in the violin plot at Figure 3-30. From the plot it can be observed that most of the 400 kV and 765 kV buses have short circuit level upto 35 kA and 30 kA respectively. The maximum short circuit level observed at 400 kV and 765 kV level is of the order of 68 kA and 52 kA respectively. Width of the violin plot indicate that short circuit levels of most of the 400 kV buses lie between 20 to 40 kA and 765 kV level lie between 15 to 25 kA.

Figure 3-30: Short circuit level variation across the country during 2026-27 timeframe



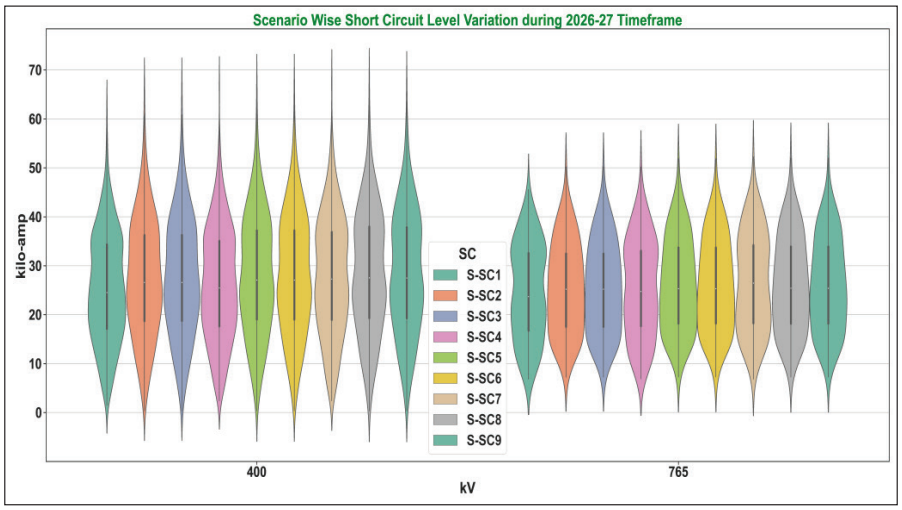
Region wise short circuit level in all nine scenarios is plotted in Figure 3-31. Maximum Short Circuit level observed at 400 kV and 765 kV bus lies in southern and western region respectively.

Figure 3-31: Region wise variation in short circuit level during 2026-27 timeframe



Scenario wise short circuit level for 400kV and 765kV bus is shown in Figure 3-32, wherein it is observed that under solar max scenario relatively lower short circuit level is observed..

Figure 3-32: Scenario wise short circuit level variation during 2026-27 timeframe



3.3 ISTS Expansion plan upto 2026-27

3.3.1 Summary of ISTS network

Region wise and year wise ISTS network expansion plan across the country upto FY 2026-2027 is enclosed in Annex 2.10. Summary of ckm addition, MVA addition and the broad estimated cost are tabulated below in Table 3-4, Table 3-5 & Table 3-6 respectively.

Table 3-4: ckm addition

Sl. No.	FY	WR	SR	NR	ER	NER	Total
1	2022-23	2,962	2,134	3,673	478	762	**10,009**
2	2023-24	3,134	1,010	1,240	265	450	**6,099**
3	2024-25	1,840	1,520	5,765	-	230	**9,355**
4	2025-26	2,100	-	2,304	-	-	**4,404**
5	2026-27	-	-	2,028	-	-	**2,028**
	Total	**10,036**	**4,664**	**15,010**	**743**	**1,442**	**31,895**

Table 3-5: MVA addition

Sl. No.	FY	WR	SR	NR	ER	NER	Total
1	2022-23	18,500	8,000	22,450	315	100	**49,365**
2	2023-24	32,500	14,000	5,000	1,000	320	**52,820**
3	2024-25	12,000	28,500	42,475	-	1,720	**84,695**
4	2025-26	12,000	-	11,330	-	-	**23,330**
5	2026-27	-	-	6,630	-	-	**6,630**
	Total	**75,000**	**50,500**	**87,885**	**1,315**	**2,140**	**2,16,840**

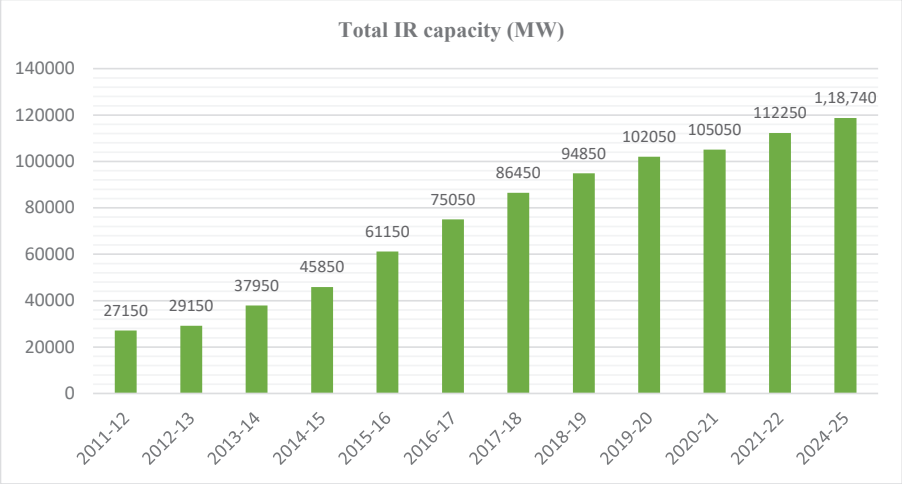
Table 3-6:Broad estimated cost (in ₹ Cr.)

Sl. No.	FY	WR	SR	NR	ER	NER	Total
1	2022-23	9,427	6,082	10,437	126	1,601	**27,673**
2	2023-24	9,703	4,014	4,200	760	402	**19,079**
3	2024-25	5,533	6,098	17,854	-	419	**29,904**
4	2025-26	6,043	-	14,482	-	-	**20,525**
5	2026-27	-	-	26,967	-	-	**26,967**
	Total	**30,706**	**16,194**	**73,940**	**886**	**2,422**	**1,24,148**

3.3.2 Inter-Regional (IR) Capacity

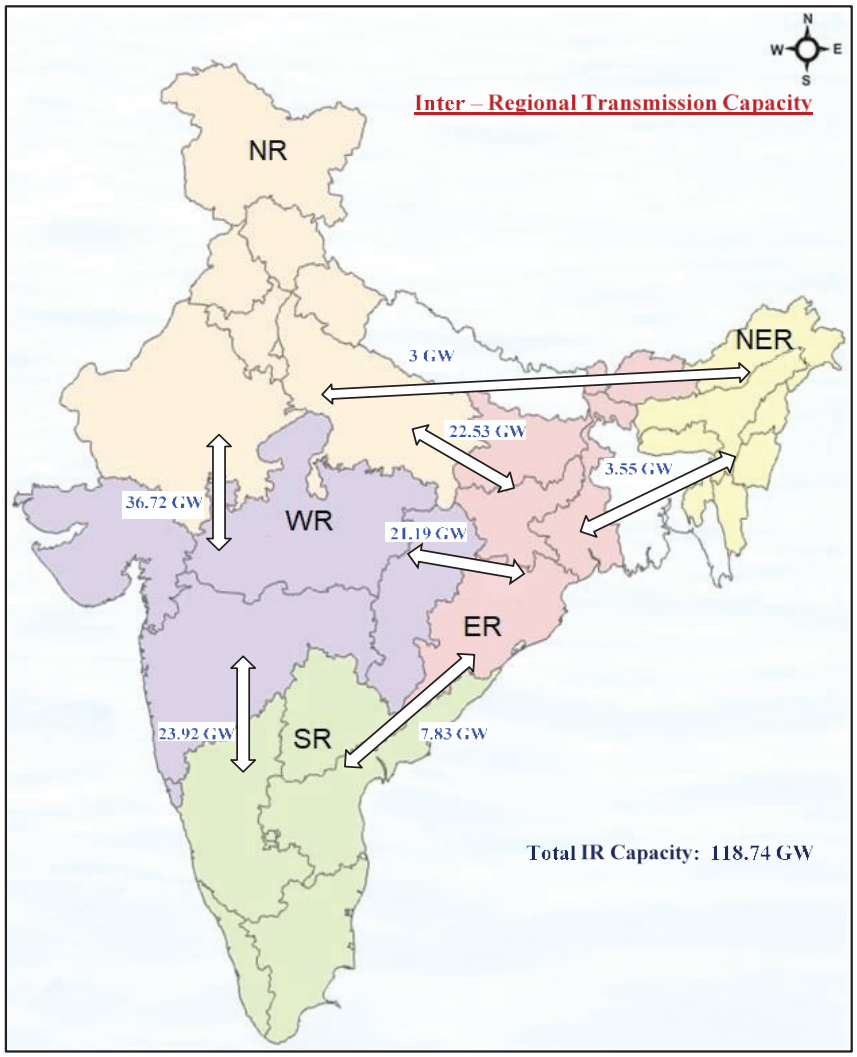
The progressive growth in Inter-Regional (IR) transmission capacity and till 2026-27 is given below in Table 3-4:

Figure 3-33: Growth in IR Capacity (MW)



Details of approved Inter Regional corridor capacity are attached at Annex 2.11 for 2026-27 and the schematic of the same is given below in Figure 3-34.

Figure 3-34: Inter-Regional Transmission Capacity in 2026-27



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 Present Power Supply Scenario

As on Jan'2022, total Installed Capacity of Northern Region is about 110.3 GW and the peak demand met is about 73.3 GW. The state-wise breakup of installed capacity and peak demand is summarised at Table- 4-1 below.

Table 4-1 Installed Capacity and Peak Demand of NR as on Jan'22

(All Fig in GW)

	Generation									Peak Demand
State / UTs / Sector	Thermal				Nuclear	Renewable			Grand Total	
	Coal	Lignite	Gas	Total		Hydro	RES	Total		
Chandigarh	0.04	0	0.02	0.06	0.01	0.10	0.05	0.16	0.22	0.43
Delhi	4.33	0	2.12	6.45	0.10	0.72	0.26	1.09	7.54	7.32
Haryana	8.64	0	0.69	9.32	0.10	2.32	1.09	3.51	12.83	12.12
Himachal Pradesh	0.15	0	0.06	0.21	0.03	3.07	1.03	4.13	4.34	2.03
Jammu & Kashmir	0.58	0	0.30	0.88	0.07	2.32	0.24	2.63	3.51	3.02
Punjab	8.52	0	0.41	8.94	0.20	3.81	1.77	5.77	14.71	13.56
Rajasthan	11.59	1.58	0.82	13.99	0.56	1.94	14.98	17.48	31.47	15.75
UP	20.41	0	0.55	20.96	0.29	3.42	4.45	8.17	29.13	24.97
Uttarakhand	0.49	0	0.52	1.01	0.03	1.98	0.91	2.91	3.93	2.47
Central unallocated	1.43	0	0.29	1.72	0.24	0.75	0	0.99	2.71	0
Total	**56.19**	**1.58**	**5.78**	**63.55**	**1.62**	**20.43**	**24.78**	**46.84**	**110.39**	**73.31**

Source: CEA monthly report

4.2 Envisaged Power Supply Scenario

As per the 19th EPS, Northern Region demand for 2026-27 timeframe is expected to increase to about 97GW. As per the inputs received from various stakeholders, total installed capacity of Northern Region for 2026-27 is expected to be about 165 GW. The state wise bifurcation of generation capacity and peak demand by 2026-27 is summarized below at Table 4-2

Table 4-2 Northern Region Installed Capacity and peak demand (2026-27)

(All Fig in GW)

State / UTs / Sector	Generation (GW)								Peak Demand (GW)
	Thermal	Hydro	Nuclear	Solar	Wind	Other RE	Gas	Total	
Chandigarh	-	-	-	-	-	-	-	-	0.59
Delhi	0.51	-	-	-	-	-	1.46	1.97	8.75
Haryana	3.62	0.06	-	0.91	-	-	-	4.60	16.45
Himachal Pradesh	-	0.31	-	-	-	-	-	0.31	2.33
Jammu & Kashmir	-	1.22	-	-	-	-	0.18	1.40	4.48
Punjab	4.84	1.37	-	1.60	-	-	-	7.81	18.81
Rajasthan	10.01	0.55	-	10.31	6.40	-	0.18	27.45	20.13
UP	22.32	1.30	-	4.19	-	-	-	27.80	31.06
Uttarakhand	-	2.16	-	-	-	-	-	2.16	4.54
Central	11.44	15.10	4.42	53.08	-	-	1.76	85.80	-
IPP	-	4.10	-	-	-	-	-	4.10	-
Rooftop / Other RE	-	-	-	4.50	-	1.36	-	5.86	
NR	52.74	26.17	4.42	74.59	6.40	1.36	3.58	169.26	97.18

There is growth of around 32 % in Northern Region peak demand for 2026-27 from present time-frame. The state wise peak demand growth is tabulated in Table 4-3 below:

Table 4-3 Increase in Peak Demand of Various States of Northern Region

(All Fig in MW)

	Peak Demand (GW)			
	2021-22	2026-27	Difference	% Increase
Chandigarh	491	587	96	19.55%
Delhi	7471	8751	1280	17.13%
Haryana	12222	16451	4229	34.60%
Himachal Pradesh	1898	2331	433	22.81%
Jammu & Kashmir	3095	4482	1387	44.81%
Punjab	14886	18809	3923	26.35%
Rajasthan	14435	20131	5696	39.46%
UP	23664	31064	7400	31.27%
Uttarakhand	3180	4538	1358	42.70%
Total	73770	97182	23412	31.74%

4.3 Load generation Balance

In the previous section, All India Load Generation Balance (LGB) for identified nine scenarios was prepared in consultation with CEA and POSOCO. This section elaborates the Load Generation Balance (LGB) of Northern Region. For Northern Region also, three points on the daily load curve i.e. Solar max (afternoon), Peak load (evening) and Off-peak load (night) have for three seasons viz. Monsoon (August), Summer (June) and Winter (February) have been considered. Load generation balance has been prepared considering the following despatch factors for the 9 scenarios and the same is given at Table 4-4.

Table 4-4 Northern Region Generation Dispatch and Demand Factors

Scenario No & Name	Generation Dispatch Factors						Demand Factors
	Hydro	Nuclear	Solar	Rooftop	Wind	Gas	
1-Aug Solar Max	70%	80%	90%	50%	50%	0%	82%
2-Aug Peak Load	95%	80%	0%	0%	70%	85%	88%
3-Aug Night Off Peak	70%	80%	0%	0%	60%	65%	80%
4-Jun Solar Max	70%	80%	90%	60%	50%	0%	88%
5-Jun Peak Load	95%	80%	0%	0%	70%	85%	104%
6-Jun Night Off Peak	70%	80%	0%	0%	60%	60%	86%
7-Feb Solar Max	30%	80%	95%	60%	10%	0%	70%
8-Feb Peak Load	60%	80%	0%	0%	35%	85%	74%
9-Feb Night Off Peak	30%	80%	0%	0%	10%	30%	46%

Out of these nine scenarios, Scenario-5 (June evening peak) and Scenario-9 (Feb night off peak) corresponds to two extreme cases with respect to demand i.e. lowest demand (44.2 GW) and highest demand (101.5 GW) scenarios respectively. In all other scenarios, Northern Region demand is varying between these two demand scenarios as per demand factors. Based on LGB, state wise surplus/deficit in these scenarios is summarised in table 4-5. Further, both maximum surplus and deficit of each state is highlighted in table below:

Table 4-5 : Drawl of various states from ISTS grid

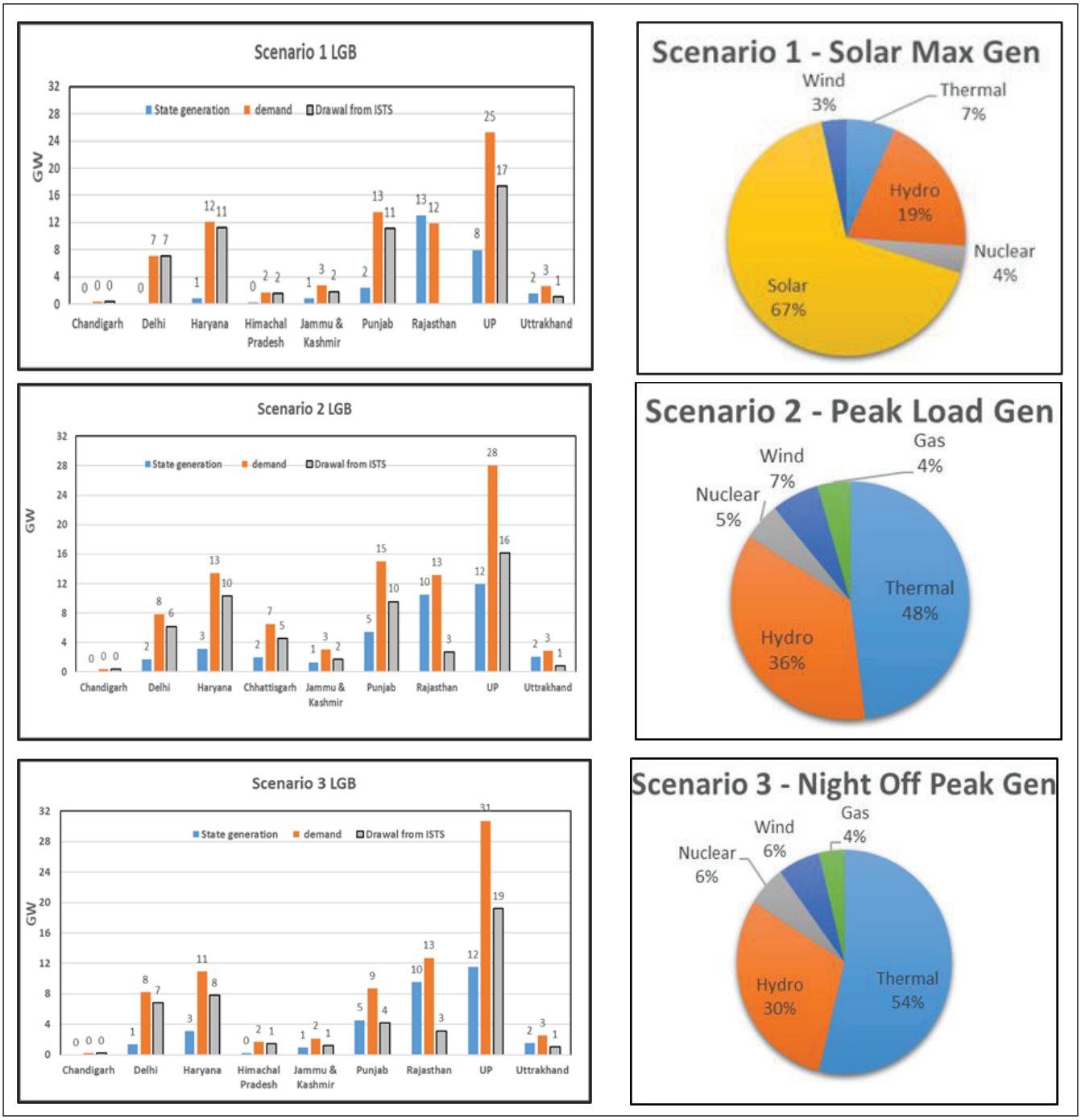
(All Fig in MW)

Drawal from ISTS	Aug'26			Jun'26			Feb'27		
Scenario / State	1	2	3	4	5	6	7	8	9
	Solar Max	Peak Load	Off Peak	Solar Max	Peak Load	Off Peak	Solar Max	Peak Load	Off Peak
Chandigarh	369	410	249	370	451	252	283	311	141
Delhi	7070	6180	6835	7203	7115	7842	4459	3212	1683
Haryana	11228	10300	7829	11420	11855	6676	7983	6612	2730
Himachal Pradesh	1510	4514	1488	1433	1718	1447	1881	1976	979
Jammu & Kashmir	1852	1698	1195	2057	2245	1412	3016	2826	2363
Punjab	11078	9559	4202	11934	13014	6028	4688	4682	2108
Rajasthan	-1167	2669	3156	14	4076	6482	95	4254	4792
UP	17307	16183	19200	18541	18091	15217	8511	9753	4494
Uttarakhand	1072	819	1036	1285	1361	1646	1974	1579	1139
Central (-)	64764	27241	24972	65490	27637	23423	62105	22353	16460
IPP (-)	2872	3898	2872	2872	3898	2872	1231	2462	1231
Total	**-17317**	**21192**	**17347**	**-14106**	**28391**	**20707**	**-30445**	**10390**	**2738**

Considering the above LGB for nine scenarios, load flow cases were prepared for 2026-27 timeframe.

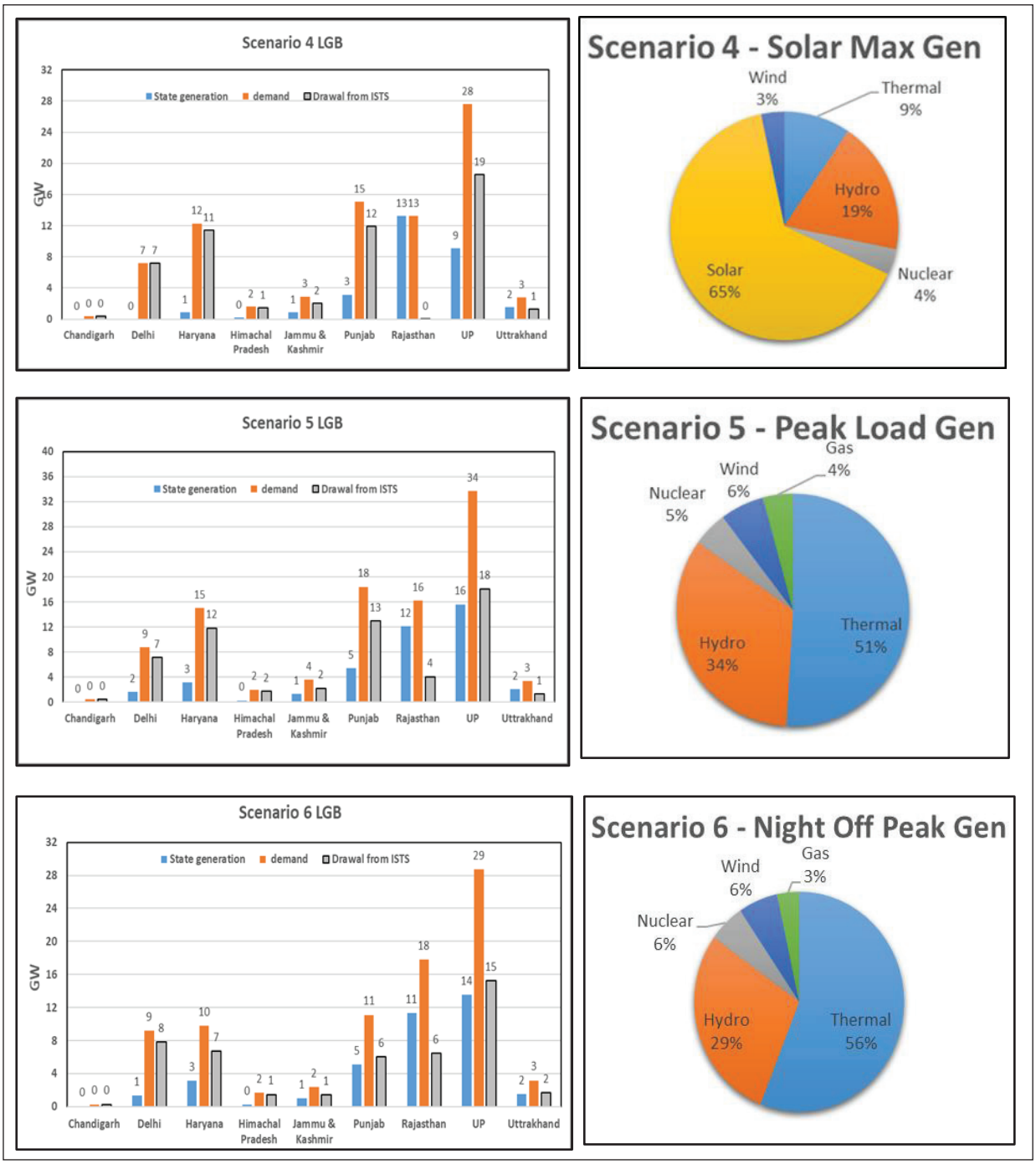
4.3.1 Monsoon Aug'26

Figure 4-1 LGB For Monsoon Aug'2026



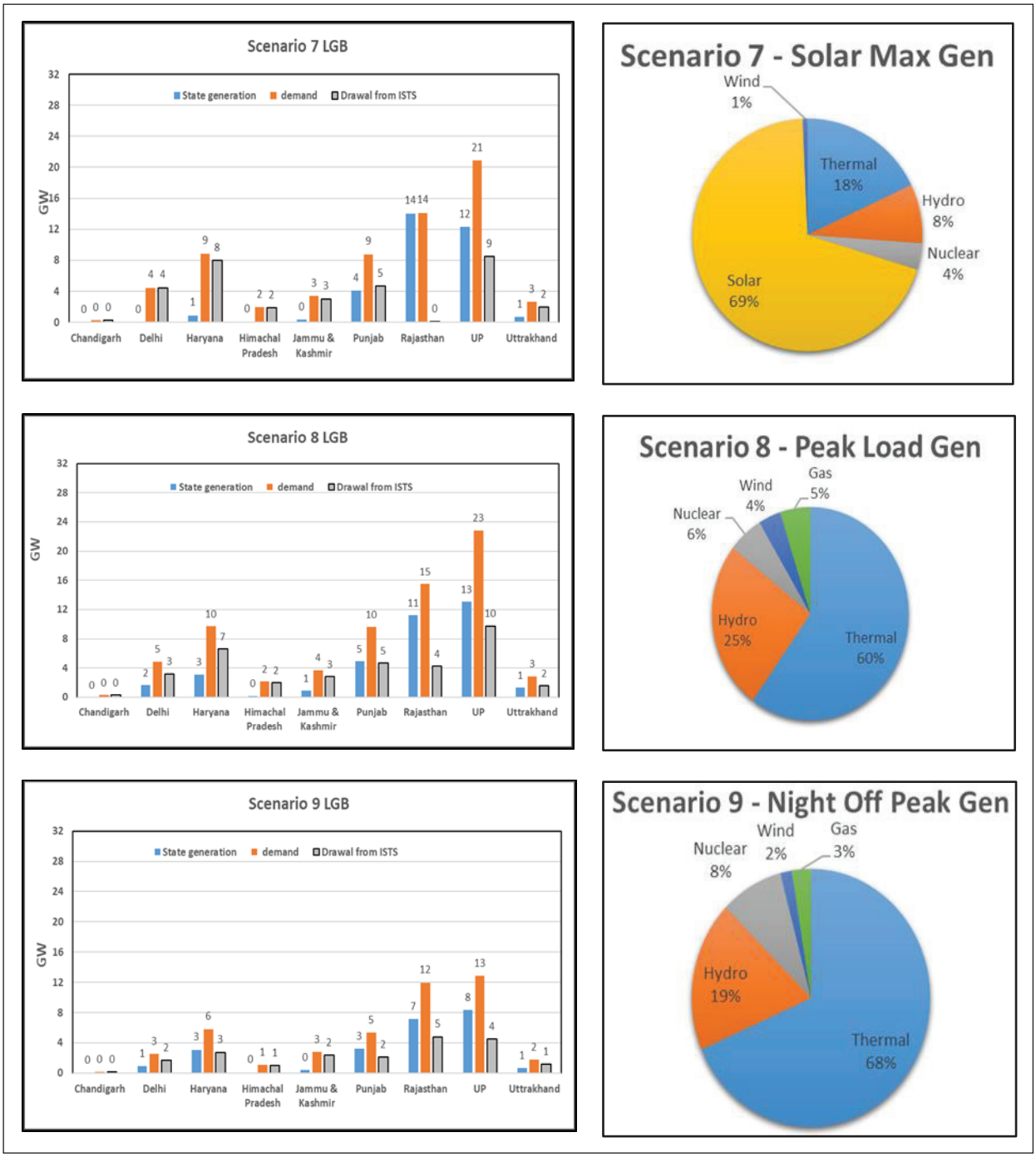
4.3.2 Summer Jun '26

Figure 4-2 LGB For Summer June'2026



4.3.3 Winter Feb '27

Figure 4-3 LGB For Winter Feb'2027



4.4 ISTS Network

Various transmission schemes have been evolved for implementation in the Consultative Meeting for Evolution of Transmission System of Northern Region (CMETS-NR) from Nov 2021 to Feb 2022. These schemes either been approved or under various stages of approval. The details of the scheme including other important issues in regard to ISTS in the Northern region which were discussed during this timeline has also been summarized below.

A) Himachal Pradesh:

I. Transmission system for evacuation of power from Kaza Solar Power Project (880 MW)

SJVN is developing a Solar power park (880 MW) in Lahul & Spiti (Kaza) in Himachal Pradesh. SJVN is also granted Stage-I connectivity in this regard. In the 4th NRPC(TP) meeting held on 05.10.21, Transmission system to provide connectivity to Kaza Solar Power Project was discussed & agreed. It was also decided that for transfer of power beyond Wangtoo S/s (HPPTCL), a high-capacity corridor would be planned. In Joint Study Meeting was held on 24.12.2021 with CEA, POSOCO, HVPN, PTCUL, HPPTCL, UPPTCL and other STUs of Northern region by CTU transmission system for evacuation of power from Kaza Solar Power Project (880MW) beyond Wangtoo was finalized. The above scheme was also discussed in the 2nd Consultation Meeting for Evolving Transmission Schemes in Northern Region (CMETS-NR) held on 29/12/2021 as well as 50th NRPC held on 28.01.2022, wherein transmission scheme comprising connectivity and evacuation system for Kaza Solar-park was agreed.

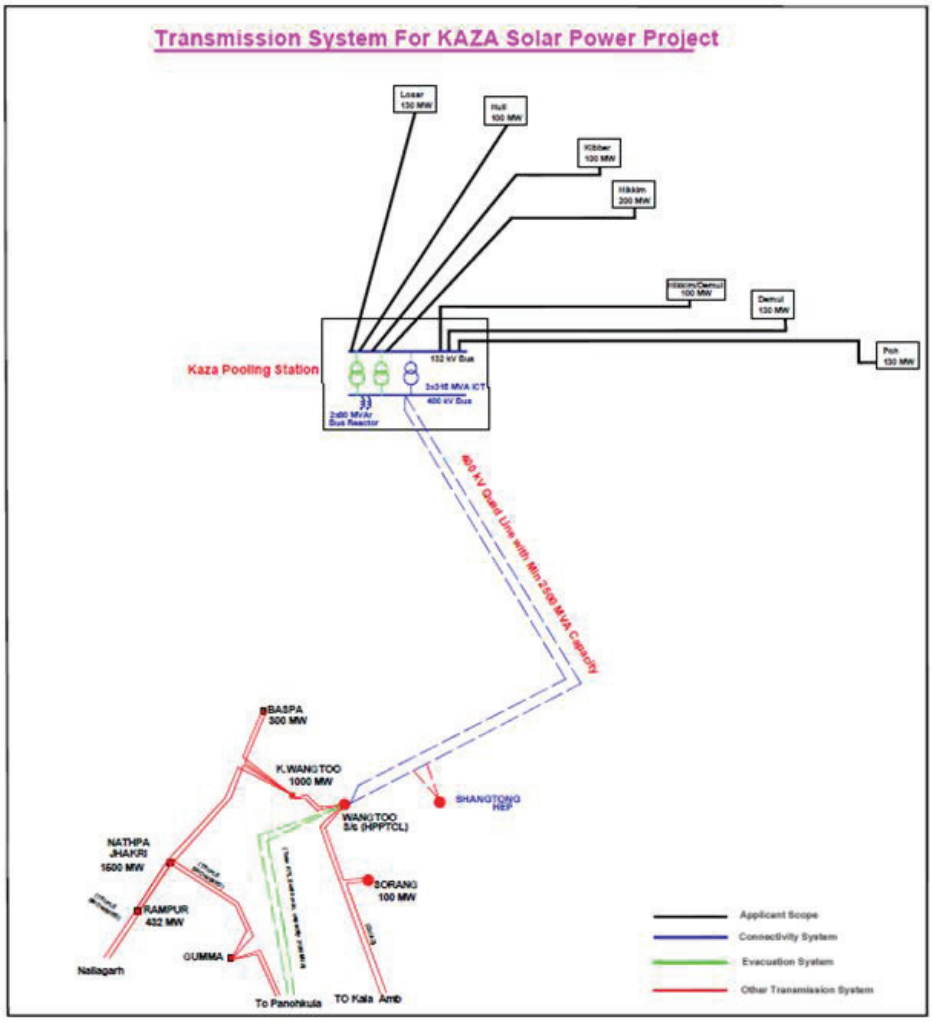
Further SJVN vide letter dated 21.02.22 revised the commissioning schedule progressively from Mar'25

Scope of work along with tentative Cost and Implementation time-frame

Sl. No.	Scope of the Transmission Scheme	Implementation time-frame	Total Estimated Cost (Rs. Cr)
	a) Establishment of 3x315 MVA (10x105 MVA single phase units including one spare) $ 400/132kV Kaza PS (GIS) Future Scope at Kaza Pooling Station: Space provision for: i. 5 nos. of 132 kV line bays for future projects# ii. 2 nos. of 400/132 kV Transformers b) Kaza-Wangtoo (HPPTCL) 400 kV D/c (Quad) line along with the associated 400 kV bays at both ends (Line capacity shall be 2500 MVA per circuit at nominal voltage) c) 1x80 MVAR switchable line reactor on each circuit at Kaza end of Kaza- Wangtoo 400 kV D/c line d) 2x80 MVAr (420kV) Bus Reactors at Kaza PS e) Wangtoo (HPPTCL) - Panchkula (PG) 400 kV D/c (Twin HTLS*) Line along with 80 MVAr switchable line reactor at Panchkula end at each circuit-210 Km *$ In case of transportation constraints, 5x200 MVA ICTs (16x66.67 MVA, 1-phase unit including one spare unit) shall be considered* *# 132 kV line bays (9 Nos.) at Kaza PS for termination of lines from 7 pockets of solar projects of SJVNL shall be under applicant scope for implementation. Space provision to kept additionally for above 9 nos. bays.* ** with minimum capacity of 2100 MVA on each circuit at nominal voltage*	Matching with Kaza Solar Park i.e. Mar' 25	Rs 3251 Cr

The scheme has been discussed in the the 8th NCT meeting for approval. The schematic of Transmission system for evacuation of power from Kaza Solar Power Project is under

Figure 4-4: Schematic of Transmission system for evacuation of power from Kaza Solar Power Project



II. Transmission system for evacuation of power for Luhri Stage-I (210MW) to be developed by SJVN Limited

Transmission scheme for evacuation of power from proposed Luhri St-I (210MW) HEP. Luhri-II (172 MW) & Sunni Dam (382 MW) near Shimla/Mandi/Kullu in HP was agreed in 3rd meeting of NRPC (TP) held on 19.02.2021 and further taken up for discussion in the 5th meeting of NCT held on 25.08.2021 and 02.09.2021, wherein it was informed that NTPC has forwarded some observation regarding the availability of space at Koldam S/s (NTPC) for 2 nos. of 400kV line bays. Therefore, the scheme was deferred and decided to be taken up again after resolution of the issue

Based on detailed deliberations in Joint Study meeting held on 21.01.22, transmission scheme for evacuation of power from Luhri St-I was finalized. Existing ISTS system beyond Koldam/Ropar would also facilitate transfer of power from Luhri-I HEP

SJVN is also granted LTA for Luhri HEP St-I (Target NR- 210 MW). The above scheme was discussed & agreed in 3rd Consultation Meeting for Evolving Transmission Schemes in Northern Region (CMETS-NR) held on 28.01.2022

Scope of work along with tentative Cost and Implementation time-frame

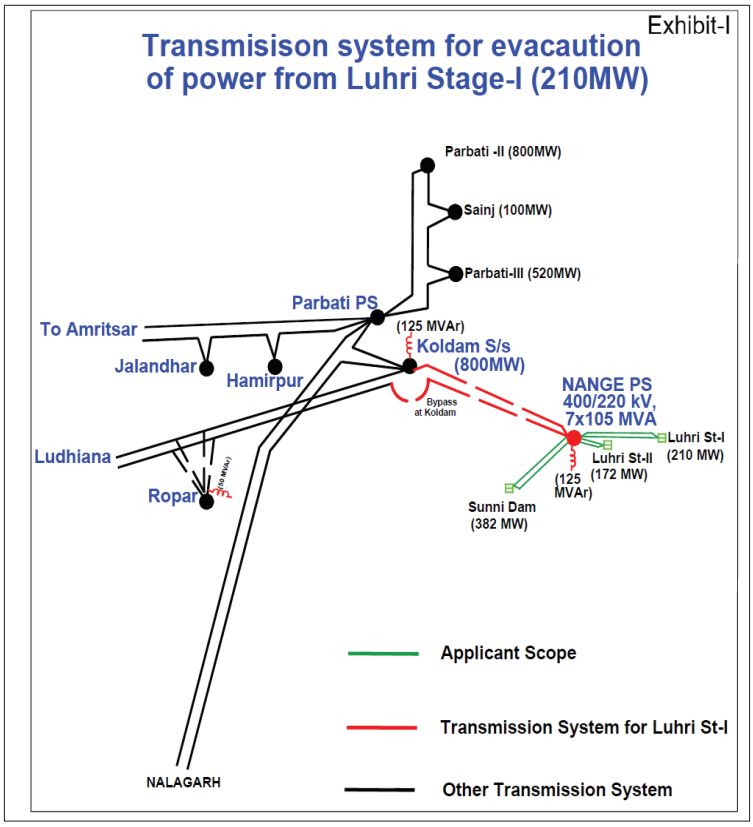
Sl. No.	Scope of the Transmission Scheme	Implementation time-frame	Total Estimated Cost (Rs. Cr)

	■ Establishment of 7x105 MVA, 400/220kV Nange GIS Pooling Station
	■ Future provisions: Space for
	  ■ 400/220kV ICTs (315 MVA with single phase units) along with associated bays: 3 nos.
	  ■ 400 kV line bays along with switchable line reactor: 3 nos.
	  ■ 220 kV line bays: 10 nos.
	■ Nange (GIS) Pooling Station – Koldam 400 kV D/c line* (Triple snowbird) – 40 km
	■ Bypassing one ckt of Koldam – Ropar/Ludhiana 400kV D/c line (Triple snowbird) at Koldam and connecting it with one of the circuit of Nange- Koldam 400kV D/c line(Triple snowbird), thus forming Nange- Ropar/ Ludhiana one line (Triple snowbird)
	■ 1x50 MVAR switchable line reactor at Ropar end of Nange- Ropar/ Ludhiana 400kV line
	■ 1 no. of 400kV line bay at Koldam S/s for termination of Nange (GIS) Pooling Station – Koldam 400 kV line
	■ 125 MVAR (420kV) Bus Reactor at Nange (GIS) PS (1-Ph units along with one spare unit)
	■ 125 MVAR (420kV) Bus Reactor at Koldam S/s (1-Ph units along with one spare unit)
		Matching with Kaza Solar Park i.e. Mar' 25	Rs 3251 Cr

**D/c line will be upto Koldam, however only one circuit is to be terminated at Koldam while second circuit would be connected to bypassed circuit of Koldam – Ropar/Ludhiana 400kV D/c line*			

The scheme has been sent to NCT for approval in its ensuing meeting. The schematic of Transmission system for evacuation of power from Luhri Stage-I (210MW) is under

Figure 4-5: Schematic of Transmission system for evacuation of power from Luhri-I HEP



B) Jammu and Kashmir

A Comprehensive master plan for evacuation of power from various upcoming hydro generation projects in J&K (Pakaldul HEP (1000 MW), Kiru HEP (624 MW), Ratle HEP (850 MW), Uri I Stage II HEP (240 MW), Kwar HEP (540 MW), Dulhasti St II HEP (260 MW)) is evolved.

Out of above connectivity and LTA application for Pakaldul HEP (1000MW) is already granted and for that transmission system is under bidding matching with generation schedule. Connectivity scheme for Ratle HEP is also agreed in 4th NRPC(TP) meeting held on 05.10.21 & 12.02.21 and 3rd CMETS-NR meeting held on 28.01.22.

As part of comprehensive transmission scheme, transmission scheme requirement for hydro generation projects scheduled by 2026-27 i.e Kiru HEP (624 MW) and Ratle HEP (850 MW is envisaged in first phase. Both the projects proposed to be interconnected to 400kv Kishtwar S/s. The details of scheme (For Kiru : S.No 1& 2, For Ratle : S.No. 3&4) evacuation of power beyond Kishtwar S/s is as under

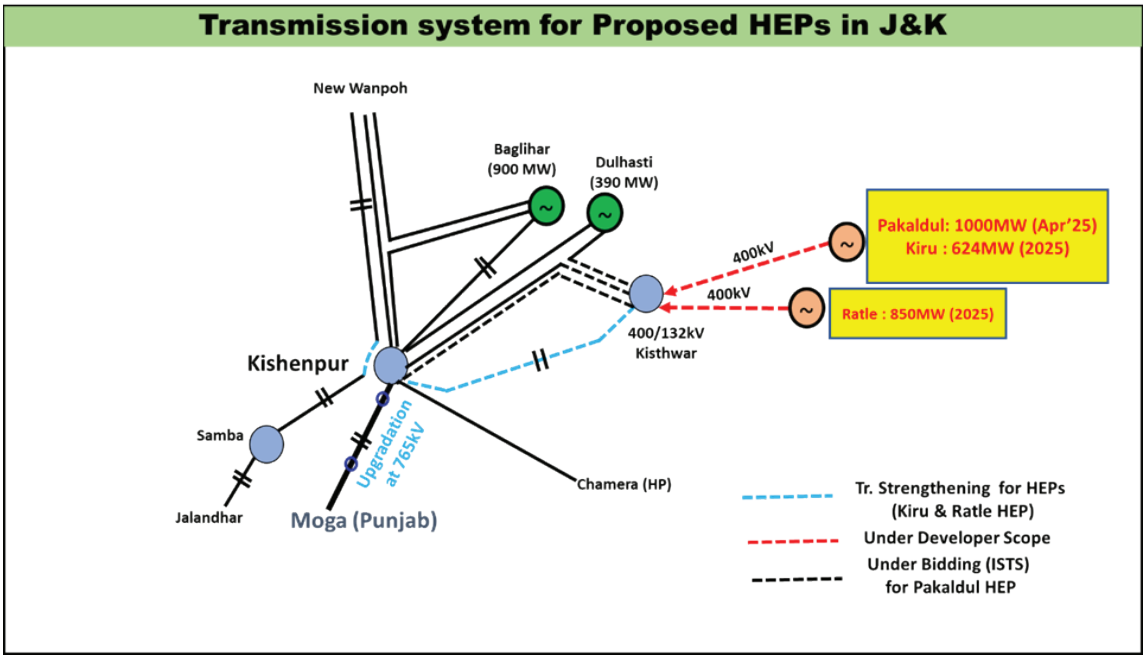
Tentative Scope of work along with Cost and Implementation time-frame

Sl. No.	Scope of the Transmission Scheme	Implementation time-frame	Tentative Estimated Cost (Rs. Cr)
1.	400kV Kishenpur Kishtwar D/c (2nd) (Quad)	Jun'25	Rs 1250 Cr
2	400kV New Wanpoh - Samba D/c (existing) line (bypassing of 400kV New Wanpoh – Kishenpur D/c & Samba – Kishenpur D/c at Kishenpur)		
3	Upgradation of Kishenpur - Moga D/c line at 765kV level (at present charged at 400kV)	Nov'25	
4	Upgradation of Kishenpur S/s at 765kV level (4x800MVA)		

Transmission system upto Kishtwar S/s to be implemented by the HEP developer

The above scheme will be taken up in forthcoming Consultation Meeting with stakeholder for deliberations. The schematic of proposed Transmission system is under.

Figure 4-6: Schematic of Transmission system for proposed HEPs in J&K



C) Haryana

I. HVPNL proposal for Intra state transmission schemes involving Interstate connection with ISTS elements

HVPNL intra-state proposal involving interconnection with ISTS elements was discussed among CEA, CTU, HVPNL, BBMB, POWERGRID and POSOCO. Subsequently, HVPNL have provided the time schedule for transmission works to be implemented under ISTS.

Composite Inter state transmission scheme for inter-connection of HVPNL proposed intra-state transmission schemes with ISTS elements agreed for implementation is as under:

- Augmentation with 1x500MVA, 400/220kV transformer (3rd) at 400/220kV Bahadurgarh (PG) S/s– Jul'24.
- 2 nos of 220 kV line bays at 400/220 kV Bahadurgarh (PG) S/s (for 220 kV D/c line from Kharkhoda pocket B) - Jul'24
- 2 nos of 220 kV line bays at 400/220 kV Bahadurgarh (PG) S/s (for 220kV METL – Bahadurgarh (PG) D/c line) – Mar'24
- Augmentation with 1x500MVA, 400/220kV transformer (3rd) at 400/220kV Jind (PG) S/s – Dec'23
- 2 nos of 220 kV line bays at 400/220 kV Sonepat (PG) S/s (for 220 kV D/c line from Kharkhoda pocket A) - Jul'24
- Total Estimated Cost : Rs 117 Cr.

HVPNL have confirmed that network for unutilised/ under implementation bays at 400/220 kV Bahadurgarh (PG), 400/220 kV Sonepat (PG) & 400/220 kV Jind (PG) Substations are already planned. Therefore, the approval of 220kV line bays requested in the above scheme are additional and agreed for implementation of the proposed scheme. The scheme will be taken up in next NCT meeting for approval & finalisation of mode of implementation.

Scope of work along with tentative Cost and Implementation time-frame:

Sl. No.	Scope of the Transmission Scheme	Implementation time-frame	Total Estimated Cost (Rs. Cr)
1	■ Augmentation with 1x500MVA, 400/220kV transformer (3rd) at 400/220kV Bahadurgarh (PG) S/s	Jul'24.	Rs 117 Cr
	■ 2 nos of 220 kV line bays at 400/220 kV Bahadurgarh (PG) S/s(for 220 kV D/c line from Kharkhoda pocket B)	Jul'24	
	■ 2 nos of 220 kV line bays at 400/220 kV Bahadurgarh (PG) S/s (for 220kV METL – Bahadurgarh (PG) D/c line)	Mar'24	
	■ Augmentation with 1x500MVA, 400/220kV transformer (3rd) at 400/220kV Jind (PG) S/s	Dec'23	
	■ 2 nos of 220 kV line bays at 400/220 kV Sonepat (PG) S/s (for 220 kV D/c line from Kharkhoda pocket A)	Jul'24	

D) Rajasthan

I. Augmentation of Transformation capacity at Bhinmal S/s

In the 4th NRPC(TP) meeting held on 05.10.21 & 12.10.21, POSOCO highlighted the issue of 'N-1' non-compliance of loading of ICTs at Bhinmal (PG) S/s. POSOCO informed that currently with 2 no. of 315 MVA ICTs, loading of ICTs was more than 'N-1' compliance limit (>420 MW) for most of the time in Jan'21, Feb'21 and first week of March'21. POSOCO recommended that new ICTs may be planned or capacity enhancement of existing ICTs may be explored. POWERGRID confirmed the space availability for 3rd ICT at Bhinmal.

In the above meeting, replacement of one no. of 315 MVA, 400/220 kV ICT at Ludhiana (PG) S/s with a 500 MVA, 400/220 kV ICT was discussed and agreed. It was also decided that the 315 MVA ICT spared from Ludhiana may be shifted to Bhinmal based on the residual life assessment or refurbishment (if required).

Sl. No.	Scope of the Transmission Scheme	Implementation time-frame	Total Estimated Cost (Rs. Cr)
1	Shifting and installation of 400/220 kV, 315 MVA ICT at Bhinmal (PG) S/s spared from Ludhiana (PG)	12 months i.e. Mar'23	Rs 18 Cr

POWERGRID informed that the condition of said ICT was evaluated departmentally based on condition monitoring test on ICT and condition of ICT was found healthy. Subsequently, POWERGRID vide mail dated 21.02.22 also confirmed receipt of CPRI report on condition assessment dated 15/02/22 declaring healthiness of the transformer.

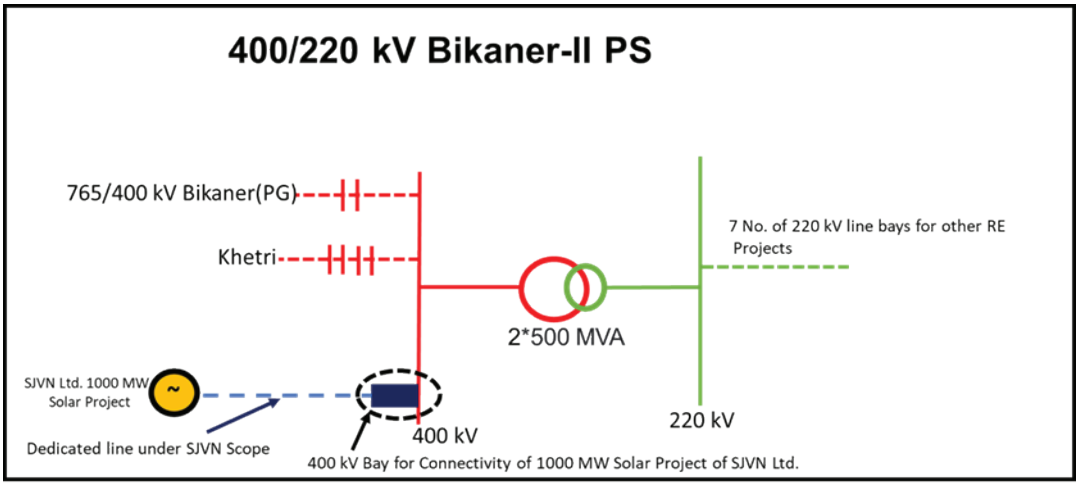
Accordingly, it is agreed in the meeting to shift the spared 315 MVA ICT from Ludhiana (PG) to Bhinmal S/s and installation of the same along with implementation of associated ICT bays at 400/220 kV Bhinmal (PG) S/s.

Scope of work along with tentative Cost and Implementation time-frame:

Sl. No.	Scope of the Transmission Scheme	Implementation time-frame	Total Estimated Cost (Rs. Cr)
1	Shifting and installation of 400/220 kV, 315 MVA ICT at Bhinmal (PG) S/s spared from Ludhiana (PG)	12 months i.e. Mar'23	Rs 20 Cr
2	Implementation of associated ICT bays (1 no. of 400 kV and 1 no. of 220 kV) at Bhinmal (PG) S/s	Jul'24	

The schematic of above Transmission system is under

Figure 4-7: Schematic of Augmentation of Transformation capacity at Bhinmal S/s



4.5 Perspective transmission schemes under planning

A) Transmission system for evacuation of power from Zangla/Padum UMREPP in Kargil (2.5GW)

Study & analysis has been carried out for evacuation of power from Kargil UMREPP of 2.5GW capacity in Ladakh through 400kV High Capacity D/c corridor via Kashmir. The EHVAC corridor has been considered from Zangla/Padum-Alusteng via Drass. The total length of corridor is about - about 340kms (incl. U/G cable- about 25km). In Drass and Alusteng, anchoring with 220kV existing substation shall facilitate feeding the local demand.

In this scenario due to very low short circuit strength of proposed new substations viz Zangla/Padum, Drass(New) & Alusteng (New), reactive power management/voltage stability both for peak solar and no solar scenario would be addressed through STACOMs along with MSR/MSC of suitable capacity at Zangla/ Padum & Drass (New) to address voltage stability

For power transfer beyond Alusteng, 400kV Alusteng – Amargarh and 400kV Alusteng – New Wanpoh is proposed. The scheme is under various stages of finalization

B) Issue of high voltage and requirement of reactive compensation at the various substations

In 4th NRPC meeting, issue of high voltage and requirement of reactive compensation at the various substations was deliberated. In the meeting CTUIL informed that due to prevailing high voltage in NR grid, it is observed that some of the 400kV ISTS lines having more than 200 km line length and without any line compensation experience difficulty in line charging.

CTUIL had further mentioned that Powergrid had analysed the past one-year data of voltage profiles of terminal substations of above ISTS lines and based on their detailed analysis and keeping in the view the availability of space at the substation, Powergrid has proposed the following

(i) Installation of 50 MVAR switchable line reactor at Mainpuri end and fixed 50 MVAR line reactor at Ballabgarh end on 400 kV Mainpuri- Ballabgarh D/c line.

(ii) Installation of 50 MVAR switchable line reactor at Allahabad end on 400 kV Kanpur- Allahabad line.

(iii) Installation of 50 MVAR line reactor at Bhiwadi end for uncompensated circuit of 400 kV Agra- Bhiwadi D/c line.

CTUIL has also carried the studies on the issue of high voltages in the grid and CEA vide its email dated 1.10.2021 has circulated the observations furnished by CTUIL to the constituents. Based on the analysis done by CTUIL, following additional reactive compensation (bus and line reactors) is proposed under Inter State transmission system strengthening scheme:

(i) 1x240MVAr switchable Line reactor at Moga end of 765kV Bhiwani-Moga line

(ii) 1x330MVAr,765kV Bus reactor at Fatehpur S/s

(iii) 1x80MVAr switchable Line reactor at Neemrana end of 400kV Sikar-Neemrana line (It will also improve voltage profile of Neemrana S/s which carry RE power through Sikar-2-Neemrana D/c line)

(iv) 1x80MVAr switchable Line reactor at Amritsar end of 400kV Banala-Amritsar line

In addition, CTUIL has also proposed the following:

(i) STUs may also explore bus reactive compensation at 400kV STU nodes (which doesn't have bus reactive compensation):

- HPPTCL -Wangtoo, Lahal, Gumma etc.
- HVPN -Daultabad, Deepalpur, Kabulpur, Dhanonda, Kirori, Nawada & Nuhiawali
- UPPTCL- Ataur, Badaun, Gonda, Harduaganj, Indirapuram
- RVPN- 765kV Anta, 400kV Ajmer
- PSTCL- Rajpura

(ii) STU/DISCOM should also ensure that shunt capacitors at sub transmission/distribution level may be switched off during off peak condition to avoid MVAr injection into the Grid. POSOCO also analysed the issue of high voltages in Northern region and made presentation highlighting the various nodes NR which are experiencing high voltages.

The matter was deliberated at a length and following was agreed:

i.) STUs would provide inputs regarding the reactors planned at various intra-state substations in the respective states along with their implementation timelines.

ii.) STUs would explore the possibility of installation of reactors at the node mentioned and accordingly intimate to CEA and CTUIL

iii.) Based on the inputs from STUs, CTUIL would carry out the studies to assess the requirement of reactive compensation at various nodes in Northern Region to overcome the issue of high voltages

Further data from most of states is received and comprehensive studies for high voltage and requirement of reactive compensation at the various substations is under process.

C) Transmission system for evacuation of RE power from Rajasthan Ph-IV (48GW)

MNRE vide letter 15.02.22 informed that SECI has identified REZs of aggregate capacity of 181.5GW in eight states for achieving 500GW capacity from Non Fossile fuel (incl. RE) by 2030. in the Meeting held on 02.02.2022 for identification of Renewable Energy Zones for achieving 500 GW capacity from non-fossil fuels (including RE) by the year 2030, SECI informed that at present, the installed capacity from Renewable Energy (RE) is150 GW (including large hydro). In addition, planning has already been done for around 132.48GW of capacity and further, there is margin in existing ISTS due to which RE capacity of around 33.87 GW may be set up in different states. This brings the total to around 316.35 GW. view of above, planning is to be done for around 183.65 GW. These RE capacities include the Solar –Wind hybrid projects along with energy storage systems. In the meeting, it was decided that based on the above identified REZs, CEA & CTU will prepare the transmission plan.

Out of total capacity, planning is to be done for 75GW RE (60GW-Solar, 15GW-Wind) installed capacity in Rajasthan with evacuation requirement of 48GW from GIB (Jaisalmer, Jodhpur, Barmer) and Non GIB Zones Sanchore, Sirohi, Jalor, Pali, Ajmer, Bikaner, Nagaur).

D) North-West Inter regional system strengthening scheme to relieve high loading of 400 kV Bhinmal-Zerda Inter-regional line

In the 3rd meeting of NRPC (TP) held on 19.02.21, it was discussed that more RE power is rushing towards Bhinmal and causing overloading beyond Barmer/Bhinmal especially high loading on 400 kV Bhinmal - Zerda line. This is also due to incremental intra state RE generation in western Rajasthan.

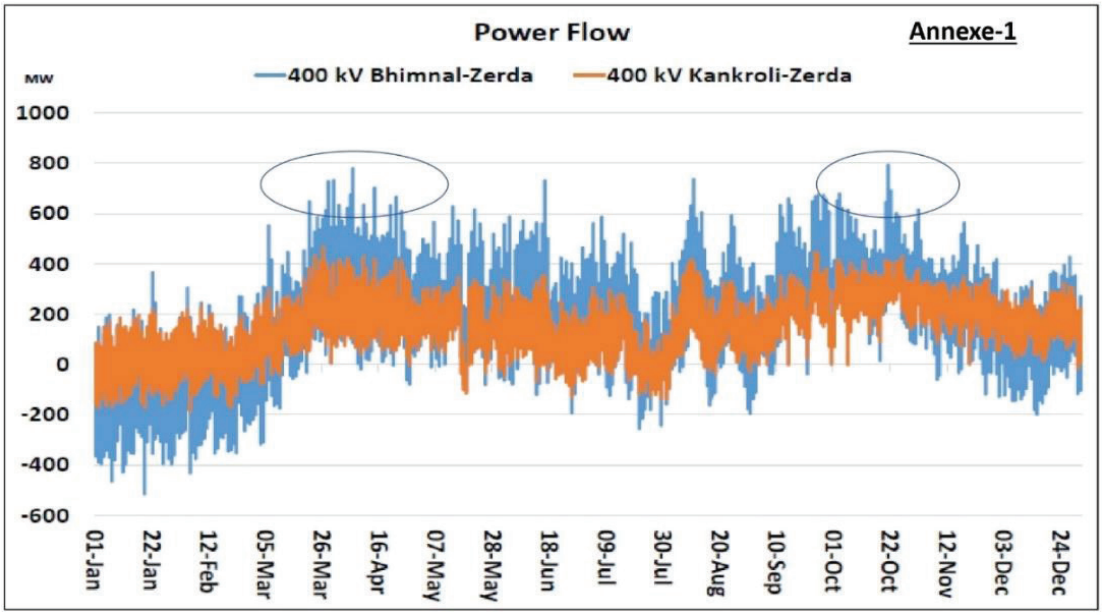
400 kV Bhinmal-Zerda line being an inter-regional corridor between NR & WR, this line may impact the inter-regional transmission capacity which may lead to operational constraints. Moreover, in low wind season (mainly Jan-Feb), due to less wind generation in Kutch area of Gujarat (Bhuj, Bhuj-II, Jam Khambhaliya, Khavda etc.), the loading in 400 kV Bhinmal-Zerda corridor further increases in peak Solar generation period (10 AM-2 PM).

NLDC(POSOCO) vide letter dated 7th Feb, 2021 requested to take actions to relieve the transmission constraints due to high loadings on 400kV inter regional transmission lines between Gujarat (WR) & Rajasthan (NR).

In the letter, it was informed that the direction of flow on 400 kV Bhinmal-Zerda & 400 kV Kankroli -Zerda lines is mostly from NR to WR and the loading on 400 kV Bhinmal-Zerda is above 500 MW for 5% of time which lies mostly during March & April month. The loading is N-1 insecure particularly when the generation within Gujarat is low and demand in Gujarat is high. Similar aggravates when the above coincides with high RE in Rajasthan (Solar Max scenario) and low demand in Northern Region. The non-availability of reverse power flow on HVDC Mundra-Mahendragarh Bipole further compounded the problem in operational horizon. In the coming months, the new RE capacity addition in Jaisalmer, Barmer and Ramgarh area of Rajasthan is expected. The incremental RE injection may aggravate the situation causing further increase in line loadings.

It was also informed the high loadings on these lines are limiting constraint in ATC/TTC calculation between western region and northern region and are likely to be in future also.

Figure 4-8: Loading of Bhinmal-Zerda & Kankroli-Zerda line for the past year (Source :POSOCO)



Considering the severity of overloading of 400kV Bhinmal - Zerda line, it was proposed that additional strengthening scheme need to be planned.

POSOCO have further informed about the power flow pattern in WR-NR corridors under the prevailing scenario of high RE(Solar) generation in Rajasthan, low demand in Northern region, high demand in Western & Southern region coupled with low generation from imported coal based conventional generations in Gujarat (mainly CGPL & Mundra UMPP) due to various issues and non-availability of HVDC Mundra-Mahendargarh bipole in reverse direction (NR to WR).

Figure 4-9: WR-NR & NR Import Flows (Source:POSOCO)

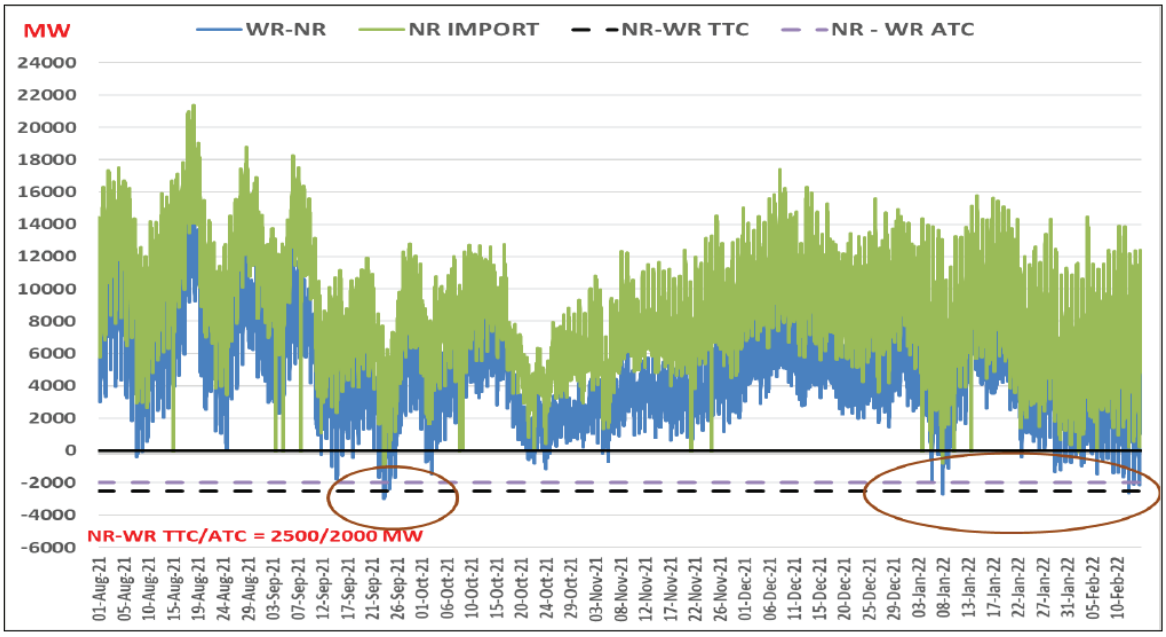
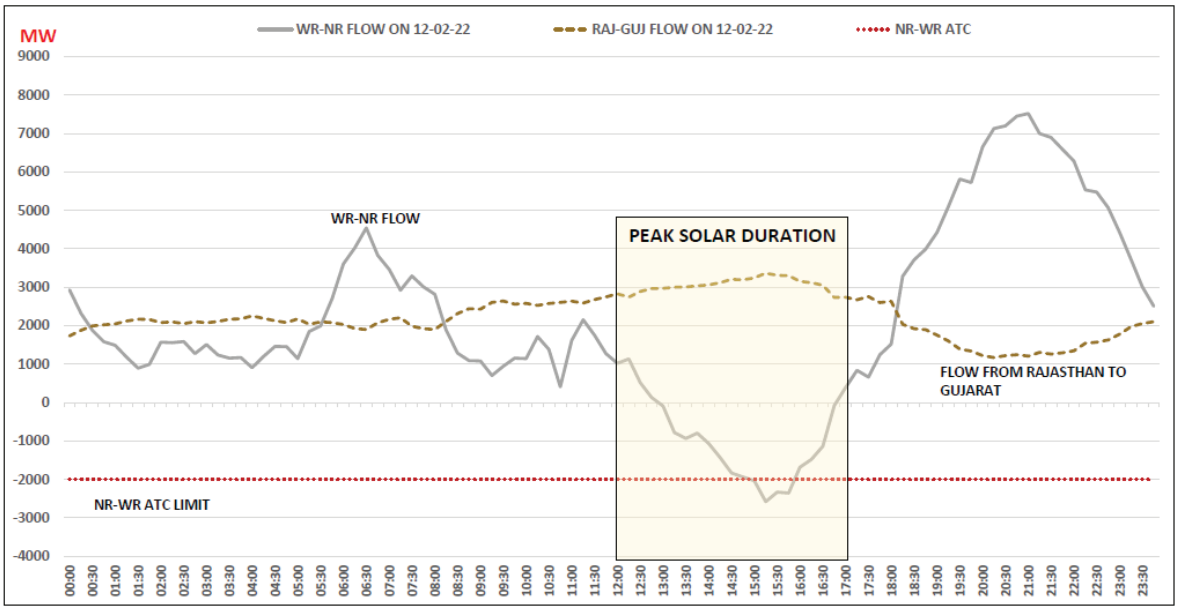


Figure 4-10: Pattern of WR-NR & Raj – Guj (Sec Axis) Flow for a Typical Day (12.02.2022) (Source: POSOCO)



From the prevailing scenario, it was observed that this pattern of NR-WR flow is mainly observed in winter season when the wind generation in WR is very low and dispatch of conventional plants in WR remain low. Under this emerging scenario, the power from Rajasthan rushes towards Gujarat during solar max condition due to high solar generation in Rajasthan and high demand and low generation in Gujarat.

In order to relieve above transmission constraint in emerging scenario, an additional high capacity Inter regional (IR) corridor between NR-WR is required. Further, Rajasthan is witnessing more RE generation in ISTS with allocation to WR & SR on firm basis from manufacturing linked plants (2024-25) which necessitates additional WR-NR corridor for power dispersal.

Considering all above aspects, studies are undergoing for winter solar max scenario for 2024-25 timeframe with low dispatch of Mundra-APL & CGPL.

4.6 System study analysis and results

4.6.1 Voltage Analysis

Voltages of all 765 kV and 400 kV buses were observed in all the nine scenarios. Maximum and minimum voltage of each bus were identified from the bus voltages in the nine number of scenarios. From the simulation results, no issue of undervoltage it was observed in Northern Region.

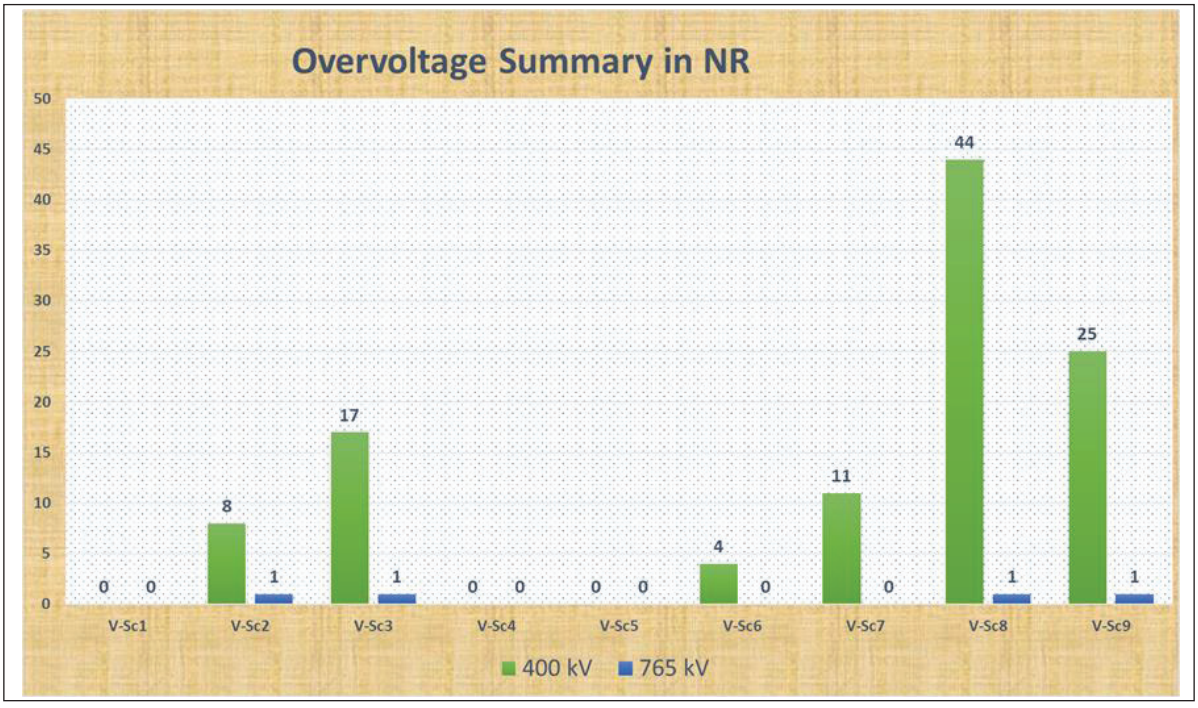
However, 765kV & 400kV buses were observed to be having voltage more than 1.05 pu (in minimum two scenarios) is depicted in Table 4-6:

Table 4-6: Substations having high voltage in NR (>1.05pu in minimum 2 scenarios) (2026-27)

Sl. No.	Bus Name	Voltage Level(kV)	Owner	Max(pu)	Scenario
1	Jodhpur Kankani	765.00	STU	1.06	2,3,7,8
2	Chamera-1	400.00	ISTS	1.06	8,9
3	Hamirpur	400.00	ISTS	1.07	8,9
4	Ropar	400.00	STU	1.07	8,9
5	Dhanasanu	400.00	STU	1.08	7,8,9
6	Behmnjsingh (Malkana)	400.00	STU	1.09	3,7,8,9

Sl. No.	Bus Name	Voltage Level(kV)	Owner	Max(pu)	Scenario
7	Talwandi Saboo	400.00	STU	1.08	7,8,9
8	Dhuri	400.00	STU	1.08	7,8,9
9	Makhu	400.00	STU	1.1	3,6,7,8,9
10	Mukatasar	400.00	STU	1.1	3,6,7,8,9
11	Nakodar	400.00	STU	1.08	3,7,8,9
12	Rajpura	400.00	STU	1.07	8,9
13	Amritsar	400.00	ISTS	1.09	3,6,7,8,9
14	Moga (split section)	400.00	ISTS	1.06	8,9
15	Patiala	400.00	ISTS	1.06	8,9
16	Patran	400.00	ISTS	1.06	8,9
17	Ludhiana	400.00	ISTS	1.06	8,9
18	Jallandar	400.00	ISTS	1.08	7,8,9
19	Malerkotla	400.00	ISTS	1.06	8,9
20	Barmer	400.00	STU	1.06	3,8
21	Bhinmal	400.00	ISTS	1.05	3,8
22	Raj West	400.00	STU	1.05	3,8
23	Deedwana	400.00	STU	1.06	2,3,9
24	Ajmer	400.00	STU	1.05	2,3
25	Pachpadra	400.00	STU	1.07	2,3,8,9
26	Jodhpur (Surpura)	400.00	STU	1.06	2,3,8,9
27	Jodhpur (Kankani)	400.00	STU	1.06	2,3,8,9
28	Hanumangarh	400.00	STU	1.07	2,3,8,9

Figure 4-11: No. of S/s having Overvoltage in NR in various scenarios



From the voltage analysis, it is emerged that some of substations i.e. Jodhpur Kankani, Moga, Barmer, Bhinmal utilized for evacuation of Solar/RE power in Rajasthan.. Due to no solar generation in evening/night time, there is minimal power flow on these 765kV long lines impacting high voltages. However adequate bus reactive compensation is also provided in this regard. Some of substations i.e. Talwandi Saboo, Makhu, Mukatasar, Nakodar, Dhuri, Dhanasanu, Amritsar, Patiala, Ludhiana, Jallandar, Malerkotla, Jodhpur (Surpura), Jodhpur (Kankani), Hanumangarh, Patran having high voltage in off peak scenarios and in winter season due to low demand in NR.

In the 4th NRPC meeting, issue of high voltage and requirement of reactive compensation at various substations was deliberated. In the meeting CTUIL informed that due to prevailing high voltage in NR grid. CTUIL has also carried the studies on the issue of high voltages in the grid and CEA vide its email dated 1.10.2021 has circulated the observations furnished by CTUIL to the constituents . In the meeting it was deliberated that

STUs would provide inputs regarding the reactors planned at various intra-state substations in the respective states along with their implementation timelines.

- STUs would explore the possibility of installation of reactors at the node mentioned and accordingly intimate to CEA and CTUIL
- Based on the inputs from STUs, CTUIL would carry out the studies to assess the requirement of reactive compensation at various nodes in Northern Region to overcome the issue of high voltages
- Comprehensive studies for high voltage and requirement of reactive compensation at the various substations in NR is undergoing and taken up in next rolling plan.

4.6.2 Contingency Analysis

a) Transmission Lines

In the base case file prepared for 2026-27 timeframe, in NR, 11 nos. of 400 kV lines are observed to be having critical loading in base case as well as Contingency scenario. Details of such lines are as under (Table 4-7):

Table 4-7: Major transmission lines having critical loading in NR (Base case/Contingency) (2026-27)

Sl. No.	Name of the Line	Scenario No.	Case	Owner	Max Loading	Rating	Remark
1	Baglihar – New Wanpoh 400kV line	1,4, 5,7	Base case (SC-4), Contingency (Sc 1,5,7)	ISTS	911 (1215 under n-1)	857 (Twin Moose)	The line loading will be higher in solar maximized scenario. Loading will be relieved with upcoming UMREPP in Kargil area
2	400kV Rajpura thermal-Rajpura D/c line	2,6	Contingency	STU	902 (under n-1)	857 (Twin Moose)	The line loading is marginally higher as per dispatch of Rajpura TPS.
3	400kV Jaisamer-2 -Barmer D/c line	1,4,7	Contingency	STU	1070 (under n-1)	857 (Twin Moose)	The line loading is higher in Solar maximized scenario. With proposed upgradation of Jaisalmer-2 S/s, loading may relieved

Sl. No.	Name of the Line	Scenario No.	Case	Owner	Max Loading	Rating	Remark
4	400kV Merta -Jodhpur (Kankani) line	1,4	Contingency	STU	884(under n-1)	857 (Twin Moose)	The line loading is marginally higher in Solar maximized scenario. With proposed RVPN schemes loading may relieved.
5	400kV Barmer -Bhinmal line	1,4,7	Contingency	ISTS	1328(under n-1)	857 (Twin Moose)	The line loadings are higher in Solar maximized scenario and further aggravated with low wind and high demand of Gujarat in winter. Strengthening scheme is under planning to relieve above loadings
6	400kV Kankroli -Jodhpur (Surpura) line	7	Contingency	ISTS	1328(under n-1)	943(Twin Moose)	
7	400kV Meja-Allahabad D/c line	2,3,5, 6.7.8	Contingency	ISTS	1078 (under n-1)	857 (Twin Moose)	The line loading is higher in evening peak and night off peak scenario. Action may required
8	400kV Agra-Agra(UP) line	2,3,5,6	Base	ISTS	1160 (under n-1:1452 MW)	857 (Twin Moose)	The line loading is higher in evening peak and night off peak scenario. Action may required.
9	400kV Agra-	2,3,5	Contingency	ISTS	1036 (under n-1)	857 (Twin Moose)	
10	400kV Dadri-Muradnagar line	3	Contingency	ISTS	924 (under n-1)	857 (Twin Moose)	The line loading is marginally higher in off peak scenario. Monitoring required
11	400kV Roorkee-Rishikesh line	1,4	Contingency	ISTS	924 (under n-1)	857 (Twin Moose)	The line loading is marginally higher in noon scenario. Monitoring required

b) Transformers

In the base case file prepared for 2026-27 timeframe, transformers at 2 nos. of 765/400 kV substations and 6 nos. of 400/220kV substations are having critical loading. Details of transformers is as under (Table 4-8)

Table 4-8: Major transformers having critical loading in NR (Base case/Contingency)

Sl. No.	Name of the Element	Scenario No.	Owner	Case	Maximum Loading/ ICT	Remark
1	765/400kV, 2x1000 +1x1500 MVA Bhiwani ICTs	1,4	ISTS	N-1 Contingency	1192 (on 1000MVA ICT)	High loading observed in Solar maximized scenario. Augmentation/Replacement of ICT may be required
2	765/400kV, 2x1000 MVA Orai ICTs	5, 7	ISTS	N-1 Contingency	1145 (on 1000 MVA ICT)	loading is higher in future due to load growth of UP. Augmentation/Replacement of ICT may be required
3	400/220kV, 3X315 MVA Kishenpur ICTs	1,2,4,5,7	ISTS	Base Case	426	High Loading observed with upcoming HEPs integrated at Kishtiwar/Kishenpur. Augmentation of ICT shall be required
4	400/220kV, 2X500 MVA Sohna Road ICTs	1,2,3,4,5,6	ISTS	N-1 Contingency	668	High loading observed in Summer Season due to high load of Delhi/NCR. Augmentation of ICT may be required beyond 2024-25 frame
5	400/220kV, 2X315 MVA Hindaun ICTs	1,2,3.5,6	STU	N-1 Contingency	415	High loading observed in most of scenarios. Load diversion/ Augmentation of ICT shall be required
6	400/220kV, 2X315+1x240 MVA Obra ICTs	2,3,5	STU	N-1 Contingency	348 (on 315MVA ICT)	loading is marginally higher at low/no generation of Obra thermal plant. Augmentation/ Replacement of ICT may be required
7	400/220kV, 3X315 MVA Allahabad ICTs	3,5	ISTS	N-1 Contingency	330	loading is marginally higher at few instances. Augmentation/ Replacement of ICT may be required
8	400/220kV, 2X315 MVA Agra ICTs	3,5,6	ISTS	N-1 Contingency	373	loading is higher in future due to load growth of UP. Augmentation/Replacement of ICT may be required

4.6.3 Short Circuit Analysis

Short circuit level was calculated for all 765kv and 400 kV buses of Northern Region and buses having fault level more than the design rating under any scenario were identified. From analysis it is emerged that there are 48 nos. of substations (765kV-1 no., 400kV- 47 nos)in NR having fault level more than designed capacity

Figure 4-12: NR Substations exceeding fault level

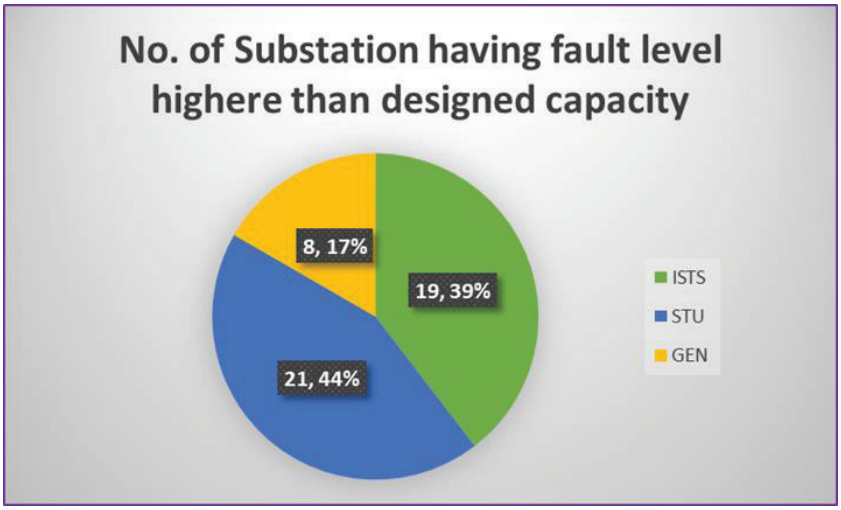
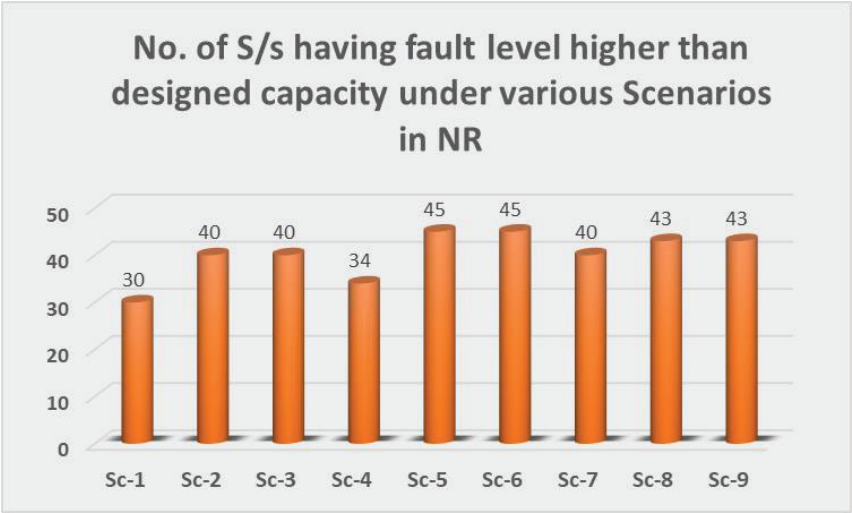


Figure 4-13: NR Substations exceeding fault level under various Scenarios (Nos.)



Out of above,5 nos. of ISTS substations and 10 nos. of STU/Generator substations exceeding fault level more than 20% design fault level for which immediate action shall be required. Details of the substations under any scenario are tabulated below in Table 4-9 and 4-10 :

ISTS Substations

Table 4-9: ISTS Buses Exceeding Designed Fault Level in Northern Region

Sl. No.	Substation Name	Scenario No.	Highest Fault level (kA)	Design Rating (kA)
1	400kV Abdullapur	All	49	40
2	400kV Neemrana	All	49	40
3	400kV Meerut	All	63	40
4	400kV Agra	All	51	40
5	400kV Allahabad	All	50	40

STU/Generation Substations

Table 4-10: STU Buses Exceeding Designed Fault Level in Northern Region

Sl. No.	Substation Name	Owner State	Scenario No.	Highest Fault level (kA)	Design Rating(kA)
1	400kV Dhanonda	Haryana	All	50	40
2	400kV Bawana Gas	Delhi	All	51	40
3	400kV Bawana	Delhi	All	51	40
4	400kV Jaipur (Phagi)	Rajasthan	All	50	40
5	400kV Meja	UP	All	49	40
6	400kV Greater Noida (2 S/s)	UP	All	54	40
7	400kV Dadri	Gen (NTPC)	All	53	40
8	400kV Anpara	Gen (IPP)	All	52	40
9	400kV Anpara C	Gen (IPP)	All	51	40
10	400kV Dadri (HVDC)	Gen (NTPC)	All	52	40

Studies to limit high short circuit on ISTS S/s will be carried out and taken up in next rolling plan. STUs/Gen developer are also required to take necessary actions such as bus splitting, bypassing of lines, fault limiting reactors etc to resolve the issue of high fault level at their buses.

Chapter 5:
Western Region

Due to geographical location, 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 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 other regions during high RE scenarios whereas it exports power to other regions during evening peak and night off peak load.

5.1 Present Power Supply Scenario

As on Jan'2022, total Installed Capacity (IC) of Western Region was about 128 GW and the peak demand was about 64 GW. At present, there is no shortage of power supply in meeting these demands. State-wise breakup is summarised at Table 5-1

Table 5-1:All India Installed Capacity and Demand met as on Jan'22

(All Fig in GW)

State / UTs	Generation						Peak Demand Met
	Thermal	Nuclear	Renewable			Grand Total	
			Hydro	RES	Total		
Gujarat	24.3	0.6	0.8	15.5	16.3	41.1	19.5
MP	16.4	0.3	3.2	5.4	8.7	25.4	15.9
Maharashtra	28.8	0.7	3.3	10.6	14.0	43.4	25.7
Chhattisgarh	12.1	0.0	0.2	0.9	1.1	13.2	4.9
DD	0.2	0.0	0.0	0.0	0.0	0.3	0.4
DNH	0.5	0.0	0.0	0.0	0.0	0.5	0.9
Goa	0.6	0.0	0.0	0.0	0.0	0.6	0.6
Central unallocated	3.0	0.2	0.0	0.0	0.0	3.2	0.0
Total	**85.8**	**1.8**	**7.6**	**32.5**	**40.1**	**127.7**	**63.9**

Source: CEA Installed capacity Monthly Report

5.2 Region and State Wise envisaged Power Supply Scenario

As per the 19th EPS, Western Region demand for 2026-27 timeframe is expected to increase to about 95 GW. The Installed capacity of Western Region is expected to be about 180GW. The state wise bifurcation of the same is given at Table 5-2.

Table 5-2 Western Region Installed Capacity and Peak Demand (2026-27)

(All Fig in MW)

State	Thermal	Hydro	Nuclear	Solar	Wind	Gas	Total	Peak Demand
Gujarat	7912	568	0	7585	8285	2840	27190	28387
MP	5320	3066	0	1538	2392	0	12316	19682
Maharashtra	20415	2945	0	3680	5297	1240	33577	39828
Chhattisgarh	2303	139	0	223	0	0	2665	8518
DD	0	0	0	0	0	0	0	553
DNH	0	0	0	0	0	0	0	1798
Goa	0	0	0	0	0	0	0	1096
Central	19000	1450	3240	21590	15347	3281	63908	-
IPP	36850	0	0	0	0	2778	39628	-
Rooftop				4500			4500	
Total	**91800**	**8168**	**3240**	**39116**	**31321**	**10139**	**183784**	**94825**

There is growth of around 48% in the peak demand of Western Region from present timeframe to 2026-27. The state wise growth in demand for 2026-27 from present time-frame is tabulated below at Table 5-3:

Table 5-3: State-wise Demand Growth in Western Region

(All Fig in MW)

Peak Demand				
State	**Present**	**19th EPS**	**Diff**	**% Increase**
	2021-22	**2026-27**		
Gujarat	19451	28387	8936	46%
MP	15917	19682	3765	24%
Maharashtra	25653	39828	14175	55%
Chhattisgarh	4878	8518	3640	75%
DD	371	553	182	49%
DNH	871	1798	927	106%
Goa	646	1096	450	70%
Total	**63873**	**94825**	**30952**	**48%**

From the above data it is observed that the increase in peak demand is maximum for DNH (106%) and minimum for MP (24%).

5.3 Load Generation Balance

Load generation balance has been prepared considering the following despatch factors for the 9 scenarios and the same is given at Table 5-4

Table 5-4: Western Region Installed Capacity and Peak Demand (2026-27)

Scenario No & Name	Generation Dispatch Factors						Demand Factors
	Hydro	Nuclear	Solar	Rooftop	Wind	Gas	
1-Aug Solar Max	40%	80%	80%	50%	55%	0%	76%
2-Aug Peak Load	70%	80%	0%	0%	75%	85%	80%
3-Aug Night Off Peak	40%	80%	0%	0%	65%	65%	70%
4-Jun Solar Max	40%	80%	85%	60%	55%	0%	89%
5-Jun Peak Load	70%	80%	0%	0%	75%	85%	90%
6-Jun Night Off Peak	40%	80%	0%	0%	65%	60%	83%
7-Feb Solar Max	20%	80%	90%	60%	10%	0%	99%
8-Feb Peak Load	40%	80%	0%	0%	20%	85%	86%
9-Feb Night Off Peak	20%	80%	0%	0%	20%	30%	70%

The despatch from thermal generations have been done considering merit order despatch. Western Region LGBs for all 9 nos. of scenarios are summarized in Figure 5-1, Figure 5-2 and Figure 5-3.

Based on LGB, state wise surplus/deficit in these scenarios is summarised in Table 5-5. Further, both maximum and minimum import of each state from ISTS grid is highlighted in table below.

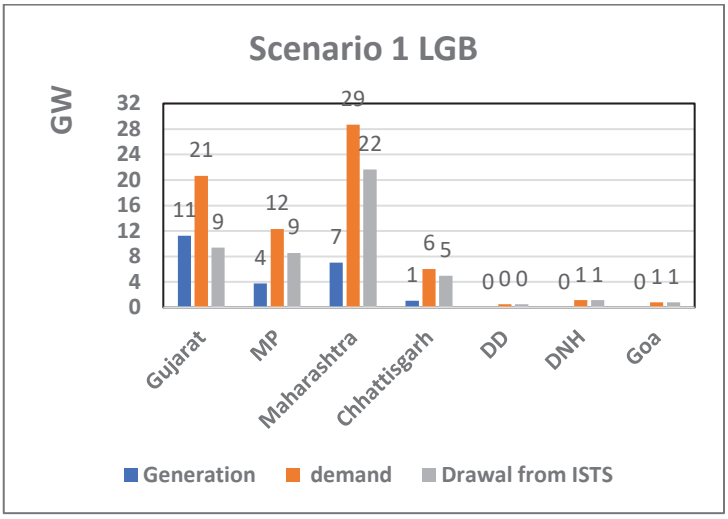
Table 5-5: Drawl of various states from ISTS grid

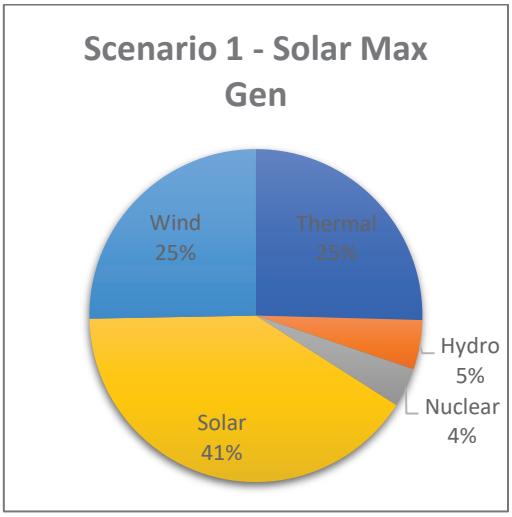
(All Fig in MW)

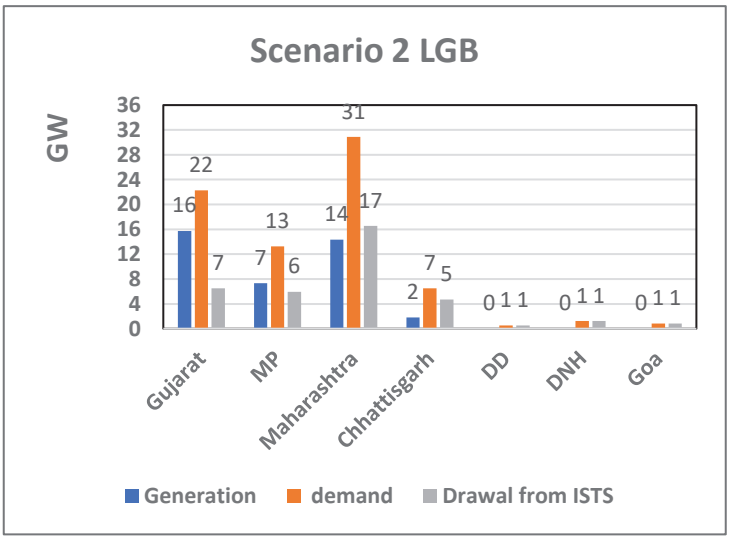
Drawal from ISTS	Aug'26			Jun'26			Feb'27		
Scenario / State	1	2	3	4	5	6	7	8	9
	Solar Max	Peak Load	Off Peak	Solar Max	Peak Load	Off Peak	Solar Max	Peak Load	Off Peak
Gujarat	9401	6500	3875	14824	11615	10841	15439	10948	10728
MP	8558	5936	6047	9528	6438	7558	16550	13415	7701
Maharashtra	21630	16533	17797	23323	18333	18490	25548	19506	15973
Chhattisgarh	4990	4715	4762	4420	4163	4260	4545	3593	2862
DD	495	533	430	503	520	392	488	440	298
DNH	1151	1239	998	1184	1224	922	1178	1061	718
Goa	794	855	689	894	924	696	876	789	534
Central	-34847	-29602	-26976	-37532	-30962	-28172	-32296	-24058	-20080
IPP	-10120	-23790	-23234	-13866	-33684	-32593	-20268	-33684	-27332
Total	2053	-17079	-15612	3278	-21428	-17606	12060	-7989	-8598

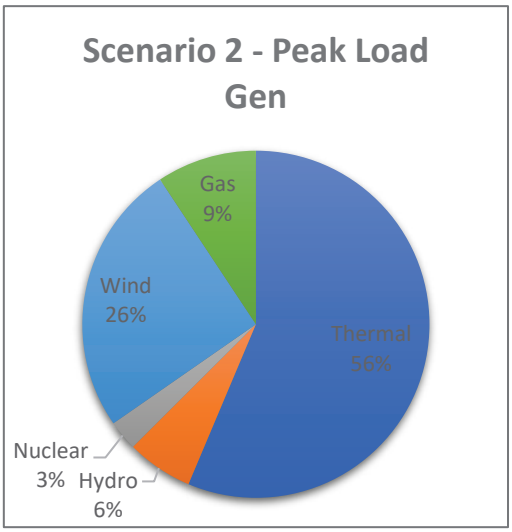
5.3.1 Monsoon Aug'26

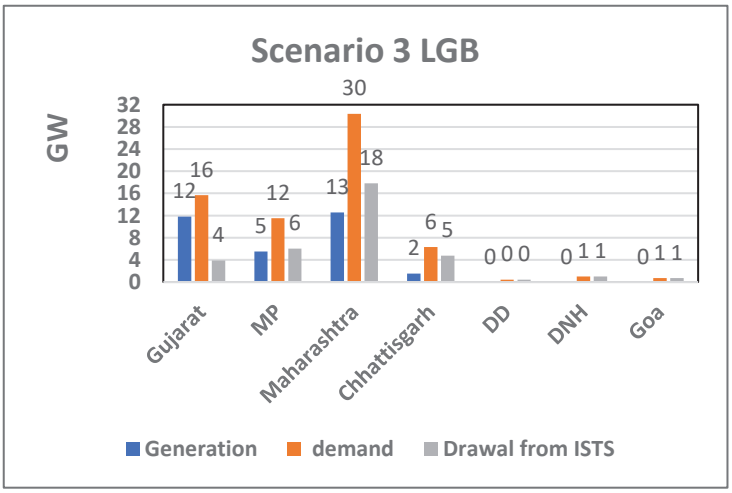
Figure 5-1: LGB for Monsoon Aug'26

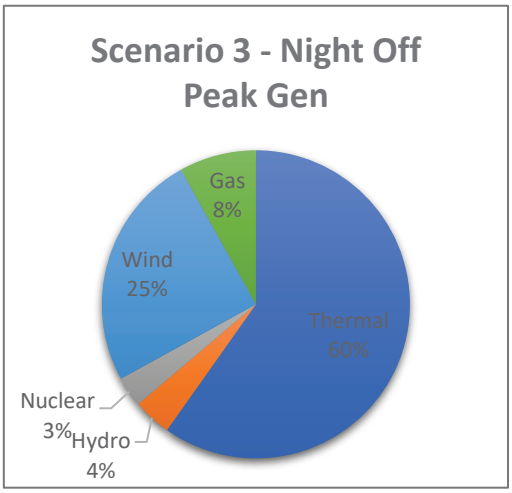






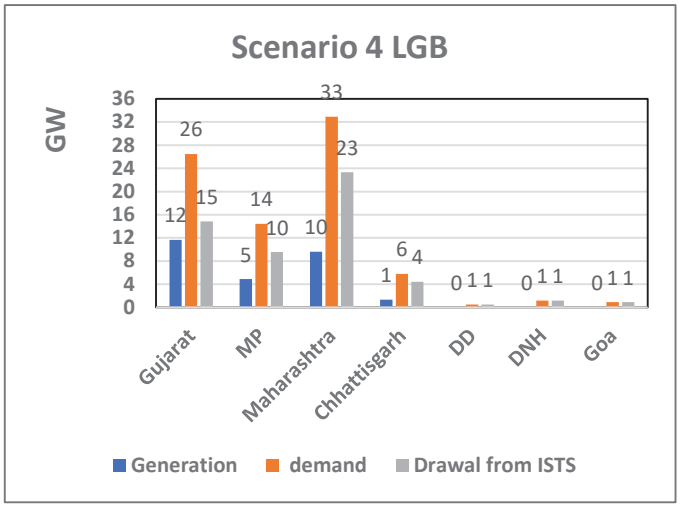


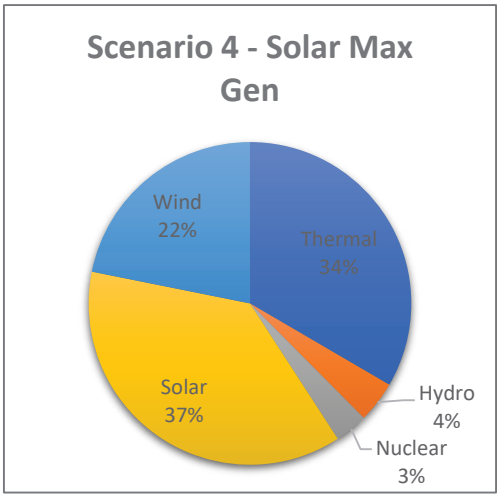


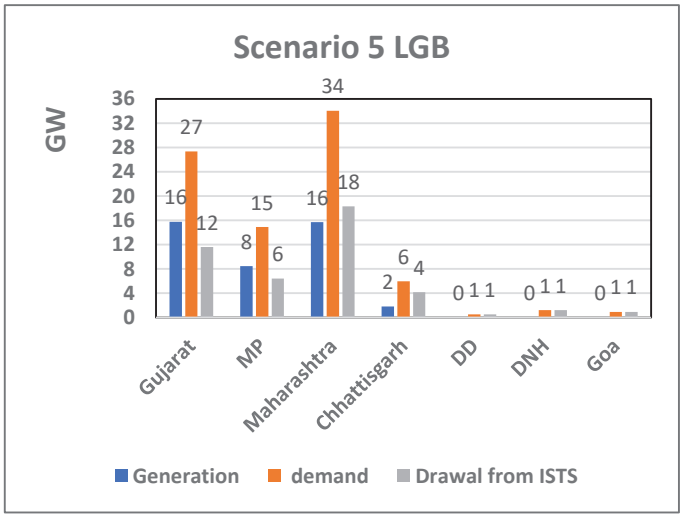


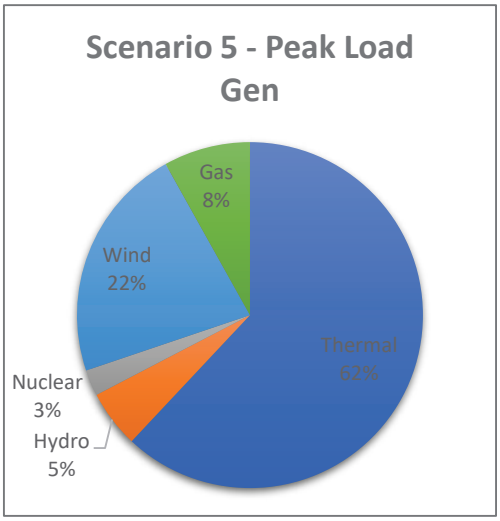
5.3.2 Summer Jun '26

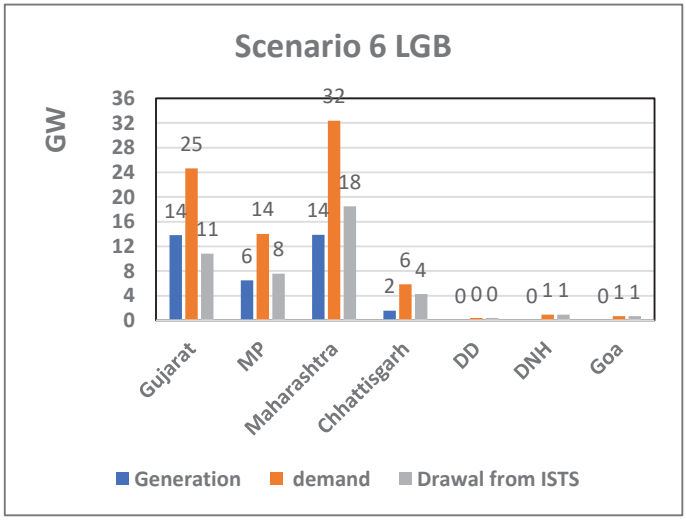
Figure 5-2: LGB for Summer Jun'26

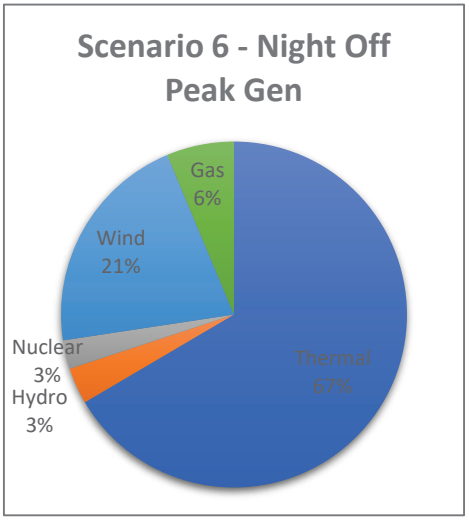






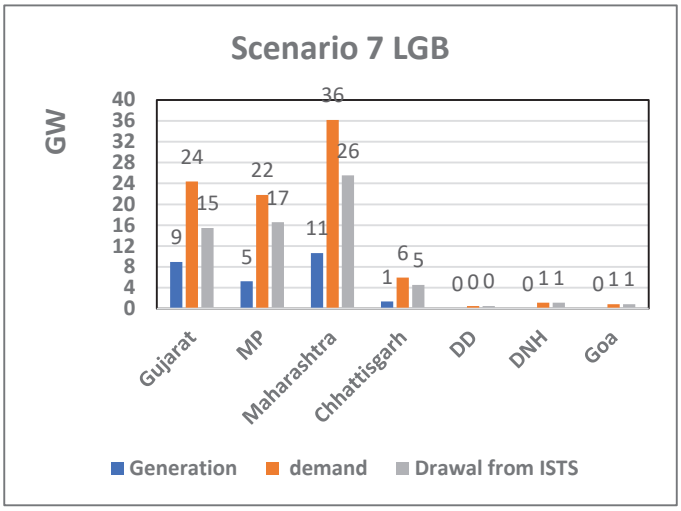


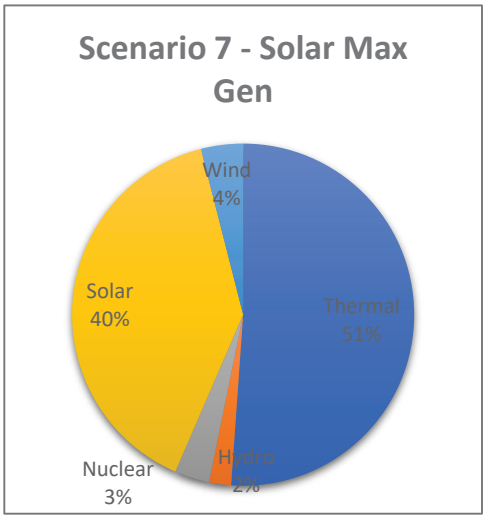


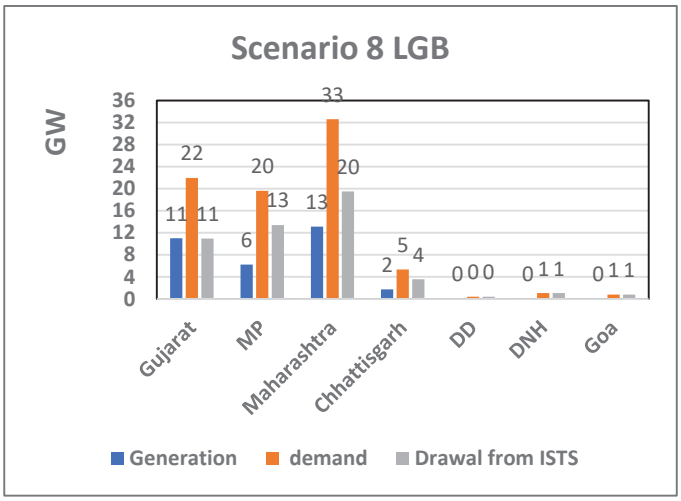


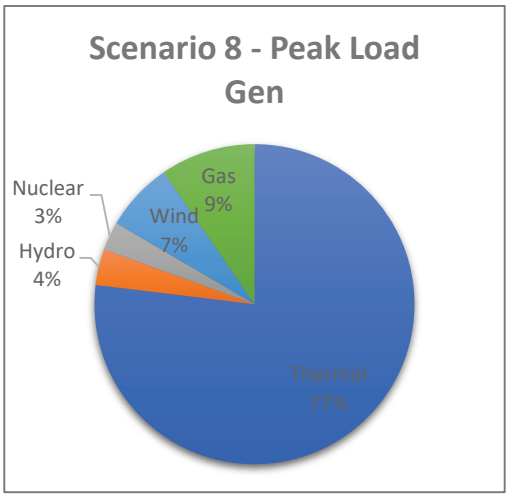
5.3.3 Winter Feb '27

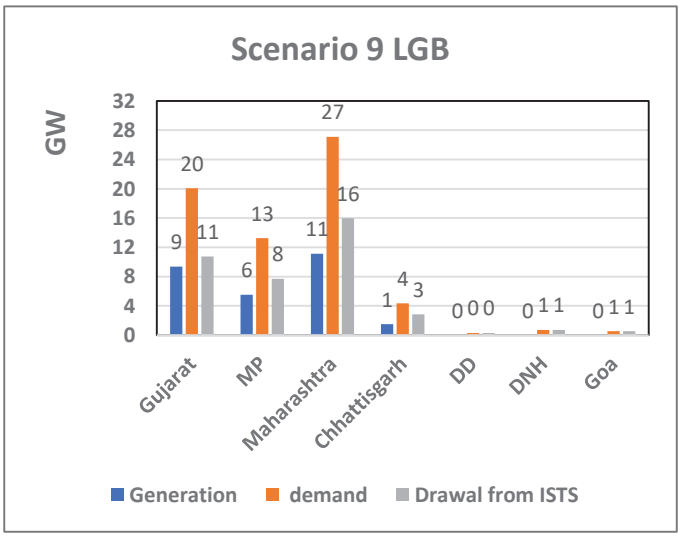
Figure 5-3: LGB for Winter Feb'27

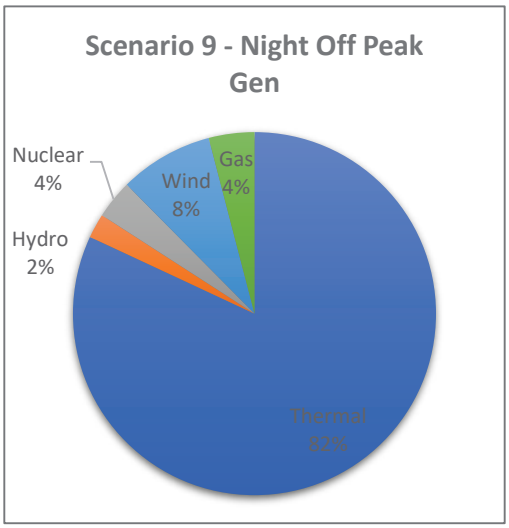












Out of these nine scenarios, Scenario-5 and Scenario-7 corresponds to two extreme cases with respect to import/export i.e. highest import (12GW) and highest export (21GW) scenarios respectively. In all other scenarios, import /export from Western Region to other regions is varying between these two extremes.

Detailed system studies have been carried out on the finalized load flow cases. The study results are discussed in subsequent chapters.

5.4 ISTS Network

Various transmission systems have been evolved for implementation in the Consultative Meeting for Evolution of Transmission System of WR (CMETS-WR) from Nov 2021 to Feb 2022. These schemes have either been approved or under various stages of approval. The details of the schemes including other important issues in regard to ISTS in the Western Region which were discussed during this timeframe has also been summarized below:

5.4.1 Gujarat:

GETCO vide letter dated 26.10.2021 had highlighted certain issues being faced in Gujarat which require ISTS system strengthening to increase ATC such as constraints observed on Vadodara 765/400kV ICTs, Kala – Kudus 400kV D/c line and Banaskantha – Veloda (Sankhari) 400kV D/c line. Hence, GETCO requested that system strengthening scheme in Gujarat needs to be evolved in such a manner that it is able to cater to RE evacuation from Khavda area as well as to enhance Gujarat system ATC for drawl of power from ISTS under peak load scenario (low RE). Accordingly, system studies were conducted in the 1st Joint study meeting on Transmission Planning for Western Region held on 05.11.2021 amongst CEA, CTU, POSOCO and GETCO and the transmission schemes in Gujarat under ISTS system were evolved:

- To meet the ATC requirement of ~16000MW of Gujarat in 2024-25 time-frame: Transmission Network Expansion scheme in Gujarat (Parts-A, B & C below)
- To cater to system strengthening requirements associated with integration of RE projects from Khavda potential RE zone

The details of finalized schemes under ISTS are given below:

a) Transmission Network Expansion in Gujarat to increase its ATC from ISTS (Part-A)

Scheme involves augmentation of transformation capacity at Vadodara (GIS) S/s by 1x 1500 MVA, 765/4000kV ICT to enhance ATC requirement of Gujarat and to mitigate network congestion under low local generation in Gujarat. In the Joint study meeting held on 05.11.2021 amongst CEA, CTU, POSOCO and GETCO to discuss various issues w.r.t. Gujarat, 3rd 765/400kV ICT at Vadodara (GIS) S/s was agreed to enhance ATC requirement of Gujarat and to mitigate network congestion under low local generation in Gujarat. The scheme was noted in the 1st WRTP (now CMETS-WR) meeting held on 29.11.2021.

Scope of work along with tentative Cost and Implementation time-frame is mentioned below in Table 5-6:

Table 5-6: Transmission Network Expansion in Gujarat to increase its ATC from ISTS (Part-A)

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Implementation timeframe
1.	Augmentation of transformation capacity at Vadodara 765/400/220kV S/s by 1x1500MVA, 765/400kV ICT (3rd) along with associated 765kV ICT bay*	765/4000 kV, 1500 MVA ICT- 1 no. 765 kV ICT bays- 1 nos.	Apr'22
	Total Estimated Cost (Rs. Crore)	**70 Cr. (approx.)**	

**Out of the 2 nos. 400kV line bays already constructed by POWERGRID for DGEN – Vadodara line, 1no. line bay to be utilized for 765/400kV ICT (3rd) at Vadodara*

Implementation time frame of Apr'22 was agreed as a special case, as discussed in the meeting convened on 02.11.2021 with respect to resource adequacy for Gujarat. The scheme was allotted to POWERGRID vide CTU OM dated 16.11.2021.

b) Transmission Network Expansion in Gujarat to increase ATC from ISTS: Part B

Scheme involves setting up of 765/400/220kV Navsari (New) S/s and its associated interconnections along with Augmentation of transformation capacity at Padghe (GIS) 765/400 kV substation by 1x1500 MVA ICT to enhance ATC requirement of Gujarat and to mitigate network congestion under low local generation in Gujarat. The scheme was agreed in the Joint study meeting held on 05.11.2021 amongst CEA, CTU, POSOCO and GETCO to discuss various issues w.r.t. Gujarat and in the 7th NCT meeting held on 03.12.2021. The scheme was noted in the 1st WRTP (now CMETS-WR) meeting held on 29.11.2021.

Scope of work along with tentative Cost and Implementation time-frame is mentioned below in Table 5-7:

Table 5-7: Transmission Network Expansion in Gujarat to increase ATC from ISTS: Part B

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Implementation timeframe
1.	Establishment of 765/400/220 kV Navsari (new) (South Gujarat) S/s (GIS) Space provisions for Future Scope 765/400 kV ICT: 4 nos. 400/220 kV ICT: 4 nos. 765 kV line bays along with space for switchable line reactor: 8 nos. 400 kV line bays along with space for switchable line reactor: 6 nos. 220 kV line bays: 16 nos.	765/400 kV, 1500 MVA- 2 nos. (7 X 500 MVA inc 1 spare unit) 400/220 kV, 500 MVA- 3 nos. 765 kV ICT bays- 2 nos. 765 kV GIS line bays -2 (for Phadge line) 400 kV ICT bays- 5 nos. 400 kV line bays – 4 nos. (for Kala and Magarwada lines) 220 kV ICT bays- 3 nos. 765 kV, 330 MVAr BR – 2 nos. (7 X 110 MVAr inc. 1 switchable spare unit) 1X 80 MVAr single phase switchable spare unit (for Ahmedabad – Navsari (New) (South Gujarat) 765 kV D/c line) 765 kV Bus Reactor bays – 2 nos. 400 kV, 125 MVAr Bus Reactor- 1 400 kV Bus Reactor bay- 1 no.	Jun'23
2.	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.	110 km 400 kV GIS line bays- 2 nos. (at Kala) 63 MVAr, 400 kV SLR along with switching eqpts.- 2 nos	
3.	Navsari(New) (South Gujarat) (GIS) – Magarwada (GIS) 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage)	80 km 400 kV GIS line bays- 2 nos. (at Magarwada)	
4.	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.	200 km 765 kV GIS line bays -2 (at Padghe) 765 kV, 330 MVAr SLR – 2 nos (6 X 110 MVAr)	

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Implementation timeframe
5.	Augmentation of transformation capacity at Padghe (GIS) 765/400 kV substation by 1x1500 MVA ICT. The available spare equipped bays (765kV bay: existing & 400kV bay: under construction under WRSS XIX scheme) at Padghe(GIS) S/s shall be utilised for the subject ICT	765/400 kV, 1500 MVA- 1 no	
	Total Estimated Cost (Rs. Crore)	2077 Cr. (approx.)	

Note:

(i) Navsari (New) (South Gujarat) S/s shall be establishment as GIS substation to reduce the land requirement as there may be issues in getting contiguous land in this area which is industrial in nature as well as densely populated.

(ii) Augmentation of transformation capacity at Navsari(new) (GIS) 765/400 kV substation by 1x1500 MVA ICT (3rd) along with its associated bays to be implemented in matching time frame of Khavda Phase-II A (Ph-II) (5GW) scheme as a part of the scheme "Transmission Network Expansion in Gujarat associated with integration of RE projects from Khavda potential RE zone".

(iii) As Kala and Magarwada are located close to each other, majority of common stretch of Kosamba – Kala and Kosamba – Magarwada 400 kV D/c line may be constructed using Multi-circuit towers in order to save RoW.

(iv) Implementation Time-frame: June 2023

(v) GETCO shall implement the following downstream system in matching time-frame of Navsari(New) (South Gujarat) S/s:

220kV Interconnections Navsari(New) (South Gujarat) S/s) [Under Intra-state]

a) LILO of both circuits of 220 KV D/C Navsari – Chikhli line at Navsari(New) (South Gujarat) (GIS) substation along with associated line bays

b) LILO of both circuits of 220 KV D/C Navsari – Nasik line at Navsari(New) (South Gujarat) (GIS) substation along with associated line bays

The scheme was allotted to POWERGRID vide MoP OM dated 13.01.2022.

c) Transmission Network Expansion in Gujarat to increase ATC from ISTS: Part C

Scheme involves augmentation of transformation capacity at Banaskantha 765/400 kV S/s by 1x1500 MVA ICT and Banaskantha – Sankhari 400 kV 2nd D/c line to enhance ATC requirement of Gujarat and to mitigate network congestion under low local generation in Gujarat. The scheme was agreed in the Joint study meeting held on 05.11.2021 amongst CEA, CTU, POSOCO and GETCO to discuss various issues w.r.t. Gujarat and in the 7th NCT meeting held on 03.12.2021. The scheme was noted in the 1st WRTP (now CMETS-WR) meeting held on 29.11.2021.

Scope of work along with tentative Cost and Implementation time-frame is mentioned below in Table 5-8:

Table 5-8: Transmission Network Expansion in Gujarat to increase ATC from ISTS: Part C

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Implementation timeframe
1.	Augmentation of transformation capacity at Banaskantha 765/400 kV S/s by 1x1500 MVA ICT	765/400 kV, 1500 MVA ICT: 1 no. 765 kV ICT bay – 1no 400 kV ICT bay– 1 no	Matching with establishment of Prantij 400/220 kV and Sankhari-Prantij 400 kV D/C line by GETCO (presently expected by Mar'25).
2	Banaskantha – Sankhari 400 kV 2nd D/c line	26 km 400 kV line bays- 4 nos. (2 nos. at Banaskantha and 2 nos. at Sankhari)	
	Total Estimated Cost (Rs. Crore)	**148 Cr. (approx.)**	

The scheme was allotted to POWERGRID vide NCT letter dated 22.12.2021.

d) Transmission Network Expansion in Gujarat associated with integration of RE projects from Khavda potential RE zone

The project involves Banaskantha – Ahmedabad 765 kV D/c line so as to facilitate integration of RE Projects under Khavda Phase-A (Ph-II) (5GW). The scheme was agreed in the Joint study meeting held on 05.11.2021 amongst CEA, CTU, POSOCO and GETCO to discuss various issues w.r.t. Gujarat and in the 7th NCT meeting held on 03.12.2021. The scheme was noted in the 1st WRTP (now CMETS-WR) meeting held on 29.11.2021.

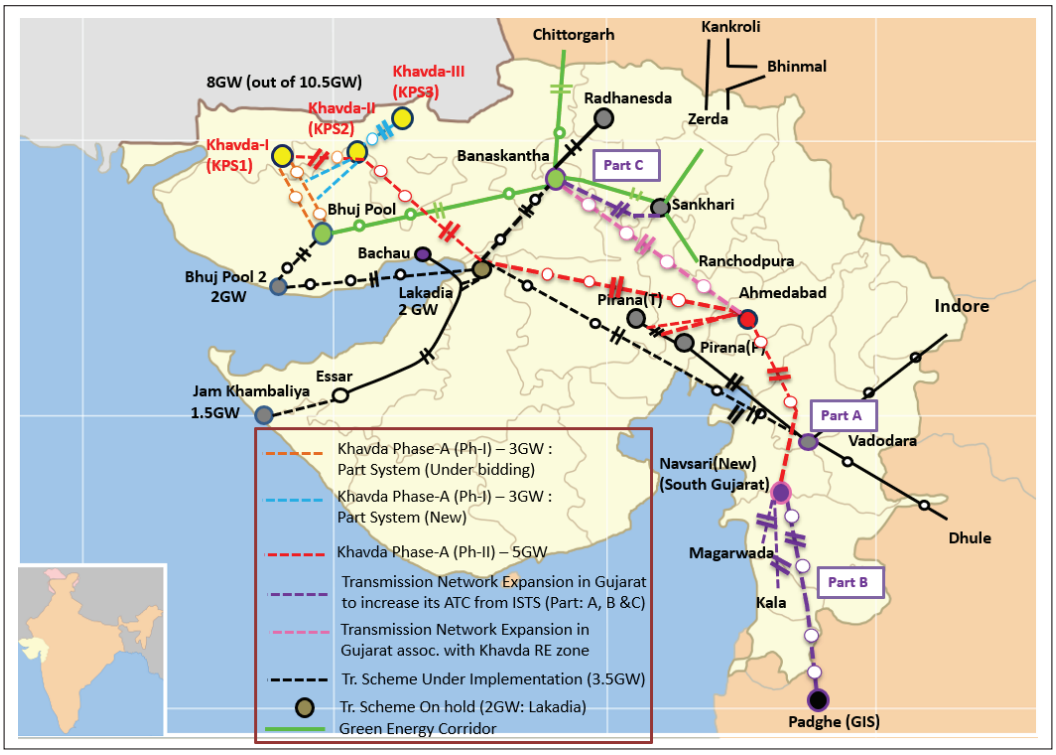
Scope of work along with tentative Cost and Implementation time-frame is mentioned below in Table 5-9:

Table 5-9: Transmission Network Expansion in Gujarat associated with integration of RE projects from Khavda potential RE zone

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Implementation timeframe
1.	Banaskantha – Ahmedabad 765 kV D/c line with 330MVAr, 765 kV Switchable line reactor on each ckt at Ahmedabad S/s end	200 km 765 kV, 330 MVAr SLR along with switching eqpts. – 2 nos (6 X 110 MVAr) 765 kV line bays- 4(2 nos. at Banaskantha and 2 nos. at Ahmedabad)	Matching with Khavda Phase-A (Ph-II) (5GW) scheme. NCT has recommended a time-line of 24 months from SPV Transfer for Khavda Phase-A (Ph-II) (5GW) scheme
	Total Estimated Cost (Rs. Crore)	**953 Cr. (approx.)**	

The scheme is currently under tendering process as per MoP Gazette dated 17.01.2022 with RECPDCL as the Bid Process Coordinator.

Figure 5-4:Schematic for Transmission Network Expansion in Gujarat to increase ATC from ISTS: Parts A, B & C and integration of RE projects from Khavda potential RE zone



Other Schemes:

e) Scheme for fault level control at Dehgam (PG) & Ranchodpura (GETCO) S/s

The project involves bypassing of Rachhodpura(GETCO) – Dehgam(PG) 400kV D/c line at Dehgam(PG) S/s and connecting it with Dehgam(PG) – Pirana 400kV D/c line (one circuit via Nicol) to form Ranchhodpura(GETCO) – Pirana(PG) 400kV D/c line (one circuit via Nicol). The scheme has been evolved for fault level control at Dehgam (PG) & Ranchhodpura (GETCO) S/s after deliberations in the 2nd CMETS-WR meeting held on 28.12.2021. Studies were carried out for the 2024-25 time-frame and the fault level at Dehgam S/s (PG) & Ranchhodpura S/s (GETCO) was observed to reach about 47kA & 41kA respectively as against its design rating of 40kA. At Dehgam S/s, there is more than 20kA contribution from Ranchhodpura (Vadavi) and Pirana/Nicol(Torrent) 400kV lines. In order to control the fault levels at Dehgam (PG) & Ranchhodpura (GETCO) S/s, the proposed bypassing scheme has been evolved. After the implementation above scheme, the fault level at 400kV buses at Dehgam S/s (PG) & Ranchhodpura S/s (GETCO) is observed to reach about 31kA & 38kA respectively (within limits).

Scope of work along with tentative Cost and Implementation time-frame is mentioned below in Table 5-10:

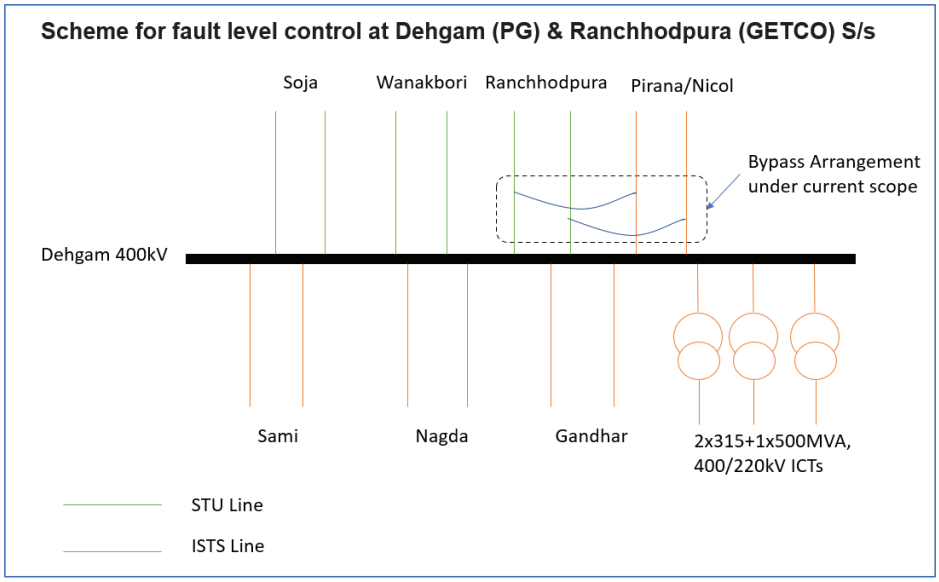
Table 5-10: Scheme for fault level control at Dehgam (PG) & Ranchodpura (GETCO) S/s

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Implementation timeframe
1.	Bypassing of Rachhodpura (GETCO) – Dehgam (PG) 400kV D/c line at Dehgam (PG) S/s and connecting it with Dehgam(PG) – Pirana 400kV D/c line (one circuit via Nicol) so as to form Ranchhodpura(GETCO) – Pirana(PG) 400kV D/c line (one circuit via Nicol). Note: 400 kV D/c Dehgam-Ranchodpura line is crossing with 400kV D/c Dehgam–Pirana line near the boundary wall of substation premises (tower 2 & 3 of Ranchorpura line and tower 3 & 4 of Pirana line from Dehgam SS end). It is possible to disconnect both the lines towards the Dehgam end and join with each other so that the 400kV D/c Ranchhodpura –Pirana line shall be established.		6 months from the issue of OM by CTUIL
		Total Estimated Cost:	**Less than INR 1 Crore@**

@since no extra Tower is required as per communication received from POWERGRID

The scheme was allotted to POWERGRID vide CTU OM dated 03.02.2022

Figure 5-5: Schematic for fault level control at Dehgam(PG) & Ranchodpura(GETCO) substations



5.4.2 Chhattisgarh

CSPTCL vide letter dated 02.08.2021 had intimated the following issues being faced when power demand of Chhattisgarh is more than 4600 MW:

i. Overloading of 2x315 MVA, 400/220 kV ICTs at NSPCL, Bhilai

ii. Overloading of 2x315 MVA ICTs at 400/220 kV ICTs at Bhatapara (PG) S/s

iii. Overloading of 2x315 MVA ICTs at 400/220 kV ICTs at Raigarh (PG) S/s

iv. Reduction in central sector drawl of Chhattisgarh due to opening of 400 kV Korba (NTPC) - Korba West line to limit the fault current at NTPC Korba

v. Increase in Central Sector share without any additional ISTS interconnection

The matter was deliberated in the 2nd Joint Study Meeting on Transmission Planning for Western Region was held on 10.12.2021 amongst CEA, CTU, WRPC, POSOCO and CSPTCL to discuss transmission network augmentation w.r.t. Chhattisgarh and that a number of ISTS and Intra-state schemes were finalized in the above joint study meeting to resolve the issues. The details of finalized schemes under ISTS is given below:

a) Western Region Expansion Scheme-XXVII (WRES-XXVII)

The scheme involves Raipur Pool – Dhamtari 400 kV D/c line. The scheme was planned in the 2nd Joint study meeting on Transmission Planning for Western Region on 10.12.2021 & 2nd CMETS-WR meeting held on 28.12.2021 for improvement of import capability of Chhattisgarh and reliability of power supply to Dhamtari S/s of CSPTCL and for relieving loading on NSPCL ICTs which are critically loaded in present time-frame.

Scope of work along with tentative Cost and Implementation time-frame is mentioned below in Table 5-11. The scheme has been sent to NCT for approval in its ensuing meeting.

Figure 5-6: Schematic for Western Region Expansion Scheme-XXVII (WRES-XXVII)

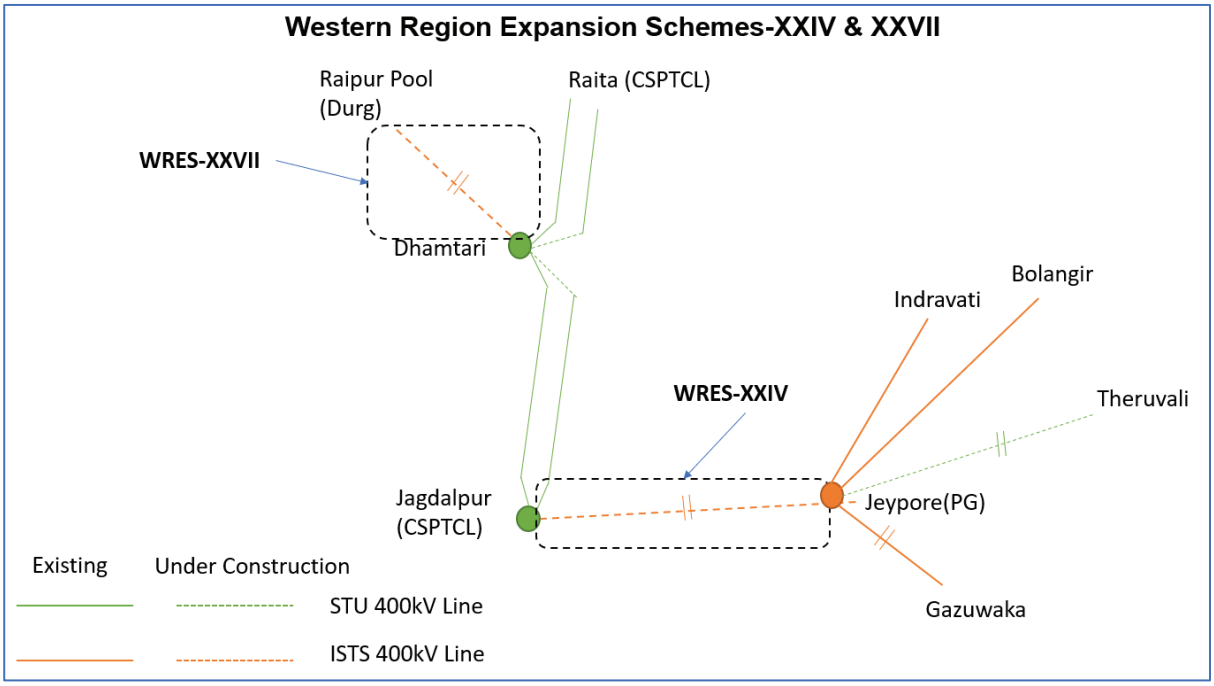


Table 5-11: Western Region Expansion Scheme-XXVII (WRES-XXVII)

b) Western Region Expansion Scheme-XXVIII (WRES-XXVIII)

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Implementation timeframe
1.	Raipur Pool – Dhamtari 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage) along with associated bays at both ends	80km. 2 no. of 400kV line bays at Raipur PS (POWERGRID) S/s 2 no. of 400kV line bays at Dhamtari (CSPTCL) S/s	Matching with downstream system mentioned at Note* below (expected progressively by Mar'24)
		Total Estimated Cost:	**Rs. 260 Crore**

Note: Dhamtari(Kurud) – Gurur 220 kV D/c (2nd) line (Dec'23) 3rd 400/220kV, 315MVA ICT at Dhamtari S/s (Mar'24)

The scheme involves Creation of 220 kV level (GIS) at 765/400 kV Raipur Pool S/s with 3x500MVA 400/220kV ICTs along with 8 nos. 220kV line bays as well as Conversion of 2x240MVAr Non-switchable line reactors at Raipur PS (associated with Raipur PS – Champa PS 765kV ckts 1 & 2) into Switchable line reactors along with NGR bypass arrangement. The scheme was planned in the 2nd Joint study meeting on Transmission Planning for Western Region on 10.12.2021 & 3rd CMETS-WR meeting held on 31.01.2022 to:

- Facilitate drawl of power at 220kV level from 765/400 kV Raipur Pool S/s as well as provide direct feed to Borjhara/Urla area, which are major load centres in Chhattisgarh, so as to ease power flow on Raipur(PG) 400/220kV ICTs (existing).
- Facilitate flexibility in system operation so that the 2x240MVAr line reactors at Raipur PS (associated with for Raipur PS – Champa PS 765kV ckts 1 & 2) may be utilized as bus reactors for voltage control at Raipur PS after line opening.

Scope of work along with tentative Cost and Implementation time-frame is mentioned below in Table 5-12:

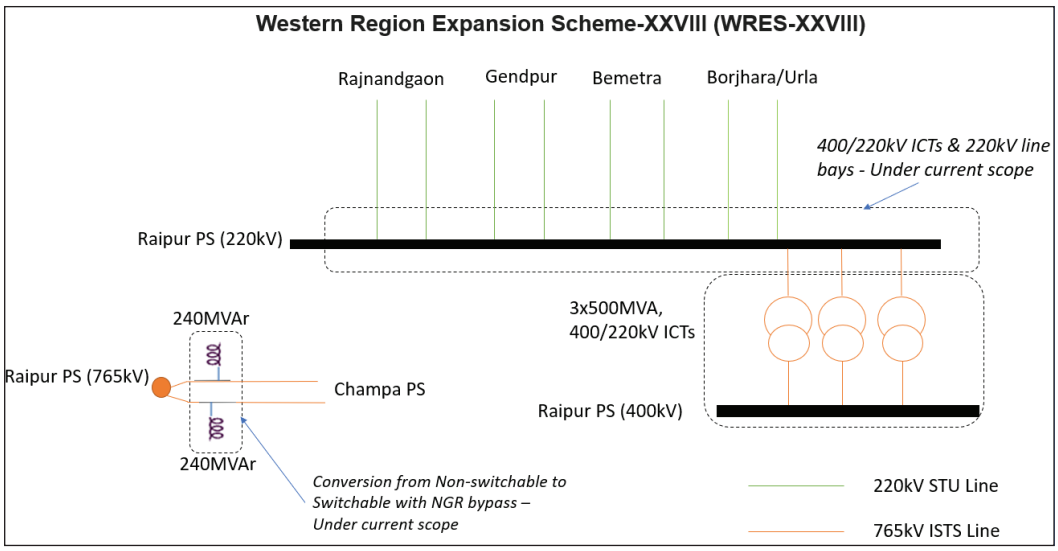
Table 5-12: Western Region Expansion Scheme-XXVIII (WRES-XXVIII)

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Implementation timeframe
1.	Creation of 220 kV level (GIS) at 765/400 kV Raipur Pool S/s with Installation of 2x500 MVA, 400/220 kV ICTs along with associated ICT bays (220kV-GIS)	500MVA, 400/220kV ICT: 2 nos. 400kV ICT bays: 2 nos. 220kV ICT bays: 2 nos. (GIS)	Dec'23
2	2 nos. 220kV line bays (GIS) at Raipur Pool S/s for termination of Raipur Pool – Rajnandgaon 220 kV D/c line	220kV line bays: 2 nos. (GIS)	Dec'23
3	Augmentation of 1x500 MVA, 400/220 kV ICT at Raipur Pool S/s along with associated ICT bays (220kV-GIS)	500MVA, 400/220kV ICT: 1 no. 400kV ICT bays: 1 no. 220kV ICT bays: 1 no. (GIS)	Mar'24
4	6 nos. 220kV line bays (GIS) at Raipur Pool S/s for termination of various lines planned by CSPTCL*	220kV line bays: 6 nos. (GIS)	Mar'24
5	Conversion of 2x240MVAr Non-switchable line reactors at Raipur PS (associated with Raipur PS – Champa PS 765kV ckts 1 & 2) into Switchable line reactors along with NGR bypass arrangement	Switching equipment along with NGR bypass arrangement – 2 nos.	Jun'23
		Total Estimated Cost:	**Rs. 193 Crore**

Raipur Pool – Gendpur 220 kV D/c line, Raipur Pool – Bemetra 220 kV D/c line and LILO of Borjhara – Urla 220kV S/c line at Raipur Pool (To be implemented by CSPTCL by Mar'24)

The scheme has been sent to NCT for approval in its ensuing meeting.

Figure 5-7: Schematic for Western Region Expansion Scheme-XXVIII (WRES-XXVIII)



c) Western Region Expansion Scheme-XXIX (WRES-XXIX)

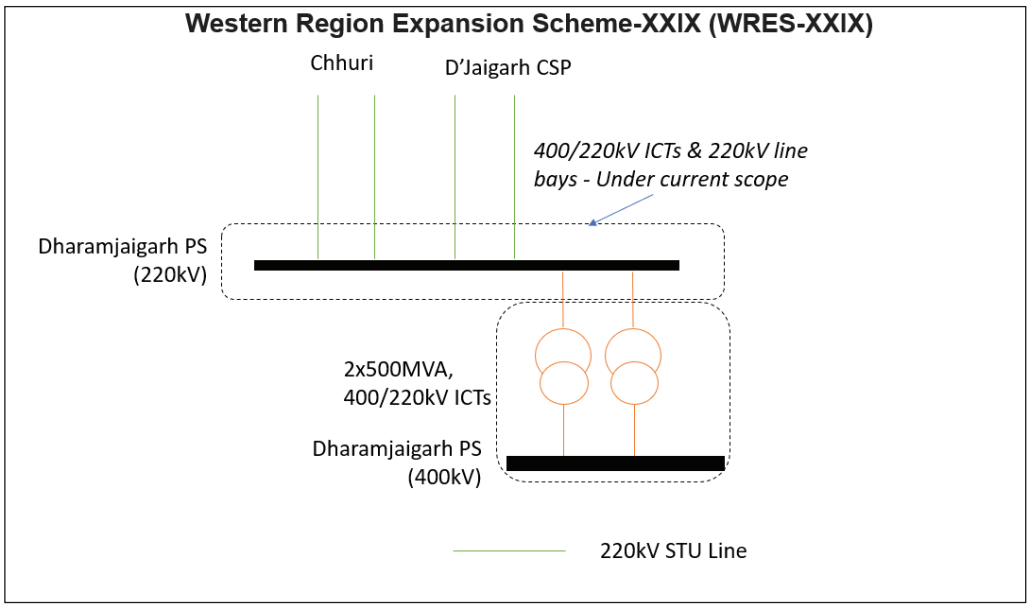
The scheme involves Creation of 220 kV level at 765/400 kV Dharamjaigarh S/s with Installation of 2x500 MVA, 400/220 kV ICTs along with 4 nos. 220kV line bays. The scheme was planned in the 2nd Joint study meeting on Transmission Planning for Western Region on 10.12.2021 & 3rd CMETS-WR meeting held on 31.01.2022 to facilitate drawl of power at 220kV level from 765/400 kV Dharamjaigarh S/s to Chhuri & Dharamjaigarh CSP substations of CSPTCL.

Scope of work along with tentative Cost and Implementation time-frame is mentioned below in Table 5-13. The scheme has been sent to NCT for approval in its ensuing meeting.

Table 5-13: Western Region Expansion Scheme-XXIX (WRES-XXIX)

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Implementation timeframe
1.	Creation of 220 kV level at 765/400 kV Dharamjaigarh S/s with Installation of 2x500 MVA, 400/220 kV ICTs along with associated ICT bays	500MVA, 400/220kV ICT: 2 nos. 400kV ICT bays: 2 nos. 220kV ICT bays: 2 nos.	Mar'24
2	2 nos. 220kV line bays at Dharamjaigarh S/s (for termination of Dharamjaigarh – Chhuri 220 kV D/c line)	220kV line bays: 2 nos.	Mar'24
3	2 nos. 220kV line bays at Dharamjaigarh S/s (for termination of Dharamjaigarh – Dharamjaigarh CSP 220 kV D/c line)	220kV line bays: 2 nos.	Dec'24
		Total Estimated Cost:	**Rs. 115 Crore**

Figure 5-8: Schematic for Western Region Expansion Scheme-XXIX (WRES-XXIX)



Inter-Regional Scheme:

d) Western Region Expansion Scheme-XXIV (WRES-XXIV)

The scheme involves Jeypore – Jagdalpur 400kV D/c line between WR & ER. The scheme was planned in the 2nd Joint study meeting on Transmission Planning for Western Region on 10.12.2021, 2nd CMETS-ER meeting held on 27.12.2021 & 2nd CMETS-WR meeting held on 28.12.2021 to facilitate reliability of power supply to Jagdalpur S/s of CSPTCL and Jeypore S/s of POWERGRID, enhance short circuit strengths of Jagdalpur and Jeypore S/s as well as to augment Inter-regional capacity between WR & ER Grids.

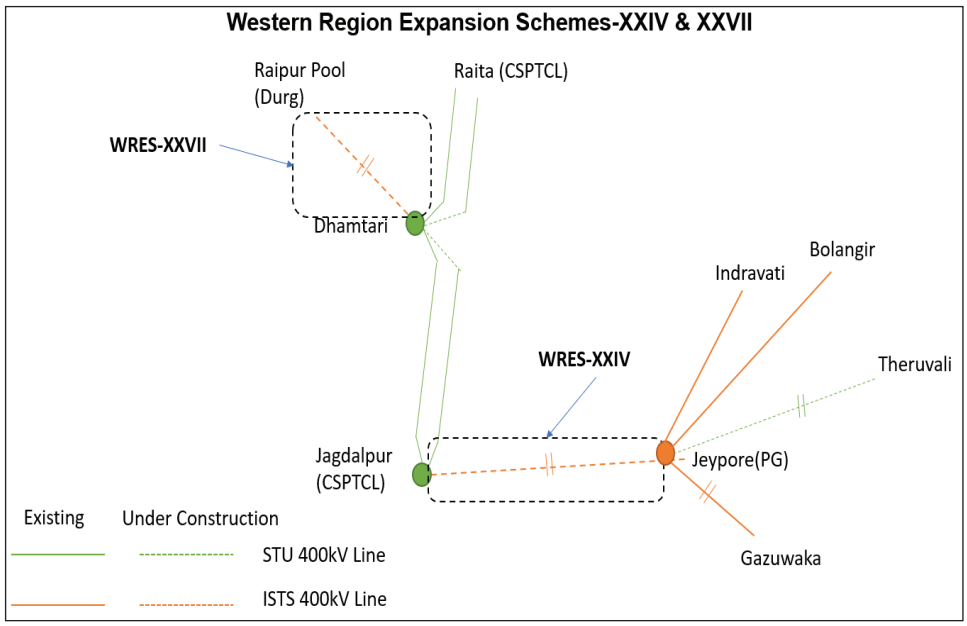
Scope of work along with tentative Cost and Implementation time-frame is mentioned below in Table 5-14:

Table 5-14: Western Region Expansion Scheme-XXIV (WRES-XXIV)

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Implementation timeframe
1.	Jeypore – Jagdalpur 400kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage) along with associated bays at both ends	80km. 2 no. of 400kV GIS line bays at Jeypore (POWERGRID) S/s 2 no. of 400kV line bays at Jagdalpur (CSPTCL) S/s	24 months from allocation to implementing agency / SPV Transfer (as the case may be) or matching with WRES-XXVII (anticipated by Mar-24), whichever is later
		Total Estimated Cost:	**Rs. 293 Crore**

The scheme has been sent to NCT for approval in its ensuing meeting.

Figure 5-9: Schematic for Western Region Expansion Scheme-XXIV (WRES-XXIV)



Other Schemes:

e) Western Region Expansion Scheme-XXV (WRES-XXV)

The scheme involves Augmentation of transformation capacity at Raigarh(Kotra) by 1x1500MVA, 765/400kV ICT at Section-A (3rd ICT on Section A) and by 2x1500MVA, 765/400kV ICTs at Section-B (3rd & 4th ICTs on Section B) along with associated ICT bays. The scheme was agreed in the 2nd CMETS-WR meeting held on 28.12.2021 to facilitate N-1 compliancy of the 765/400kV ICTs at Raigarh (Kotra) S/s under various operating conditions (after bus split arrangement).

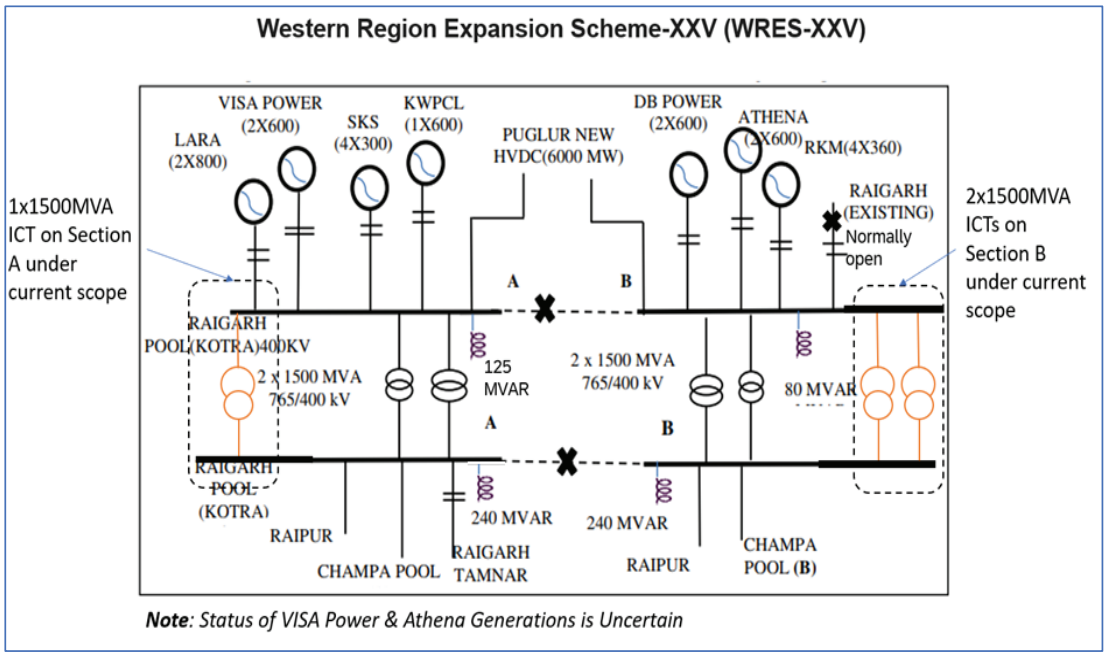
Scope of work along with tentative Cost and Implementation time-frame is mentioned below in Table 5-15:

Table 5-15: Western Region Expansion Scheme-XXV (WRES-XXV)

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Implementation timeframe
1.	Augmentation of transformation capacity at Raigarh(Kotra) by 1x1500MVA, 765/400kV ICT at Section-A (3rd ICT on Section A) and by 2x1500MVA, 765/400kV ICTs at Section-B (3rd & 4th ICTs on Section B) along with associated ICT bays	Raigarh(Kotra) Section-A • 765/400kV ICT: 1x1500MVA • 765kV ICT bay: 1 no. • 400kV ICT bay: 1 no. Raigarh(Kotra) Section-B • 765/400kV ICT: 2x1500MVA • 765kV ICT bay: 2 nos. • 400kV ICT bay: 2 nos.	12 months from date of allocation to implementing agency
		Total Estimated Cost:	**Rs. 210 Crore**

The scheme has been sent to NCT for approval in its ensuing meeting.

Figure 5-10: Schematic for Western Region Expansion Scheme-XXV (WRES-XXV



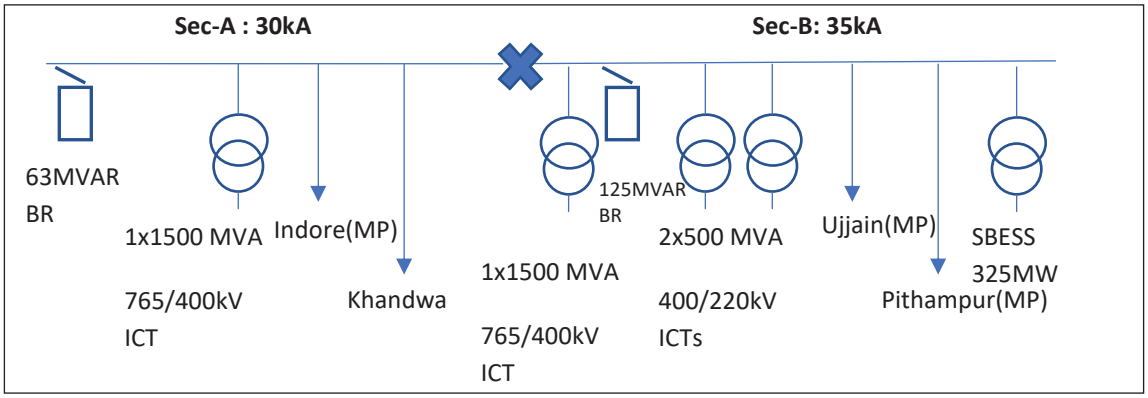
5.4.3 Madhya Pradesh:

a) Scheme to control fault level at Indore S/s

The project involves the implementation of 400kV Bus splitting of 765/400/220 kV Indore substation into two sections A & B to contain short circuit level of 400 kV bus within the designed rating of 40 kA. Indore 765/400/220 kV S/s in MP acts as a node for the transfer of power from generation projects in MP and Gujarat to load centers in MP through high capacity 400 kV and 765 kV networks. A large number of RE generation projects are coming up in Gujarat whose power is getting dispersed through various substations (at 765kV level) including Indore (PG) for onward transfer of power to other parts of the grid resulting in high short circuit levels of the interconnected grid. As per system studies, short circuit level at Indore (PG) 400 kV substation in 2022-2023 time-frame crosses 50 kA which is designed for 40 kA. Even in the current time frame, the fault level is about 42 kA.

The above issue was deliberated in the 3rd WRPC(TP) meeting held on 14.06.2021, 5th NCT meeting held on 25.08.2021 & 02.09.2021 & 1st meeting for Western Region Transmission Planning (WRTP) held on 29.11.2021, wherein 400 kV Bus Splitting of 765/400/220 kV Indore substation into two sections A & B was agreed as per the schematic given below with implementation time-frame of 15 months from date of issue of OM allocating of the scope of work.

Figure 5-11: Schematic for Scheme to control fault level at Indore S/s



Scope of work along with tentative Cost and Implementation time-frame is mentioned below in Table 5-16:

Table 5-16: Scheme to control fault level at Indore S/s

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Implementation timeframe
1.	Splitting of 400 kV bus at 765/400/220 kV Indore S/s into two sections (A&B) * through 400kV Bus Sectionalizer bays (GIS) & GIS Bus duct (as per schematic given above) *Between dia (765kV ICT-2 – TIE – 125Mvar 420kV Bus reactor) and dia (63Mvar 420kv Bus Reactor – TIE – 400kV Indore MP Line)	400 kV Bus Sectionalizer bays (GIS)- 2nos. GIS Bus duct – about 300mts.	15 months from the issue of OM by CTUIL
		Total Estimated Cost:	**Rs. 15 Crore**

The scheme was allotted to POWERGRID vide CTU OM dated 29.12.2021

5.4.4 Maharashtra:

a) Upgradation of 40% FSC associated with Wardha – Aurangabad 400kV D/c line at Wardha S/s from 40kA to 50kA short circuit level.

The project involves upgradation of FSC equipment from 40kA (1s) to 50kA (1s) considering the increased fault level requirement at Wardha S/s. Transmission System associated with Mundra UMPP was envisaged for reliable evacuation of power from Mundra UMPP to its various beneficiaries and the same has been implemented by POWERGRID. Presently, all elements associated with the scheme have been commissioned by March 2021 except works associated with 40% FSC for Wardha – Aurangabad 400kV D/c (Quad) line at Wardha Substation. The FSC design was based on short circuit level of 40kA (1s).

However, the short circuit level at Wardha S/s is observed to be beyond 40kA and hence the scheme to control fault level at Wardha Substation is being implemented vide Bus splitting and reconfiguration of lines which also includes necessary modifications at Wardha substation like change of some elements including CTs (if those are not designed for 50kA fault level).

Considering the increased fault level requirement at Wardha S/s, POWERGRID vide letter dated 26.07.2021 had proposed to upgrade the above FSC from 40kA (1s) to 50kA (1s) SC level as part of "Works associated with 40% Fixed Series Compensation for Wardha – Aurangabad 400kV D/c (Quad) line at Wardha Substation" scheme for commissioning of the FSCs.

The matter was deliberated in the 1st WRTP meeting held on 29.11.2021 and it was agreed to upgrade the 40% FSC for Wardha – Aurangabad 400kV D/c (Quad) line at Wardha Substation from 40kA (1s) to 50kA (1s) SC level with an implementation time-frame of 15 months from date of issue of OM for allocation of the scope of work.

Scope of work along with tentative Cost and Implementation time-frame is mentioned below in Table 5-17:

Table 5-17: Upgradation of 40% FSC associated with Wardha – Aurangabad 400kV D/c line

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Implementation timeframe
1.	Upgradation of 40% FSC associated with Wardha – Aurangabad 400kV D/c (Quad) line at Wardha S/s from 40kA (1s) to 50kA (1s) SC level	Replacement of spark gap, MOV and bypass switch associated with the FSC#	15 months from the issue of OM by CTUIL
		Total Estimated Cost:	**Rs. 15 Crore**

based on a preliminary assessment carried out by POWERGRID and intimated in 1st WRTP meeting held on 29.11.2021.

The scheme was allotted to POWERGRID vide CTU OM dated 29.12.2021.

b) Western Region Expansion Scheme-XXVI (WRES-XXVI)

The scheme involves Creation of 220kV level (GIS) at 765/400kV Shikrapur (PGCIL) (GIS) Substation with 2x500MVA, 400/220kV ICTs and 4 nos. of 220kV line bays. The scheme has been evolved to feed demand in the vicinity of the Pune area (Ranjangaon/Khed City) through deliberations in 2nd CMETS-WR meeting held on 28.12.2021.

Scope of work along with tentative Cost and Implementation time-frame frame is mentioned below in Table 5-18:

Table 5-18: Western Region Expansion Scheme-XXVI (WRES-XXVI)

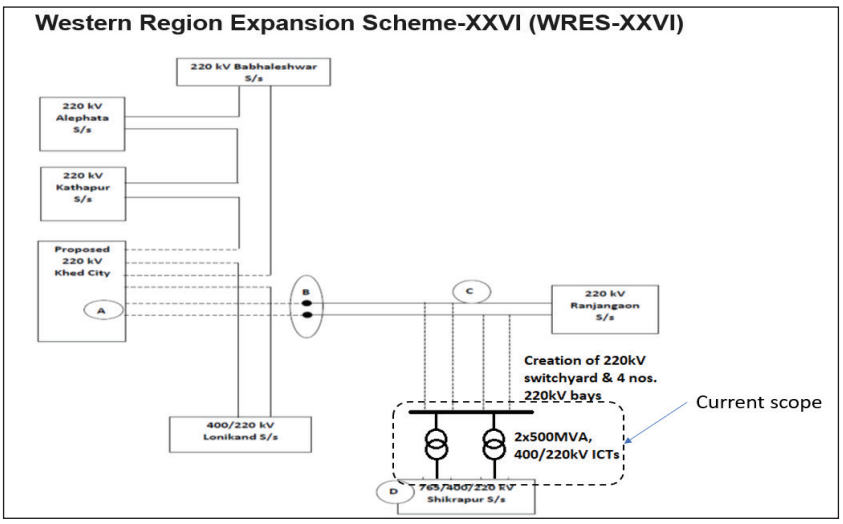
Sl. No.	Scope of the Transmission Scheme	Capacity	Implementation timeframe
1.	Creation of 220kV level (GIS) at 765/400kV Shikrapur (PGCIL) (GIS) Substation with 2x500MVA, 400/220kV ICTs and 4 nos. of 220kV line bays.	400/220kV, 500MVA ICT– 2 nos. 400kV ICT Bay (GIS) – 2nos. 220kV ICT Bay (GIS) –2nos. 220kV Line Bay (GIS) –4nos.	Mar'23#
		Total Estimated Cost:	**Rs. 95 Crore**

Note:

1. MSETCL shall ensure LILO of both circuits of 220 kV Khed City – Ranjangaon D/c line with a high capacity conductor (of minimum capacity of 400MVA/ckt at nominal voltage) at 765/400/220kV Pune GIS (Shikrapur) S/s in matching time-frame of WRES-XXVI. Further, the balance section of Pune (GIS) – Ranjangaon 220kV D/c line shall be reconductored by MSETCL in the future based on loadings on the line.
2. #POWERGRID to coordinate for implementation in matching time-frame with downstream 220kV lines of MSETCL.

The scheme was allotted to POWERGRID vide CTU OM dated 03.02.2022.

Figure 5-12: Schematic for Western Region Expansion Scheme-XXVI (WRES-XXVI)



Inter-Regional Scheme:

c) ISTS Network Expansion scheme in Western Region & Southern Region for export of surplus power during high RE scenario in Southern Region

NLDC as part of operational feedbacks has highlighted that high loadings beyond Kolhapur is observed due to multiple factors viz. high generation at Kudgi TPS, low generation at plants in southern Maharashtra, high load around Kolhapur area, high renewable (Solar) generation in Southern Region etc. In addition, number of large RE based generation projects are envisaged in Southern Region especially in the prioritized REZs of Koppal, Gadag, Karur and Tuticorin areas. Transmission system for integration and immediate evacuation of power from these REZs has already been planned and is under different phases of implementation. Stage-II Connectivity and LTA applications have already been received / granted from a number of generation projects in these areas. However, constraints are observed for export of surplus power from REZs in Southern Region to Western Region under high RE scenario in SR. To mitigate the contraints beyond Kolhapur, following ISTS network expansion between WR and SR for export of surplus power from SR has whose scope is mentioned at Table 5-19 has been finalized in the 3rd Consultation Meeting for Evolving Transmission Schemes in Southern Region held on 28.01.2022 and 3rd Consultation Meeting for Evolving Transmission Schemes in Western Region held on 31.01.2022:

Table 5-19: ISTS Network Expansion scheme in Western Region & Southern Region for export of surplus power during high RE scenario in Southern Region

Sl.	Scope of the Transmission Scheme	Capacity /km	Estimated Cost
1.	Narendra New (GIS) – Pune (GIS) 765kV D/c line with 1x330MVAr switchable line reactor on each ckt at both ends	• 765 kV line bays -2 (GIS) (at Narendra New) • 765 kV line bays -2 (GIS) (at Pune) • 765 kV, 330 MVAr SLR – 2 nos (7 X 110 MVAr incl. 1 switchable spare unit) at Pune (GIS) • 765 kV, 330 MVAr SLR – 2 nos (6 X 110 MVAr) at Narendra (New) (GIS)	2374 Cr
2.	Upgradation of Narendra (New) (GIS) to its rated voltage of 765 kV level along with 4x1500 MVA transformer and 2x330 MVAr Bus Reactor.	• 765/400 kV, 1500 MVA- 4 no. (13 X 500 MVA incl. 1 spare unit) • 765 kV ICT bays- 4 nos.(GIS) • 400 kV ICT bays- 2 nos.(GIS) ^ • 765 kV, 330 MVAr BR – 2 nos. (7 X 110 MVAr inc. 1 switchable spare unit to be used for both bus/line reactors) • 765 kV Bus Reactor bays – 2 nos. (GIS)	

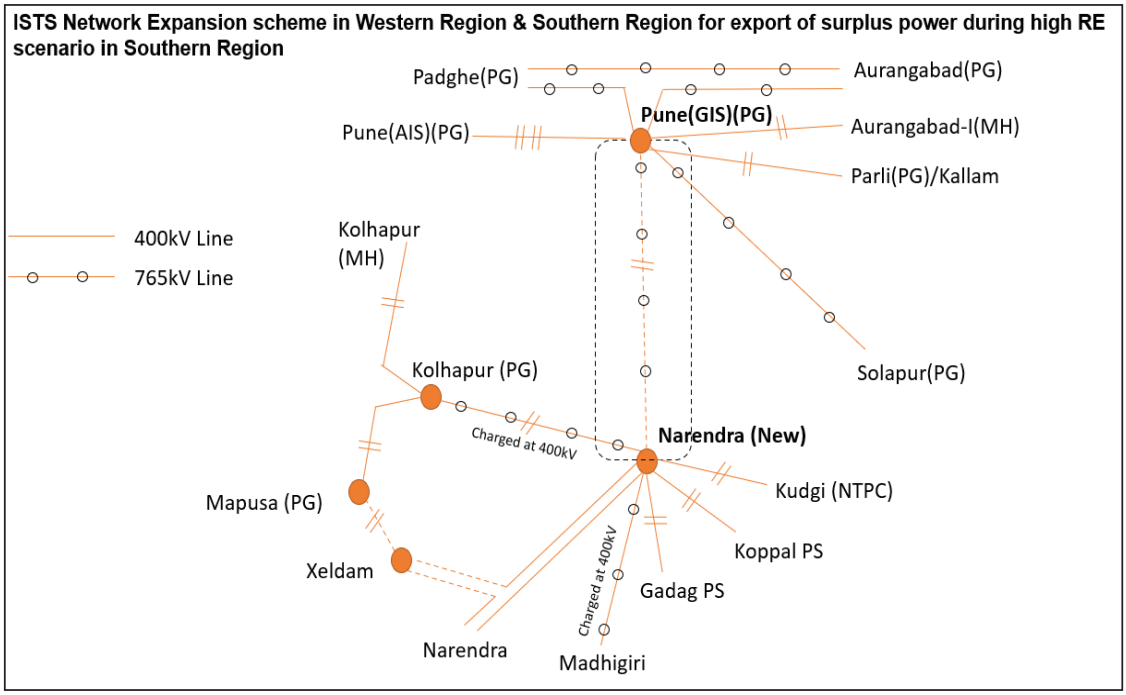
Narendra (New)(GIS) - Kolhapur 765kV D/c line to be kept charged at 400kV level
^ Two nos. equipped 400kV bays (opposite Koppal line bays) under implementation under TBCB route (Koppal WEZ scheme) to be utilised for 400kV side of 2 nos. 765/400kV Transformers

The Narendra New (GIS) – Pune 765kV D/c line may be LILOed in future at a suitable location as per requirement of MSETCL.

This scheme was also deliberated in the 40th SRPC & 41st SRPC meeting held on 31.01.2022 & 02.03.2022 and 41st WRPC meeting held on 23.02.2022. Views/Recommendation of SRPC & WRPC shall be put up to NCT and then subsequently to Ministry of Power, Government of India for approval and finalisation of the implementation modality.

Implementation Timeframe: 18 months from date of allocation to implementing agency / SPV Transfer (as the case may be)

Figure 5-13: Schematic of ISTS Network Expansion scheme in Western Region & Southern Region for export of surplus power during high RE scenario in Southern Region



5.5 System Study Analysis and Results

Based on the load-generation scenarios as elaborated in section 8.3, various system studies have been carried out in PSSE. Planned/ Under implementation Transmission system that are expected to be commissioned in 2026-27 timeframe are considered for conducting these studies. Results of these studies were analysed and the same are deliberated below-

5.5.1 Voltage Analysis

PU voltages of all 765 kV and 400 kV buses was monitored in all the nine scenarios. Maximum and minimum voltage of each bus was identified from nine voltages available in nine number of scenarios. Following 765kV & 400kV buses were observed to be having voltage more than 1.05 pu and less than 0.95pu are tabulated below at Table 5-20:

Table 5-20: Buses having more than 1.05 pu Voltage in WR

Sl. No.	Bus Name	Voltage Level	Owner	Max/Min	Scenario
Overvoltage					
1	Wardha	765	ISTS	1.05	2 and 3
2	Aurangabad	765	ISTS	1.05	2 and 3
3	Shivlakha PS	400	STU	1.06	3,8 and 9
4	Mauda	400	ISGS	1.05	2 and 3
5	Jaigad II	400	STU	1.11	1
6	Dolvi	400	STU	1.10	1
7	Wardha SP	400	ISTS	1.05	2 and 3
8	Warora Pool	400	ISTS	1.06	2 and 3
9	Wardha	400	ISTS	1.06	2 and 3
Undervoltage					
10	Jaigad II	400	STU	0.95	5,6 and 8
11	Dolvi	400	STU	0.91	5,6 and 8

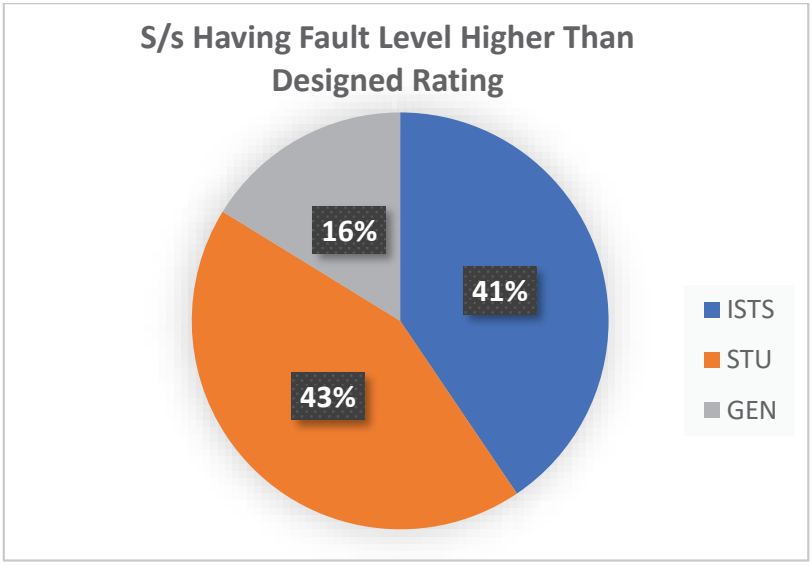
High voltages have been observed at Wardha, Aurangabad, Warora buses during during Evening & Offpeak hours due to less loading in 765kV and 400kV lines emanating from these substations. Adequate reactive compensation is being planned at above buses to control high voltage issues.

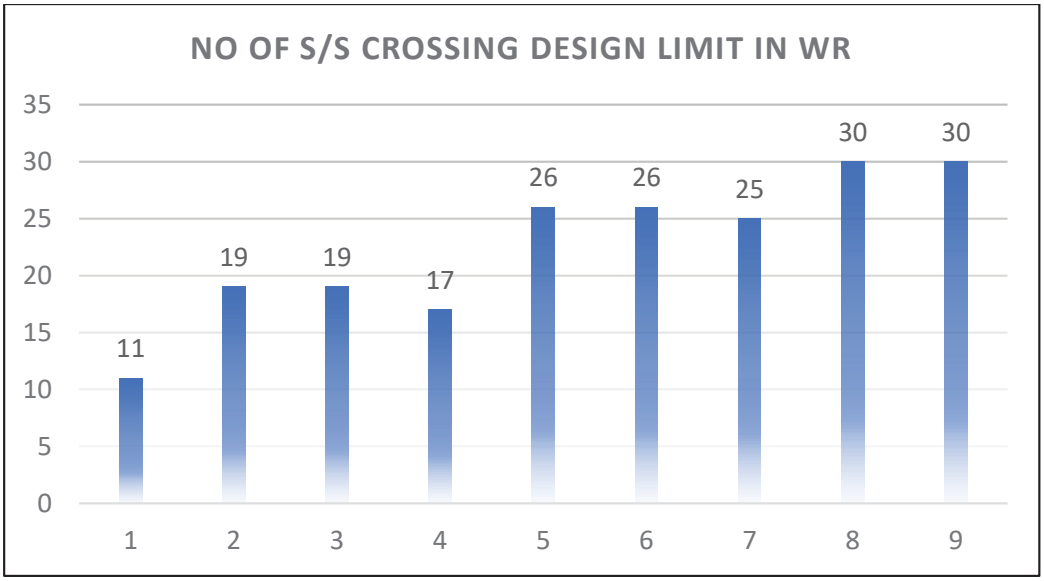
Jaigad-II and Dolvi are weak buses having low short circuit strength. Accordingly, both high voltage and low voltages are observed in accordance with generation dispatches. In addition to above, low voltages are also observed in Western part of Maharashtra (400kV Kharghar, Kalwa, Vikhroli buses) and 400kV Hazira bus. The low voltages in Western part of Maharashtra is observed due to concentration of load in these areas. Suitable capacitor bank may be installed by STUs at lower voltages to control the low voltages.

5.5.2 Short Circuit Analysis

Short circuit level was calculated for all 765 and 400 kV buses of Western Region and buses having fault level more than the design rating under various scenarios were identified. From analysis, it is emerged that there as 37 nos. of substations in WR having fault level more than designed capacity.

Figure 5-14: Substations crossing the design limit in WR





Details of the ISTS buses exceeding design fault level by more than 5% are tabulated below at Table 5-21:

Table 5-21: ISTS Buses Exceeding Designed Fault Level in Western Region

Sl. No.	Substation Name	Scenario No.	Highest Fault level (kA)	Designed Rating (kA)
1	400kV Bilaspur Pool	All	47	40
2	765kV Bilaspur Pool	2 to 9	44	40
3	765kV Bina	2 to 9	42	40
4	400kV Jabalpur	5,6,7,8,9	43	40
5	400kV Parli	All	45	40
6	400kV Padghe (GIS)	All	60	40
7	765kV Wardha	8,9	42	40

From the above, it can be seen that 7 nos. of buses i.e. 400kV & 765kV Bilaspur PS, 765kV Bina, 400kV Jabalpur, 765kV Wardha, 400kV Parli & 400kV Padghe (GIS) violates the design fault level by more than 5%. Detailed studies are being carried out and suitable measures shall be included in the next Rolling Plan.

Further, following STU buses exceed the substation design fault level by more than 5% under different scenario are mentioned at Table 5-22:

Table 5-22: STU Buses Exceeding Designed Fault Level in Western Region

Sl. No.	Substation Name	State	Scenario No.	Highest Fault level (kA)	Designed Rating (kA)
1	400kV Chorania	Gujarat	2,3,5,6,7, 8,9	44	40
2	400kV Sankhari	Gujarat	All	46	40
3	400kV Bhopal	MP	2,3,4,5,6,7,8,9	43	40
4	400kV Nagda	MP	5,6,7,8,9	42	40
5	400kV Parli Girwal	Maharashtra	2,3,4,5,6,7,8,9	43	40
6	400kV Padghe	Maharashtra	All	51	40
7	400kV Aurangabad-I	Maharashtra	2,3,5,6,7,8,9	45	40
8	400kV Aurangabad-II	Maharashtra	2,3,5,6,7,8,9	44	40
9	400kV Aurangabad-III	Maharashtra	5,6,8,9	43	40
10	400kV Kudus	Maharashtra	All	62	40

Following Generator buses exceed the substation design fault level by more than 5% under different scenario are mentioned at Table 5-23 below:

Table 5-23: Generator Buses Exceeding Designed Fault Level in Western Region

Sl. No.	Substation Name	State	Scenario No.	Highest Fault level (kA)	Designed Rating (kA)
1	400kV Jindal	Chhattisgarh	All	43	40
2	400kV CGPL	Gujarat	All	45	40
3	400kV Chandrapur-I	Maharashtra	5,6,7,8,9	46	40
4	400kV Chandrapur-II	Maharashtra	5,6,7,8,9	46	40
5	400kV Chandrapur SW	Maharashtra	5,6,7,8,9	44	40
6	400kV Padghe	Maharashtra	All	51	40

STUs are also required to take necessary actions such as bus splitting, bypassing of lines, fault limiting reactors etc to resolve the issue of high fault level at their buses. Further, WRLDC has also highlighted that MSETCL needs to carry out studies considering the following aspects:

- High fault levels at various 400kV substations of MSETCL
- Import capability (ATC) constraints and associated system augmentation
- Reactive compensation planning at Intra-state nodes
- Transmission system augmentation in vicinity of Mumbai (especially considering the fact that PPA with Dahanu generation is expiring by next year)

5.5.3 Contingency Analysis

Contingency analysis has been performed on all the 765 kV & 400kV transmission lines, and 765/400 kV & 400/220 kV transformers to ascertain the loading levels under outage of any other 765 kV or 400 kV transmission element. Results of the analysis are discussed below:

a) Transmission Lines

List of 765kV ISTS lines loaded beyond 3500MW under N-1 contingency are summarized below at Table 5-24:

Table 5-24: 765kV ISTS Transmission lines not meeting N-1 Criteria in Western Region

Sl. No.	Name of the Line	Contingency	Scenario No.	Owner	Base case Loading	Loading under n-1	Rating	% Loading
1	Champa PS - Raigarh (Kotra) 765kV line	Raipur PS – Kotra PS 765kV line	1,2,3,5,6	ISTS	2133	3690	3500	105%
2	Raipur PS – Kotra PS 765kV line	Champa PS - Raigarh (Kotra) 765kV line	2,3,5,6	ISTS	1576	3697	3500	106%
3	Tamnar – Dharamjaigarh 765kV one line	Tamnar – Dharamjaigarh 765kV other line	5,6	ISTS	2398	4145	3500	118%
4	Sasan – Vindhyachal Pool 765kV one line	Sasan – Vindhyachal Pool 765kV other line	2,6	ISTS	2502	3506	3500	100%

Under reverse mode of HVDC operation with 3000MW power order in Raigarh-Pugalur HVDC link, in case of tripping of one 765kV line from Section-B, the other circuit is getting overloaded to around 3600MW and hence during such contingencies, modulation of HVDC link, 765kV bus sectionalizer closing or any other appropriate measures can be taken. The same has also been mentioned in joint study meeting regarding constraints at Raigarh (Kotra) under various operating conditions. Due to high generation in Chattisgarh, and low generation in West Bengal, high power is flowing on Tamnar – Dharamjaigarh-Ranchi-Mednipur 765kV D/c corridor. Suitable network augmentation would be planned in consultation with respective states. Sasan- Vindhyachal Pool 765kV D/c line length is only about 5km and with 3500MW loading no issues are envisaged.

Further, 400kV ISTS lines loaded beyond 100% of thermal rating under N-1 contingency are summarized below at Table 5-25:

Table 5-25: 400kV ISTS Transmission lines not meeting N-1 Criteria in Western Region

Sl. No.	Name of the Line	Contingency	Scenario No.	Owner	Base case Loading	Loading under n-1	Rating	% Loading
1	Khargar - Navi Mumbai 400kV line	Khargar - Padghe 400kV line one ckt	4,7	ISTS	323	1053	850 (Twin Moose)	124%
2	Gandhar -Dehgam 400kV D/c line (Twin Moose)	Gandhar-Dehgam 400kV line one ckt	7	ISTS	709	895	850 (Twin Moose)	105%
3	Pirana PG- Nicol Torrent 400kV line	Ranchodpura-Nicol Torrent 400kV line	1,2,4,5,6,7,8,9	ISTS	624	1182	850 (Twin Moose)	139%
4	Gandhar-Hazira 400kV D/c line (Twin Moose)	Gandhar-Hazira 400kV line one ckt	4,5,7	EPTCL	439	880	850 (Twin Moose)	103%

Due to less availability of gas based generations at Sugen, Gandhar, DGEN etc and high demand in Gujarat (Pirana, Dehgam area) high loadings are observed near Dehgam and Pirana area. Adequate system augmentation in consultation with GETCO would be evolved. Further, reconductoring of Kharghar - Navi Mumbai 400kV line may be done to mitigate the overloading issue.

400kV STU lines loaded beyond 100% of thermal rating under N-1 contingency are summarized below at Table 5-26:

Table 5-26: 400kV STU Transmission lines not meeting N-1 Criteria in Western Region

Sl. No.	**Name of the Line**	**Contingency**	**Scenario No.**	**Owner**	**Base case Loading**	**Loading under n-1**	**Rating**	**% Loading**
1	Lonikhand I- Lonikhand II 400kV D/c line	Lonikhand I- Lonikhand II 400kV line one ckt	4,7,9	MSTECL	725	1437	850 (Twin Moose)	169%
2	Mandsaur -Nagda 400kV D/c line (Twin Moose)	Mandsaur -Nagda 400kV line one ckt	7	MPPTCL	750	1091	850 (Twin Moose)	128%
3	Malwa-Chegaon 400kV D/c line (Twin Moose)	Malwa-Chegaon 400kV line one ckt	7	MPPTCL	572	894	850 (Twin Moose)	105%

Sl. No.	Name of the Line	Contingency	Scenario No.	Owner	Base case Loading	Loading under n-1	Rating	% Loading
4	TAPS-Velgaon 400kV D/c line	TAPS- Velgaon 400kV one ckt	7	MSETCL	783	945	850 (Twin Moose)	111%
5	Pune (GIS)-Lonikand II 400kV D/c line	Pune (GIS)-Lonikand II 400kV D/c one ckt	7	MSETCL	875	1277	1158 (Twin Moose)	110%
6	Pune (GIS)-Lonikand II 400kV D/c line	Pune (GIS)-Lonikand II 400kV D/c one ckt	7	MSETCL	875	1277	1158 (Twin AL59)	110%

Velgaon S/s along with interconnections is presently being reviewed by MSETCL. Issue of overloading of Mandsaur-Nagda 400kV D/c line would be resolved subsequent to implementation of NR-WR corridor (Jalore-Chittorgarh-Indore 765kV D/c corridor) which is currently under planning. Further, additional system strengthening may be planned by respective STU's to feed the growing demand.

b) Transformers

List of ISTS ICTs loaded beyond MVA rating under N-1 contingency are summarized below at Table 5-27:

Table 5-27: ISTS ICTs not meeting N-1 Criteria in Western Region

Sl. No.	Name of the Element	Scenario No.	Owner	Maximum Base Case Flow	Maximum Loading under N-1 of ICT	% Loading	Rating
1	400/220kV, 2X315 MVA Magarwada DD ICTs	1,2,3,4,5,6,7, 8	ISTS	223	456	145%	315
2	765/400kV, 2X1500 MVA Pune GIS ICTs	1,4,7	ISTS	1359	1948	130%	1500
3	765/400kV, 3X1500 MVA Navsari New ICTs	1,4,7	ISTS	1371	1815	121%	1500
4	400/220kV, 3X500 MVA Navsari New ICTs	4,7	ISTS	469	573	115%	500
5	400/220kV, (2X315)+ (1X500) MVA Satna ICTs	1,7,8	ISTS	371	541	171%	315
6	400/220kV, (2X315)+ (1X500) MVA Wardha ICTs	1	ISTS	256	359	114%	315
7	400/220kV, 2X500 MVA Vadodara ICTs	4,7	ISTS	461	629	126%	500
8	765/400kV, 3X1500 MVA Padghe GIS ICTs	4,7	ISTS	1431	1834	122%	1500
9	400/220kV, (2X315)+ (1X500) MVA Shujalpur ICTs	4,7	ISTS	339	484	154%	315
10	400/220kV, 2X315 MVA Jabalpur ICTs	7	ISTS	277	401	127%	315
11	400/220kV, 3X315 MVA Gwalior ICTs	7	ISTS	283	359	113%	315

Sl. No.	Name of the Element	Scenario No.	Owner	Maximum Base Case Flow	Maximum Loading under N-1 of ICT	% Loading	Rating
12	400/220kV, (2X315)+ (1X500) MVA Solapur ICTs	7	ISTS	247	354	112%	315
13	400/220kV, (2X315)+ (2X500) MVA Boisar ICTs	7	ISTS	295	349	111%	315
14	400/220kV, 3X315 MVA Sugen ICTs	4,5,7	TPL	300	372	118%	315

In MP, high loading of ICTs at Satna, Shujalpur, Jabalpur and Gwalior are observed due to more drawl of power from the ISTS network on account of issues of less self-generation due to imported coal issues/ less state thermal based generations coupled with high demand. The issue has also been highlighted by MP and ISTS system strengthening in MP to increase ATC would be evolved in joint study meeting to feed the growing demand of MP.

In Gujarat, high loading of ICTs at Navsari (New), Vadodara and Sugen are observed on account of high RE integration in Khavda, Bhuj area of Gujarat coupled with high demand in Gujarat and low self-generation. The above RE power is also overloading Magarwada ICTs. Adequate system augmentation in consultation with GETCO/DD would be evolved.

With proposed Narendra (New) -Pune 765kV D/c corridor for high RE injection at Narendra (New) from Koppal and Gadag REZ coupled with high demand in western part of Maharashtra, high loading is observed at Pune (GIS) S/s. Further, Padghe, Wardha and Boisar ICTs are also observed to be overloaded. Import capability (ATC) constraints for Maharashtra have been reported by WRLDC and associated system augmentation in consultation with MSETCL would be evolved.

List of STU ICTs loaded beyond MVA rating under N-1 contingency are summarized below at Table 5-28:

Table 5-28: STU ICTs not meeting N-1 Criteria in Western Region

Sl. No.	Name of the Element	Scenario No.	Owner	Maximum Base Case Flow	Maximum Loading under N-1 of ICT	% Loading	Rating
1	400/220kV, (2X315) + (1X500) MVA Nagothane ICTs	1	MSETCL	400	515	163%	315
2	400/220kV, 2X315 MVA Dolvi ICTs	4	MSETCL	294	656	131%	500
3	400/220kV 2X500 MVA Prantij ICTs	4	GETCO	335	502	100%	500
4	400/220kV 2X315 MVA Mandsaur ICTs	7	MPPTCL	273	387	123%	315
5	400/220kV 2X500 MVA Malegaon ICTs	7	MSETCL	403	604	120%	500
6	400/220kV 2X315 MVA Sagar ICTs	7	MPPTCL	256	366	116%	315
7	400/220kV 3X315 MVA Chakan ICTs	7	MSETCL	260	348	110%	315
8	400/220kV 2X500 MVA Kudus ICTs	7	MSETCL	461	555	111%	500

Sl. No.	Name of the Element	Scenario No.	Owner	Maximum Base Case Flow	Maximum Loading under N-1 of ICT	% Loading	Rating
9	400/220kV 3X315 MVA Zerda ICTs	7	GETCO	285	353	112%	315
10	400/220kV (3X315 +1x500+1x600) MVA Padghe ICTs	7	MSETCL	279	335	106%	315
11	400/220kV 3X500 MVA Velgaon ICTs	7	MSETCL	426	504	101%	500
12	400/220kV, 2X315 MVA Mundra APL ICTs	2	APL	275	379	120%	315
13	400/220kV, 2X500 MVA Koradi II ICTs	2,3	Maha Genco	556	809	162%	500
14	400/220kV, 2x500MVA Nanded ICTs	8	MSETCL	322	506	101%	500

From above, it is observed ICT loadings i.r.o 9 nos. of substations in Maharashtra, 3 nos. in Gujarat, and 2 nos. in Madhya Pradesh are not complying with N-1 criteria in 2026-27 timeframe. Therefore, STUs are required to take immediate measures to mitigate this issue. Additional system strengthening in these areas such as planning additional feeds from ISTS, shifting of loads, ICT augmentation, increase in self generation, etc. may be required to feed the growing demand.

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 RE rich comprising of largescale Solar & Wind potential. Southern part of Karnataka (Bangalore), Kerala and Central part of Telangana (Hyderabad) has high demand and less internal generation. Based on the generation availability and demand, 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 Present Power Supply Scenario

As on Jan'2022, total Installed Capacity (IC) of Southern Region was about 118 GW and the peak demand met was about 58 GW. The state-wise breakup of installed capacity and peak demand is summarised at Table 6-1 below.

Table 6-1: Installed Capacity and Peak Demand of SR as on Jan'22

(All Fig in GW)

	Generation										Peak Demand
State / UTs / Sector	Thermal					Nuclear	Renewable			Grand Total	
	Coal	Lignite	Gas	Diesel	Total		Hydro	RES	Total		
Andhra Pradesh	10.4	0.2	4.1	0.0	14.7	0.1	1.7	9.2	10.9	25.7	11.6
Telangana	9.4	0.2	0.8	0.0	10.5	0.1	2.5	4.8	7.2	17.9	**13.6**
Karnataka	9.8	0.5	0.0	0.0	10.3	0.7	3.6	15.8	19.4	30.5	**14.2**
Kerala	2.1	0.3	0.5	0.2	3.1	0.4	1.9	0.7	2.5	5.9	4.3
Tamil Nadu	12.4	1.8	1.0	0.2	15.4	1.4	2.2	16.0	18.1	35.0	16.5
Puducherry	0.1	0.1	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.4	0.5
NLC and Lakshadweep	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.0
Central unallocated	1.4	0.4	0.0	0.0	1.8	0.5	0.0	0.0	0.0	2.3	0.0
Total	**45.7**	**3.6**	**6.5**	**0.4**	**56.3**	**3.3**	**11.8**	**46.4**	**58.2**	**117.8**	**58.4**

Source: CEA monthly report

6.2 Envisaged Power Supply Scenario

As per the 19th EPS, Southern Region demand for 2026-27 timeframe is expected to increase to about 84 GW. As per the inputs received from various stakeholders, total installed capacity of Southern Region for 2026-27 is expected to be about 144 GW. The state wise bifurcation of installed capacity and peak demand is summarized below at Table 6-2.

Table 6-2: Southern Region Installed Capacity and peak demand (2026-27)

(All Fig in GW)

State / UTs / Sector	Generation (GW)								Peak Demand (GW)
	Thermal	Hydro	Nuclear	Solar	Wind	Other RE	Gas	Total	
Andhra Pradesh	6.4	4.5	-	3.4	4.3	-	1.9	20.5	16.8
Telangana	10.8	2.5	-	2.6	0.1	-	-	16.0	18.7
Karnataka	7.7	4.7	-	6.0	5.2	-	0.4	24.9	18.5
Kerala	-	2.4	-	0.4	-	-	0.4	3.1	6.6
Tamil Nadu	12.6	2.5	-	5.5	10.7	-	0.7	32.0	27.4
Pudducherry	-	-	-	-	-	-	-	-	0.7
Central	12.9	-	3.8	14.6	10.9	-	-	42.1	-
IPP	4.6	1.2	-	-	-	-	-	5.8	-
Rooftop / Other RE	-	-	-	4.5	-	2.4	-	6.9	
SR	55.0	17.7	3.8	36.9	31.2	-	3.4	151.3	83.6

There is growth of around 43 % in peak demand of Southern Region from present time-frame to 2026-27. 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	2021-22	2026-27	Difference	% Increase
Andhra Pradesh	11570	16820	5250	45.38%
Telangana	13622	18653	5031	36.93%
Karnataka	14158	18481	4323	30.53%
Kerala	4261	6603	2342	54.96%
Tamil Nadu	16541	27392	10851	65.60%
Puducherry	465	708	243	52.26%
Total	**58430**	**83652**	**25222**	**43.17%**

From the above data it is observed that the increase in peak demand is maximum for Tamil Nadu (65.6%) and minimum for Karnataka (30.5%).

6.3 Load generation Balance

In the previous chapter, All India Load Generation Balance (LGB) for identified nine scenarios was prepared as per the methodology finalized in consultation with CTU, CEA and POSOCO. This section elaborates the Southern Region Load Generation Balance (LGB) for 2026-27 time-frame. 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 despatch 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	Rooftop	Wind	Gas	
1-Aug Solar Max	40%	80%	80%	50%	55%	0%	74%
2-Aug Peak Load	70%	80%	0%	0%	75%	85%	76%
3-Aug Night Off Peak	40%	80%	0%	0%	65%	65%	63%
4-Jun Solar Max	40%	80%	85%	60%	55%	0%	80%
5-Jun Peak Load	70%	80%	0%	0%	75%	85%	85%
6-Jun Night Off Peak	40%	80%	0%	0%	65%	60%	71%
7-Feb Solar Max	20%	80%	90%	60%	0%	0%	94%
8-Feb Peak Load	40%	80%	0%	0%	20%	85%	86%
9-Feb Night Off Peak	20%	80%	0%	0%	0%	30%	70%

Out of these nine scenarios, Scenario-3 and Scenario-7 corresponds to two extreme cases with respect to demand i.e. lowest demand (52.8 GW) and highest demand (76.2 GW) scenarios respectively. In all other scenarios, Southern Region demand is varying between these two demands as per demand factors.

Southern Region LGBs for all 9 nos. of scenarios are summarized in below figures.

Based on the LGB, state wise drawl from ISTS under these scenarios is summarised in Table 6-5. Further, both maximum and minimum import of each state is also highlighted in table below.

Table 6-5: Drawl of various States from ISTS Grid

(All Fig in MW)

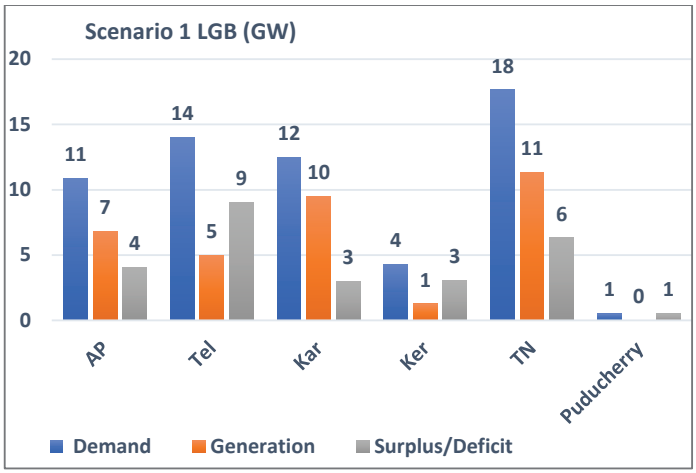
State / UTs	Drawl From ISTS								
Scenario No	Aug'26 Time Frame			Jun'26 Time Frame			Feb'27 Time Frame		
	1 (Solar Max	2 (Peak Load)	3 (Off Peak)	4 (Solar Max)	5 (Peak Load)	6 (Off Peak)	7 (Solar Max)	8 (Peak Load)	9 (Off Peak)
Andhra Pradesh	4062	-390	711	5330	918	1298	6999	3189	4511
Telangana	9038	5767	4621	3201	2602	3657	9618	6879	4442
Karnataka	2977	775	1218	3891	2188	2172	7351	7123	6847
Kerala	3044	2648	2513	3899	3810	3403	4607	3901	3691
Tamil Nadu	6322	974	2612	8279	3337	3876	10111	5598	6364
Puducherry	515	551	467	586	652	578	535	507	410
Central	-22763	-14955	-15896	-24482	-16765	-15225	-20428	-14646	-10135
IPP	-1932	-2292	-2724	-1932	-4184	-3458	-2792	-4030	-2792
Total	1263	-6922	-6477	-1228	-7441	-3700	16002	8521	13337

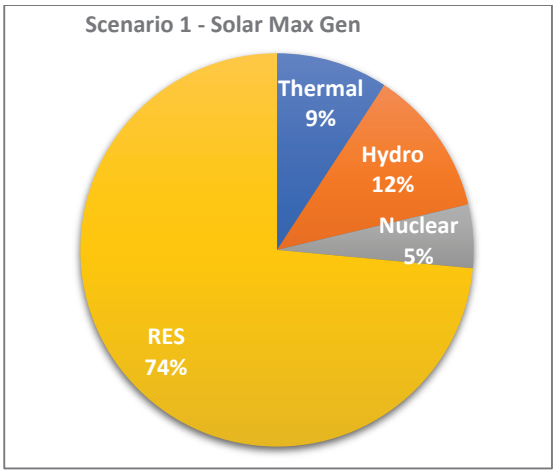
Out of these nine scenarios, Scenario-5 and Scenario-7 corresponds to two extreme cases with respect to import/export i.e. highest import (7.4 GW) and highest export (16 GW) scenarios respectively. In all other scenarios, import /export from Southern Region to other regions is varying between these two extremes.

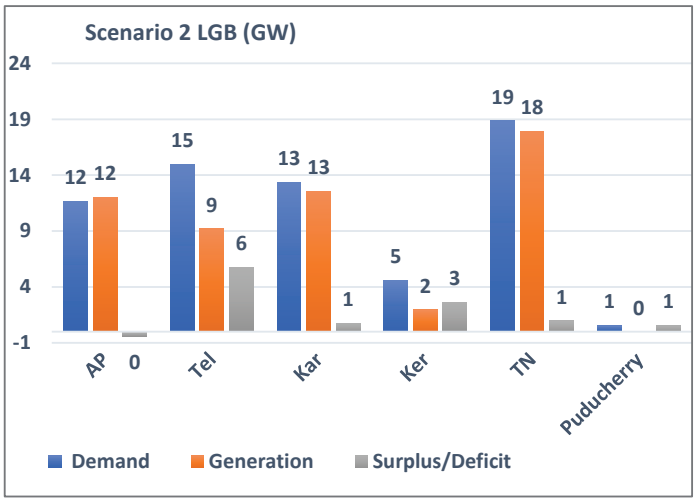
Considering the above LGB for nine scenarios, load flow cases were prepared for 2026-27 timeframe. Detailed system studies have been carried out on the finalized load flow cases. The study results are discussed in subsequent chapters.

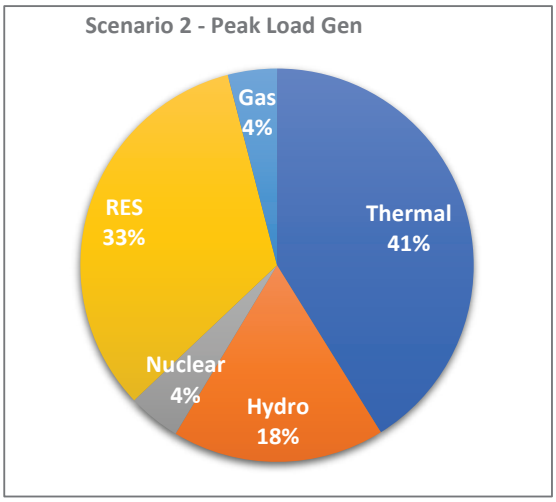
6.3.1 Monsoon Aug'2026

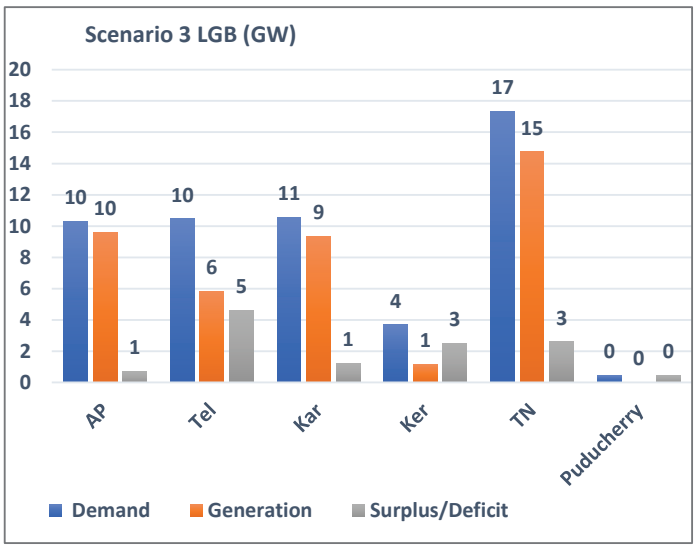
Figure 6-1: LGB For Monsson Aug'2026

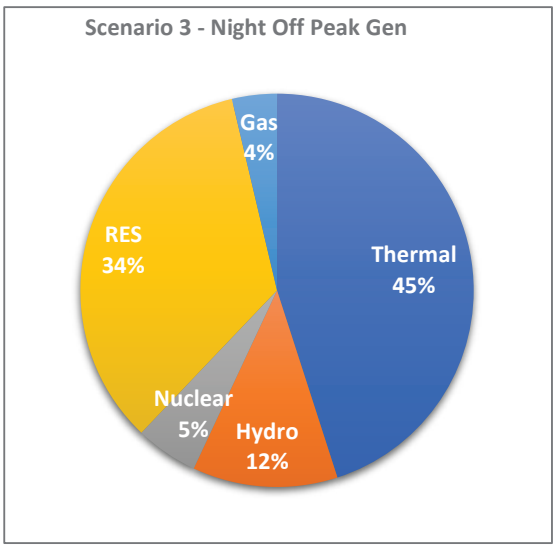






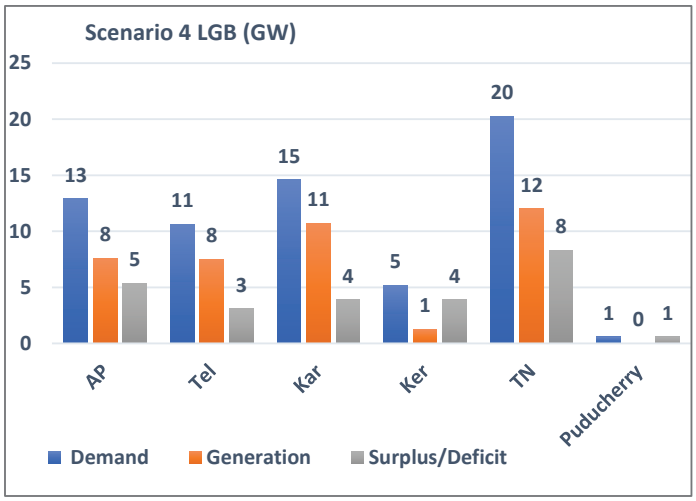


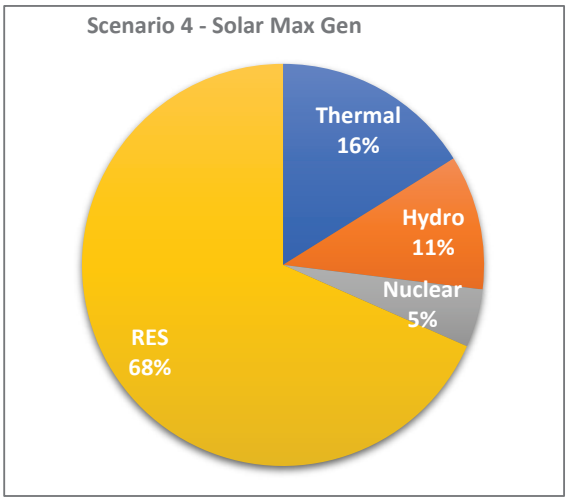


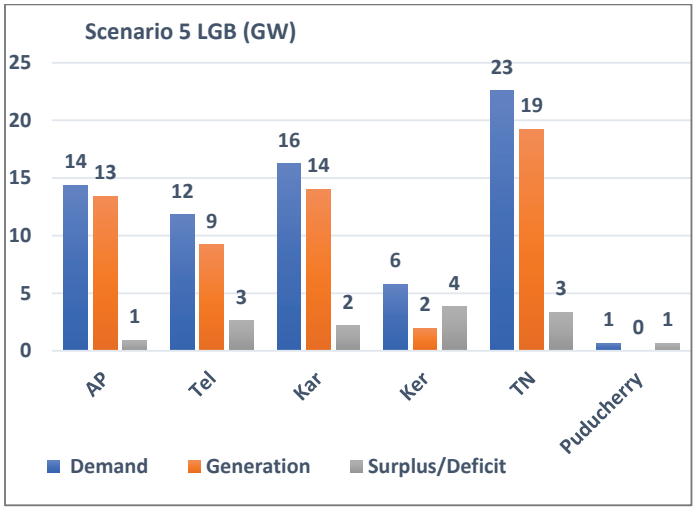


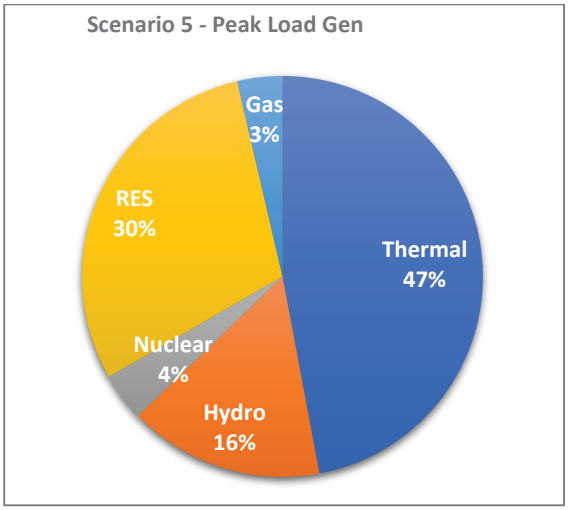
6.3.2 Summer June'2026

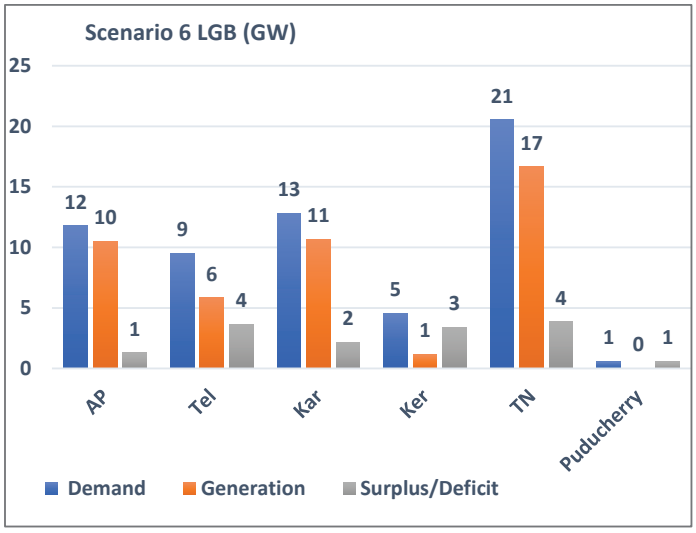
Figure 6-2: LGB For Summer June'2026

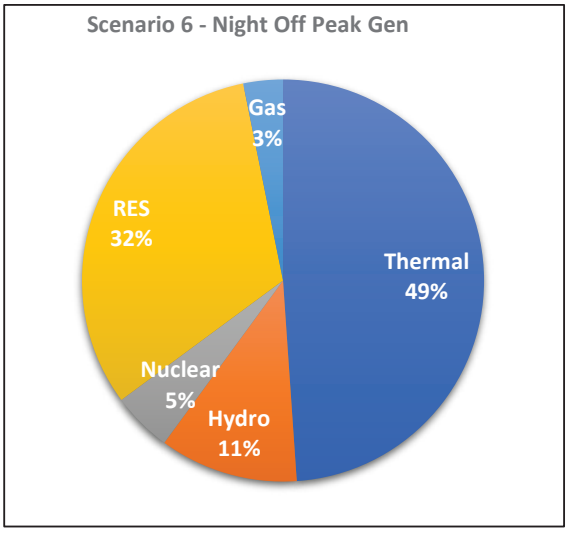






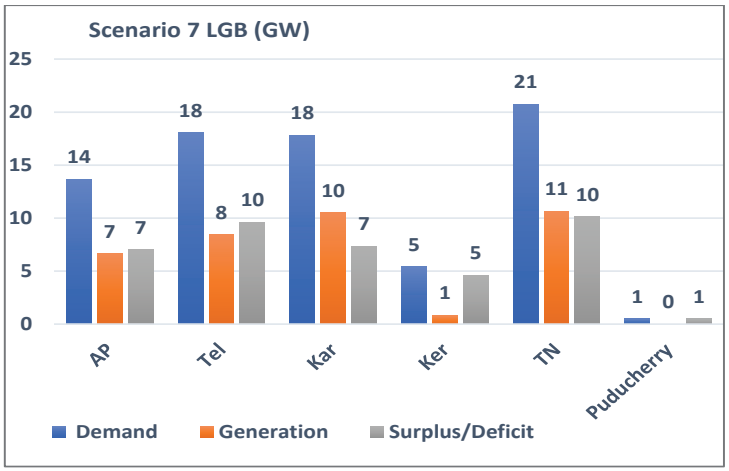


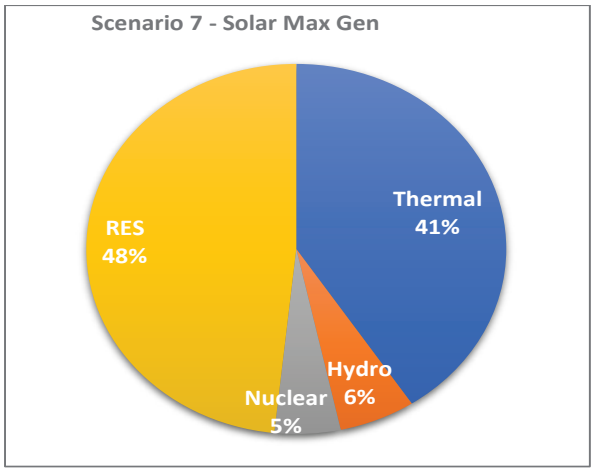


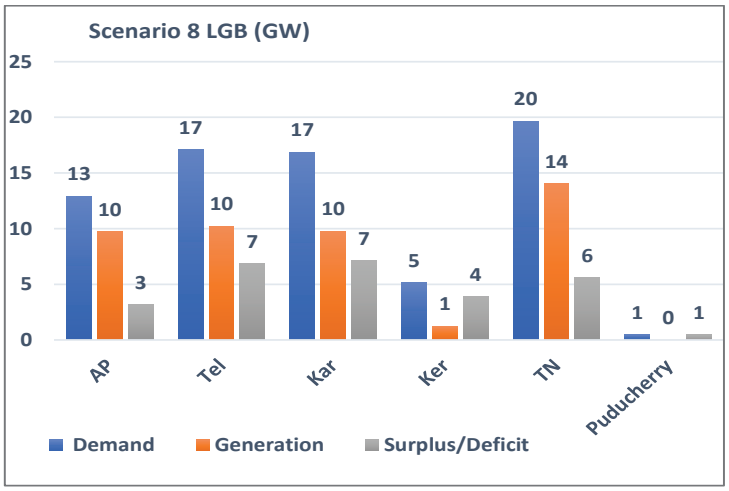


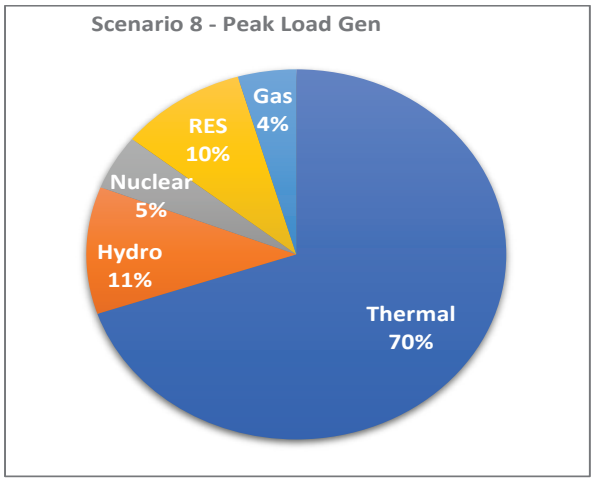
6.3.3 Winter Feb'2027

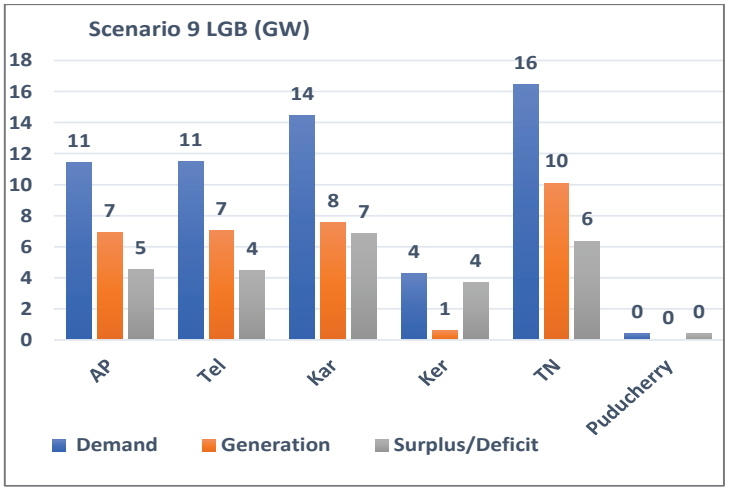
Figure 6-3: LGB For Winter Feb'2027

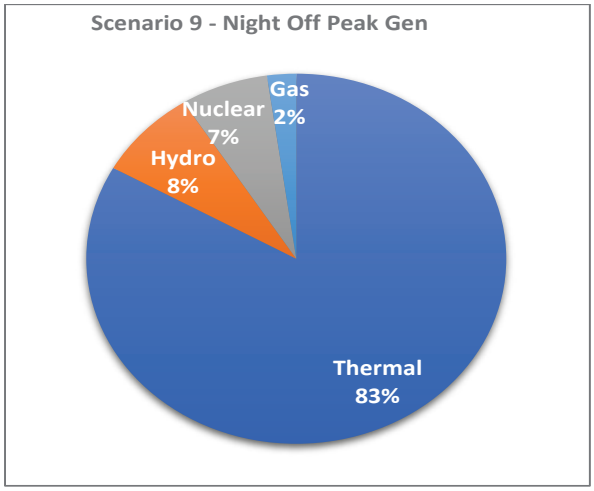












6.4 ISTS Network Expansion Scheme in Southern Region

Various transmission systems have been evolved for implementation in the Consultative Meeting for Evolution of Transmission System of SR (CMETS-SR) from Nov 2021 to Feb 2022. These schemes have either been approved or under various stages of approval. The details of the schemes including other important issues in regard to ISTS in the Southern Region which were discussed during this timeframe has also been summarized below:

6.4.1 Tamil Nadu

a) Augmentation of transformation capacity by 1x500 MVA ICT (5th) at Tutitcorin-II PS

To facilitate ISTS interconnection of RE power projects and transfer of power to beneficiaries from these RE projects in Tirunelveli area of Tamil Nadu, 2x500 MVA, 400/230kV Tuticorin-II (GIS) substation along with 2x125 MVAR, 420 kV Bus Reactors was planned as part of Green Energy Corridor and it was interconnected with existing Tuticorin PS with Tuticorin-II - Tuticorin Pooling Station 400 kV 2xD/c (Quad) lines. Subsequently, the substation was augmented with 1x500 MVA, 400/230kV (3rd) transformer and the same has been commissioned recently. To cater the long-term demand in Tuticorin area, 4th 1x500MVA, 400/230 kV ICT was also planned which is under implementation by POWERGRID under RTM with commissioning schedule of March'23.

Till November 2021, LTA of 1802.37 MW was granted at Tuticorin-II out of which LTA of 950 MW is already under operation. Further, LTA applications were received for additional 367.73 MW LTA in the month of November' 2021 and therefore the total LTA quantum at Tuticorin-II is 2170.1 MW against the total transformation capacity of 2000 MVA. Therefore, 5th 1x500 MVA, 400/230kV ICT was planned to avoid bottling-up of renewable power at Tuticorin-II and the ICT was agreed in the 2nd Consultation Meeting for Evolving Transmission Schemes in Southern Region held on 29.12.2021.

Detailed scope of the scheme is mentioned below in Table 6-6:

Table 6-6: Augmentation of transformation capacity by 1x500 MVA ICT (5th) at Tutitcorin-II PS

Sl. No.	Scope of the Transmission Scheme	Capacity	Estimated Cost
1.	1x500MVA, 400/230kV ICT (5th) at Tuticorin-II	1x500 MVA, 400/230 kV ICT 400kV ICT bay (GIS type) – 1 No. 230 kV ICT bay (Hybrid type) – 1 No.	49 Cr

OM has been issued to POWERGRID for implementation of the scheme under RTM with commissioning schedule as March'23.

6.4.2 Karnataka

a) ISTS Network Expansion scheme in Western Region & Southern Region for export of surplus power during high RE scenario in Southern Region

Karnataka is having huge RE potential which includes RE power projects of 2.5 GW capacity each at Koppal, Gadag & Bidar area. Power from Koppal & Gadag REZs, Kudgi thermal power plant (3X800 MW) and Kaiga Nuclear Power Plant is getting pooled at Narendra (New). Narendra (New) is well integrated with Kolhapur in Western Region through Narendra (New) – Kolhapur 765kV D/c line. Despite situated in Western Maharashtra, Kolhapur is nearer to Narendra from electrical point of view. Tendency of power flow is from Narendra to Kolhapur most of the times and Kolhapur and beyond network gets overloaded in high export scenario of Southern Region.

NLDC as part of operational feedbacks has also highlighted that high loading beyond Kolhapur is observed due to multiple factors viz. high generation at Kudgi TPS, low generation at plants in southern Maharashtra, high load around Kolhapur area, high renewable (Solar) generation in Southern Region etc. In addition, number of large RE based generation projects are envisaged in Southern Region especially in the prioritized REZs of Koppal, Gadag, Karur and Tuticorin areas. Transmission system for integration and immediate evacuation of power from

these REZs has already been planned and is under different phases of implementation. Stage-II Connectivity and LTA applications have already been received / granted from a number of generation projects in these areas. However, constraints are observed for export of surplus power from REZs in Southern Region to Western Region under high RE scenario in SR. To mitigate the constraints beyond Kolhapur, ISTS network expansion between WR and SR for export of surplus power from SR has been finalized in the 3rd Consultation Meeting for Evolving Transmission Schemes in Southern Region held on 28.01.2022 and 3rd Consultation Meeting for Evolving Transmission Schemes in Western Region held on 31.01.2022.

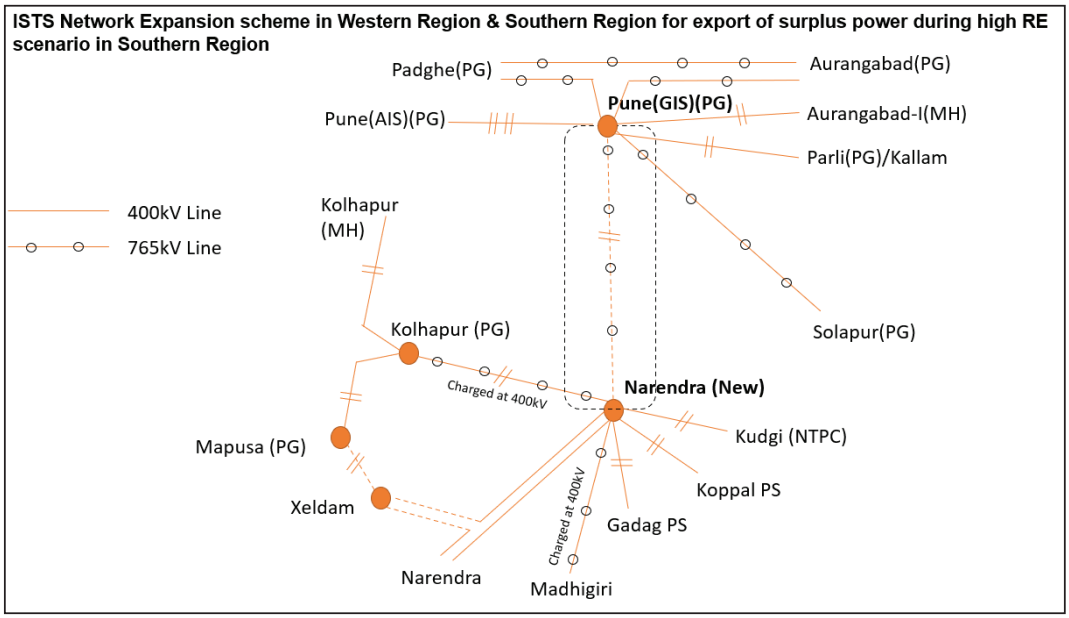
Detailed scope of the scheme is mentioned below in Table 6-7.

Table 6-7: ISTS Network Expansion scheme in Western Region & Southern Region

Sl.	Scope of the Transmission Scheme	Capacity /km	Estimated Cost
1.	Narendra New (GIS) – Pune (GIS) 765kV D/c line with 1x330MVAr switchable line reactor on each ckt at both ends	340 km • 765 kV line bays -2 (GIS) (at Narendra New) • 765 kV line bays -2 (GIS) (at Pune) • 765 kV, 330 MVAr SLR – 2 nos (7 X 110 MVAr incl. 1 switchable spare unit) at Pune (GIS) • 765 kV, 330 MVAr SLR – 2 nos (6 X 110 MVAr) at Narendra (New) (GIS)	2374 Cr
2.	Upgradation of Narendra (New) (GIS) to its rated voltage of 765 kV level along with 4x1500 MVA transformer and 2x330 MVAr Bus Reactor.	• 765/400 kV, 1500 MVA- 4 no. (13 X 500 MVA incl. 1 spare unit) • 765 kV ICT bays- 4 nos.(GIS) • 400 kV ICT bays- 4 nos.(GIS) • 765 kV, 330 MVAr BR – 2 nos. (7 X 110 MVAr inc. 1 switchable spare unit to be used for both bus/ line reactors) • 765 kV Bus Reactor bays – 2 nos. (GIS)	

**Narendra (New)(GIS) - *Kolhapur 765kV D/c line to be kept charged at 400kV level*
^Out of required 04 nos. of 400kV ICT bays (GIS) for 765/400kV ICTs, 02 nos. of 400 kV ICT bays (GIS) for 765/400kV ICTs are under implementation through TBCB route under the scheme "Evacuation of Power from RE Sources in Koppal Wind Energy Zone (Karnataka) (2500 MW)"

Figure 6-4: ISTS Network Expansion scheme in SR & WR for export of surplus power during high RE scenario in SR



This scheme was also deliberated in the 40th SRPC & 41st SRPC meeting held on 31.01.2022 & 02.03.2022 and 41st WRPC meeting held on 23.02.2022 and presently, the scheme is under consideration with NCT.

6.4.3 Telangana

The ±500kV, Bhadrawati (Chandrapur) BtB HVDC (2x500 MW) Inter-Regional link was planned for initial asynchronous integration of the SR grid with the WR grid as well as transfer of power between these Regions. The link has also benefitted both the regions under black-out operations or under severe grid disturbance conditions. After commissioning of the link, numerous transmission infrastructures have been progressively commissioned in the SR as well as WR grids. Various asynchronous and synchronous Inter-Regional links have also been commissioned between SR Grid & NEW Grid. Even during these phases, the Bhadrawati BtB HVDC link has facilitated in controlling the loadings on the parallel AC Inter-Regional links. More new transmission schemes have been planned and are under different phases of implementation to strengthen the Regional as well as National Grid for dispersal & supply of power from various Renewable Energy Zones in NR, WR and SR to demand centres in different parts of the country.

The Bhadrawati BtB HVDC was commissioned on 01.10.1997 and has already completed more than 24 Years. POWERGRID had filed petition for determination of transmission tariff of 2019-24 tariff period for Bhadrawati (Chandrapur) BtB HVDC station (2x500 MW). POWERGRID has proposed an Additional Capital Expenditure (ACE) of about 490 crores on account of replacement of old and obsolete control and protection system, thyristor valves, PLC filters etc. at Bhadrawati (Chandrapur) HVDC.

CERC directed POWERGRID to obtain and submit the technical approval and report of CTU and POSOCO on the requirement and usefulness of Bhadrawati (Chandrapur) BtB HVDC (2x500 MW). Based on the request of POWERGRID, System Studies has been carried out to assess the requirement and usefulness of Bhadrawati (Chandrapur) BtB HVDC (2x500 MW).

The Southern Region has been projected with RE rich states and during the high RE scenarios SR is expected to export power to NEW Grid and during other scenarios SR is expected to import power from NEW Grid. System Studies have been carried out under both import & export scenario for SR to assess the requirement and usefulness of Bhadrawati (Chandrapur) BtB HVDC (2x500 MW) link.

From the Techno-Economic and feasibility analysis of the different alternatives studied, the following conclusions were arrived.

- Bhadrawati BtB HVDC has significant role in controlling the AC power flow on WR-SR Inter-Regional lines as well as in relieving the high loading on NEW-SR corridors, voltage support, Black-start support etc.
- TTC for import of power from NEW grid to SR grid is expected to be reduced by about 700 MW during the 2024-25 timeframe without Bhadrawati BtB HVDC. There would be a total reduction of TTC by about 4000 MW during the 2024-25 timeframe without Bhadrawati (2x500 MW) BtB HVDC and Warora – Warangal 765kV D/c line.
- In the present timeframe, TTC of 19650 MW for import of power by SR from NEW grid is expected to be reduced to 17500 MW (reduced by about 2150 MW) without Bhadrawati BtB HVDC.
- Bypassing of Bhadrawati HVDC and reconductoring of Bhadrawati – Ramagundam 400 kV D/c line do not provide a feasible technical solution, as it shall lead to enhanced Short Circuit levels at both the stations beyond their design limits. Further, bus splitting at Bhadrawati along with rearrangement of line sections in order to control the fault level/line loadings is not feasible.
- Under export scenario of power transfer from SR grid to New grid through Bhadrawati BtB HVDC, marginal relief on loadings on inter-regional links has been observed.

Considering the above, following 2 options has been communicated to POWERGRID for onward submission to CERC:

i) In case of HVDC BtB (2x500 MW) retires after completion of its successful life, it shall lead to reduction

in import TTC of SR by about 700 MW during 2024-25 time frame. Furthermore, under such scenario, the existing infrastructures viz HVDC Bhadrawati BtB (2x500 MW) and Bhadrawati – Ramagundam 400 kV D/c line of 178 km line length shall have to be abandoned.

ii) Refurbishment of Bhadrawati (Chandrapur) BtB HVDC (2x500 MW) may be carried out for prevention of reduction in import TTC as well as for utilisation of existing infrastructure. The HVDC BtB shall also facilitate controlled transfer of power between NEW Grid & SR Grid as well as during the blackout conditions.

6.5 System Study Analysis and Results

Based on the load-generation scenarios as elaborated in section 5.3, various system studies have been carried out in PSSE. Planned/ Under implementation Transmission system that are expected to be commissioned in 2026-27 timeframe are considered for conducting these studies. Results of these studies were analysed and the same are deliberated below-

6.5.1 Load Flow Studies

a) Transmission Lines

In the base case file prepared for 2026-27 timeframe, 4 nos. of 400 kV lines are having loading more than 70% of the thermal limit of the line. Scenarios where loading is more than 70% of rating and maximum loading obtained on these transmission lines in the simulation studies are tabulated below at Table 6-8.

Table 6-8: Transmission Lines Loading in the Base Cases

(All Fig in MW)

Sl. No.	Name of the Line	Scenario No.	Owner	Maximum Loading	Rating	Remark
1	Cuddapah – Chittoor 400kV S/c line	4	ISTS & STU (AP)	737	850 (Twin Moose)	
2	Kolar – Dommasandra 400kV S/c line	7, 8, 9	ISTS & STU (KPTCL)	692	850 (Twin Moose)	Karnataka is drawing more power from ISTS in scenario 7, 8 & 9 and this is causing high power flow on Kolar – Domasandra line
3	Raichur – Veltoor 400kV S/c line	1	ISTS	607	850 (Twin Moose)	Lower internal thermal generation of Telangana in August Solar Max scenario is causing more power flow on Raichur – Veltoor line

b) Transformers

In the base case file prepared for 2026-27 timeframe, transformers at 2 nos. of 765/400 kV substations and 2 nos. of 400/220kV substations are having loading more than 80% of the ICT rating. Scenarios where loading is more than 80% of rating and maximum loading hit by these transformers in the simulation studies are tabulated below at Table 6-9.

Table 6-9: Transformers Loading in the Base Cases

(Max Loading in MW)

Sl. No.	Name of the Element	Scenario No.	Owner	Maximum Loading	Rating (MVA)	Remark
1	765/400kV, 3X1500 MVA Kurnool-III ICTs	1 & 4	ISTS	1276	1500	With commissioning of RE generation at Kurnool & Anantpur REZ, Augmentation of Kurnool-III with 4th 1500 MVA ICT would be required.
2	765/400kV, 2X1500 MVA Maheshwaram ICTs	7	ISTS	1254	1500	Low internal generation of Telangana and high solar dispatch at Bidar is causing high loading of ICTs at Maheshwaram. Augmentation of Maheshwaram with 3rd 1500 MVA ICT is required.
3	400/230kV, 2X250 MVA Neyveli TS-II ICTs	1, 2, 3, 4, 5, 6, 7, 8	ISTS	233	250	Issue of high transformer loading has been highlighted earlier also. In the 3rd SRPC(TP) meeting, TANTRANSCO suggested that shifting of the NLC TS II Unit-IV connectivity from 400 kV side to 230 kV side would mitigate the overloading issue of 2x250 MVA ICTs at NLC TS-II.
4	400/220kV, 2X250 MVA Ramagundam NTPC ICTs	8	ISTS	213	250	High thermal dispatch at Ramagundam and high hydro at Nagarjunsagar is causing power rush towards Ramagundam ICTs. In the 3rd SRPC(TP) meeting, TANTRANSCO has informed that part of the load would be shifted to some other substation to relieve the loading.
5	400/220kV, 2X315 MVA Ramagundam NTPC ICTs	8	ISTS	268	315	
6	400/132kV, 200 MVA Ramagundam NTPC ICTs	5, 7, 8	ISTS	263	200	

6.5.2 Voltage Analysis

PU voltages of all 765 kV and 400 kV buses were observed in all the nine scenarios. Maximum and minimum voltage of each bus were identified from the bus voltages in the nine number of scenarios. From the simulation results, it was observed that no bus in Southern Region is having issue of under voltage.

Further, 765kV & 400kV buses having voltage more than 1.05 pu are Tabulated at Table 6-10.

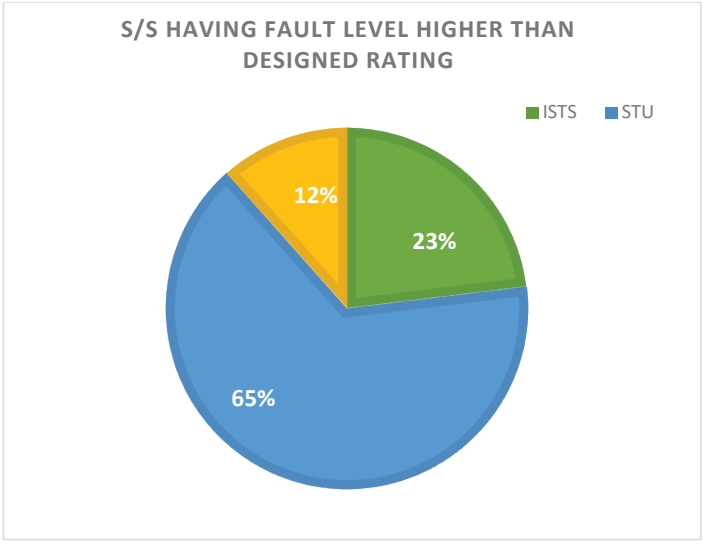
Table 6-10: Buses having more than 1.05 pu Voltage in SR

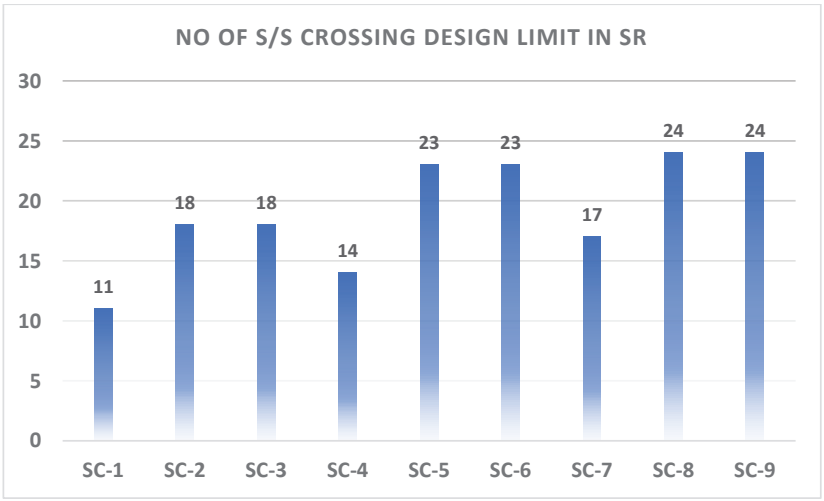
Sl. No.	Bus Name	Voltage Level (kV)	Owner	Max (pu)	Scenario
1.	Maheshwaram	765	ISTS	1.07	3 & 6
2.	Nizamabad	765	ISTS	1.07	2, 3, 6
3.	Nizamabad	400	ISTS	1.07	3, 6
4.	Muddunur	400	STU	1.07	2, 3
5.	Konasema Vemagiri	400	STU	1.06	9
6.	Kalikiri	400	STU	1.06	2, 3
7.	Dichipally	400	STU	1.07	3, 6
8.	Nirmal	400	STU	1.07	3, 6
9.	Narsapur	400	STU	1.06	2, 3

6.5.3 Short Circuit Analysis

Short circuit level was calculated for all 765 and 400 kV buses of Southern Region and buses having fault level more than the design rating under any scenario were identified. From analysis, it is emerged that 2 nos. of 765kV substations and 26 nos of 400kV substations in SR are having fault level more than designed capacity. Owner wise distribution of these buses and scenarios in which these buses are crossing the design fault level are shown in Figure 6-5.

Figure 6-5: Substations crossing the design limit in SR





Details of the ISTS buses exceeding design fault level under any scenario are tabulated below at Table 6-11.

Table 6-11: ISTS Buses Exceeding Designed Fault Level in Southern Region

(All Fig in kA)

Sl. No.	Substation Name	Owner	Scenario No.	Highest Fault level	Designed Rating
1	765kV Kurnool	POWERGRID	All	43	40
2	765kV Maheshwaram	POWERGRID	4 & 7	41	40
3	400kV Maheshwaram PG	POWERGRID	2, 3, 4, 5, 6, 7, 8, 9	68	63
4	400kV Kurnool New	POWERGRID	All	57	50
5	400kV Tirunelveli	POWERGRID	All	49	40
6	400kV Udumalpet	POWERGRID	All	48	40
7	400kV Pugalur	POWERGRID	5, 6, 8	42	40
8	400kV Hyderabad	POWERGRID	5, 6, 7, 8, 9	41	40
9	400kV Ramagundam	NTPC	All	41	40
10	400kV Simhadri	NTPC	9	41	40
11	400kV Simhadri-II	NTPC	9	41	40

From the above, it can be seen that 4 nos. of buses i.e. 400kV Maheshwaram PG, 400kV Kurnool New, 400kV Tirunelveli & 400kV Udumalpet violates the design fault level under all the scenarios by more than 5%. Detailed studies are being carried out and suitable measures shall be included in the next Rolling Plan.

Further, STU buses exceeding the substation design fault level under different scenario are mentioned at Table 6-12.

Table 6-12: STU Buses Exceeding Designed Fault Level in Southern Region

(All Fig in kA)

Sl. No.	Substation Name	Owner	Scenario No.	Highest Fault level	Designed Rating
1.	400kV Thalayapalem	AP	2, 3, 5, 6, 8 ,9	41	40
2.	400kV Guddigudem	AP	2, 3, 4, 5, 6, 7, 8, 9	45	40
3.	400kV Kakinada SEZ	AP	5, 6, 8, 9	43	40
4.	400kV Vijaywada	AP	All	46	40
5.	400kV VTPS-IV	AP	2, 3, 5, 6, 7, 8, 9	43	40
6.	400kV Vemagiri	AP	2, 3, 5, 6, 7, 8, 9	56	40
7.	400kV Kurnool	AP	All	53	40
8.	400kV Vizag Pool	AP	5, 6, 8, 9	42	40
9.	400kV Pollavar HEP	AP	All	46	40
10.	400kV Mamidipally	TSTRANSCO	All	48	40
11.	400kV Gajwel	TSTRANSCO	7, 8, 9	43	40
12.	400kV Dichipally	TSTRANSCO	All	43	40
13.	400kV Maheshwaram	TSTRANSCO	All	68	50
14.	400kV Raichur	KPTCL	5, 6, 8, 9	41	40
15.	400kV Neelmangala	KPTCL	All	44	40
16.	400kV Kanarpatty	TANTRANSCO	2 ,3, 5, 6, 7, 8, 9	44	40
17.	400kV Kayathar	TANTRANSCO	5, 6, 8	42	40

STUs are also required to take necessary actions such as bus splitting, bypassing of lines, fault limiting reactors etc to resolve the issue of high fault level at their buses.

6.5.4 Contingency Analysis

Contingency analysis has been performed on all the 765 kV & 400kV transmission lines, and 765/400 kV & 400/220 kV transformers to ascertain the loading levels under outage of any other 765 kV or 400 kV transmission element. Results of the analysis are discussed below:

a) Transmission Lines

ISTS lines loaded beyond 90% of thermal rating under N-1 contingency are summarized below at Table 6-13.

Table 6-13: ISTS Transmission lines not meeting N-1 Criteria in Southern Region

(All Fig in MW)

Sl. No.	Name of the Line	Contingency	Scenario No.	Owner	Base case Loading	Loading under N-1	Rating	% Loading
1	Pugalur New – Karur 400kV (Quad) D/c line	Pugalur New – Karur 400kV one ckt	2, 3, 5, 6	ISTS	1446	2491*	2186 (Quad Moose)	114%
2	Kolar – Dommasandra 400kV line	Mylasandra – Dharmapuri 400kV line	8	ISTS & STU (KPTCL)	670	783	850 (Twin Moose)	92%
3	Malekottaiyur – Thiruvalam A 400kV D/c line	Malekottaiyur – Thiruvalam A 400kV one ckt	4	ISTS	593	773	850 (Twin Moose)	91%

**High loading on Pugalur New – Karur 400kV D/c (Quad) D/c line is observed (under N-1) in the high RE scenario wherein Southern Region is exporting power to NEW Grid and Raigarh – Pugalur HVDC is considered in reverse mode operation.*

Further, transmission lines mentioned at Sl. No. 2 & 3 may be reconductored with HTLS conductor in coordination with STUs and the same would be included in next Rolling Plan.

Further, STU lines loaded beyond 90% of thermal rating under N-1 contingency are summarized below at Table 6-14.

Table 6-14: STU Transmission lines not meeting N-1 Criteria in Southern Region

(All Fig in MW)

Sl. No.	Name of the Line	Contingency	Scenario No.	Owner	Base case Loading	Loading under N-1	Rating	% Loading
1	Vizag Pool – Hinduja 400kV D/c line	Vizag Pool – Hinduja 400kV one ckt	2	APTRANSCO	496	942#	850 (Twin Moose	99%
2	Maheshwaram – Maheshwaram TS 400kV D/c line	Maheshwaram – Maheshwaram TS 400kV one ckt	1, 7	TSTRANSCO	1180	2299$	2186	92%

 # High loading of Vizag Pool – Hinduja 400kV D/c line is observed (under N-1) during high generation at Hinduja and low generation at Simhadri generation complex which is a rare event.

$ High loading of Maheshwaram – Maheshwaram TS 400kV (Quad) D/c line is observed (under N-1) during low internal generation of Telangana and high solar dispatch at Bidar. TSTRANSCO is planning an additional 400kV outlet from Maheshwaram (PG) that would relieve the overloading issue of Maheshwaram – Maheshwaram TS 400kV (Quad) D/c line.

b) Transformers

ISTS ICTs loaded beyond 90% of MVA rating under N-1 contingency are summarized below at Table 6-15.

Table 6-15: ISTS ICTs not meeting N-1 Criteria in Southern Region

(All Fig in MW)

Sl. No.	Name of the Element	Scenario No.	Owner	Base Case Flow	Loading of ICT under N-1	% Loading	Rating (MVA)	Remark
1	765/400kV, 3X1500 MVA Kurnool-III ICTs	1 & 4	ISTS	1294	1840	123%	1500	With commissioning of RE generation at Kurnool & Anantpur REZ, Augmentation of Kurnool-III with 4th 1500 MVA ICT would be required.
2	765/400kV, 2X1500 MVA Maheshwaram ICTs	1 & 7	ISTS	1273	1711	114 %	1500	Low internal generation of Telangana and high solar dispatch at Bidar is causing high loading of ICTs at Maheshwaram. Augmentation of Maheshwaram with 3rd 1500 MVA ICT is required.
3	400/230kV, 2X250 MVA Neyveli TS-II ICTs	1, 2, 3, 4, 5, 6, 7, 8	ISTS	233	278	111%	250	Issue of high transformer loading has been highlighted earlier also. In the 3rd SRPC(TP) meeting, TANTRANSCO suggested that shifting of the NLC TS II Unit-IV connectivity from 400 kV side to 230 kV side would mitigate the overloading issue of 2x250 MVA ICTs at NLC TS-II.
4	400/220kV, 3X315 MVA Hosur ICTs	4	ISTS	227	290	92%	315	In the 3rd SRPC(TP) meeting, TANTRANSCO stated that ICT augmentation may not be required as the 'N-1' violation is very meagre. Further, the load will be diverted from Hosur S/S to mitigate ICT constrainst.
5	400/220kV, 2X250 MVA Ramagundam NTPC ICTs	8	ISTS	216	256	102%	250	High thermal dispatch at Ramagundam and high hydro at Nagarjunsagar is causing power rush towards Ramagundam ICTs. In the 3rd SRPC(TP) meeting, TANTRANSCO has informed that part of the load would be shifted to some other substation to relieve the loading.
6	400/220kV, 2X315 MVA Ramagundam NTPC ICTs	8	ISTS	273	322	102%	315	
7	400/132kV, 250 MVA Ramagundam NTPC ICTs	5, 7, 8	ISTS	264	286	142%	200	

(All Fig in MW)

Sl. No.	Name of the Element	Scenario No.	Owner	Base Case Flow	Loading of ICT under N-1	% Loading	Rating (MVA)	Remark
8	400/220kV, 5X500 MVA Koppal ICTs	2	ISTS	370	462	92%	500	N-1 of RE PS is not to be considered as per Transmission Planning Criteria.
9	400/220kV, 2X315 MVA Cuddapah ICTs	4 & 7	ISTS	236	325	103%	315	High RE generation at Anantapur is causing overloading of ICTs.
10	400/220kV, 1X500 MVA Cuddapah ICTs	7	ISTS	375	453	91%	500	
11	400/220kV, 3X315 MVA Trivandrum ICTs	7	ISTS	210	286	91%	315	Transformation capacity augmentation would be planned in consultation with STU.
12	400/220kV, 2X315 MVA Trichy ICTs	3, 5, 6, 7, 8	ISTS	227	321	102%	315	Transformation capacity augmentation would be planned in consultation with STU.

Requirement of additional transformation augmentation wherever necessary would be planned subsequently in coordination with respective STUs and the same would be included in the next Rolling Plan.

STU ICTs loaded beyond 90% of MVA rating under N-1 contingency are summarized below at Table 6-16.

Table 6-16: STU ICTs not meeting N-1 Criteria in Southern Region

(All Fig in MW)

Sl. No.	Name of the Element	Scenario No.	Owner	Base Case Flow	Loading of ICT under N-1	% Loading	Rating (MVA)
1	400/220kV, 2X500 MVA Gulbarga ICTs	2, 3, 5, 6, 8, 9	AP	396	721	144%	500
2	400/220kV, 2X315 MVA Kottyam ICTs	7	KSEB	249	321	102%	315
4	400/220kV, 2X500 MVA Ramadugu ICTs	8	TSTRANSCO	346	494	99%	500
5	400/220kV, 2X500 MVA Dommasandra ICTs	7	KPTCL	321	465	93%	500
6	400/220kV, 3X500 MVA Devanhalli ICTs	7	KPTCL	330	455	91%	500
8	400/220kV, 2X500 MVA Jagalur ICTs	1 & 4	KPTCL	319	489	97%	500
9	400/110kV, 2X100 MVA Otapidaram ICTs	7, 8 ,9	TANTRANSCO	95	137	137%	100
10	400/110kV, 2X200MVA Salem ICTs	4, 5, 6, 7	TANTRANSCO	163	209	105%	200
11	400/220kV, 2X315 MVA Kanarpatty ICTs	1 & 4	TANTRANSCO	162	324	102%	315
13	400/230kV, 2X315 MVA Thenampatty ICTs	1, 4, 7	TANTRANSCO	220	438	139%	315

Sl. No.	Name of the Element	Scenario No.	Owner	Base Case Flow	Loading of ICT under N-1	% Loading	Rating (MVA)
14	400/110kV, 2X200 MVA Thenampatty ICTs	1, 4, 7	TANTRANSCO	161	300	159%	200
15	400/110kV, 2X200 MVA Madras ICTs	4, 5, 6	TANTRANSCO	147	197	98%	200
16	400/110kV, 2X200 MVA Kanarpatty ICTs	1, 2, 4, 5	TANTRANSCO	181	251	126%	200
17	400/110kV, 2X200 MVA Velalavidu ICTs	1, 2, 4, 5, 6, 7, 8, 9	TANTRANSCO	145	226	113%	200
18	400/110kV, 2X100 MVA Rasipalayam ICTs	2, 5	TANTRANSCO	78	105	105%	100
19	400/110kV, 2X200 MVA Edayarpalayam ICTs	7, 8, 9	TANTRANSCO	238	286	142%	200
20	400/110kV, 2X200 MVA Kamuthi ICTs	1, 4, 7	TANTRANSCO	155	248	124%	200
21	400/110kV, 2X200 MVA Palavadi ICTs	2, 4, 5, 6, 7, 8	TANTRANSCO	151	228	114%	200
22	400/230kV, 2X500 MVA Ariyalur ICTs	5	TANTRANSCO	300	452	90%	500

From above, it is observed that one ICT each in Andhra Pradesh, Telangana & Kerala, 3 nos. of ICTs in Karnataka and 13 nos. of ICTs in Tamil Nadu are not complying N-1 criteria in 2026-27 timeframe. Some of them are violating the limits in present timeframe also and are continuously flagged by POSOCO in their Operational Feedback. Most of these ICTs of TANTRANSCO are hitting more than 120% loading under N-1 Contingency and some of these ICTs are limiting the Available Transfer Capability of the State that is matter of serious concern. Therefore, STUs are required to take immediate measures to mitigate this issue of high transformer loading.

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. Eastern Region is also connected to Bhutan for import of power from hydro generations and to Nepal & Bangladesh for export of power.

7.1 Present Power Supply Position

As on Jan'2022, total Installed Capacity (IC) of Eastern Region was about 34.2 GW and the peak demand was about 26 GW. The state wise distribution of various fuel type installed generation capacity is given at Table 7-1

Table 7-1: Installed Capacity and Peak Demand of ER as on Jan'22

(All Fig in MW)

State	Thermal	Renewable			Grand Total	Peak Demand
	Coal	Hydro	RES	Total		
Bihar	6308	110	387	497	6805	7154
Jharkhand	2427	191	96	287	2714	1850
DVC	3247	186	0	186	3433	3125
Odisha	5027	2151	597	2748	7775	5643
West Bengal	9097	1396	587	1983	11180	9089
Sikkim	50	633	57	690	740	133
Central unallocated	1490	85	0	85	1575	0
Total	**27646**	**4752**	**1724**	**6476**	**34223**	**26019**

7.2 Envisaged Power Supply Scenario

As per the 19th EPS, Eastern Region demand for 2026-27 timeframe is expected to increase to about 35.6 GW at a CAGR of about 6.5%. The Installed capacity of Eastern Region is expected to be about 57GW growing at a CAGR of more than 10%. The state wise distribution of the same is given at Table 7-2.

Table 7-2 Eastern Region Installed Capacity and Peak Demand (2026-27)

(All Fig in MW)

State	Thermal	Hydro	Solar	Total	Peak Demand
Bihar	1820	45	700	2565	9308
Jharkhand*	2400	130	0	2530	2896
DVC*	0	0	0	0	5180
Odisha	2490	2193	403	5086	6273
West Bengal*	6065	1474	0	7539	14229
Sikkim	0	14	0	14	216
Central	24440	5819	0	30259	-
IPP	4150	5012	0	9162	-
Rooftop	-	-	400	400	-
Total	**41365**	**14686**	**1503**	**57554**	**35674**

The peak demand of Jharkhand, DVC and West Bengal has been calculated in the same ratio as the present peak demand ratio of Jharkhand and West Bengal.

There is growth of around 37% in the peak demand of Eastern Region from present timeframe to 2026-27. The state wise peak demand growth is given in Table 7-3.

Table 7-3 Increase in peak demand of various states of ER

(All Fig in MW)

State	2021-22	2026-27	Difference	% increase
Bihar	7154	9308	2154	30%
Jharkhand	1850	2896	1046	57%
DVC	3125	5180	2055	66%
Odisha	5643	6273	630	11%
West Bengal	9089	14229	5140	57%
Sikkim	133	216	83	62%
Total	**26019**	**35674**	**9655**	**37%**

From the above data it is observed that the increase in peak demand is maximum for DVC (66%) and minimum for Odisha (11%). However, considering the present demand of OPTCL, it is understood that the peak demand of OPTCL would surpass the EPS projection.

7.3 Load Generation Balance

Load generation balance has been prepared considering the following despatch factors for the 9 scenarios and the same is given in Table 7-4.

Table 7-4: Despatch and Demand factors for 9 scenarios

Scenario No & Name	Generation Dispatch Factors			Demand Factors
	Hydro	Solar	Rooftop	
1-Aug Solar Max	70%	80%	50%	83%
2-Aug Peak Load	90%	0%	0%	97%
3-Aug Night Off Peak	70%	0%	0%	88%
4-Jun Solar Max	70%	85%	60%	84%
5-Jun Peak Load	90%	0%	0%	99%
6-Jun Night Off Peak	70%	0%	0%	84%
7-Feb Solar Max	30%	90%	60%	69%
8-Feb Peak Load	60%	0%	0%	81%
9-Feb Night Off Peak	30%	0%	0%	54%

The despatch from thermal generations have been done considering merit order despatch. Eastern Region LGBs for all 9 nos. of scenarios are summarized in Figure 7-1, Figure 7-2 and Figure 7-3.

Based on LGB, state wise surplus/deficit in these scenarios is summarised in Table 7-5. Further, both maximum and minimum import of each state from ISTS grid is highlighted in table below.

Table 7-5: Drawl of various states from ISTS grid

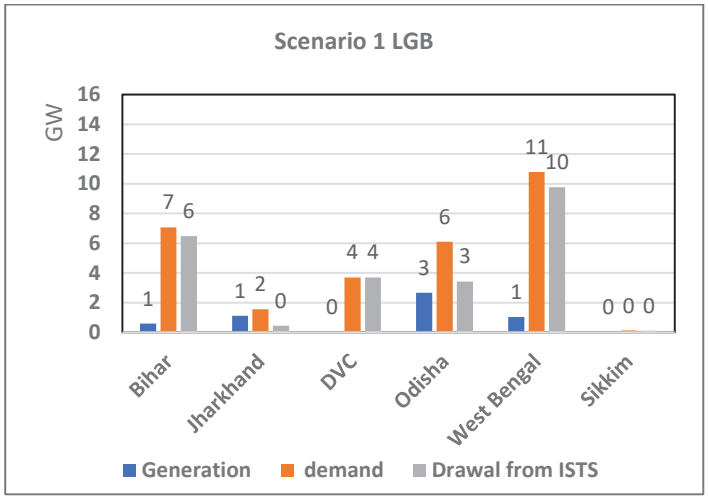
(All Fig in MW)

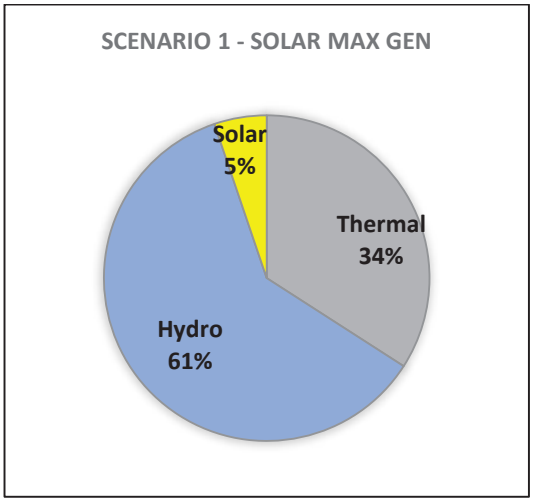
Drawl from ISTS	Aug'26			Jun'26			Feb'27		
Scenario / State	1 Solar Max	2 Peak Load	3 Off Peak	4 Solar Max	5 Peak Load	6 Off Peak	7 Solar Max	8 Peak Load	9 Off Peak
Bihar	6474	6724	2106	5991	6699	4537	4651	4712	2215
Jharkhand	439	-331	2	151	-301	173	225	-238	-201
DVC	3693	4344	5550	4087	4855	4017	4017	4769	3785
Odisha	3423	3937	5507	3546	4179	2839	3222	3361	2203
West Bengal	9753	9312	9825	10125	9878	5111	6577	6601	4964
Sikkim	109	128	9	106	125	175	181	212	116
Central	-6603	-12073	-11366	-9821	-17925	-15845	-14341	-24266	-16568
IPP	-4916	-6687	-5684	-4916	-6687	-5684	-3786	-6535	-4554
Total	12370	5354	5948	9270	824	-4677	746	-11383	-8040

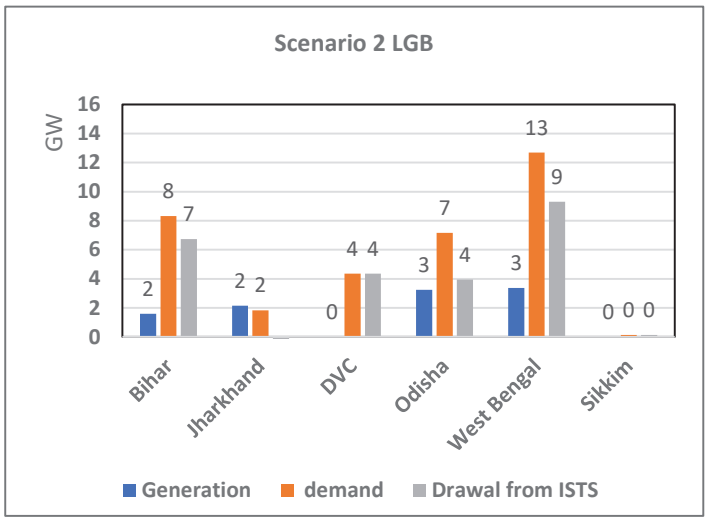
Out of these nine scenarios, Scenario-1 and Scenario-8 corresponds to two extreme cases with respect to import/ export i.e. highest import (12.3 GW) and highest export (11.3 GW) scenarios respectively. In all other scenarios, import /export from Eastern Region to other regions is varying between these two extremes. Detailed system studies have been carried out on the finalized load flow cases. The study results are discussed in subsequent chapters.

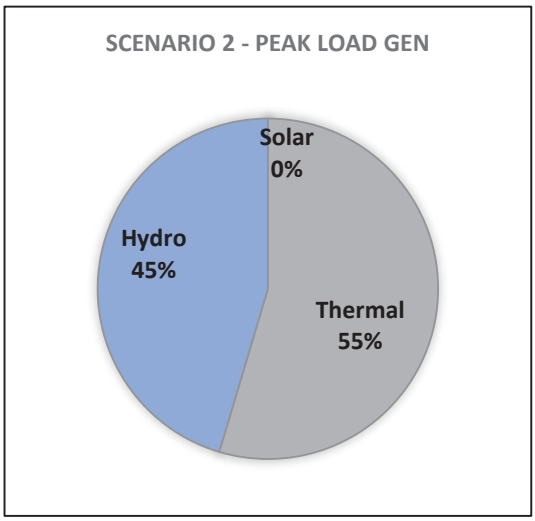
7.3.1 Monsoon Aug'26

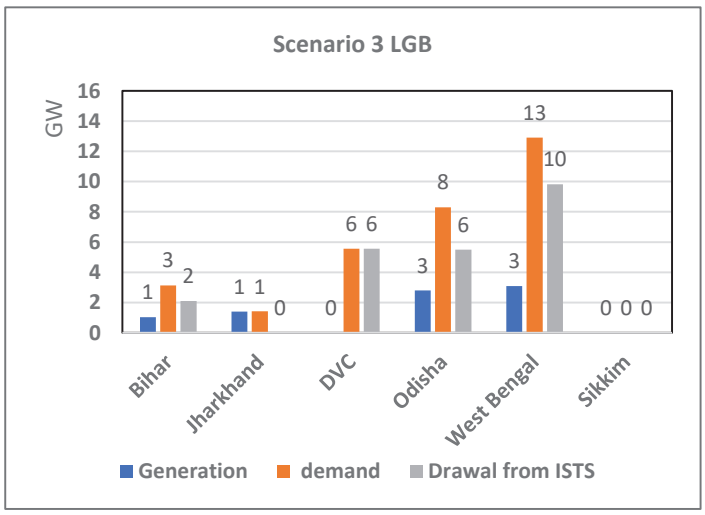
Figure 7-1 LGB for Monsoon Aug'26

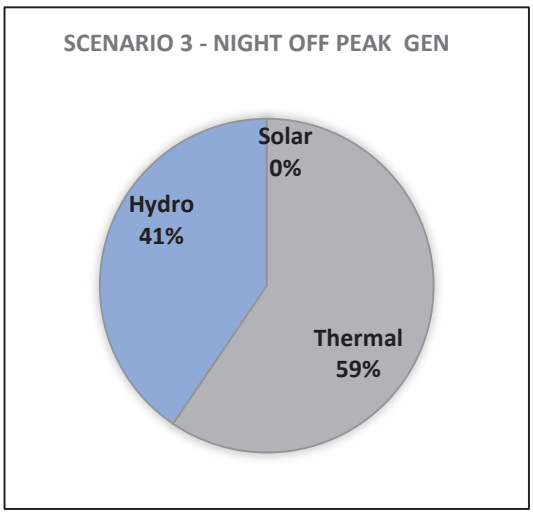






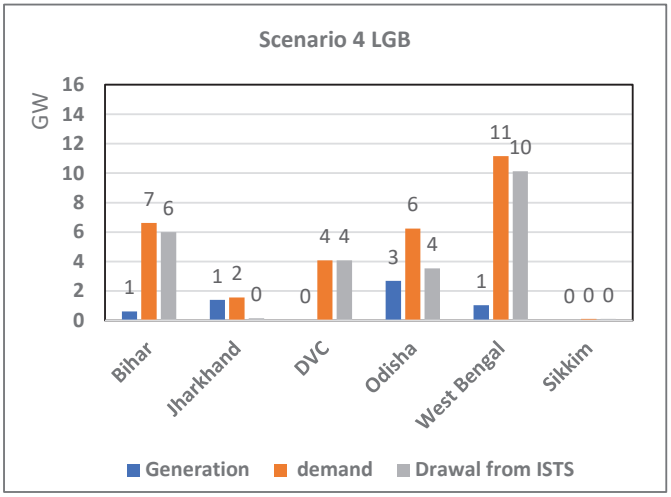


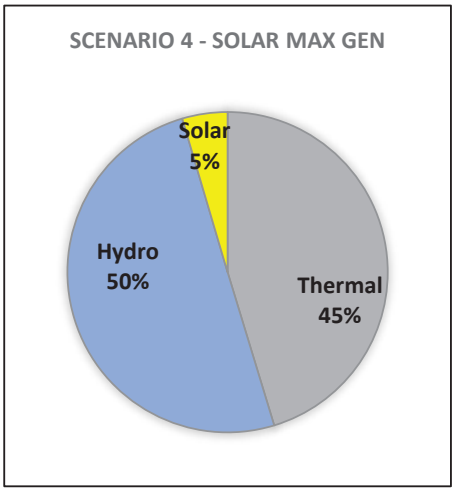


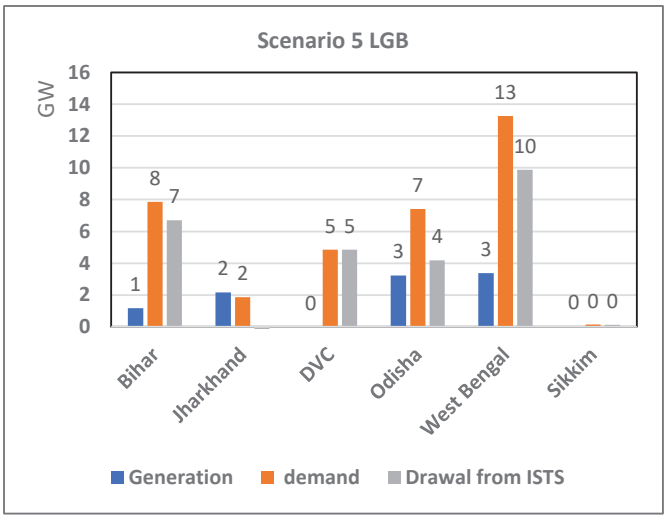


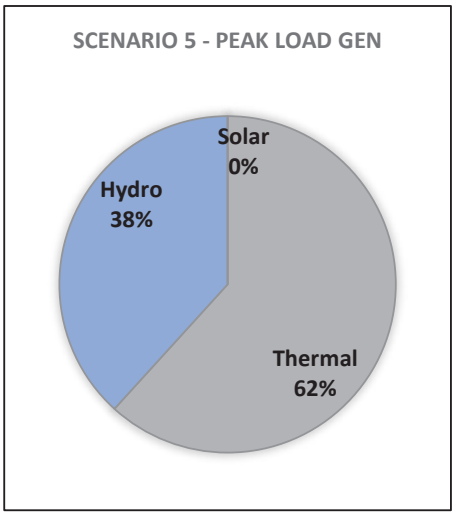
7.3.2 Summer Jun '26

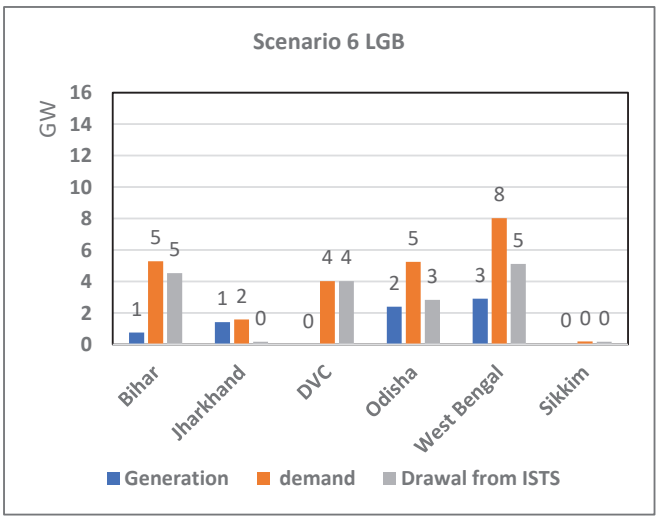
Figure 7-2 LGB for Summer Jun'26

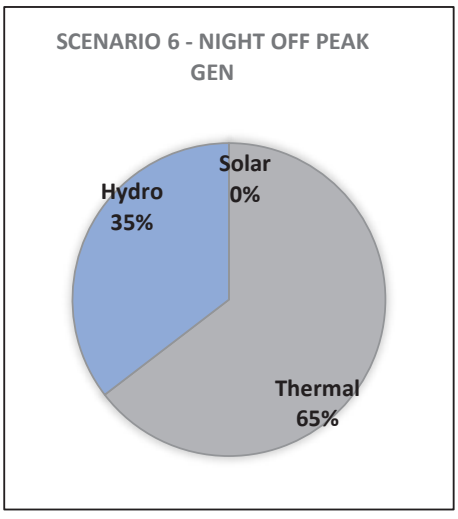






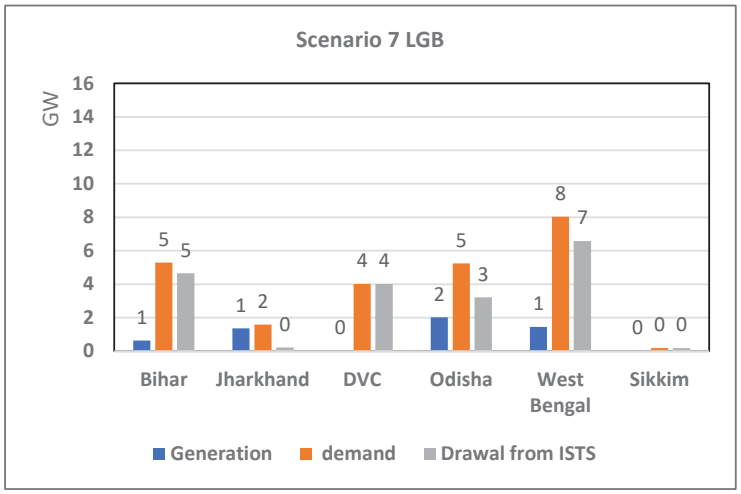


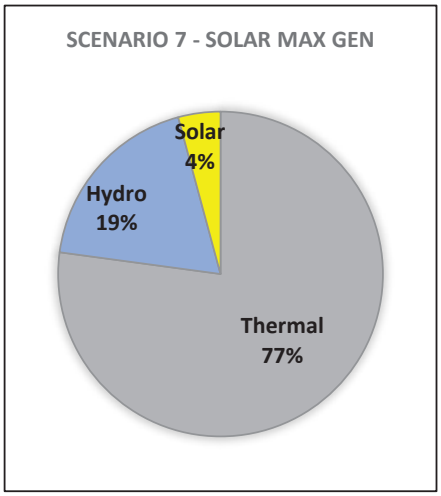


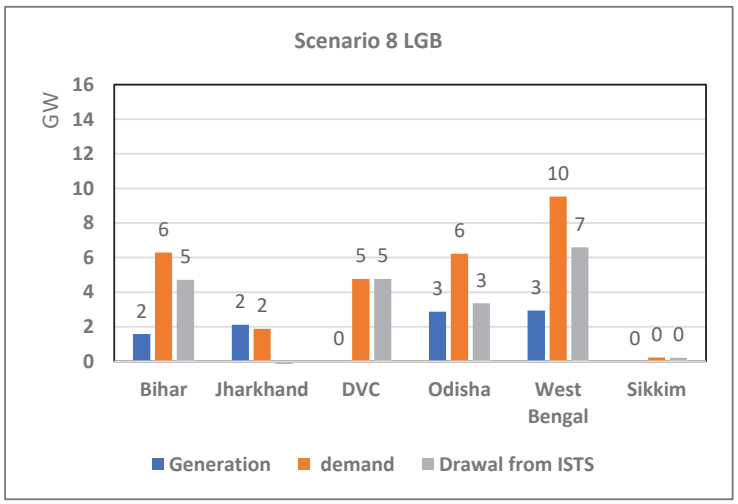


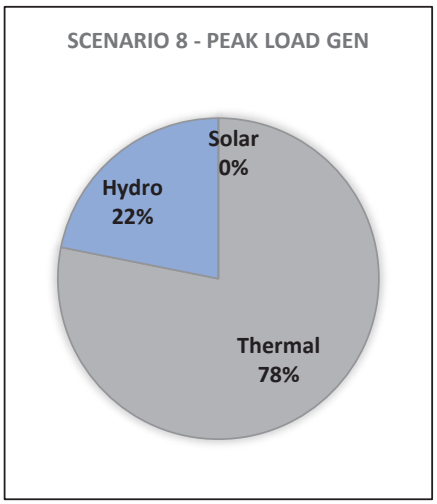
7.3.3 Winter Feb '27

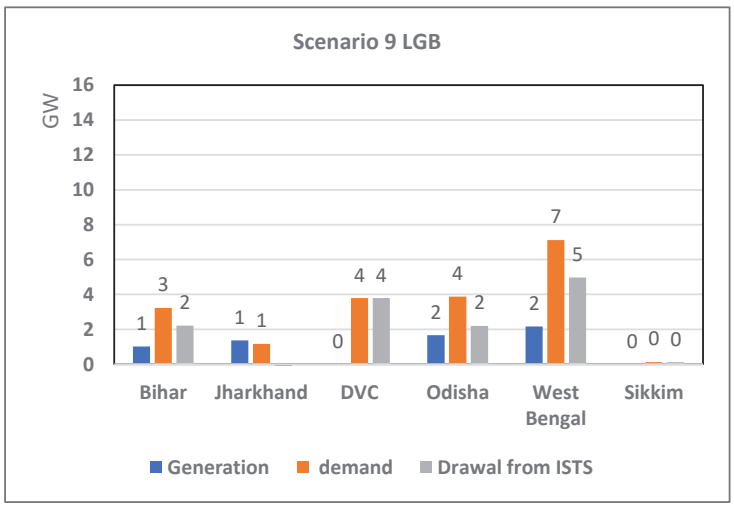
Figure 7-3 LGB for Winter Feb'27

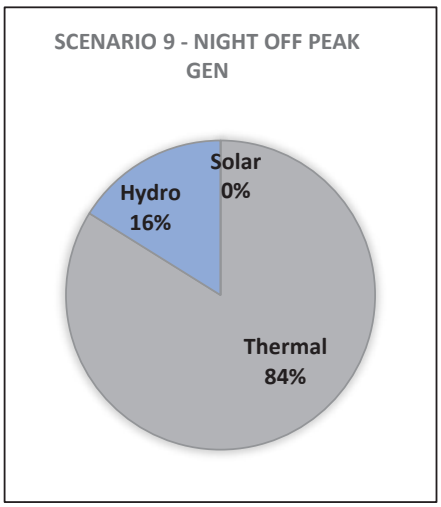












7.4 ISTS Network

Various transmission systems have been planned for implementation in the Consultative Meeting for Evolution of Transmission System of ER (CMETS-ER) from Nov 2021 to Feb 2022. These schemes have either been approved or under various stages of approval. The details of the schemes including other important issues in regard to ISTS in the Eastern Region which were discussed during this timeframe has also been summarized below:

7.4.1 West Bengal

(a) Installation of 420kV, 1x125MVAr Bus Reactor along with associated bay at Alipurduar (POWERGRID) S/s

Under the low hydro scenario (Nov to Mar) and due to long 400kV transmission lines mainly from Bhutan HEPs, the transmission lines become lightly loaded resulting in MVAr generation. The surplus reactive power leads to over voltage in system. Peak voltages at 400kV bus upto 430kV and 425kV has been observed at Alipurduar and New Siliguri substations. Continuous high voltage produces stress on the connected equipment and may cause failure of insulation in long run.

In the studies, it has been observed that with switching of 125MVAr bus reactor at Alipurduar, the bus voltage changes by 4-5kV, in low hydro scenario in Sikkim and Bhutan. In high hydro condition, the change is of the order of 2-3kV.

Accordingly, the following scheme has been agreed for implemented under ISTS to limit the voltage at Alipurduar and nearby areas:

(a) Installation of 420kV, 1x125MVAr bus reactor along with associated bay at Alipurduar (POWERGRID) S/s

The implementation schedule of the scheme would be about 18months. However, best efforts would be made to commission the reactor at the earliest.

7.4.2 Bihar

(a) Installation of 420kV, 63MVAr switchable Line Reactor at Kahalgaon (NTPC) end, one each in both circuits of Kahalgaon (NTPC) – Durgapur (POWERGRID) 400kV D/c line

Farakka – Kahalgaon (ckt-3 & ckt-4) and Farakka – Durgapur 400kV D/c lines have been bypassed at Farakka so as to form Kahalgaon – Durgapur 400kV D/c line (243km) in order to limit short circuit current at Farakka generation switchyard under ERSS-XXIII Scheme. During charging in off-peak condition voltage rise of about 18-20kV has been observed on the line.

With 63MVAr line reactor at any one end, the percentage compensation is observed to be about 40%. It is a general practice to charge a transmission line connecting a generation project to the grid from the remote end. In the studies, it has been observed that without the line reactor, the total rise on the line while charging from Durgapur end is about 19-20kV. After installation of 63 MVAr line reactor, the total rise reduces to about 5-6kV.

Accordingly, the following scheme has been agreed for implemented under ISTS for reliable operation of Kahalgaon – Durgapur 400kV D/c line:

(a) Installation of 420kV, 63MVAr switchable line reactor at Kahalgaon (NTPC) end, in each circuits of Kahalgaon (NTPC) – Durgapur (POWERGRID) 400kV D/c line.

The implementation schedule of the scheme would be about 18months. However, best efforts would be made to commission the reactor at the earliest.

7.4.3 Odisha

(a) Western Region Expansion Scheme-XXIV (WRES-XXIV)

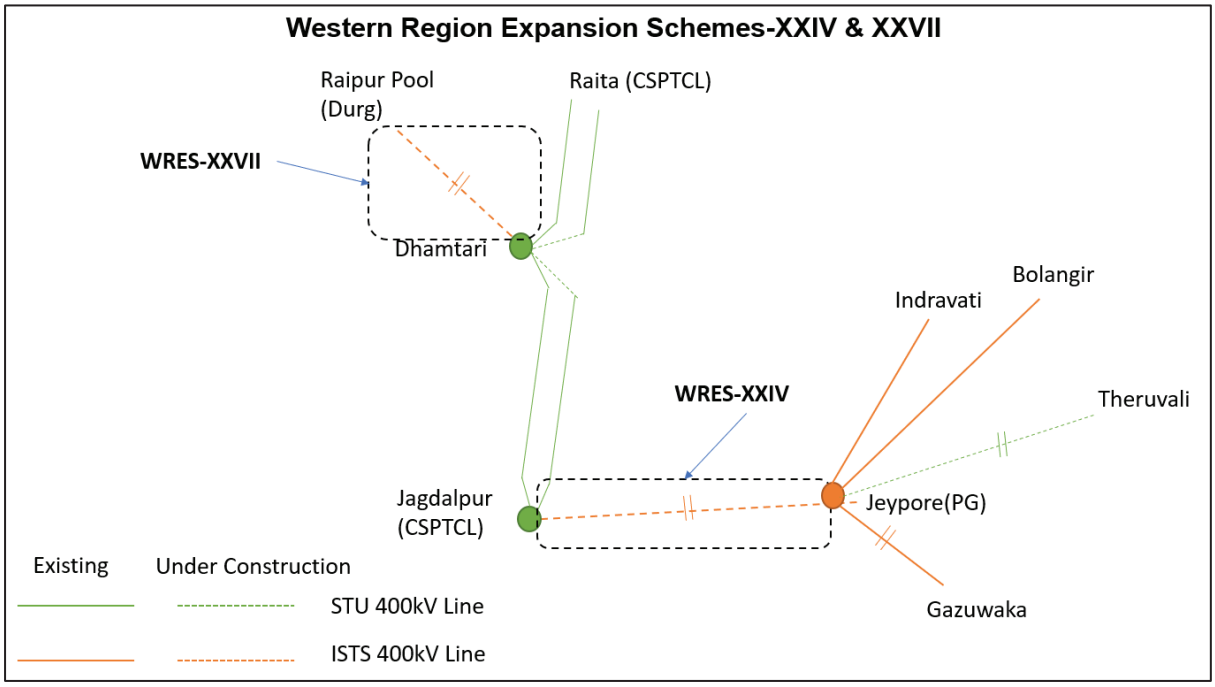
The scheme involves Jeypore – Jagdalpur 400kV D/c line between WR & ER. The scheme was planned in the 2nd Joint study meeting on Transmission Planning for Western Region on 10.12.2021, 2nd CMETS-ER meeting held on 27.12.2021 & 2nd CMETS-WR meeting held on 28.12.2021 to facilitate reliability of power supply to Jagdalpur S/s of CSPTCL and Jeypore S/s of POWERGRID, enhance short circuit strengths of Jagdalpur and Jeypore S/s as well as to augment Inter-regional capacity between WR & ER Grids.

Scope of work along with tentative Cost and Implementation time-frame:

Sl. No.	Scope of the Transmission Scheme	Capacity/km	Implementation timeframe
1	Jeypore – Jagdalpur 400kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage) along with associated bays at both ends	80km. 2 no. of 400kV GIS line bays at Jeypore (POWERGRID) S/s 2 no. of 400kV line bays at Jagdalpur (CSPTCL) S/s	24 months from allocation to implementing agency / SPV Transfer (as the case may be) or matching with WRES-XXVII (anticipated by Mar-24), whichever is later
	Total Estimated Cost:		Rs. 293 Crore

The scheme has been sent to NCT for approval in its ensuing meeting.

Figure 7-4 Schematic WRES-XXIV



7.5 RE Evacuation

Eastern Region has limited wind energy generation potential of about 1.7 GW and moderate Solar Generation potential of about 66 GW mainly in the state of Odisha, Jharkhand & Bihar. By the year 2026-27, no renewable generation capacity is expected to be integrated in the ISTS Network. Some Renewable generation (Solar and floating solar) are being implemented in Bihar, Jharkhand, DVC and West Bengal which are expected to be connected to STU grid by this timeframe.

7.6 System Study Analysis and Results

Based on the load-generation scenarios as elaborated in section 7.3, various system studies have been carried out in PSSE. Planned/ Under implementation Transmission system that are expected to be commissioned in 2026-27 timeframe are considered for conducting these studies. Results of these studies were analysed and the same are deliberated below-

7.6.1 Load Flow Studies

e) Transmission Lines

In the base case file prepared for 2026-27 timeframe, 4 nos. of 400 kV lines are having loading more than 70% of the thermal limit of the line. Scenarios where loading is more than 70% of rating and maximum loading obtained on these transmission lines in the simulation studies are tabulated below in Table 7-6:

Table 7-6: List of Transmission line with loading more than 70% of their thermal rating in ER

Sl. No.	Name of the Line	Scenario No.	Owner	Maximum Loading (MVA)	Rating (MW)
1	Kahalgaon-B – Farakka 400kV D/c line	8	ISTS	783	850 (Twin Moose)
2	Jharsuguda – Rourkela 400kV D/c line	3,5	ISTS	844	1093 (Twin Moose)
3	Rourkela – Chaibasa 400kV D/c line	5	ISTS	783	1093 (Twin Moose)
4	Sipat – Ranchi 400kV D/c line	2,3,5	ISTS	683	850 (Twin Moose)
5	Meramundali – Mendhasal 400kV D/c line	1,2,3,4,5,6	OPTCL	882	850 (Twin Moose)
6	Sterlite – Lapanga 400kV D/c line	1,2,3,4,5,6	OPTCL	1392	1093 (Twin Moose)

Low generation in West Bengal coupled with retirement of old units in DVC /West Bengal (Bakreshwar, DPL and Titagarh) is the main reason for increase in power flow in these lines. Therefore, additional strengthening to DVC/West Bengal area may be required to feed the growing demand. Further, Talcher-III generation project is expected to be connected in Meramundali, which would reduce the overloading in Meramundali area.

f) Transformers

In the base case file prepared for 2026-27 timeframe, transformers at 3 nos. of 400/220kV substations are having loading more than 80% of the ICT rating. Scenarios where loading is more than 80% of rating and maximum loading hit by these transformers in the simulation studies are tabulated below:

Table 7-7: List of ICT with loading above 80% of their ratings in Eastern Region

Sl. No.	Name of the Element	Scenario No.	Owner	Maximum Loading (MVA)	Rating (MVA)
1	400/220kV, 2x315MVA ICTs at Durgapur TPS	2,3,5,6	ISTS	324	315
2	400/220kV, 2x315MVA ICTs at Bokaro-A TPS	All except 2	ISTS	390	315
3	400/220kV, 2x315MVA ICTs at Koderma TPS	3	ISTS	252	315
4	400/220kV, 2x315MVA ICTs at Menshasal	1,2,3,4,5,6,8	OPTCL	346	315
5	400/220kV, 2x315MVA ICTs at Kolaghat TPS	1,4	WBSETCL	306	315
6	400/220kV, 3x315MVA ICTs at Chanditala	1,2,3,4,5,6	WBSETCL	317	315
7	400/220kV, 3x315MVA ICTs at Kharagpur	2,4,5,6	WBSETCL	269	315
8	400/220kV, 4x315MVA ICTs at Jeerat	2,3,4,5,6	WBSETCL	294	315
9	400/220kV, 3x315MVA ICTs at Bidhannagar	1,4	WBSETCL	292	315

Retirement of old units in DVC /West Bengal (Bakreshwar, DPL and Titagarh) is the main reason for increase in power flow in these transformers. Therefore, additional strengthening in DVC area may be required to feed the growing demand. DVC has proposed new 220kV S/s to shift part of their load. Studies for the same is being carried out and discussed in subsequent CMETS meetings of ER. Further, OPTCL may plan additional lines in Bhubaneshwar/ Cuttack area for drawl of reliable power from ISTS grid.

7.6.2 Voltage Analysis

PU voltages of all 765 kV and 400 kV buses were observed in all the nine scenarios. Maximum and minimum voltage of each bus were identified from the bus voltages in the nine number of scenarios. Following 765kV & 400kV buses were observed to be having voltage more than 1.05 pu mentioned in the table below Table 7-8:

Table 7-8: List of Substation with Voltage more than 1.05pu in Eastern Region

Sl. No.	Bus Name	Voltage Level (kV)	Owner	Max	Scenario
1	Kahalgaon-A	400	ISTS	1.06	2,3,6

High voltage has been observed at Kahalgaon due to switching off old 200MW machine as their variable cost is on the higher side.

Following 765kV & 400kV buses were observed to be having voltage less than 0.95 pu mentioned in the table below Table 7-9::

Table 7-9: List of substations with Voltage less than 0.95 pu in Eastern Region

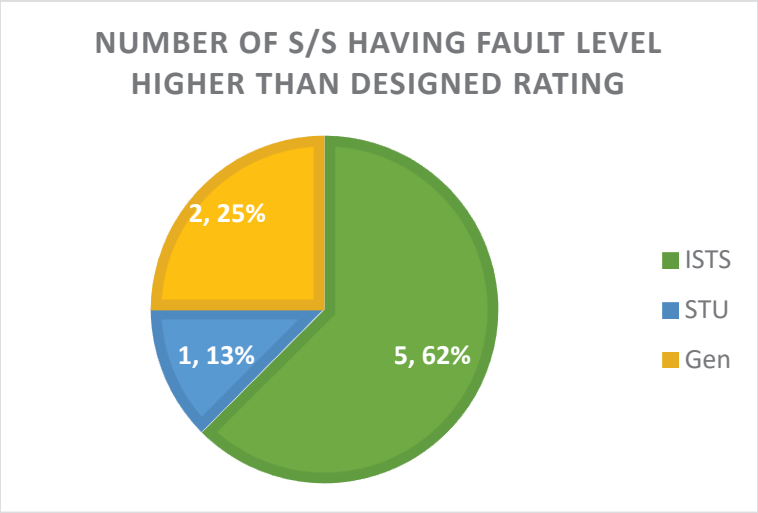
Sl. No.	Bus Name	Voltage Level (kV)	Owner	Min (pu)	Scenario
1	DUBURI	400	OPTCL	0.91	3
2	MENDHASAL	400	OPTCL	0.92	3,5
3	PARADEEP4	400	OPTCL	0.89	3,5
4	PANDIABILI	400	ISTS	0.92	3,5
5	MERAMNDLI-B	400	OPTCL	0.91	3
6	GMR-OD	400	Gen	0.91	3
7	NARENDRAPUR	400	OPTCL	0.92	3,5
8	BHADRAK-NEW	400	OPTCL	0.94	3

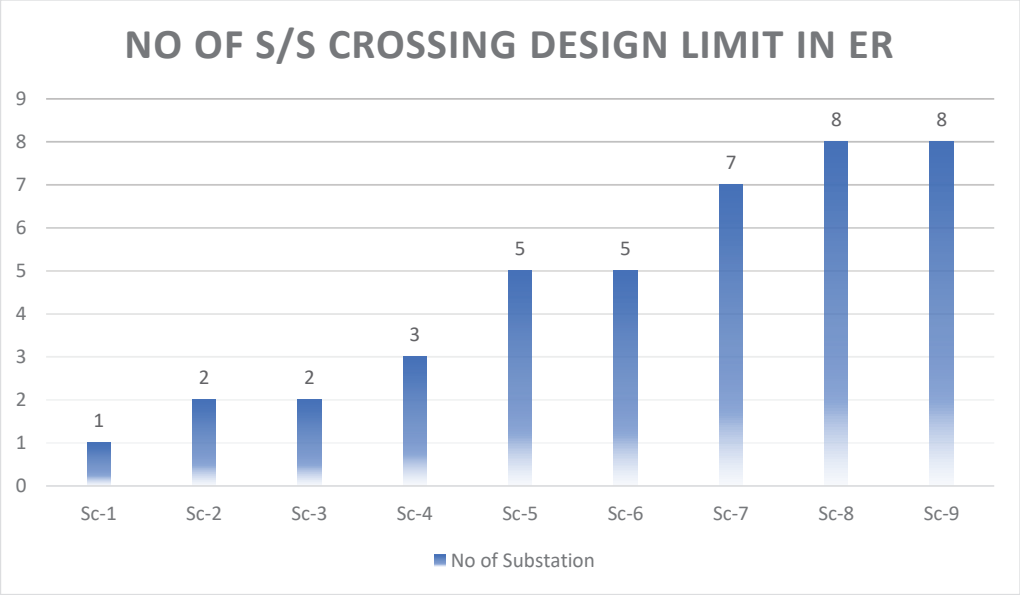
The load voltage in OPTCL system is due to concentration of load in Mendhasal and Pandialbili area. Suitable capacitor bank may be installed by OPTCL at lower voltages to control the undervoltage. Further, Talcher-III generation project is expected to be connected in Meramundali, which would improve the voltage profile in Meramundali area.

7.6.3 Short Circuit Analysis

Short circuit level was calculated for all 765 and 400 kV buses of Eastern Region and buses having fault level more than the design rating under any scenario were identified. From analysis it is emerged that there as 8 nos of 400kV s/s in ER having fault level more than designed capacity.

Figure 7-5 No of S/s having fault level higher than designed rating





Details of the ISTS buses exceeding design fault level under any scenario are tabulated below at Table 7-10:

Table 7-10 List of ISTS substations exceeding design fault level in Eastern Region

Sl. No.	Substation Name	Owner	Scenario No.	Highest Fault level (in kA)	Designed Rating (in kA)
1	400kV Patna PG	POWERGRID	2,3,5,6,7,8,9	50	40
2	400kV Barh	NTPC	7,8,9	46	40
3	400kV Farakka	NTPC	5,6,7,8,9	42	40
4	400kV Siliguri	POWERGRID	8,9	40	40
5	400kV Jharkhand pool	POWERGRID	4,5,6,7,8,9	46	40
6	400kV Ranchi	POWERGRID	All	51	40

From the above, it can be seen that 2 nos. of buses i.e. 400kV Farakka, 400kV Siliguri violates the design fault level under all the scenarios by less than 10%.

Bypassing arrangement has been identified at Patna which shall relieve the fault level at Barh and Patna. Detailed studies are being carried out for 400kV Ranchi and suitable measures shall be included in the next Rolling Plan.

Further, following STU buses exceed the design fault level under different scenario is listed below in Table 7-11:

Table 7-11 List of STU substations exceeding designed fault level in Eastern Region

Sl. No.	Substation Name	Owner	Scenario No.	Highest Fault level (in kA)	Designed Rating (in kA)
1	400kV Patratu	JUSNL	7,8,9	42	40
2	400kV Essar	Generator	4,5,6,7,8,9	45	40

STUs are also required to take necessary actions such as bus splitting, bypassing of lines, fault limiting reactors etc to resolve the issue of high fault level at their buses.

7.6.4 Contingency Analysis

Contingency analysis has been performed on all the 765 kV & 400kV transmission lines, and 765/400 kV & 400/220 kV transformers to ascertain the loading levels under outage of any other 765 kV or 400 kV transmission element. Results of the analysis are discussed below:

e) Transmission Lines

List of ISTS lines loaded beyond 90% of thermal rating under N-1 contingency are summarized below in Table 7-12:

Table 7- 12: List of ISTS lines voilating their thermal limits under N-1 Contingency in ER

Sl. No.	Name of the Line	Contingency	Scenario No.	Owner	Base case Loading (MVA)	Loading under n-1 (MVA)	Rating (MW)	% Loading
1	Ranchi – Sipat 400kV line-1	Ranchi – Sipat 400kV line-2	2,5	ISTS	715	862	850 (Twin Moose)	101%
2	Ranchi – Sipat 400kV line-1	Ranchi New – Dharamjaigarh 765kV line-1	3	ISTS	716	805	850 (Twin Moose)	95%
3	Kahalgaon – Farakka 400kV line-1	Kahalgaon – Farakka 400kV line-2	1,6,7,8	ISTS	783	1129	850 (Twin Moose)	132%
4	Jharsuguda – Rourkela 400kV line-1	Jharsuguda – Rourkela 400kV line-2	3,5	ISTS	844	1085	1093 (Twin Moose)	99%
5	Rourkela – Chaibasa 400kV line-1	Rourkela – Chaibasa 400kV line-2	5	ISTS	782	1012	1093 (Twin Moose)	93%
6	JITPL – Angul 400kV line-1	JITPL – Angul 400kV line-1	2,3,5,6,8,9	Dedicated line	614	1209	850 (Twin Moose)	142%

Low generation in West Bengal coupled with retirement of old units in DVC /West Bengal is the main reason for increase in power flow in these lines. Therefore, additional strengthening to DVC/West Bengal area may be required to feed the growing demand.

List of STU lines loaded beyond 90% of thermal rating under N-1 contingency are summarized below in Table 7-13:

Table 7-13: List of STU lines voilating their thermal limits under N-1 Contingency in ER

Sl. No.	Name of the Line	Contingency	Scenar io No.	Owner	Base case Loading (MVA)	Loading under n-1 (MVA)	Rating (MW)	% Loading
1	Meramundali – Mendhasal 400kV line-1	Meramundali – Mendhasal 400kV line-2	1,2,3, 4,5,6,8	OPTCL	882	1353	850 (Twin Moose)	159%
2	Sterlite – Lapanga 400kV line-1	Sterlite – Lapanga 400kV line-2	All except-9	OPTCL	1385	2614	1093 (Twin Moose)	239%

High concentration of load centres in Meramundali and Mendhasal area lead to violation of "N-1" contingency in the lines feeding these substation. Additional feed to these substation may be required to bring the loading limit under N-1 contingency within permissible limits. OPTCl may take up implementation of Khuntuni substation so control the overloading around Meramundali.

f) Transformers

List of ISTS ICTs loaded beyond 90% of MVA rating under N-1 contingency are summarized below in Table 7-14:

Table 7-14: List of ISTS ICTs with loading more than 90% of their ratings under N-1 Contingency in Eastern Region

Sl. No.	Name of the Element	Scenario No.	Owner	Maximum Base Case Flow (MVA)	Maximum Loading under n-1 of ICT (MVA)	% Loading	Rating (MVA)
1	400/220kV, 2x315MVA ICTs at Durgapur TPS	2,3,5,6	ISTS	330	441	140%	315
2	400/220kV, 2x315MVA ICTs at Bokaro-A TPS	All	ISTS	393	570	181 %	315
3	400/220kV, 2x315MVA ICTs at Koderma TPS	All except-9	ISTS	262	414	131%	315
4	400/220kV, 2x315MVA ICTs at Raghunathpur TPS	2,3,5,6,8	ISTS	241	347	110%	315
5	400/220kV, 2x500MVA ICTs at Rajarhat	3,5	ISTS	339	464	93%	500
6	400/220kV, 4x315MVA +1x500MVA ICTs at Subahsgram	2,3,5,6	ISTS	233	255	92%	315
7	765/400kV, 2x1500MVA ICTs at Jeerat New	1,2,3,4,5,6	ISTS	1019	1680	112%	1500

Retirement of old units in DVC /West Bengal is the main reason for increase in power flow in these transformers. Therefore, additional strengthening in DVC area may be required to feed the growing demand. DVC has proposed new 220kV S/s to shift part of their load. Studies for the same is being carried out and discussed in subsequent CMETS meetings of ER.

List of ISTS ICTs loaded beyond 90% of MVA rating under N-1 contingency are summarized below in Table 7-15

Table 7-15: List of STU ICTs with loading more than 90% of their ratings under N-1 Contingency in Eastern Region

Sl. No.	Name of the Element	Scenario No.	Owner	Maximum Base Case Flow (MVA)	Maximum Loading under n-1 of ICT (MVA)	% Loading	Rating (MVA)
1	400/220kV, 2x315MVA ICTs at Mendhasal	All except-9	OPTCL	406	562	178%	315
2	400/220kV, 2x315MVA ICTs at Lapanga	3	OPTCL	237	33	105%	315
3	400/220kV, 2x315MVA ICTs at Narendrapur	2,3,5	OPTCL	248	399	127%	315
4	400/220kV, 2x315MVA ICTs at Mendhasal	All except-9	OPTCL	406	562	178%	315
5	400/220kV, 4x315MVA ICTs at Jeerat	1,2,3,4,5,6,	WBSETCL	296	345	110%	315

Sl. No.	Name of the Element	Scenario No.	Owner	Maximum Base Case Flow (MVA)	Maximum Loading under n-1 of ICT (MVA)	% Loading	Rating (MVA)
6	400/220kV, 2x315MVA ICTs at Kolaghat TPS	1,2,3,4,5,6,7	WBSETCL	307	454	144%	315
7	400/220kV, 3x315MVA ICTs at Chanditala	1,2,3,4,5,6	WBSETCL	324	397	126%	315
8	400/220kV, 3x315MVA ICTs at Kharagpur	1,2,3,4,5,6	WBSETCL	269	370	117%	315
9	400/220kV, 3x315MVA ICTs at New Laxmikantpur	2,3, 5,6	WBSETCL	256	374	118%	315
10	400/220kV, 3x315MVA ICTs at New Bidhannagar	1,4	WBSETCL	296	380	121%	315

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. The NER grid is further strongly 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. North Eastern Region is also connected to Bhutan for import of power from hydro generations. Further, North Eastern Region is also connected to Myanmar and Bangladesh for export of power.

8.1 Present Power Supply Position

As on Jan'2022, total Installed Capacity (IC) of North Eastern Region was about 34.2 GW and the peak demand was about 26 GW. The state wise distribution of various fuel type installed generation capacity is given at Table 8-1

Table 8-1 Installed Capacity and Peak Demand of NER as on Jan'22

(All Fig in MW)

State	Thermal				Renewable			Grand Total	Peak Demand
	Coal	Gas	Diesel	Total	Hydro	RES	Total		
Assam	403	765	0	1167	522	105	627	1794	2126
Arunachal Pradesh	37	47	0	84	545	142	687	771	197
Meghalaya	52	110	0	161	409	50	460	621	408
Tripura	56	574	0	630	68	31	99	729	328
Manipur	47	72	36	155	95	18	113	268	258
Nagaland	32	49	0	81	66	34	100	181	173
Mizoram	31	40	0	72	98	44	142	214	156
Central unallocated	113	64	0	176	140	0	140	316	0
Total	**770**	**1720**	**36**	**2526**	**1944**	**424**	**2368**	**4894**	**3427**

8.2 Envisaged Power Supply Scenario

As per the 19th EPS, North Eastern Region demand for 2026-27 timeframe is expected to increase to about 6.71 GW at a CAGR of about 14.4%. The Installed capacity of North Eastern Region is expected to be about 7.2GW growing at a CAGR of about 8%. The state wise distribution of the same is given at Table 8-2.

Table 8-2 North Eastern Region installed capacity and peak demand (2026-27)

(All Fig in MW)

State	Thermal				Renewable			Grand Total	Peak Demand
	Coal	Gas	Diesel	Total	Hydro	RES	Total		
Assam	-	329	-	329	220	5	225	554	4166
Arunachal Pradesh	-	-	-	-	-	107	107	107	482
Meghalaya	-	-	-	-	322	33	355	355	605
Tripura	-	137	-	137	-	16	16	153	495
Manipur	-	-	36	36	-	5	5	41	667
Nagaland	-	-	-	-	-	31	31	31	322
Mizoram	-	-	-	-	-	36	36	36	252
Central	770	1254	-	-	3522	30	3552	5576	-
Private	-	-	-	-	-	161	161	161	-
Rooftop	-	-	-	-	-	100	100	100	-
Total	770	1720	36	2526	4064	524	4588	7114	6710

There is growth of around 96% in the peak demand of North Eastern Region from present timeframe to 2026-27. This huge increase is envisaged due to establishment of large number of distribution S/s under NERPSIP and Comprehensive Schemes. The state wise peak demand growth is given in Table 8-3

Table 8-3 Increase in peak demand of various states of NER

(All Fig in MW)

State	2021-22	2026-27	Difference	% increase
Assam	2126	4166	2040	96%
Arunachal Pradesh	197	482	285	145%
Meghalaya	408	605	197	48%
Tripura	328	495	167	51%
Manipur	258	667	409	159%
Nagaland	173	322	149	86%
Mizoram	156	252	96	62%
Total	3427	6710	9655	37%

From the above data it is observed that the increase in peak demand is maximum for Manipur (159%) and minimum for Tripura (51%).

8.3 Load Generation Balance

Load generation balance has been prepared considering the following despatch factors for the 9 scenarios and the same is given in Table 8-4

Table 8-4: Despatch and Demand factors for 9 scenarios

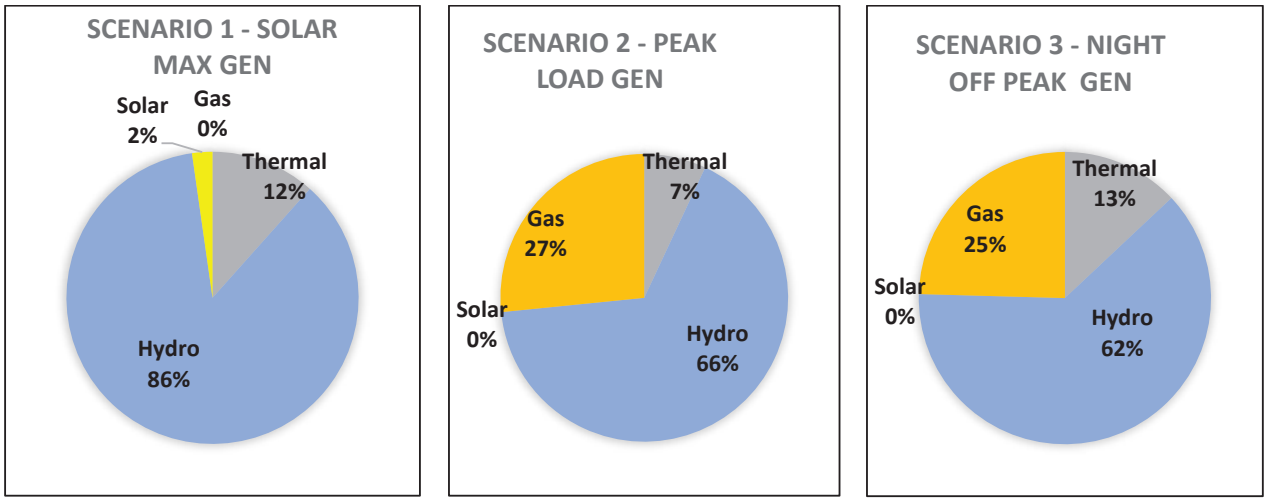
Scenario No & Name	Generation Dispatch Factors				Demand Factors
	Hydro	Solar	Rooftop	Gas	
1-Aug Solar Max	70%	80%	50%	0%	69%
2-Aug Peak Load	90%	0%	0%	85%	93%
3-Aug Night Off Peak	70%	0%	0%	65%	72%
4-Jun Solar Max	70%	85%	60%	0%	64%
5-Jun Peak Load	90%	0%	0%	85%	83%
6-Jun Night Off Peak	70%	0%	0%	60%	62%
7-Feb Solar Max	30%	90%	60%	0%	55%
8-Feb Peak Load	60%	0%	0%	85%	79%
9-Feb Night Off Peak	30%	0%	0%	30%	42%

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

North Eastern Region LGBs for all 9 nos. of scenarios are summarized in below figures.

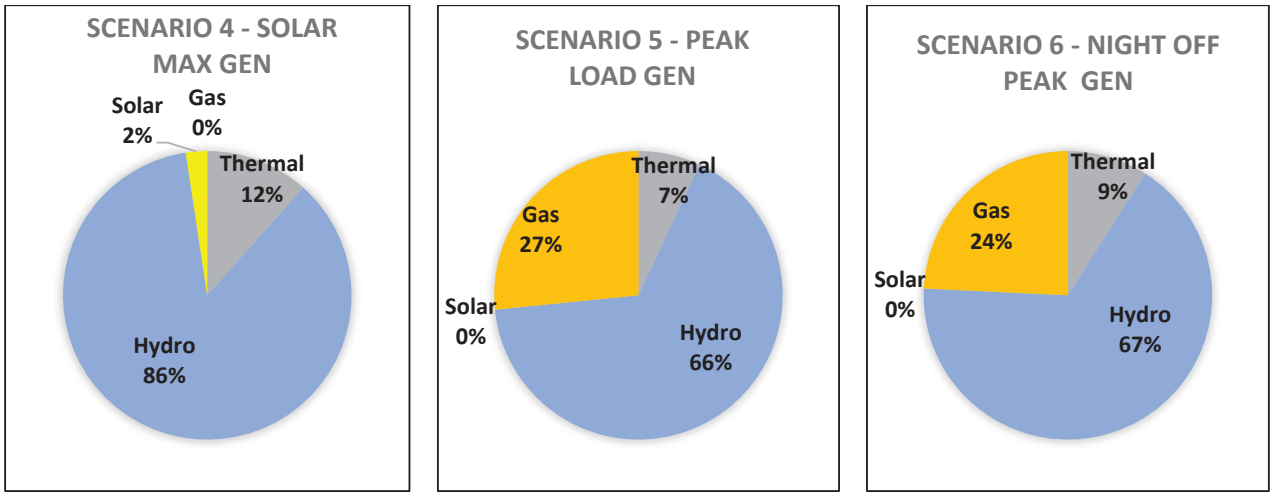
8.3.1 Monsoon Aug'26

Figure 8-1 LGB for Monsoon Aug'26



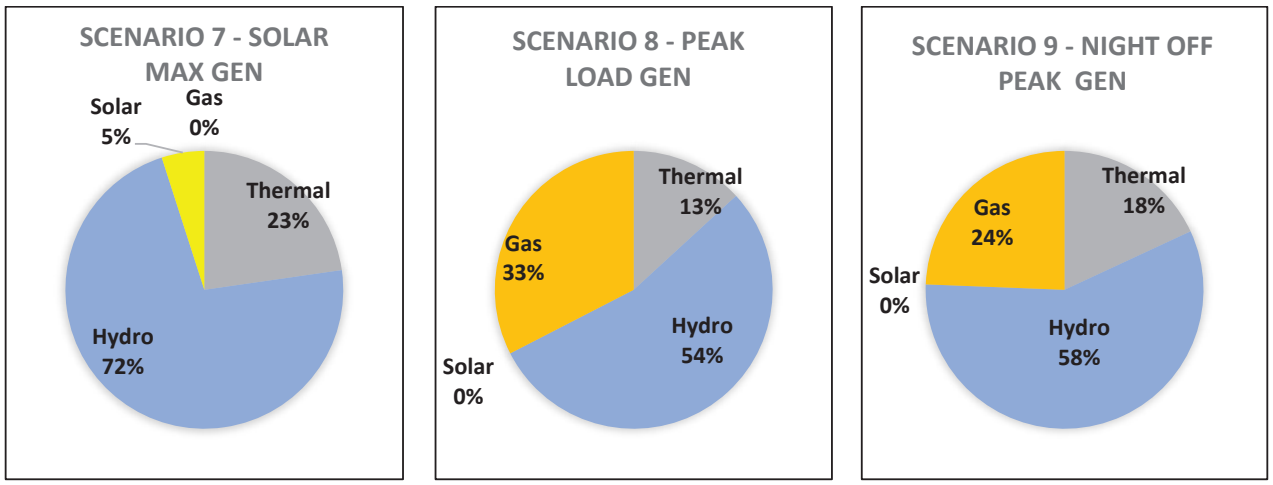
8.3.2 Summer Jun '26

Figure 8-2: LGB for Summer Jun'26



8.3.3 Winter Feb '27

Figure 8-3: LGB for Winter Feb'27



Based on LGB, state wise surplus/deficit in these scenarios is summarised in Table 8-5. Further, both maximum and minimum import of each state from ISTS grid is highlighted below in Table 8-5.

Table 8-5: Drawl of various states from other grids

(All Fig in MW)

Drawl from Other Region	Aug'26			Jun'26			Feb'27		
Scenario / State	1 Solar Max	2 Peak Load	3 Off Peak	4 Solar Max	5 Peak Load	6 Off Peak	7 Solar Max	8 Peak Load	9 Off Peak
NER	1020	346	-91	668	-345	-434	1827	461	563

Out of these nine scenarios, Scenario-7 and Scenario-5 corresponds to two extreme cases with respect to import/ export i.e. highest import (1827MW) and highest export (345MW) scenarios respectively. In all other scenarios, import /export from North Eastern Region to other regions is varying between these two extremes.

Detailed system studies have been carried out on the finalized load flow cases. The study results are discussed in subsequent chapters.

8.4 ISTS Network

Various transmission systems have been evolved for implementation in the Consultative Meeting for Evolution of Transmission System of NER (CMETS-NER) from Nov 2021 to Feb 2022. These schemes have either been approved or under various stages of approval. The details of the schemes including other important issues in regard to ISTS in the Eastern Region which were discussed during this timeframe has also been summarized below:

8.4.1 Assam and Arunachal Pradesh

(a) Transmission system for Dibang HEP

M/s NHPC Ltd. had requested for grant of 2880MW connectivity for its Dibang HEP (12x240MW) generation project in Arunachal Pradesh. Due to absence of any pooling point in upper Assam or Arunachal Pradesh, Dibang HEP needs to be pooled at a new poling point such that the same pooling point could also be utilised for pooling of other hydro projects in future. A new 400kV substation has been planned at Gogamukh through LILO of one D/c (ckt-1 & ckt-2 of D/c line-1) of Lower Subansiri – Biswanath Chariali 400kV (Twin Lapwing) 2xD/c lines, which are being taken up for implementation under NERES-XVI scheme (expected by Mar 2025). The Dibang HEP has been planned to be pooled at Gogamukh through 400kV 2xD/c (Quad) ISTS lines. For further power evacuation, Gogamukh – Biswanath Chariali 400kV (Quad) D/c line has been planned.

- **Transmission system for Connectivity**

  (a) Dibang – Gogamukh 400kV 2xD/c (Quad) line

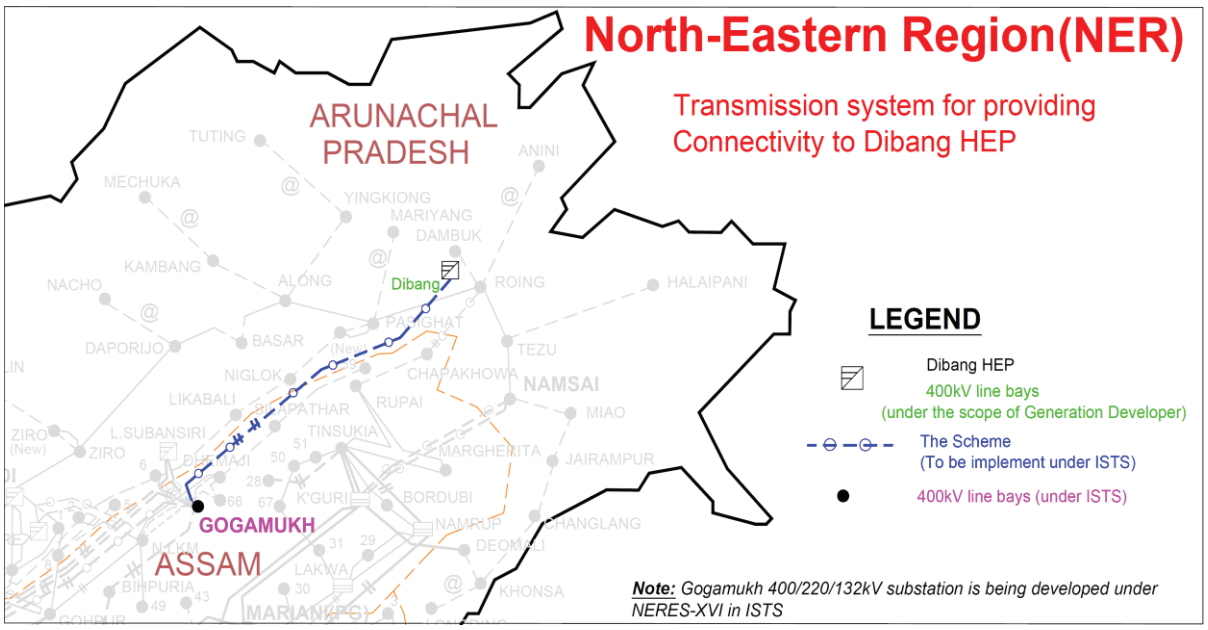
  (b) Extension works at Gogamukh S/s at 400kV level

  - 4 no. of line bays for termination of Dibang – Gogamukh 2xD/c lines
  - 4x63MVAr switchable line reactors at Gogamukh end of Dibang – Gogamukh 400kV 2xD/c lines, one in each circuit

  Note: 4 no. of 400kV line bays at Dibang HEP switchyard for termination of Dibang – Gogamukh 400kV D/c 2xD/c (Quad) lines along with 4x63MVAr switchable line reactors at Dibang end, one in each line, would be implemented by the Dibang HEP developer.

  Estimated Cost: Rs. 1650Cr

Figure 8-4: Schematic of Dibang Connectivity



- **Transmission system for power evacuation**

  (a) Gogamukh – Biswanath Chariali 400kV D/c (Quad) line

  (b) Extension works at Biswanath Chariali (POWERGRID) S/s at 400kV level

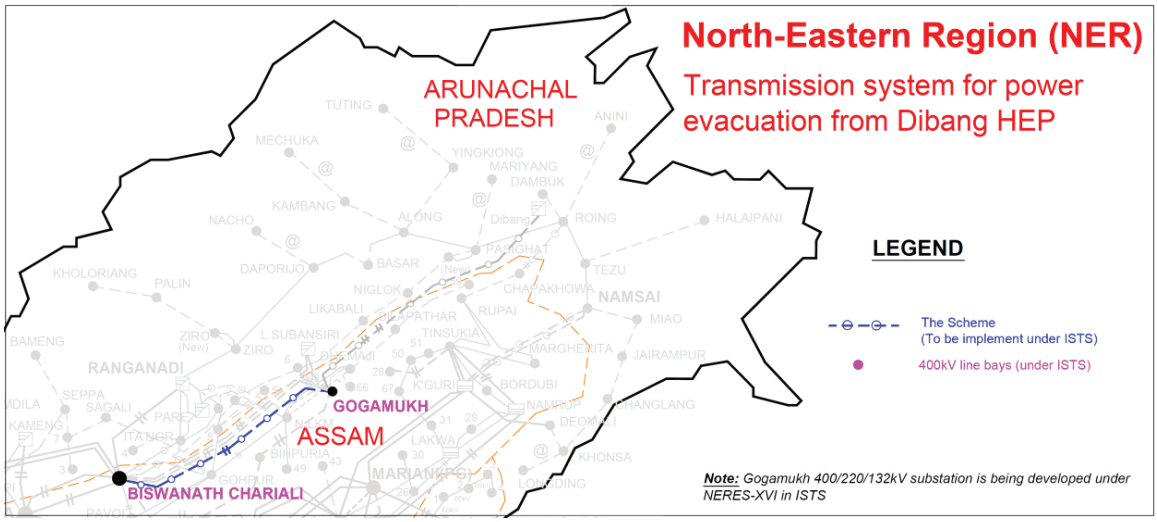
  - 2 no. of 400kV line bays for termination of Gogamukh – Biswanath Chariali 400kV D/c (Quad) line

  (c) Extension works at Gogamukh S/s at 400kV level

  - 2 no. of 400kV line bays for termination of Gogamukh – Biswanath Chariali 400kV D/c (Quad) line
  - 2x80MVAr switchable line reactors at Gogamukh end of Gogamukh – Biswanath Chariali 400kV D/c line, one in each circuit

  Estimated Cost: Rs. 852Cr

Figure 8-5: Schematic of Dibang Evacuation



- **Implementation timeframe: In matching timeframe of COD of generation unit i.e. May 2029 (as per the application for connectivity).**

- **Note: Gogamukh 400/220/132kV S/s has been planned under NERES-XVI scheme which is proposed to be commissioned by Mar 2025.**

The scheme has been sent to NERPC for comments.

(b) North-Eastern Region Expansion Scheme-XVI (NERES-XVI)

There was requirement of a new 400kV substation in upper Assam (north of Brahmaputra river) to augment power supply to areas in upper Assam and Arunachal Pradesh. Considering the availability of land in upper Assam (north of Brahmaputra River) and Arunachal Pradesh, terrain and Row of Way (RoW) requirement in that area for future transmission lines, optimisation of transmission system is very essential. Further, there is no source (EHV substation or generation) in upper Assam or in eastern part of Arunachal Pradesh to provide an alternate power source to feed to long Pasighat - Khupi corridor. Therefore, the following scheme has been agreed overcome both the problems:

(a) Establishment of New Gogamukh 400/220/132kV substation

- 400/220kV, 2x500MVA ICTs alongwith associated ICT bays at both levels
- 220/132kV, 2x200MVA ICTs alongwith associated ICT bays at both levels
- 420kV, 2x125MVAr bus reactor along with associated bays
- 400kV line bays

- 4 no. for termination of LILO of one D/c line of Lower Subansiri – Biswanath Chariali 400kV (Twin Lapwing) 2xD/c lines
- 220kV line bays
- 2 no. for termination of Bihpuria – Gogamukh 220kV D/c line (line to be implemented by AEGCL)
- 132kV line bays
- 2 no. for termination of LILO of one circuit of North Lakhimpur – Dhemaji 132kV new D/c line (LILO to be implemented by AEGCL)
- 2 no. for termination of Gogamukh (ISTS) – Gerukamukh (Arunachal Pradesh) 132kV D/c line
- Additional space for future expansion:
- 220/132kV, 1x200MVA ICT - 1 no. (along with associated bays at both levels)
- 400/220kV, 1x500MVA ICT - 1 no. (along with associated bays at both levels)
- 420kV, 1x125MVAr bus reactor along with associated bays
- 12 nos. of 400kV line bays for future lines
    - o 4 nos. of 400V line bays for termination of Dibang – Gogamukh 2xD/c lines
    - o 2 nos. of 400kV line bays (along with 2x80MVAr switchable line reactor) for termination of Gogamukh – Biswanath Chariali 400kV D/c (Quad) line
    - o 6 nos. of 400kV line bays (along with switchable line reactor) for future lines
- 6 nos. of 220kV line bays for future lines
- 6 nos. of 132kV line bays for future lines

(b) LILO of one D/c of Lower Subansiri – Biswanath Chariali 400kV (Twin Lapwing) 2xD/c lines at Gogamukh S/s

(c) Gogamukh (ISTS) – Gerukamukh (Arunachal Pradesh) 132kV D/c (ACSR Zebra) line

(d) Extension works at Gerukamukh (Arunachal Pradesh) 132kV S/s

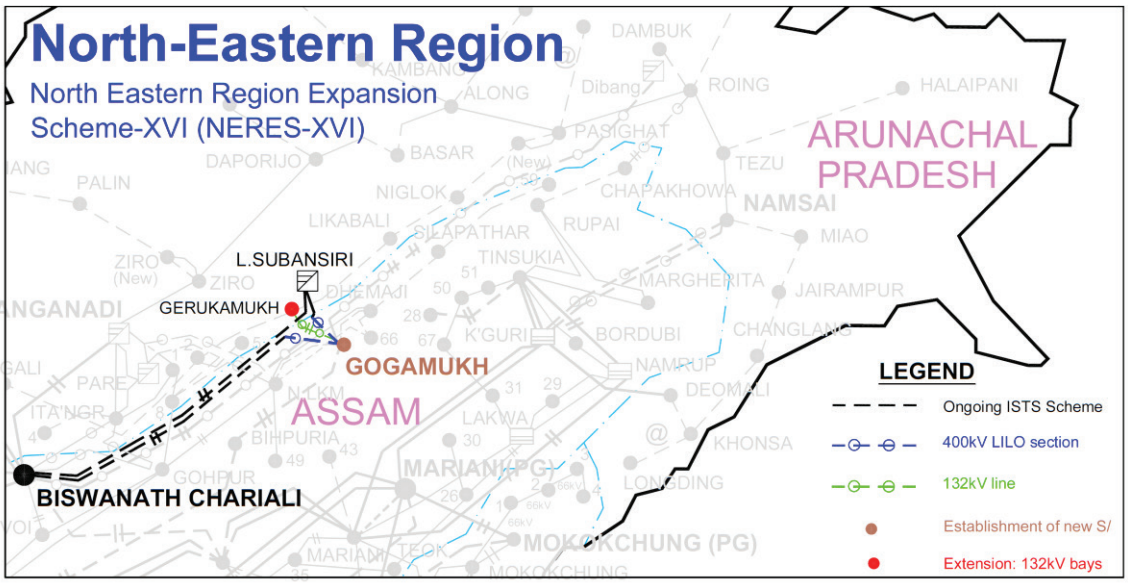
- 2 no. of 132kV line bays for termination of Gogamukh (ISTS) – Gerukamukh (Arunachal Pradesh) 132kV D/c line

Note: Lower Subansiri – Biswanath Chariali 400kV (Twin Lapwing) D/c line is under implementation and is expected to be commissioned by Aug 2022.

- Estimated Cost: Rs. 289Cr
- Implementation timeframe: Mar 2025

The scheme has been sent to NCT for approval in its ensuing meeting.

Figure 8-6: Schematic of NERES-XVI



Further, AEGCL to implement Intra-State network expansion in Assam to draw power from Gogamukh ISTS substation

(a) Bihpuria – Gogamukh 220kV D/c line

(b) Construction of North Lakhimpur – Dhemaji 132kV new D/c line along with LILO of one circuit at Gogamukh (ISTS)

Implementation timeframe: Mar 2025

8.4.2 Manipur

(a) Upgradation/Modification of four 33kV panels (for outgoing feeders) at Imphal (POWERGRID) S/s, including CT, HT Cables and accessories etc. for handling about 20MW per feeder

MSPCL has desired to draw about 20MW each through 4 nos. 33kV feeder from 400/132/33kV Imphal substation during certain contingencies. Accordingly, the following scheme has been agreed for implementation under ISTS:

(a) Upgradation/modification of four 33kV panels (for outgoing feeders) at Imphal (POWERGRID) S/s, including CT, HT Cables and accessories etc. for handling about 20MW per feeder.

The implementation schedule of the scheme would be about 9months. However, best efforts would be made to commission the scope of works at the earliest.

8.5 RE Evacuation

North Eastern Region has limited wind energy generation potential of about 502 MW mainly in Arunachal Pradesh and Assam and moderate Solar Generation potential of about 57 GW mainly in the state of Assam, Manipur, Mizoram and Arunachal Pradesh. By the year 2026-27 no renewable generation capacity is expected to be integrated in the ISTS Network.

8.6 System Study Analysis and Results

Based on the load-generation scenarios as elaborated in section 8.3, various system studies have been carried out in PSSE. Planned/ Under implementation Transmission system that are expected to be commissioned in 2026-27 timeframe are considered for conducting these studies. Results of these studies were analysed and the same are deliberated below-

8.6.1 Load Flow Studies

a) Transmission Lines

In the base case file prepared for 2026-27 timeframe, no 400 kV transmission lines are having loading more than 70% of the thermal limit of the line. Transformers

In the base case file prepared for 2026-27 timeframe, no transformers at 400/220kV substations is loaded more than 80% of the ICT rating.

8.6.2 Voltage Analysis

PU voltages of all 400 kV buses of North Eastern Region were observed in all the nine scenarios. Maximum and minimum voltage of each bus were checked from the bus voltages in the nine number of scenarios. It was observed that no bus at 400kV crossed the nominal voltage limit of 0.95pu and 1.05pu.

8.6.3 Short Circuit Analysis

Short circuit level was calculated for all 400 kV buses of North Eastern Region and it was observed that no 400kV buses are having fault level more than the design rating under any scenario.

8.6.4 Contingency Analysis

Contingency analysis has been performed on all the 400kV transmission lines, and 400/220kV & 400/132 kV transformers to ascertain the loading levels under outage of any other 400 kV transmission element. Results of the analysis are discussed below:

a) Transmission Lines

List of ISTS lines loaded beyond 90% of thermal rating under N-1 contingency are summarized below in Table 8-6:

Table 8-6: List of ISTS lines voilating their thermal limits under N-1 Contingency in NER

Sl. No.	Name of the Line	Contingency	Scenario No.	Owner	Base case Loading (MVA)	Loading under n-1 (MVA)	Rating (MW)	% Loading
1	Misa – Balipara 400kV line-1	Misa – Balipara 400kV line-2	1,4,7	ISTS	580	871	850 (Twin Moose)	104%

Reconductoring of Misa – Balipara 400kV D/c line is required to control this overloading in future timeframe and feed the load centres of southern part of Assam reliably.

No STU lines are loaded beyond 90% of thermal rating under N-1 contingency.

b) Transformers

No ISTS ICTs are loaded beyond 90% of MVA rating under N-1 contingency.

List of STU ICTs loaded beyond 90% of MVA rating under N-1 contingency are summarized below in Table 8-7:

Table 8-7: List of STU ICTs with loading more than 90% of their ratings under N-1 Contingency in NER

Sl. No.	Name of the Element	Scenario No.	Owner	Maximum Base Case Flow (MVA)	Maximum Loading under n-1 of ICT (MVA)	% Loading	Rating (MVA)	Remark
1	400/220kV, 2x315MVA ICTs at Khumtai	1,4,7	AEGCL	331	529	106%	500	Increasing load cnetres in the upper Assam leads to overloading of this ICT. With the load rearrangement from Khumtai to Mariani 400/220kV S/s, this overloading can be reduced and investment in additional ICT can be avoided.

Load rearrangement from Khumtai to Mariani 400/220kV s/s can reduce the overloading of Khutai ICT under 'N-1' contingency. AEGCL may take necessary actions at a suitable time.

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 and Nepal with Indian grid to facilitate transfer of power for the benefit of both sides is given below:

9.1 India-Bangladesh

(i) 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).

(ii) Planned interconnection

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 drawl of power.

9.2 India-Bhutan

(i) Present interconnection

2070MW is being 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 (3 circuits)
- Tala HEP – Siliguri 400kV 2xD/c
- Mangdechhu HEP – Alipurduar (via Punatsangchhu) 400kV D/c (Quad) line
- Jigmeling (Bhutan) – Alipurduar 400kV D/c (Quad) line

(ii) Under Construction interconnection

With the commissioning of Punatsangchu-I and II generation by 2024-25, the power transfer capacity would increase to about 4290MW.

9.3 India-Myanmar

(i) 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.

(ii) Under Discussion interconnection

- 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) - Cikha (Myanmar) 11kV S/c radial line
- Zokhawthar (Mizoram, India) - Rikhawdar (Myanmar) 11kV S/c radial line
- Various 11kV S/c lines from Nagaland, India to Myanmar

9.4 India-Nepal

(i) Present interconnection

1000MW can be transferred from India to Nepal through following links in radial mode of operation:

- About 350MW through 132kV & below radial lines
- About 650MW of power through the first high-capacity link i.e., 400kV D/c Dhalkebar (Nepal) – Muzaffarpur (India) line.

(ii) Under Construction interconnection

Additional 1800MW 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 Apr 2023.
- Gorakhpur (India) – New Butwal (Nepal) 400kV D/c (Quad) line: Requisite approvals are being obtained to take up implementation.

(iii) Under Discussion interconnection

- New Purnea (India) - New Duhabi (Nepal) 400kV (Quad) D/c line
- Bareilly New (India) - Lumki (Nepal) 400kV (Quad) D/c line
- Lucknow (India) – Kohalpur (Nepal) 400kV (Quad) D/c line
- 2nd circuit stringing of Raxaul (India) - Parwanipur (Nepal) 132kV S/c on D/c line
- 2nd circuit stringing of Kataiya (India) - Kusaha (Nepal) 132kV S/c on D/c line
- Nanpara (India) - Kohlapur (Nepal) 132kV D/c line
- New Nautanwa (India) - Mainhiya (Nepal) 132kV D/c line

9.5 India-Sri Lanka

(i) Under Discussion interconnection

New Madurai – New Habarana 1000MW HVDC Bipole line

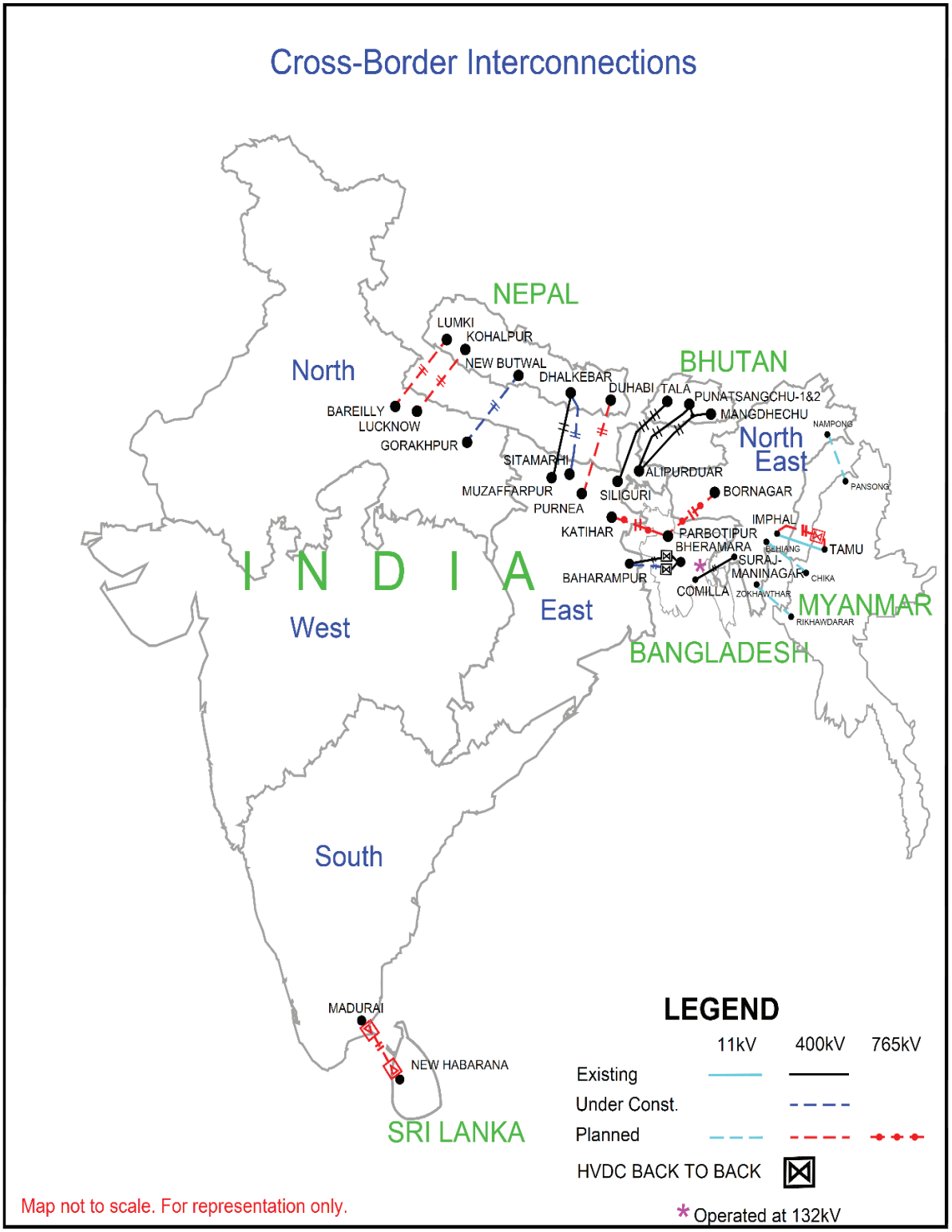
The cross-border transmission capacity of India with neighbouring countries in present time-frame and through under construction interconnections is summarized below in Table 9-1:

Table 9-1:Cross-border power transfer capacity by 2026-27

Country	Existing (MW)	Under Construction (MW)	Planned (MW)	Total (MW)
India-Bangladesh	1160	0	0	1160
India-Bhutan	2070	2220	0	4290
India-Myanmar	3	0	250	253
India-Nepal	1000	1970	0	2970
India-Sri Lanka	0	0	500	500
Total	4233	4190	750	9173

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

Figure 9-1: Cross-Border interconnections



Chapter 10:
Conclusion

The installed capacity of Indian grid is expected to be about 568GW by 2026-27, wherein the power sector will see a decline in contribution of conventional source of energy in total installed capacity from 73% to 60%. Whereas, it will witness an increase in contribution of non-conventional sources in total installed capacity from 26% to 40%. Solar generation alone is expected to see an increase of around 200% by FY 2027 from current time-frame. This will create a pathway for India's commitment in COP26, wherein India is projected to have total installed capacity of non-fossile fuel based generation of 500GW 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 expected to be established in Northern, Western, and Southern regions by 2026-27 time-frame majorly in Rajasthan (20GW) and Gujarat (15GW). The transmission system for integrating the same into the grid has already been planned and is currently under various stages of implementation. As substantial RE generation addition has been envisaged in Rajasthan, this has resulted in NR becoming exporter of power during the afternoon Solar max period and importer during the evening peak demand period, in all seasons. 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 and demand, load generation balance has been prepared for three seasons (Monsoon, Summer, and Winter) in a year with three points (Solar max, Evening peak demand, and Night off-peak demand) on daily load curve for each season. All India maximum and minimum demand of 299 GW and 191 GW has been considered while working out the LGBs. Out of these nine scenarios, the most crucial ones from transmission planning point of view are three scenarios viz. highest RE generation (Scenario-1), highest all India demand (Scenario-5) and lowest all India demand (Scenario-9).

While preparing the LGB it has been observed that to dispatch maximum RE generation during the noon time, on bar thermal units are required to meet evening peak demand are to be operated below the present technical minimum of 55%. As per the analysis it was found that technical minimum of around 19% during Monsoon and Summer seasons is required for keeping the same number of thermal units on bar throughout the day. If thermal units are to be operated at 55% of technical minimum during the Solar max period, then 55 GW, 59 GW and 24 GW of surplus thermal generation would be available in Monsoon, Summer and Winter season respectively after meeting the all India demand in 2026-27 time-frame. If technical minimum of thermal units is reduced to 40%, then surplus generation reduces to 33 GW and 30 GW in Monsoon and Summer seasons respectively. This study also highlights the need for about 33 GW of energy storage in the grid to facilitate the RE integration of the order of 225 GW by 2026-27. As of now, the portion of energy and peak demand met by RE as compared to total requirement is quite low. However, this will not be the case of future when a large quantum of RE will integrate with grid. In solar max period, even after operating thermal generation at technical minimum a sufficient amount of surplus generation will persist. In order to absorb this surplus energy, energy storage system would be required for stable operation of grid.

Various system studies and analysis have been conducted like load flow, contingency and short-circuit studies on All India basis as well as on Regional basis to evaluate and evolve new transmission system. This caters to a power transmission network planned in a manner that offers techno-feasible solution considering all the aspects without compromising the security, reliability and robustness of National Grid.

Load flow including N-1 contingency studies have been conducted for all scenarios to check and analyse the power flow pattern on EHV transmission lines and transformers. During the studies it was observed that most of the transmission lines and transformers loading are within limits except for few cases which are highlighted in report and the same shall be taken care of in subsequent transmission planning exercises.

Bus voltages at 765kV and 400kV have also been analysed for all the scenarios and voltages beyond the permissible limits are highlighted in the report. About 85% to 90% of bus voltages are found to be within the range and by adopting suitable grid operating mechanisms, the voltage can be controlled. Nevertheless, more reactive power management devices are also being planned for installation in high voltage areas.

Short circuit studies at 765kV and 400kV have also been performed on all the scenarios and fault MVA violations beyond the design rating are also highlighted in the report. Fault level at many of the 400 kV buses including the STU and generating station buses are observed to be beyond the design limits. Measures like bus split and incorporating series reactor to control the fault MVA level is under planning at ISTS buses. However, same also needs to be taken up at STU and generating station level by respective utilities.

In summary, existing and planned/proposed transmission network is found to be adequate for meeting the demand and integrating anticipated generation to be commissioned by 2026-27 timeframe. Further, basic health network parameters of the Indian grid are within their operating limits except for few cases which are being studied in detail and necessary augmentation plan will be published in the subsequent Network Plan report.

In this Rolling Plan, transmission schems of about 3,772 ckm of transmission lines and 32,490 MVA of transformation capacity has been formulated at an estimated cost of Rs.14,646 Cr. Thus, cumulatively by 2026-27, transmission schemes comprising of 31,895 ckm of transmission lines and transformation capacity of 2,16,840 MVA at estimated cost of Rs 1,24,148 Cr. is expected to be added in the grid.

Brief of each of the regional transmission systems and observations from system studies is as below:

Northern Region (NR)

Presently total installed generation capacity of NR is about 110.3GW (Jan'22) which constitute capacity from conventional sources (77% share) viz. Thermal (57%), Nuclear (1.5%) and large hydro (18.5GW). Balance (23%) contribution is from renewable generation capacity.

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, 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 19th EPS, NR demand for 2026-27 timeframe is expected to increase to about 97GW. As per the inputs received from various stakeholders, total installed capacity of NR for 2026-27 is expected to be about 165 GW. In this Rolling Plan, transmission schems of about 1,120 ckm of transmission lines and 6090 MVA of transformation capacity has been formulated at an estimated cost of Rs. 5068 Cr. Thus, cumulatively by 2026-27, transmission schemes comprising of 15,010 ckm of transmission lines and transformation capacity of 87,885 MVA at estimated cost of Rs 73,940 Cr. is expected to be added in the grid.

Various transmission schemes i.e. transmission system for evacuation of power from Kaza Solar Power Project (880 MW), Transmission system for evacuation of power for Luhri Stage-I (210MW), Comprehensive transmission scheme for Power Evacuation from proposed HEPs in J&K, HVPNL proposal for Intra state transmission schemes involving Interstate connection with ISTS elements, Augmentation of Transformation capacity at Bhinmal S/s have been evolved for implementation in the Consultation Meeting for Evolution of Transmission System in Northern Region (CMETS-NR) from Nov 2021 to Mar 2022. These schemes either been approved or under various stages of approval.

Additionally, transmission schemes for evacuation of power from Kargil UMREPP, Transmission system for evacuation of RE power from Rajasthan Ph-IV (48GW), overvoltage studies and WR-NR strengthening studies is under planning and would be taken up in next rolling plan

Western Region (WR)

Presently total installed generation capacity of WR is about 128GW (Jan'22) which constitute capacity from conventional sources (75% share) viz. Thermal (67%), Nuclear (1%) and large hydro (6%). Balance (25%) contribution is from renewable generation capacity.

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 Solar & Wind capacity. Western part of Maharashtra, southern Gujarat and DD & DNH have high demand and less internal generation.

To meet the growing demand, WR is continuously progressing in generation capacity addition majorly through thermal and non-conventional/renewable sources. As per the 19th EPS, Western Region demand for 2026-27 timeframe is expected to increase to about 85GW. As per the inputs received from various stakeholders, total installed capacity of Western Region for 2026-27 is expected to be about 180 GW. In this Rolling Plan, transmission schems of about 2,232 ckm of transmission lines and 18,500 MVA of transformation capacity has been formulated at an estimated cost of Rs.6,189 Cr. Thus, cumulatively by 2026-27, transmission schemes comprising of 10,036 ckm of transmission lines and transformation capacity of 75,000 MVA at estimated cost of Rs 30,706 Cr. is expected to be added in the grid.

Various transmission systems have been evolved for implementation in the Consultation Meeting for Evolution of Transmission System in WR (CMETS-WR) from Nov 2021 to Feb 2022. These schemes have either been approved or are under various stages of approval. To resolve issues of import capability constraints in Gujarat and to cater to system strengthening requirements associated with integration of RE projects from Khavda potential RE zone Transmission Network Expansion in Gujarat to increase its ATC from ISTS (Part-A to C) and Transmission Network Expansion in Gujarat associated with integration of RE projects from Khavda potential RE zone has been evolved. Similarly, a number of ISTS and Intra-state schemes have also been evolved in Chhattisgarh to resolve import capability, overloading issues and to meet the growing demand of the state.

Additionally, ISTS network expansion scheme in Western Region & Southern Region for export of surplus power during high RE scenario in Southern Region which includes Narendra New (GIS) – Pune (GIS) 765kV D/c line has also been evolved and is under approval. The proposed scheme will enable export of surplus power from REZs in Koppal, Gadag area with reliability and also mitigate operational constraints being faced during high RE of SR.

Further, under high RE (solar max) scenario in February, low demand in Northern region coupled with high demand in Western region and low wind availability, NR becomes surplus and over loadings are observed on WR-NR interregional lines (Bhinmal- Zerda 400kV S/c line). To mitigate the issue, WR-NR corridor strengthening is being carried out in consultation with stakeholders and would be taken up in in next rolling plan. Import capability, voltage and short circuit issues are also observed in MP and Maharashtra due to high demand, less availability of internal generation and large interconnections. ISTS and Intra-State strengthening required to mitigate the above issues are also under planning and would be taken up in next rolling plan.

Southern Region (SR)

Presently total installed generation capacity of SR is about 118 GW (Jan'22) which constitute capacity from conventional sources (61% share) viz. Thermal (48%), Nuclear (2.8%) and large hydro (10%). Balance (39%) contribution is from renewable generation capacity.

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 RE rich comprising of largescale Solar & Wind potential. Southern part of Karnataka (Bangalore), Kerala and Central part of Telangana (Hyderabad) has high demand and less internal generation.

To meet the growing demand, Southern region is continuously progressing in generation capacity addition majorly through thermal and non-conventional/renewable sources. As per the 19th EPS, Southern Region demand for 2026-27 timeframe is expected to increase to about 84GW. As per the inputs received from various stakeholders, total installed capacity of Western Region for 2026-27 is expected to be about 144 GW. In this Rolling Plan, transmission schems of about 340 ckm of transmission lines and 6,500 MVA of transformation capacity has been formulated at an estimated cost of Rs.2,423 Cr. Thus, cumulatively by 2026-27, transmission schemes comprising of 4,664 ckm of transmission lines and transformation capacity of 50,500 MVA at estimated cost of Rs 16,194 Cr. is expected to be added in the grid.

Various transmission systems have been evolved for implementation in the Consultation Meeting for Evolution of Transmission System in SR (CMETS-SR) from Nov 2021 to Feb 2022. These schemes have either been approved or under various stages of approval. For export of surplus power during high RE scenario in Southern Region, ISTS Network Expansion scheme in Western Region & Southern Region which includes Narendra New (GIS) – Pune (GIS) 765kV D/c line has also been evolved and the scheme is under approval. The proposed scheme will enable export of surplus power from REZs in Koppal, Gadag area with reliability and also mitigate operational constraints being faced during high RE of SR.

Short Circuit issues are observed in Tamil Nadu, Telangana, Karnataka and Andhra Pradesh due large interconnections. Further, high transformer loading is also observed in Tamil Nadu, Telangana, Karnataka, Kerala and Andhra Pradesh. Most of the ICTs are in Tamil Nadu and some of them are also limiting the Available Transfer Capability of the State. Loading on some of the lines such as Maheshwaram – Maheshwaram TS 400kV D/c line, Pugalur New – Karur 400kV (Quad) D/c line etc. are crossing thermal limit under N-1 contingency. ISTS and Intra-State strengthening required to mitigate the above issues are also under planning and would be taken up in next rolling plan.

Eastern Region (ER)

Presently total installed generation capacity of ER is about 34.2GW (Jan'22) which constitute capacity from thermal (81% share), hydro (14%) and renewable (5%) sources.

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 concentrated into primarily in Sikkim. Eastern region is also connected to 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. As per the 19th EPS, Eastern Region demand for 2026-27 timeframe is expected to increase to about 35.6GW. As per the inputs received from various stakeholders, total installed capacity of Eastern Region for 2026-27 is expected to be about 57.5 GW. In this Rolling Plan, reactors at an estimated cost of Rs.47 Cr. has been formulated. Thus, cumulatively by 2026-27, transmission schemes comprising of 743 ckm of transmission lines and transformation capacity of 1,315 MVA at estimated cost of Rs 886 Cr. is expected to be added in the grid.

Various transmission schemes i.e Jeypore – Jagdalpur 400kV High capacity D/c line (WR-ER interconnections), augmentation of reactive compensation at Kahalgaon &, Alipurduar S/s have been evolved in the Consultation Meeting for Evolution of Transmission System in Eastern Region (CMETS-ER) from Nov 2021 to Feb 2022. These schemes either been approved or are under various stages of approval. Further, new expansions in Eastern Region is being taken up on a continuous basis and the solutions identified would be taken up for detailed analysis in the subsequent rolling plan.

North Eastern Region (NER)

Presently total installed generation capacity of NER is about 4.9GW (Jan'22) which constitute capacity from coal (16% share), gas (35%), hydro (40%) and renewable (9%) sources.

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 generation 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. As per the 19th EPS, North Eastern Region demand for 2026-27 timeframe is expected to increase to about 6.7GW. The total installed capacity of Northern Eastern Region for 2026-27 is expected to be about 7.1 GW. In this Rolling Plan, transmission schems of about 80 ckm of transmission lines and 1400 MVA of transformation capacity has been formulated at an estimated cost of Rs.289 Cr. Thus, cumulatively by 2026-27, transmission schemes comprising of 1,442 ckm of transmission lines and transformation capacity of 2,140 MVA at estimated cost of Rs 2,422 Cr. is expected to be added in the grid.

Various transmission schemes i.e New 400kV substation at Gogamukh and associated 400kV system, transmission system for connectivity and evacuation of power from Dibang (2880MW) HEP have been evolved in the Consultation Meeting for Evolution of Transmission System in North Eastern Region (CMETS-NER) from Nov 2021 to Feb 2022. These schemes have either been approved or are under various stages of approval. New expansion schemes in North Eastern Region are being taken up on a continuous basis and the solutions identified would be taken up for detailed analysis in the subsequent rolling plan. 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 generations projects.

ANNEXURES

Annex-2.1

Retirement of Thermal Installed Capacity by 2027

S.No	Region	State	PROJECT NAME	UNIT	IC (MW)	To be Retired Capacity (MW)	Utility
1	WR	MP	SATPURA-II	1x200+1x210	410	410	State
2	WR	Chhatisgarh	KORBA (E)	4x50+2x120	440	200	State
3	WR	Chhatisgarh	KORBA (W)	4x210+1x500	1340	840	State
4	WR	MAHARASHTRA	KORADI	2x210	420	420	State
5	WR	MAHARASHTRA	Gupta Energy ltd	2x60	120	120	State
7	ER	Bihar	BARAUNI	(2x110)	220	220	State
8	ER	Bihar	MUZAFFARPUR	(2x110)	220	220	State
9	ER	Jharkhand	TENUGHAT	(2x210)	420	420	State
10	ER	Jharkhand	BOKARO'B'	(1x210)	210	210	Central
11	ER	West Bengal	BANDEL	(4x82.5+1x210)	540	540	State
12	ER	West Bengal	BAKRESHWAR	(5x210)	1050	1050	State
13	ER	West Bengal	TITAGARH	(4x60)	240	240	State
14	SR	Andhra Pradesh	Vijayawada	6 X 210	1260	1260	State
15	SR	Telangana	Kothagudem A B C	4 X 60 + 4 X 120	720	720	State
19	SR	Tamil Nadu	Tuticorin	5 X 210	1050	1050	State
20	SR	Tamil Nadu	Mettur	4 X 210	840	840	State
21	SR	Tamil Nadu	Neyveli -I NLC	6x50 + 3X100	600	600	State
22	SR	Tamil Nadu	Neyveli Zero (STCMS)	1 X 250	250	250	State
23	SR	Tamil Nadu	North Chennai	3x210 + 2 x 600	1830	630	State
24	SR	Tamil Nadu	NLC TPS-I Exp.	2X210	420	420	Central
25	NR	UP	Tanda TPS	4x110	440	440	Central
26	NR	Haryana	Panipat	2x210+2x250	920	420	State
27	NR	Punjab	Guru Gobind Singh TPS Ropar	6x210	1260	1260	State
28	NR	Punjab	Lehra Mohabbat TPS	2x210 +2x250	920	420	State
29	NR	Rajasthan	Kota TPS	2x110+3x-210+2x195	1240	850	State
30	NR	UP	Obra A	2x50+1X94	194	194	State
31	NR	UP	Harduaganj - B	1x60+1x105	165	165	State
32	NR	UP	Paricha - A,B,C	2x110+2x-210+2x250	1140	220	State
				Total	18879	14629	

Annex-2.2

Load Generation Balance (LGB)

Monsoon (Aug'26)

Installed Capacity

Region	Thermal Central	Thermal State	Thermal Private	Thermal	Hydro	Nuclear	Solar	Rooftop	Wind	Other RE	Diesel	Gas	Total	EPS Peak De	Peak Demand		LTA
NR	11440	41299	0	52739	26169	4420	70085	4500	6401	1360	0	3583	**169256**	**97182**	91294		**0**
WR	19000	35950	36850	91800	8168	3240	34616	4500	31321	0	0	10139	**183784**	**94825**	89080		**0**
SR	12870	37511	4640	55021	17699	3820	32370	4500	31213	2358	983	3366	**151330**	**83652**	78584		**0**
ER	24440	12775	4150	41365	14686	0	1103	400	0	0	0	0	**57554**	**35674**	33513		**0**
NER	750	0	0	750	4375	0	100	100	0	0	0	1854	**7179**	**6710**	6303		**0**
	68500	**127534**	**45640**	**241674**	**71097**	**11480**	**138274**	**14000**	**68935**	**3718**	**983**	**18941**	**569102**	**298774**	298774		
		241674					**224927**							318043			

Scenario 1 : Solar Max Aug 2026

Avail	rmal Ce	rmal Sta	rmal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	Other Re	Diesel	Gas		National DF	Regional DF
NR	25%	8%	0%	19%	70%	80%	90%	50%	50%	0%	0%	0%		82%	77%
WR	31%	3%	27%	17%	40%	80%	80%	50%	55%	0%	0%	0%		76%	72%
SR	16%	5%	31%	13%	40%	80%	80%	50%	55%	0%	0%	0%		74%	70%
ER	10%	14%	34%	3%	70%	80%	80%	50%	0%	0%	0%	0%		83%	78%
NER	55%	0%	0%	0%	70%	80%	80%	50%	0%	0%	0%	0%		69%	65%
	20%	7%	28%	14%										83%	247982

Avail	Central	State	IPP	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	RE RPO	Diesel	Gas	Total ava	Demand	Surplus/	Net Avai	Net Dem
NR	2888	3401	0	10272	18318	3536	63077	2250	3201	47227	0	0	96670	79353	17317	94420	77103
WR	5962	1238	10120	15738	3267	2592	27693	2250	17227	50804	0	0	70348	72401	-2053	68098	70151
SR	2072	1859	1452	7269	7080	3056	25896	2250	17167	44691	0	0	60832	62096	-1263	58582	59846
ER	2530	1837	1408	1290	10280	0	882	200	0	17079	0	0	17137	29508	-12370	16937	29308
NER	413	0	0	0	3063	0	80	50	0	2421	0	0	3605	4625	-1020	3555	4575
Total	**13864**	**8334**	**12980**	**34568**	**42008**	**9184**	**117628**	**7000**	**37594**	**162222**	**0**	**0**	**248592**	**247982**	**610**	**241592**	**240982**
		35178						**162222**						233848			
24%	StateTh																

Scenario 2 : Peak load Aug 2026

Avail	rmal Ce	rmal Sta	rmal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	er Renew	Diesel	Gas	0	National DF	egional DF
NR	69%	57%	0%	74%	95%	80%	0%	0%	70%	0%	0%	85%		88%	83%
WR	62%	53%	58%	46%	70%	80%	0%	0%	75%	0%	0%	85%		80%	75%
SR	29%	64%	31%	57%	70%	80%	0%	0%	75%	0%	0%	85%		76%	72%
ER	28%	54%	52%	38%	90%	80%	0%	0%	0%	0%	0%	85%		97%	91%
NER	55%	0%	0%	0%	90%	80%	0%	0%	0%	0%	0%	85%		93%	88%
	45%	58%	55%	53%										**89%**	**265909**

Avail	rmal Ce	rmal Sta	rmal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	RE RPO	Diesel	Gas	l availab	emand Facto	Surplus/	Net Avai	Net Dem
NR	7867	23573	0	39265	24860	3536	0	0	4481	14958	0	3045	67363	85665	-18302	67363	85665
WR	11696	19067	21429	42512	5717	2592	0	0	23491	16091	0	8618	92610	75530	17079	92610	75530
SR	3724	23996	1452	31504	12390	3056	0	0	23410	14155	0	2861	70887	63966	6922	70887	63966
ER	6836	6894	2176	15841	13217	0	0	0	0	5410	0	0	29123	34477	-5354	29123	34477
NER	413	0	0	0	3938	0	0	0	0	767	0	1576	5926	6271	-346	5926	6271
Total	**30535**	**73530**	**25057**	**129121**	**60122**	**9184**	**0**	**0**	**51381**	**51381**	**0**	**16100**	**265909**	**265909**	**0**	**265909**	**265909**
		129121						**51381**						250377			
57%	StateTh																

Scenario 3 : off peak load Aug 2026

Avail	rmal Ce	rmal Sta	rmal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	Other Re	Diesel	Gas		National DF	Regional DF
NR	85%	56%	0%	78%	70%	80%	0%	0%	60%	0%	0%	65%		80%	75%
WR	62%	44%	58%	43%	40%	80%	0%	0%	65%	0%	0%	65%		70%	65%
SR	45%	50%	48%	51%	40%	80%	0%	0%	65%	0%	0%	65%		63%	59%
ER	30%	44%	52%	39%	70%	80%	0%	0%	0%	0%	0%	65%		88%	82%
NER	85%	0%	0%	0%	70%	80%	0%	0%	0%	0%	0%	65%		72%	67%
	51%	49%	57%	52%										78%	233044

Avail	rmal Ce	rmal Sta	rmal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	RE RPO	Diesel	Gas	l availab	emand Facto	Surplus/	Net Avai	Net Dem
NR	9724	22956	0	40916	18318	3536	0	0	3841	12952	0	2329	60704	78050	-17347	60704	78050
WR	11696	15683	21429	39621	3267	2592	0	0	20359	13932	0	6590	81615	66003	15612	81615	66003
SR	5755	18718	2244	28272	7080	3056	0	0	20288	12256	0	2188	59328	52851	6477	59328	52851
ER	7293	5628	2176	16244	10280	0	0	0	0	4684	0	0	25377	31325	-5948	25377	31325
NER	638	0	0	0	3063	0	0	0	0	664	0	1205	4905	4814	91	4905	4814
Total	**35105**	**62984**	**25849**	**125053**	**42008**	**9184**	**0**	**0**	**44488**	**44488**	**0**	**12312**	**231929**	**233044**	**-1115**	**231929**	**233044**
		123938						**44488**						217626			
51%	StateTh																

Summer (Jun'26)

Installed Capacity

Region	Thermal Central	Thermal State	Thermal Private	Thermal	Hydro	Nuclear	Solar	Rooftop	Wind	Other RE	Diesel	Gas	Total	EPS Peak De	Peak Demand		LTA
NR	11440	41299	0	52739	26169	4420	70085	4500	6401	1360	0	3583	**169256**	**97182**	91294		**0**
WR	19000	35950	36850	91800	8168	3240	34616	4500	31321	0	0	10139	**183784**	**94825**	89080		**0**
SR	12870	37511	4640	55021	17699	3820	32370	4500	31213	2358	983	3366	**151330**	**83652**	78584		**0**
ER	24440	12775	4150	41365	14686	0	1103	400	0	0	0	0	**57554**	**35674**	33513		**0**
NER	750	0	0	750	4375	0	100	100	0	0	0	1854	**7179**	**6710**	6303		**0**
	68500	**127534**	**45640**	**241674**	**71097**	**11480**	**138274**	**14000**	**68935**	**3718**	**983**	**18941**	**569102**	**298774**	298774		
		241674					**224927**							318043			

Scenario 4 : Solar Max Jun 2026

Avail	rmal Cen	hermal Sta	ermal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	Other Re	Diesel	Gas		National DF	Regional DF
NR	32%	13%	0%	29%	70%	80%	90%	60%	50%	0%	0%	0%		88%	83%
WR	40%	14%	38%	29%	40%	80%	85%	60%	55%	0%	0%	0%		89%	84%
SR	24%	16%	31%	19%	40%	80%	85%	60%	55%	0%	0%	0%		80%	75%
ER	24%	17%	34%	2%	70%	80%	85%	60%	0%	0%	0%	0%		84%	79%
NER	55%	0%	0%	0%	70%	80%	85%	60%	0%	0%	0%	0%		64%	60%
	30%	15%	37%	22%										91%	271884

Avail	Central	hermal Sta	ermal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	RE RPO	Diesel	Gas	Total ava	emand Facto	Surplus/(	Net Avai	Net Dem
NR	3614	5575	0	15432	18318	3536	63077	2700	3201	48627	0	0	100020	85914	14106	97320	83214
WR	7568	4919	13866	26671	3267	2592	29424	2700	17227	52310	0	0	81562	84840	-3278	78862	82140
SR	3064	6020	1452	10673	7080	3056	27515	2700	17167	46016	0	0	68052	66825	1228	65352	64125
ER	5747	2134	1408	885	10280	0	938	240	0	17585	0	0	20747	30018	-9270	20507	29778
NER	413	0	0	0	3063	0	85	60	0	2493	0	0	3620	4288	-668	3560	4228
Total	**20405**	**18647**	**16726**	**53661**	**42008**	**9184**	**121037**	**8400**	**37594**	**167032**	**0**	**0**	**274001**	**271884**	**2116**	**265601**	**263484**
		55778					**167031**							255262			
33%	StateTh																

Scenario 5 : Peak Load Jun 2026

Avail	rmal Cen	hermal Sta	ermal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	Other Re	Diesel	Gas		National DF	Regional DF
NR	72%	70%	0%	105%	95%	80%	0%	0%	70%	0%	0%	85%		104%	98%
WR	69%	60%	85%	57%	70%	80%	0%	0%	75%	0%	0%	85%		90%	84%
SR	43%	75%	72%	71%	70%	80%	0%	0%	75%	0%	0%	85%		85%	80%
ER	52%	51%	52%	39%	90%	80%	0%	0%	0%	0%	0%	85%		99%	93%
NER	55%	0%	0%	0%	90%	80%	0%	0%	0%	0%	0%	85%		83%	78%
	58%	67%	81%	67%										**100%**	**298774**

Avail	rmal Cen	hermal Sta	ermal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	RE RPO	Diesel	Gas	l availab	emand Facto	Surplus/(	Net Avai	Net Dem
NR	8263	28967	0	55143	24860	3536	0	0	4481	14958	0	3045	73152	101543	-28391	73152	101543
WR	13056	21558	31323	51907	5717	2592	0	0	23491	16091	0	8618	106354	84926	21428	106354	84926
SR	5534	28199	3344	38890	12390	3056	0	0	23410	14155	0	2861	78793	71352	7441	78793	71352
ER	12687	6469	2176	16046	13217	0	0	0	0	5410	0	0	34549	35373	-824	34549	35373
NER	413	0	0	0	3938	0	0	0	0	767	0	1576	5926	5580	345	5926	5580
Total	**39952**	**85192**	**36843**	**161987**	**60122**	**9184**	**0**	**0**	**51381**	**51381**	**0**	**16100**	**298774**	**298774**	**0**	**298774**	**298774**
		161987					**51381**							280224			
53%	StateTh																

Scenario 6 : Off peak Load Jun 2026

Avail	rmal Cen	hermal Sta	ermal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	Other Re	Diesel	Gas		National DF	Regional DF
NR	72%	66%	0%	89%	70%	80%	0%	0%	60%	0%	0%	60%		86%	81%
WR	69%	56%	84%	58%	40%	80%	0%	0%	65%	0%	0%	60%		83%	78%
SR	39%	61%	64%	64%	40%	80%	0%	0%	65%	0%	0%	60%		71%	67%
ER	48%	38%	52%	35%	70%	80%	0%	0%	0%	0%	0%	60%		84%	79%
NER	55%	0%	0%	0%	70%	80%	0%	0%	0%	0%	0%	60%		62%	58%
	56%	59%	79%	62%										86%	256946

Avail	rmal Cen	hermal Sta	ermal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	RE RPO	Diesel	Gas	l availab	emand Facto	Surplus/(	Net Avai	Net Dem
NR	8263	27180	0	47039	18318	3536	0	0	3841	12952	0	2150	63287	83995	-20707	63287	83995
WR	13056	20245	30927	53047	3267	2592	0	0	20359	13932	0	6083	96529	78922	17606	96529	78922
SR	5084	22999	2978	35393	7080	3056	0	0	20288	12256	0	2020	63504	59804	3700	63504	59804
ER	11772	4810	2176	14422	10280	0	0	0	0	4684	0	0	29038	30072	-1034	29038	30072
NER	413	0	0		3063	0	0	0	0	664	0	1112	4587	4153	434	4587	4153
Total	**38587**	**75234**	**36081**	**149901**	**42008**	**9184**	**0**	**0**	**44488**	**44488**	**0**	**11365**	**256946**	**256946**	**0**	**256946**	**256946**
		149901					**44488**							240802			
50%	StateTh																

Winter (Feb'27)

Installed Capacity

Region	Thermal Central	Thermal State	Thermal Private	Thermal	Hydro	Nuclear	Solar	Rooftop	Wind	Other RE	Diesel	Gas	Total	EPS Peak De	Peak Demand		LTA
NR	11440	41299	0	52739	26169	4420	70085	4500	6401	1360	0	3583	**169256**	**97182**	91294		**0**
WR	19000	35950	36850	91800	8168	3240	34616	4500	31321	0	0	10139	**183784**	**94825**	89080		**0**
SR	12870	37511	4640	55021	17699	3820	32370	4500	31213	2358	983	3366	**151330**	**83652**	78584		**0**
ER	24440	12775	4150	41365	14686	0	1103	400	0	0	0	0	**57554**	**35674**	33513		**0**
NER	750	0	0	750	4375	0	100	100	0	0	0	1854	**7179**	**6710**	6303		**0**
	68500	**127534**	**45640**	**241674**	**71097**	**11480**	**138274**	**14000**	**68935**	**3718**	**983**	**18941**	**569102**	**298774**	298774		
		241674					**224927**							318043			

Scenario 7 : Solar max Feb 2027

Avail	rmal Cen	rmal Stat	rmal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	Other Re	Diesel	Gas		National DF	Regional DF
NR	35%	35%	0%	32%	30%	80%	90%	60%	10%	0%	0%	0%		70%	66%
WR	44%	36%	55%	51%	20%	80%	90%	60%	10%	0%	0%	0%		99%	93%
SR	44%	50%	55%	63%	20%	80%	90%	60%	0%	0%	0%	0%		94%	89%
ER	50%	26%	55%	15%	30%	80%	90%	60%	0%	0%	0%	0%		69%	65%
NER	55%	0%	0%	0%	30%	80%	90%	60%	0%	0%	0%	0%		55%	52%
	45%	39%	55%	43%										90%	268897

Avail	rmal Cen	rmal Stat	rmal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	RE RPO	Diesel	Gas	Total ava	emand Facto	Surplus/(	Net Avai	Net Dem
NR	4053	14623	0	16888	7851	3536	63077	2700	640	39773	0	0	96479	68048	28432	93779	65348
WR	8448	12893	20268	46549	1634	2592	31154	2700	3132	42785	0	0	82820	93560	-10740	80120	90860
SR	5643	18654	2552	34753	3540	3056	29133	2700	0	37637	0	0	65277	78986	-13709	62577	76286
ER	12298	3339	2283	6162	4406	0	993	240	0	14384	0	0	23558	24601	-1043	23318	24361
NER	413	0	0	0	1313	0	90	60	0	2039	0	0	1875	3702	-1827	1815	3642
Total	**30854**	**49508**	**25102**	**104351**	**18742**	**9184**	**124447**	**8400**	**3772**	**136619**	**0**	**0**	**270010**	**268897**	**1113**	**261610**	**260497**
		105464					**136619**							253455			
47%	StateTh																

Scenario 8 : Peak Load Feb 2027

Avail	rmal Cen	rmal Stat	rmal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	Other Re	Diesel	Gas		National DF	Regional DF
NR	72%	69%	0%	85%	60%	80%	0%	0%	35%	0%	0%	85%		74%	70%
WR	79%	63%	85%	68%	40%	80%	0%	0%	20%	0%	0%	85%		86%	82%
SR	73%	84%	77%	100%	40%	80%	0%	0%	20%	0%	0%	85%		86%	82%
ER	85%	56%	85%	47%	60%	80%	0%	0%	0%	0%	0%	85%		81%	77%
NER	85%	0%	0%	0%	60%	80%	0%	0%	0%	0%	0%	85%		79%	75%
	79%	70%	84%	75%										**87%**	**259933**

Avail	rmal Cen	rmal Stat	rmal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	RE RPO	Diesel	Gas	l availab	emand Facto	Surplus/(	Net Avai	Net Dem
NR	8263	28448	0	45048	15701	3536	0	0	2240	4293	0	3045	61234	71624	-10390	61234	71624
WR	15028	22765	31323	62772	3267	2592	0	0	6264	4618	0	8618	89856	81868	7989	89856	81868
SR	9410	31501	3550	55162	7080	3056	0	0	6243	4063	0	2861	63701	72221	-8521	63701	72221
ER	20774	7191	3528	19435	8812	0	0	0	0	1553	0	0	40304	28921	11383	40304	28921
NER	638	0	0	0	2625	0	0	0	0	220	0	1576	4838	5299	-461	4838	5299
Total	**54112**	**89905**	**38400**	**182418**	**37485**	**9184**	**0**	**0**	**14747**	**14747**	**0**	**16100**	**259933**	**259933**	**0**	**259933**	**259933**
		182418					**14747**							246880			
49%	StateTh																

Scenario 9: Off peak Load Feb 2027

Avail	rmal Cen	rmal Stat	rmal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	Other Re	Diesel	Gas		National DF	Regional DF
NR	69%	50%	0%	57%	30%	80%	0%	0%	10%	0%	0%	30%		46%	43%
WR	69%	60%	72%	62%	20%	80%	0%	0%	20%	0%	0%	30%		70%	66%
SR	55%	74%	55%	89%	20%	80%	0%	0%	0%	0%	0%	30%		70%	66%
ER	61%	39%	74%	36%	30%	80%	0%	0%	0%	0%	0%	30%		54%	51%
NER	55%	0%	0%	0%	30%	80%	0%	0%	0%	0%	0%	30%		42%	40%
	63%	59%	70%	62%										64%	191215

Avail	rmal Cen	rmal Stat	rmal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	RE RPO	Diesel	Gas	l availab	emand Facto	Surplus/(	Net Avai	Net Dem
NR	7867	20572	0	29807	7851	3536	0	0	640	2010	0	1075	41541	44279	-2738	41541	44279
WR	13144	21738	26499	56885	1634	2592	0	0	6264	2162	0	3042	74912	66314	8598	74912	66314
SR	7079	27927	2552	48993	3540	3056	0	0	0	1902	0	1010	45163	58501	-13337	45163	58501
ER	14822	5040	3051	15018	4406	0	0	0	0	727	0	0	27318	19278	8040	27318	19278
NER	413	0	0	0	1313	0	0	0	0	103	0	556	2281	2844	-563	2281	2844
Total	**43324**	**75277**	**32101**	**150702**	**18742**	**9184**	**0**	**0**	**6904**	**6904**	**0**	**5682**	**191215**	**191215**	**0**	**191215**	**191215**
		150702					**6904**							180461			
50%	StateTh																

Inter-Regional AC transmission Lines Flow

FromName	ToName	Voltage	Id	P-Sc1	P-Sc2	P-Sc3	P-Sc4	P-Sc5	P-Sc6	P-Sc7	P-Sc8	P-Sc9	Thermal Limit
SAKATPUR	BHANPURA-2	220	1	139	66	44	135	115	62	307	173	149	267
MODAK	BHANPURA-2	220	1	183	32	35	183	118	9	615	397	339	267
BHINMAL	ZERDA	400	1	827	330	264	1002	621	340	1476	310	507	857
KANKROLI	ZERDA	400	1	178	271	224	309	448	268	706	182	349	857
RAPS_C4	SHUJALPR-4	400	1	574	43	101	493	141	81	866	393	384	857
RAPS_C4	SHUJALPR-4	400	2	574	43	101	493	141	81	866	393	384	857
SAHUPU_N	PUSAULI BSPT	220	1	336	134	90	202	60	77	208	47	37	267
AURYA2	MEHGAON-2	220	1	19	53	43	29	28	60	209	211	149	267
RANGIA	MOTANGA	132	1	-64	99	82	63	91	76	50	83	45	84
SALAKATI	GELEPHU1	132	1	-66	101	83	62	91	78	51	84	46	84
SIPAT4	RNC-SIPT FSC	400	2	539	679	717	462	715	562	114	67	84	850
SIPAT4	RNC-SIPT FSC	400	1	539	679	455	462	715	562	114	67	84	850

- Note: Highlighted cell indicates Powerflow >70% of Thermal limit

HVDC transmission Lines Flow

Area	From Name	To Name	Voltage	P-Sc1	P-Sc2	P-Sc3	P-Sc4	P-Sc5	P-Sc6	P-Sc7	P-Sc8	P-Sc9
IR	AGRA	BISWANATH-CH	800	250	0	0	250	0	0	250	0	0
IR	AGRA	BISWANATH-CH	800	250	0	0	250	0	0	250	0	0
IR	ALIPURDUAR	AGRA	800	0	1500	1500	0	1500	1500	0	1500	1000
IR	ALIPURDUAR	AGRA	800	0	1500	1500	0	1500	1500	0	1500	1000
NORTH	BAL74-PG	BHIWADI	1	0	500	500	0	500	500	0	500	500
NORTH	BAL74-PG	BHIWADI	1	0	500	500	0	500	500	0	500	500
NORTH	BHADLA-3	FATEH VSC	800	3019	100	100	3000	100	100	3000	100	100
NORTH	BHADLA-3	FATEH VSC	800	3019	100	100	3000	100	100	3000	100	100
IR	BHADR4	CHANDRAPR-SR	70	50	50	50	50	50	50	50	50	50
IR	BHADR4	CHANDRAPR-SR	70	50	50	50	50	50	50	50	50	50
NORTH	BHIWADI	BAL74-PG	500	1006	0	0	1000	0	0	1000	0	0
NORTH	BHIWADI	BAL74-PG	500	1006	0	0	1000	0	0	1000	0	0
IR	BISWANATH-CH	ALIPURDUAR	800	0	1000	1000	0	1000	1000	0	1000	300
IR	BISWANATH-CH	ALIPURDUAR	800	0	1000	1000	0	1000	1000	0	1000	300
IR	CHAMPA SPLT	KURUKSHETR	800	500	2500	2500	500	2500	2500	500	2500	2500
IR	CHAMPA_POOL	KURUKSHETR	800	500	2500	2500	500	2500	2500	500	2500	2500
WEST	CHANDRAPUR I	PADGH4	480	702	700	700	700	700	700	700	700	700
WEST	CHANDRAPUR I	PADGH4	480	702	700	700	700	700	700	700	700	700
IR	GAZUWAKA-ER	GAZU-SR	70	327	325	325	325	325	325	325	325	325
IR	GAZUWAKA-ER	GAZU-SR	70	327	325	325	325	325	325	325	325	325
WEST	KUDUS	ARAY-220	320	1000	1000	1000	1000	1000	1000	1000	1000	1000
IR	MAHIN_HV	MUNDRA-APL	500	626	0	0	625	0	0	625	0	0
IR	MAHIN_HV	MUNDRA-APL	500	626	0	0	625	0	0	625	0	0
IR	MUNDRA-APL	MAHIN_HV	500	0	1000	1000	0	1000	1000	0	1000	1000
IR	MUNDRA-APL	MAHIN_HV	500	0	1000	1000	0	1000	1000	0	1000	1000
IR	PUGALUR-NEW	RAIGARH_POOL	800	0	1500	1500	0	1500	1500	0	0	0
IR	PUGALUR-NEW	KOTRA SPLT	800	0	1500	1500	0	1500	1500	0	0	0

Area	From Name	To Name	Voltage	P-Sc1	P-Sc2	P-Sc3	P-Sc4	P-Sc5	P-Sc6	P-Sc7	P-Sc8	P-Sc9
SOUTH	PUGALUR-NEW	TCR-HVDC	320	1003	1000	1000	1000	1000	1000	1000	1000	1000
SOUTH	PUGALUR-NEW	TCR-HVDC	320	1003	1000	1000	1000	1000	1000	1000	1000	1000
IR	RAIGARH_POOL	PUGALUR-NEW	800	1002	0	0	1000	0	0	3000	3000	3000
IR	KOTRA SPLT	PUGALUR-NEW	800	1002	0	0	1000	0	0	3000	3000	3000
NORTH	RIHAN-HV	DADR-HVD	500	753	750	750	750	750	750	750	750	750
NORTH	RIHAN-HV	DADR-HVD	500	753	750	750	750	750	750	750	750	750
EAST	SASARAM-ER	SASARAM-NR	70	251	250	250	250	250	250	250	250	250
IR	TALCHER	KOLAR	500	1005	1000	1000	1000	1000	1000	1000	1000	1000
IR	TALCHER	KOLAR	500	1005	1000	1000	1000	1000	1000	1000	1000	1000
IR	VINDH_1-2-3	VINDHYBT	70	125	125	125	125	125	125	125	125	125
IR	VINDH_1-2-3	VINDHYBT	70	125	125	125	125	125	125	125	125	125

400kV Transmission Line loadings above 70% of thermal limit

Area	FromName	ToName	Voltage	Id	P-Sc1	P-Sc2	P-Sc3	P-Sc4	P-Sc5	P-Sc6	P-Sc7	P-Sc8	P-Sc9	Thermal Limit
WEST	ASOJ-BYP-KOS	ASOJ4	400	1	-548	99	85	651	191	246	720	157	279	857
WEST	ASOJ-BYP-KOS	KOSAMBA	400	1	548	99	85	651	191	246	720	157	279	857
WEST	DGM-BYP-NICL	RANCHODPURA	400	2	-589	419	344	586	562	530	619	429	379	857
WEST	DGM-BYP-NICL	NICOL TORREN	400	2	589	419	344	586	562	530	619	429	379	857
NORTH	BAGLIHAR4	NEWWANPO	400	1	831	537	300	889	718	361	827	541	343	857
NORTH	KISHENPUR	CHAMERA-2	400	1	645	269	129	660	378	202	275	99	243	857
NORTH	PARBT-PO	HAMIRPUR	400	1	493	531	366	529	602	391	349	425	276	857
NORTH	MALERKOTLA4	KURUKSHETR	400	2	-369	465	333	434	630	422	416	465	550	857
NORTH	BHIWANI	BHIWANI-PG	400	1	-710	177	81	737	419	60	496	55	176	857
NORTH	BHIWANI-PG	JINDPG	400	1	621	64	240	667	141	244	441	262	391	857
NORTH	BHIWANI-PG	JINDPG	400	2	621	64	240	667	141	244	441	262	391	857
NORTH	JAISALMER-2	BARMER-4	400	1	655	140	123	685	171	74	815	98	170	857
NORTH	JAISALMER-2	BARMER-4	400	2	636	139	123	665	168	78	791	99	168	857
NORTH	MERTA	JODH KANKANI	400	1	-712	218	184	732	214	166	540	101	116	857
NORTH	BARMER-4	BHINMAL	400	1	704	78	101	785	28	121	967	316	328	857
NORTH	BARMER-4	BHINMAL	400	2	704	78	101	785	28	121	967	316	328	857
NORTH	BHADLA	BIKANE-4	400	1	1203	220	187	1220	209	176	1015	142	140	1714
NORTH	BHADLA	BIKANE-4	400	2	1203	220	187	1220	209	176	1015	142	140	1714
IR	BHINMAL	ZERDA	400	1	827	330	264	1002	621	340	1476	310	507	857
NORTH	KANKROLI	JODH SURPURA	400	1	-640	129	114	699	170	100	883	187	218	857
IR	KANKROLI	ZERDA	400	1	178	271	224	309	448	268	706	182	349	857
IR	RAPS_C4	SHUJALPR-4	400	1	574	43	101	493	141	81	866	393	384	857
IR	RAPS_C4	SHUJALPR-4	400	2	574	43	101	493	141	81	866	393	384	857
NORTH	KOTA	ANTA-4	400	1	188	258	287	224	190	295	409	626	465	857
NORTH	MEJA	ALLAHABA	400	1	290	658	648	390	618	552	587	628	397	857
NORTH	MEJA	ALLAHABA	400	2	290	658	648	390	618	552	587	628	397	857

Area	FromName	ToName	Voltage	Id	P-Sc1	P-Sc2	P-Sc3	P-Sc4	P-Sc5	P-Sc6	P-Sc7	P-Sc8	P-Sc9	Thermal Limit
NORTH	AGRAUP4	AGRA	400	2	-700	1121	1163	742	1042	851	289	594	315	857
NORTH	AGRANEW	AGRA	400	2	-336	639	656	369	565	450	134	326	159	857
NORTH	RIHAND-G	RIHAN-HV	400	1	754	757	757	757	757	757	757	757	757	857
NORTH	RIHAND-G	RIHAN-HV	400	2	754	757	757	757	757	757	757	757	757	857
NORTH	DADR-NCR	GNOIDA4	400	1	944	1338	1586	872	995	1087	921	1363	1245	1988
NORTH	DADR-NCR	DADR-HVD	400	1	-722	773	773	771	726	762	931	917	902	857
NORTH	DADR-NCR	DADR-HVD	400	2	-722	773	773	771	726	762	931	917	902	857
NORTH	DADRI_SPLT	MURADNAG-2	400	1	-33	427	719	138	250	424	63	455	471	857
NORTH	MUZAFRN4	SRINAGAR_GVK	400	1	-343	562	385	363	601	407	93	369	160	857
NORTH	LUCK74-P	KANPRNEW	400	1	-686	317	335	609	357	307	491	147	97	857
NORTH	LUCK74-P	KANPRNEW	400	2	-686	317	335	609	357	307	491	147	97	857
NORTH	ROORKEE	RISHIKE4_PT	400	1	-760	566	419	776	652	405	464	304	125	857
IR	SIPAT4	RNC-SIPT FSC	400	2	539	679	717	462	715	562	114	67	84	850
IR	SIPAT4	RNC-SIPT FSC	400	1	539	679	455	462	715	562	114	67	84	850
WEST	GANCS4	DEHGM4	400	1	-545	90	87	572	196	263	698	210	299	857
WEST	GANCS4	DEHGM4	400	2	-545	90	87	572	196	263	698	210	299	857
WEST	GANCS4	GPEC4	400	1	-666	360	298	746	457	444	733	273	374	857
WEST	GPEC4	KASOR4	400	1	-667	360	298	747	457	444	734	272	374	857
WEST	PIRANA_P	NICOL TORREN	400	2	290	525	321	561	628	539	436	516	481	857
WEST	ZERDA	BANASKANTHA	400	2	-321	602	516	421	490	382	148	119	132	857
WEST	PRANTIJ	SANKHARI	400	1	-574	191	187	633	236	248	613	198	195	857
WEST	PRANTIJ	SANKHARI	400	2	-574	191	187	633	236	248	613	198	195	857
WEST	SATPURA	KORADI-I	400	1	669	34	14	577	205	138	502	136	8	857
WEST	NAGDA-4	SHUJALPR-4	400	1	-209	82	32	339	108	31	610	258	317	857
WEST	NAGDA-4	SHUJALPR-4	400	2	-209	82	32	339	108	31	610	258	317	857
WEST	NAGDA-4	MANDSAUR-4	400	1	-579	138	103	563	264	147	746	91	122	857
WEST	NAGDA-4	MANDSAUR-4	400	2	-579	138	103	563	264	147	746	91	122	857
WEST	KHARGAR	PADGHEGIS	400	1	-996	798	870	1138	932	949	1332	937	789	1714

Area	FromName	ToName	Voltage	Id	P-Sc1	P-Sc2	P-Sc3	P-Sc4	P-Sc5	P-Sc6	P-Sc7	P-Sc8	P-Sc9	Thermal Limit
WEST	LONIKAND I	LONIKANDII	400	1	-374	193	292	486	279	386	726	415	482	857
WEST	LONIKAND I	LONIKANDII	400	2	-372	191	290	483	278	384	722	413	480	857
WEST	KARAD4	JEJ4	400	3	395	586	489	453	619	480	284	410	201	857
WEST	DHULE4	BABLESWAR	400	1	495	240	255	545	268	297	651	296	323	857
WEST	DHULE4	BABLESWAR	400	2	495	240	255	545	268	297	651	296	323	857
WEST	TAPS4	VELGAON4	400	2	646	565	635	612	582	618	786	668	614	857
WEST	SOLAPUR-PG	ALKUD	400	1	108	110	30	267	38	125	661	313	363	857
WEST	PUNE-PG-GIS	LONIKANDII	400	1	594	389	491	660	454	537	881	591	583	1158
WEST	PUNE-PG-GIS	LONIKANDII	400	2	594	389	491	660	454	537	881	591	583	1158
WEST	PADGHEGIS	NAVI-MUM	400	1	966	768	840	1098	895	913	1300	906	764	1714
EAST	KAHALGAON-B	FARAKKA	400	1	536	392	507	519	485	545	534	783	418	852
EAST	KAHALGAON-B	FARAKKA	400	2	536	392	507	519	485	545	534	783	418	852
EAST	ROURKELA	JHARSUGUDA-B	400	1	-681	724	784	644	844	716	247	227	148	1093
EAST	ROURKELA	JHARSUGUDA-B	400	2	-681	724	784	644	844	716	247	227	148	1093
EAST	ROURKELA	CHAIBASA	400	1	520	752	704	454	783	668	142	9	59	1093
EAST	ROURKELA	CHAIBASA	400	2	520	752	704	454	783	668	142	9	59	1093
EAST	MENDHASAL	MERAMUNDLI	400	1	-617	794	882	616	813	686	421	559	366	850
EAST	MENDHASAL	MERAMUNDLI	400	2	-617	794	882	616	813	686	421	559	366	850
EAST	STERLITE	LAPANGA	400	1	1091	1195	1392	1064	1273	997	699	748	472	1093
EAST	STERLITE	LAPANGA	400	2	1091	1195	1392	1064	1273	997	699	748	472	1093
EAST	RANCHI	RNC-SIPT FSC	400	2	-518	648	683	451	679	539	224	207	209	850
EAST	RANCHI	RNC-SIPT FSC	400	1	-518	648	439	451	679	539	224	207	209	850
SOUTH	CUDP	CHITOR	400	1	507	165	150	738	291	297	454	92	16	852
SOUTH	VELTOOR	RAIC	400	1	-607	320	245	124	58	110	320	97	34	850
SOUTH	KOLAR	DOMSANDRA	400	1	456	508	489	524	582	521	700	670	644	850

- Note: Highlighted cell indicates Powerflow >70% of Thermal limit

765/400 kV ICT loadings above 80% of MVA rating

Area	FromName	Voltage	ToName	Voltage	Id	P-Sc1	P-Sc2	P-Sc3	P-Sc4	P-Sc5	P-Sc6	P-Sc7	P-Sc8	P-Sc9	MVA Rating
NORTH	BHIWANI-PG	400	BHIWN-PG	765	1	-844	-157	72	-886	-382	51	-586	121	303	1000
NORTH	BHIWANI-PG	400	BHIWN-PG	765	2	-844	-157	72	-886	-382	51	-586	121	303	1000
NORTH	BHIWANI-PG	400	BHIWN-PG	765	3	-1266	-157	72	-1329	-382	51	-878	121	303	1000
NORTH	BHIWANI SR	400	BHIWN-PG	765	2	-810	-54	91	-841	-209	62	-558	166	320	1000
NORTH	FATEHG-2	400	FATEH-2	765	1	1368	134	107	1357	153	81	1216	-1	-67	1500
NORTH	FATEHG-2	400	FATEH-2	765	2	1368	134	107	1357	153	81	1216	-1	-67	1500
NORTH	FATEHG-2	400	FATEH-2	765	3	1368	134	107	1357	153	81	1216	-1	-67	1500
NORTH	FATEHG-2	400	FATEH-2	765	4	1368	134	107	1357	153	81	1216	-1	-67	1500
NORTH	FATEHG-2	400	FATEH-2	765	5	1368	134	107	1357	153	81	1216	-1	-67	1500
NORTH	FATEHG-2	400	FATEH-2	765	6	1368	134	107	1357	153	81	1216	-1	-67	1500
NORTH	FATEHG-3	400	FATEHG-3	765	1	1214	-53	-44	1221	-70	-34	1255	11	29	1500
NORTH	FATEHG-3	400	FATEHG-3	765	2	1214	-53	-44	1221	-70	-34	1255	11	29	1500
NORTH	FATEHG-3	400	FATEHG-3	765	3	1214	-53	-44	1221	-70	-34	1255	11	29	1500
NORTH	FATEHG-3	400	FATEHG-3	765	4	1214	-53	-44	1221	-70	-34	1255	11	29	1500
NORTH	FATEHG-3	400	FATEHG-3	765	5	1214	-53	-44	1221	-70	-34	1255	11	29	1500
NORTH	FATEHG-3	400	FATEHG-3	765	6	1214	-53	-44	1221	-70	-34	1255	11	29	1500
NORTH	BHADLA-2	400	BHADLA-2	765	1	1267	51	43	1256	41	10	1196	-16	-42	1500
NORTH	BHADLA-2	400	BHADLA-2	765	2	1267	51	43	1256	41	10	1196	-16	-42	1500
NORTH	BHADLA-2	400	BHADLA-2	765	3	1267	51	43	1256	41	10	1196	-16	-42	1500
NORTH	BHADLA-2	400	BHADLA-2	765	4	1267	51	43	1256	41	10	1196	-16	-42	1500
NORTH	BHADLA-2	400	BHADLA-2	765	5	1267	51	43	1256	41	10	1196	-16	-42	1500
NORTH	ORAI	400	ORAI	765	1	184	-666	-626	134	-768	-495	814	-48	145	1000
NORTH	ORAI	400	ORAI	765	2	184	-666	-626	134	-768	-495	814	-48	145	1000
WEST	NAVSARI-NEW	400	NAVSARI-NEW	765	1	-1210	-600	-547	-1367	-721	-722	-1352	-526	-565	1500
WEST	NAVSARI-NEW	400	NAVSARI-NEW	765	2	-1210	-600	-547	-1367	-721	-722	-1352	-526	-565	1500
WEST	NAVSARI-NEW	400	NAVSARI-NEW	765	3	-1210	-600	-547	-1367	-721	-722	-1352	-526	-565	1500

Area	FromName	Voltage	ToName	Voltage	Id	P-Sc1	P-Sc2	P-Sc3	P-Sc4	P-Sc5	P-Sc6	P-Sc7	P-Sc8	P-Sc9	MVA Rating
WEST	PUNE-PG-GIS	400	PUNE-PG-GIS	765	1	-1200	-785	-897	-1260	-842	-881	-1335	-866	-721	1500
WEST	PUNE-PG-GIS	400	PUNE-PG-GIS	765	2	-1200	-785	-897	-1260	-842	-881	-1335	-866	-721	1500
WEST	PADGHEGIS	400	PADGHEGIS	765	1	-1171	-902	-917	-1425	-1105	-1070	-1438	-941	-767	1500
WEST	PADGHEGIS	400	PADGHEGIS	765	2	-1171	-902	-917	-1425	-1105	-1070	-1438	-941	-767	1500
WEST	PADGHEGIS	400	PADGHEGIS	765	3	-1171	-902	-917	-1425	-1105	-1070	-1438	-941	-767	1500
SOUTH	KURNOOL-III	400	KURNOOL-III	765	1	1276	606	523	1269	593	495	836	130	-74	1500
SOUTH	KURNOOL-III	400	KURNOOL-III	765	2	1276	606	523	1269	593	495	836	130	-74	1500
SOUTH	KURNOOL-III	400	KURNOOL-III	765	3	1276	606	523	1269	593	495	836	130	-74	1500
SOUTH	MAHESWRM	400	MAHESH-WARAM	765	1	-1049	-318	-251	-597	-9	-213	-1254	-493	-404	1500
SOUTH	MAHESWRM	400	MAHESH-WARAM	765	2	-1049	-318	-251	-597	-9	-213	-1254	-493	-404	1500

- Note: Highlighted cell indicates Powerflow >80% of MVA rating

400/220 kV ICT loadings above 80% of MVA rating

Area	From Name	Voltage	To Name	Voltage	Id	P-Sc1	P-Sc2	P-Sc3	P-Sc4	P-Sc5	P-Sc6	P-Sc7	P-Sc8	P-Sc9	MVA Rating
NORTH	KISHENPUR	220	KISHENPUR	400	1	-389	-258	-131	-422	-354	-166	-366	-235	-142	315
NORTH	KISHENPUR	220	KISHENPUR	400	2	-389	-258	-131	-422	-354	-166	-366	-235	-142	315
NORTH	KISHENPUR	220	KISHENPUR	400	3	-389	-258	-131	-422	-354	-166	-366	-235	-142	315
NORTH	PANG220SP2	220	PANG400SP2	400	1	275	0	0	274	0	0	272	0	0	315
NORTH	PANG220SP2	220	PANG400SP2	400	2	275	0	0	274	0	0	272	0	0	315
NORTH	PANG220SP2	220	PANG400SP2	400	3	275	0	0	274	0	0	272	0	0	315
NORTH	PANG220SP2	220	PANG400SP2	400	4	275	0	0	274	0	0	272	0	0	315
NORTH	PANG220SP2	220	PANG400SP2	400	5	275	0	0	274	0	0	272	0	0	315
NORTH	PANG220SP2	220	PANG400SP2	400	6	275	0	0	274	0	0	272	0	0	315
NORTH	PANG220SP3	220	PANG400SP3	400	1	275	0	0	274	0	0	272	0	0	315
NORTH	PANG220SP3	220	PANG400SP3	400	2	275	0	0	274	0	0	272	0	0	315
NORTH	PANG220SP3	220	PANG400SP3	400	3	275	0	0	274	0	0	272	0	0	315
NORTH	PANG220SP3	220	PANG400SP3	400	4	275	0	0	274	0	0	272	0	0	315
NORTH	PANG220SP3	220	PANG400SP3	400	5	275	0	0	274	0	0	272	0	0	315
NORTH	PANG220SP3	220	PANG400SP3	400	6	275	0	0	274	0	0	272	0	0	315
NORTH	SOHNAROAD	220	SONAROAD	400	1	-409	-459	-418	-402	-499	-375	-280	-308	-193	500
NORTH	SOHNAROAD	220	SONAROAD	400	2	-409	-459	-418	-402	-499	-375	-280	-308	-193	500
NORTH	HINDAU-4	220	HINDAU-4	400	1	-225	-231	-224	-238	-274	-278	-245	-200	-145	315
NORTH	HINDAU-4	220	HINDAU-4	400	2	-225	-231	-224	-238	-274	-278	-245	-200	-145	315
NORTH	SURATGARH-42	220	SURATG-4	400	1	-52	-215	-205	-67	-245	-252	-134	-237	-177	315
NORTH	SURATGARH-42	220	SURATG-4	400	2	-52	-215	-205	-67	-245	-252	-134	-237	-177	315
NORTH	BHADLA-S	220	BHADLA	400	1	450	-41	-48	434	-63	-105	379	-115	-113	500
NORTH	BHADLA-S	220	BHADLA	400	2	450	-41	-48	434	-63	-105	379	-115	-113	500
NORTH	BHADLA-S	220	BHADLA	400	3	450	-41	-48	434	-63	-105	379	-115	-113	500
NORTH	BHADLA-S	220	BHADLA	400	4	450	-41	-48	434	-63	-105	379	-115	-113	500
NORTH	KALISIND	220	KALISI-4	400	2	-194	-331	-343	-219	-347	-421	-523	-504	-399	500
NORTH	AJMER42	220	AJMER	400	1	-111	-182	-177	-136	-230	-261	-153	-206	-166	315

Area	From Name	Voltage	To Name	Voltage	Id	P-Sc1	P-Sc2	P-Sc3	P-Sc4	P-Sc5	P-Sc6	P-Sc7	P-Sc8	P-Sc9	MVA Rating
NORTH	AJMER42	220	AJMER	400	2	-111	-182	-177	-136	-230	-261	-153	-206	-166	315
NORTH	BHIWADI	220	BHIWADI	400	1	-151	-227	-203	-164	-267	-236	-130	-202	-145	315
NORTH	BHIWADI	220	BHIWADI	400	2	-151	-227	-203	-163	-267	-236	-129	-202	-145	315
NORTH	BHIWADI	220	BHIWADI	400	3	-151	-227	-203	-163	-267	-236	-129	-202	-145	315
NORTH	JODHPURN-42	220	JODH KANKANI	400	1	-74	-185	-187	-95	-239	-294	-130	-276	-237	315
NORTH	BHADLA-PG	220	BHADLA PG	400	1	464	0	0	464	0	0	460	0	0	500
NORTH	BHADLA-PG	220	BHADLA PG	400	2	464	0	0	464	0	0	460	0	0	500
NORTH	BHADLA-PG	220	BHADLA PG	400	3	464	0	0	464	0	0	460	0	0	500
NORTH	BHADLA-PG	220	BHADLA PG	400	4	464	0	0	464	0	0	460	0	0	500
NORTH	BHADLA-PG	220	BHADLA PG	400	5	464	0	0	464	0	0	460	0	0	500
NORTH	BHADLA-PG	220	BHADLA PG	400	6	464	0	0	464	0	0	460	0	0	500
NORTH	FATEHG-III	220	FATEHG-3 SPL	400	1	451	0	0	450	0	0	447	0	0	500
NORTH	FATEHG-III	220	FATEHG-3 SPL	400	2	451	0	0	450	0	0	447	0	0	500
NORTH	FATEHG-III	220	FATEHG-3 SPL	400	3	451	0	0	450	0	0	447	0	0	500
NORTH	FATEHG-III	220	FATEHG-3 SPL	400	4	451	0	0	450	0	0	447	0	0	500
NORTH	FATEHG-III	220	FATEHG-3 SPL	400	5	451	0	0	450	0	0	447	0	0	500
NORTH	RAMGARH-I	220	RAMG-I	400	1	445	0	0	444	0	0	441	0	0	500
NORTH	RAMGARH-I	220	RAMG-I	400	2	445	0	0	444	0	0	441	0	0	500
NORTH	BIKANER	220	BIKANER-NW	400	2	815	0	0	815	0	0	808	0	0	1000
NORTH	FATEH-2	220	FATEHG-2	400	1	492	0	0	492	0	0	488	0	0	500
NORTH	FATEH-2	220	FATEHG-2	400	2	492	0	0	492	0	0	488	0	0	500
NORTH	FATEH-2	220	FATEHG-2	400	3	492	0	0	492	0	0	488	0	0	500
NORTH	FATEH-2	220	FATEHG-2	400	4	492	0	0	492	0	0	488	0	0	500
NORTH	FATEH-2	220	FATEHG-2	400	5	492	0	0	492	0	0	488	0	0	500
NORTH	FATEHG-3	220	FATEHG-3	400	1	478	0	0	478	0	0	474	0	0	500
NORTH	FATEHG-3	220	FATEHG-3	400	2	478	0	0	478	0	0	474	0	0	500
NORTH	FATEHG-3	220	FATEHG-3	400	3	478	0	0	478	0	0	474	0	0	500

Area	From Name	Voltage	To Name	Voltage	Id	P-Sc1	P-Sc2	P-Sc3	P-Sc4	P-Sc5	P-Sc6	P-Sc7	P-Sc8	P-Sc9	MVA Rating
NORTH	FATEHG-3	220	FATEHG-3	400	4	478	0	0	478	0	0	474	0	0	500
NORTH	FATEHG-3	220	FATEHG-3	400	5	478	0	0	478	0	0	474	0	0	500
NORTH	FATEHG-4	220	FATEHG-4	400	1	415	0	0	415	0	0	411	0	0	500
NORTH	FATEHG-4	220	FATEHG-4	400	2	415	0	0	415	0	0	411	0	0	500
NORTH	FATEHG-4	220	FATEHG-4	400	3	415	0	0	415	0	0	411	0	0	500
NORTH	FATEHG-4	220	FATEHG-4	400	4	415	0	0	415	0	0	411	0	0	500
NORTH	FATEHG-4	220	FATEHG-4	400	5	415	0	0	415	0	0	411	0	0	500
NORTH	BHADLA-3	220	BHADLA-3	400	1	445	0	0	444	0	0	441	0	0	500
NORTH	BHADLA-3	220	BHADLA-3	400	2	445	0	0	444	0	0	441	0	0	500
NORTH	BHADLA-3	220	BHADLA-3	400	3	445	0	0	444	0	0	441	0	0	500
NORTH	BHADLA-3	220	BHADLA-3	400	4	445	0	0	444	0	0	441	0	0	500
NORTH	BHADLA-3	220	BHADLA-3	400	5	445	0	0	444	0	0	441	0	0	500
NORTH	BHADLA-2	220	BHADLA-2	400	1	480	0	0	480	0	0	476	0	0	500
NORTH	BHADLA-2	220	BHADLA-2	400	2	480	0	0	480	0	0	476	0	0	500
NORTH	BHADLA-2	220	BHADLA-2	400	3	480	0	0	480	0	0	476	0	0	500
NORTH	BHADLA-2	220	BHADLA-2	400	4	480	0	0	480	0	0	476	0	0	500
NORTH	BHADLA-2	220	BHADLA-2	400	5	480	0	0	480	0	0	476	0	0	500
NORTH	BHAD-2 SPLT	220	BHADLA-2	400	1	1403	0	0	1402	0	0	1391	0	0	1500
NORTH	POKARAN-S	220	POKARAN	400	1	947	0	0	945	0	0	787	0	0	1000
NORTH	KOTA	220	KOTA	400	1	-194	-190	-191	-229	-251	-288	-262	-110	-110	315
NORTH	KOTA	220	KOTA	400	2	-194	-190	-191	-229	-251	-288	-262	-110	-110	315
NORTH	FATEH-SPL 2	220	FATEHG-2	400	1	488	0	0	488	0	0	484	0	0	500
NORTH	FATEH-SPL 2	220	FATEHG-2	400	2	488	0	0	488	0	0	484	0	0	500
NORTH	FATEH-SPL 2	220	FATEHG-2	400	3	488	0	0	488	0	0	484	0	0	500
NORTH	FATEH-SPL 2	220	FATEHG-2	400	4	488	0	0	488	0	0	484	0	0	500
NORTH	FATEH-SPL 2	220	FATEHG-2	400	5	488	0	0	488	0	0	484	0	0	500
NORTH	BHADLA3-SPL	220	BHADLA-3	400	1	445	0	0	444	0	0	441	0	0	500

Area	From Name	Voltage	To Name	Voltage	Id	P-Sc1	P-Sc2	P-Sc3	P-Sc4	P-Sc5	P-Sc6	P-Sc7	P-Sc8	P-Sc9	MVA Rating
NORTH	BHADLA3-SPL	220	BHADLA-3	400	2	445	0	0	444	0	0	441	0	0	500
NORTH	BHADLA3-SPL	220	BHADLA-3	400	3	445	0	0	444	0	0	441	0	0	500
NORTH	BHADLA3-SPL	220	BHADLA-3	400	4	445	0	0	444	0	0	441	0	0	500
NORTH	BHADLA3-SPL	220	BHADLA-3	400	5	445	0	0	444	0	0	441	0	0	500
NORTH	OBRA2	220	OBRA4	400	1	-161	-255	-262	-177	-259	-231	-180	-227	-155	315
NORTH	OBRA2	220	OBRA4	400	2	-161	-255	-262	-177	-259	-231	-180	-227	-155	315
NORTH	OBRA2	220	OBRA4	400	3	-123	-194	-200	-135	-198	-177	-138	-173	-118	240
NORTH	ALLAHABA	220	ALLAHABA	400	1	-204	-244	-259	-211	-276	-240	-161	-194	-121	315
NORTH	ALLAHABA	220	ALLAHABA	400	2	-204	-244	-259	-211	-276	-240	-161	-194	-121	315
NORTH	ALLAHABA	220	ALLAHABA	400	3	-204	-244	-259	-211	-276	-240	-161	-194	-121	315
NORTH	KANPU-PG	220	KANPUR	400	1	-254	-176	-182	-245	-206	-169	-135	-98	-34	315
NORTH	KANPU-PG	220	KANPUR	400	2	-254	-176	-182	-245	-206	-169	-135	-98	-34	315
NORTH	REWAROAD	220	REWA	400	1	-247	-311	-323	-266	-335	-292	-233	-258	-156	315
NORTH	AGRA-PG	220	AGRA	400	1	-171	-246	-256	-188	-286	-259	-130	-186	-113	315
NORTH	AGRA-PG	220	AGRA	400	2	-171	-246	-256	-188	-286	-259	-130	-186	-113	315
NORTH	PIPALKOTI SW	220	PIPALKOTI SW	400	1	166	218	161	166	228	167	71	144	69	240
NORTH	PIPALKOTI SW	220	PIPALKOTI SW	400	2	166	218	161	166	228	167	71	144	69	240
WEST	WANAKBORI	220	WANAKBORI	400	1	-184	-210	-144	-232	-273	-267	-246	-255	-257	315
WEST	SUGEN	220	SUGEN	400	1	-234	-199	-141	-300	-260	-236	-275	-201	-186	315
WEST	SUGEN	220	SUGEN	400	2	-234	-199	-141	-300	-260	-236	-275	-201	-186	315
WEST	SUGEN	220	SUGEN	400	3	-234	-199	-141	-300	-260	-236	-275	-201	-186	315
WEST	MUNDRA-APL	220	MUNDRA-APL	400	1	55	274	250	31	242	218	-90	109	119	315
WEST	MUNDRA-APL	220	MUNDRA-APL	400	2	55	274	250	31	242	218	-90	109	119	315
WEST	ZERDA2	220	ZERDA	400	1	-176	-139	-87	-248	-196	-191	-284	-224	-215	315
WEST	ZERDA2	220	ZERDA	400	2	-176	-139	-87	-248	-196	-191	-284	-224	-215	315
WEST	ZERDA2	220	ZERDA	400	3	-176	-139	-87	-248	-196	-191	-284	-224	-215	315
WEST	VADODARAPG	220	VADODARA	400	1	-339	-182	-137	-456	-258	-260	-426	-183	-233	500

Area	From Name	Voltage	To Name	Voltage	Id	P-Sc1	P-Sc2	P-Sc3	P-Sc4	P-Sc5	P-Sc6	P-Sc7	P-Sc8	P-Sc9	MVA Rating
WEST	VADODARAPG	220	VADODARA	400	2	-339	-182	-137	-456	-258	-260	-426	-183	-233	500
WEST	NAVSARI-NEW	220	NAVSARI-NEW	400	1	-355	-184	-131	-468	-263	-257	-412	-161	-201	500
WEST	NAVSARI-NEW	220	NAVSARI-NEW	400	2	-355	-184	-131	-468	-263	-257	-412	-161	-201	500
WEST	NAVSARI-NEW	220	NAVSARI-NEW	400	3	-355	-184	-131	-468	-263	-257	-412	-161	-201	500
WEST	GWALIOR-742	220	GWALIOR-4	400	1	-139	-110	-100	-158	-120	-128	-278	-218	-149	315
WEST	GWALIOR-742	220	GWALIOR-4	400	2	-139	-110	-100	-158	-120	-128	-278	-218	-149	315
WEST	GWALIOR-742	220	GWALIOR-4	400	3	-139	-110	-100	-158	-120	-128	-278	-218	-149	315
WEST	SATNAPG-742	220	SATNA-74	400	1	-217	-121	-130	-209	-116	-154	-363	-276	-216	315
WEST	SATNAPG-742	220	SATNA-74	400	2	-217	-121	-130	-209	-116	-154	-363	-276	-216	315
WEST	SATNAPG-742	220	SATNA-74	400	3	-344	-193	-207	-333	-184	-244	-577	-438	-343	500
WEST	SAGAR-2	220	SAGAR-4	400	1	-150	-91	-87	-157	-95	-109	-255	-187	-135	315
WEST	SAGAR-2	220	SAGAR-4	400	2	-150	-91	-87	-157	-95	-109	-255	-187	-135	315
WEST	JABALPUR-42	220	JABALPUR-4	400	1	-174	-85	-92	-160	-113	-127	-274	-211	-125	315
WEST	JABALPUR-42	220	JABALPUR-4	400	2	-174	-85	-92	-160	-113	-127	-274	-211	-125	315
WEST	JABALPUR-42	220	JABALPUR-4	400	3	-278	-136	-147	-255	-181	-203	-434	-335	-200	500
WEST	SHUJALP-42	220	SHUJALPR-4	400	1	-208	-88	-86	-224	-85	-102	-332	-195	-147	315
WEST	SHUJALP-42	220	SHUJALPR-4	400	2	-330	-139	-136	-355	-135	-162	-527	-310	-233	500
WEST	SHUJALP-42	220	SHUJALPR-4	400	3	-208	-88	-86	-224	-85	-102	-332	-195	-147	315
WEST	MANDSOUR-42	220	MANDSAUR-4	400	1	-140	-81	-77	-151	-92	-102	-271	-194	-118	315
WEST	MANDSOUR-42	220	MANDSAUR-4	400	2	-140	-81	-77	-151	-92	-102	-271	-194	-118	315
WEST	BOISAR-P	220	BOISAR	400	1	-214	-197	-210	-242	-226	-227	-291	-231	-192	315
WEST	BOISAR-P	220	BOISAR	400	2	-214	-197	-210	-242	-226	-227	-291	-231	-192	315
WEST	BOISAR-P	220	BOISAR	400	3	-338	-313	-332	-384	-358	-359	-461	-366	-305	500
WEST	BOISAR-P	220	BOISAR	400	4	-338	-313	-332	-384	-358	-359	-461	-366	-305	500
WEST	WARDH_PG	220	WARDHA SPLT	400	2	-236	-74	-81	-254	-76	-75	-201	-84	-47	315
WEST	WARDH_PG	220	WARDHA SPLT	400	3	-236	-74	-81	-254	-76	-75	-201	-84	-47	315
WEST	WARDH_PG	220	WARDHA SPLT	400	4	-379	-116	-127	-407	-119	-118	-321	-133	-75	500

Area	From Name	Voltage	To Name	Voltage	Id	P-Sc1	P-Sc2	P-Sc3	P-Sc4	P-Sc5	P-Sc6	P-Sc7	P-Sc8	P-Sc9	MVA Rating
WEST	KHARGR22	220	KHARGAR	400	1	-189	-146	-161	-231	-180	-187	-263	-173	-150	315
WEST	KHARGR22	220	KHARGAR	400	2	-189	-146	-161	-231	-180	-187	-263	-173	-150	315
WEST	KHARGR22	220	KHARGAR	400	3	-189	-146	-161	-231	-180	-187	-263	-173	-150	315
WEST	PADGHE22	220	PADGH4	400	1	-392	-431	-429	-479	-494	-470	-527	-467	-374	600
WEST	PADGHE22	220	PADGH4	400	2	-202	-221	-220	-246	-254	-241	-271	-240	-192	315
WEST	PADGHE22	220	PADGH4	400	3	-202	-221	-220	-246	-254	-241	-271	-240	-192	315
WEST	PADGHE22	220	PADGH4	400	4	-202	-221	-220	-246	-254	-241	-271	-240	-192	315
WEST	PADGHE22	220	PADGH4	400	5	-319	-351	-349	-389	-402	-382	-429	-380	-304	500
WEST	NDIL	220	DOLVI	400	1	0	-420	-416	-284	-431	-424	-330	-430	-398	500
WEST	NDIL	220	DOLVI	400	2	0	-420	-416	-284	-431	-424	-330	-430	-398	500
WEST	KUDUS220	220	KUDUS	400	1	-329	-308	-319	-397	-365	-355	-449	-347	-277	500
WEST	KUDUS220	220	KUDUS	400	2	-329	-308	-319	-397	-365	-355	-449	-347	-277	500
WEST	KORADI-II	220	KORADI-II	400	1	-91	-506	-493	-133	-552	-504	-238	-504	-439	500
WEST	KORADI-II	220	KORADI-II	400	2	-91	-506	-493	-133	-552	-504	-238	-504	-439	500
WEST	VELGAON	220	VELGAON4	400	1	-307	-283	-297	-362	-331	-328	-420	-326	-268	500
WEST	VELGAON	220	VELGAON4	400	2	-307	-283	-297	-362	-331	-328	-420	-326	-268	500
WEST	VELGAON	220	VELGAON4	400	3	-307	-283	-297	-362	-331	-328	-420	-326	-268	500
EAST	PANDIABILI	220	PANDIABILI	400	1	-183	-219	-253	-187	-227	-183	-151	-182	-113	500
EAST	PANDIABILI	220	PANDIABILI	400	2	-183	-219	-253	-187	-227	-183	-151	-182	-113	500
EAST	MENDHASAL	220	MENDHASAL	400	1	-278	-334	-385	-282	-346	-282	-230	-278	-178	315
EAST	MENDHASAL	220	MENDHASAL	400	2	-278	-334	-385	-282	-346	-282	-230	-278	-178	315
EAST	KTPS220	220	KOLAGHAT	400	1	-298	-223	-221	-306	-246	-233	-197	-134	-82	315
EAST	KTPS220	220	KOLAGHAT	400	2	-298	-223	-221	-306	-246	-233	-197	-134	-82	315
EAST	CHANDITALA_N	220	CHANDITALA_N	400	1	-296	-298	-305	-305	-317	-303	-200	-205	-148	315
EAST	CHANDITALA_N	220	CHANDITALA_N	400	2	-296	-298	-305	-305	-317	-303	-200	-205	-148	315
EAST	CHANDITALA_N	220	CHANDITALA_N	400	3	-296	-298	-305	-305	-317	-303	-200	-205	-148	315
EAST	KHARAGPR-WB	220	KHARAGPR-WB	400	1	-250	-253	-249	-257	-269	-258	-148	-169	-117	315

Area	From Name	Voltage	To Name	Voltage	Id	P-Sc1	P-Sc2	P-Sc3	P-Sc4	P-Sc5	P-Sc6	P-Sc7	P-Sc8	P-Sc9	MVA Rating
EAST	KHARAGPR-WB	220	KHARAGPR-WB	400	2	-250	-253	-249	-257	-269	-258	-148	-169	-117	315
EAST	KHARAGPR-WB	220	KHARAGPR-WB	400	3	-250	-253	-249	-257	-269	-258	-148	-169	-117	315
EAST	JEERAT	220	JEERAT	400	1	-247	-281	-285	-254	-294	-282	-169	-201	-147	315
EAST	JEERAT	220	JEERAT	400	2	-247	-281	-285	-254	-294	-282	-169	-201	-147	315
EAST	JEERAT	220	JEERAT	400	3	-247	-281	-285	-254	-294	-282	-169	-201	-147	315
EAST	JEERAT	220	JEERAT	400	4	-247	-281	-285	-254	-294	-282	-169	-201	-147	315
EAST	BIDHANNGR-WB	220	BIDHAN NGR	400	1	-288	-138	-135	-292	-175	-139	-127	-102	-75	315
EAST	BIDHANNGR-WB	220	BIDHAN NGR	400	2	-288	-138	-135	-292	-175	-139	-127	-102	-75	315
EAST	BIDHANNGR-WB	220	BIDHAN NGR	400	3	-288	-137	-135	-292	-175	-139	-127	-102	-75	315
EAST	DURGAPUR TPS	220	DURGAPUR TPS	400	1	-129	-278	-324	-187	-292	-323	-52	-172	-129	315
EAST	DURGAPUR TPS	220	DURGAPUR TPS	400	2	-129	-278	-324	-187	-292	-323	-52	-172	-129	315
EAST	BOKARO TPS	220	BOKARO-A	400	1	-315	-220	-332	-332	-293	-330	-390	-297	-263	315
EAST	BOKARO TPS	220	BOKARO-A	400	2	-315	-220	-332	-332	-293	-330	-390	-297	-263	315
EAST	KODEMA_DVC	220	KODERMA-DVC	400	1	-217	-192	-252	-229	-214	-246	-234	-203	-173	315
EAST	KODEMA_DVC	220	KODERMA-DVC	400	2	-217	-192	-252	-229	-214	-246	-234	-203	-173	315
SOUTH	NTPC-RMGD	220	RAMGUNDM STP	400	1	-176	-198	-194	-169	-231	-179	-196	-268	-178	315
SOUTH	NTPC-RMGD	220	RAMGUNDM STP	400	2	-140	-157	-154	-134	-184	-142	-155	-213	-141	250
SOUTH	NTPC-RMGD	220	RAMGUNDM STP	400	3	-140	-157	-154	-134	-184	-142	-155	-213	-141	250
SOUTH	NTPC-RMGD	220	RAMGUNDM STP	400	4	-176	-198	-194	-169	-231	-179	-196	-268	-178	315
SOUTH	NLCTS22	230	NYVL TS 2	400	1	-215	-200	-212	-210	-233	-215	-201	-232	-161	250
SOUTH	NLCTS22	230	NYVL TS 2	400	2	-215	-200	-212	-210	-233	-215	-201	-232	-161	250

- *Note: Highlighted cell indicates Powerflow >80% of MVA rating*

Over Voltage Nodes 400V Bus Voltage >=1.05 PU

Area Name	Bus Name	V-Sc1	V-Sc2	V-Sc3	V-Sc4	V-Sc5	V-Sc6	V-Sc7	V-Sc8	V-Sc9	Max
NORTH	CHAMERA-1	1.00	1.01	1.03	1.00	1.00	1.04	1.03	1.02	1.06	1.06
NORTH	HAMIRPUR	1.01	1.01	1.02	1.01	1.00	1.03	1.03	1.01	1.06	1.06
NORTH	ROPAR4	1.01	1.00	1.03	1.00	1.00	1.04	1.05	1.02	1.07	1.07
NORTH	DHANANSU4	1.02	1.01	1.05	1.01	1.00	1.05	1.05	1.04	1.08	1.08
NORTH	BEHMNJSINGH4	1.04	1.01	1.05	1.02	1.00	1.05	1.06	1.05	1.09	1.09
NORTH	TALWNDISABO4	1.04	1.00	1.05	1.02	1.00	1.04	1.05	1.04	1.08	1.08
NORTH	DHURI4	1.03	1.01	1.04	1.01	1.00	1.04	1.05	1.04	1.08	1.08
NORTH	MAKHU4	1.03	1.01	1.06	1.02	1.00	1.05	1.06	1.05	1.09	1.09
NORTH	MUKATSAR4	1.04	1.01	1.06	1.02	1.00	1.05	1.07	1.05	1.10	1.10
NORTH	NAKODAR4	1.03	1.01	1.05	1.01	1.00	1.05	1.06	1.04	1.08	1.08
NORTH	RAJPURA_TH4	1.03	1.00	1.04	1.00	1.00	1.03	1.04	1.03	1.07	1.07
NORTH	RAJPURA4	1.03	1.00	1.04	1.00	1.00	1.04	1.04	1.03	1.07	1.07
NORTH	AMRITSAR4	1.03	1.01	1.06	1.01	1.00	1.05	1.06	1.05	1.09	1.09
NORTH	MOGA SPLT4	1.03	1.02	1.06	1.02	1.00	1.05	1.06	1.05	1.09	1.09
NORTH	PATIALA4	1.01	1.01	1.03	1.01	1.00	1.04	1.04	1.03	1.06	1.06
NORTH	PATRAN4	1.02	1.01	1.03	1.01	1.01	1.04	1.04	1.03	1.05	1.05
NORTH	LUDHIANA4	1.00	1.00	1.03	1.00	1.00	1.03	1.04	1.02	1.06	1.06
NORTH	JALANDHAR4	1.02	1.01	1.05	1.01	1.00	1.05	1.05	1.04	1.08	1.08
NORTH	MALERKOTLA4	1.01	1.01	1.03	1.01	1.00	1.04	1.04	1.03	1.06	1.06
NORTH	MITAL(ENG)4	1.04	1.01	1.05	1.02	1.00	1.05	1.06	1.05	1.09	1.09
NORTH	BHILWA-4	1.02	1.05	1.05	1.03	1.02	1.03	1.01	1.03	1.04	1.05
NORTH	DEEDWANA	1.00	1.06	1.06	1.01	1.02	1.03	1.01	1.04	1.05	1.06
NORTH	AJMER	1.01	1.05	1.05	1.02	1.03	1.03	1.01	1.04	1.05	1.05
NORTH	JODH SURPURA	0.98	1.05	1.05	0.99	1.03	1.03	1.00	1.04	1.05	1.05
NORTH	JODH KANKANI	0.97	1.06	1.06	0.99	1.03	1.04	1.00	1.05	1.05	1.06
NORTH	BIKANE-4	0.99	1.05	1.05	1.00	1.02	1.03	1.01	1.04	1.05	1.05

Area Name	Bus Name	V-Sc1	V-Sc2	V-Sc3	V-Sc4	V-Sc5	V-Sc6	V-Sc7	V-Sc8	V-Sc9	Max
NORTH	HANUMAN	1.01	1.07	1.05	1.02	1.03	1.03	1.02	1.05	1.05	1.07
MYANMAR	TAMU	0.99	1.02	1.03	0.98	1.02	1.05	1.00	1.03	1.04	1.05
WEST	SHIVLAKHAPS	1.05	1.05	1.06	1.05	1.04	1.05	1.04	1.06	1.06	1.06
WEST	WARD4	1.04	1.05	1.06	1.04	1.04	1.05	1.03	1.03	1.03	1.06
WEST	MAUDA	1.04	1.05	1.05	1.04	1.03	1.05	1.03	1.00	1.01	1.05
WEST	JAIGAD II	1.11	0.95	0.96	0.99	0.95	0.95	0.98	0.95	0.97	1.11
WEST	DOLVI	1.10	0.93	0.93	0.98	0.91	0.92	0.97	0.92	0.94	1.10
WEST	WARDHA SP	1.01	1.05	1.05	1.01	1.03	1.04	1.00	1.03	1.03	1.05
WEST	WARORA POOL	1.03	1.05	1.06	1.03	1.03	1.05	1.01	1.03	1.03	1.06
EAST	KAHALGAON-A	1.04	1.06	1.05	1.04	1.05	1.06	1.02	1.03	1.02	1.06
EAST	RNC-SIPT FSC	1.02	1.07	1.07	1.00	1.05	1.05	0.96	0.95	0.96	1.07
EAST	RNC-SIPT FSC	1.02	1.07	1.03	1.00	1.05	1.05	0.96	0.95	0.96	1.07
SOUTH	CUDP	1.00	1.04	1.05	1.02	1.02	1.04	1.02	1.03	1.04	1.05
SOUTH	MUDN400	1.02	1.06	1.07	1.05	1.00	1.01	1.01	1.01	1.02	1.07
SOUTH	KONAS_VMGR 4	1.01	1.01	1.02	1.01	1.01	1.01	1.01	1.01	1.06	1.06
SOUTH	KALIKIRI	1.01	1.05	1.06	1.04	1.00	1.02	1.01	1.02	1.03	1.06
SOUTH	DICHPAL4	1.03	1.04	1.07	1.04	1.03	1.05	1.03	1.03	1.04	1.07
SOUTH	SHANKARPALLY	1.01	1.03	1.06	1.03	1.02	1.04	1.02	1.01	1.02	1.06
SOUTH	NIZAMABAD	1.03	1.04	1.07	1.04	1.03	1.05	1.03	1.03	1.04	1.07
SOUTH	NIRMAL	1.03	1.04	1.07	1.05	1.03	1.06	1.03	1.03	1.04	1.07
SOUTH	RAIDURG	1.02	1.03	1.07	1.03	1.02	1.05	1.02	1.01	1.03	1.07
SOUTH	WARANGAL NEW	1.01	1.03	1.05	1.02	1.02	1.04	1.02	1.02	1.03	1.05
SOUTH	WARANGAL	1.01	1.03	1.05	1.02	1.01	1.03	1.01	1.01	1.02	1.05
SOUTH	NARSAPUR	1.00	1.02	1.05	1.02	1.01	1.04	1.01	1.01	1.02	1.05
SOUTH	MAHESWRM	1.00	1.03	1.05	1.02	1.01	1.03	1.01	1.02	1.02	1.05
SOUTH	MAHESH-TS	1.00	1.03	1.05	1.02	1.01	1.03	1.01	1.01	1.02	1.05
SOUTH	KETHIREDDYPA	1.02	1.03	1.07	1.03	1.02	1.04	1.02	1.01	1.03	1.07
SOUTH	BIDAR PS SZ	1.00	1.04	1.06	1.00	1.03	1.04	1.00	1.03	1.04	1.06

Note: Highlighted cell indicates 765kV Bus Voltage>=1.05 P.U.

765kV Bus Voltage >=1.05 PU

Area Name	Bus Name	V-Sc1	V-Sc2	V-Sc3	V-Sc4	V-Sc5	V-Sc6	V-Sc7	V-Sc8	V-Sc9	Max
NORTH	JODH KANKANI	0.98	1.06	1.05	0.99	1.03	1.04	1.01	1.05	1.05	1.06
WEST	WARDHA	1.04	1.05	1.06	1.05	1.04	1.05	1.04	1.04	1.04	1.06
WEST	AURANG-CHTPM	1.03	1.05	1.05	1.04	1.03	1.04	1.04	1.03	1.04	1.05
SOUTH	CUDP800	1.02	1.05	1.06	1.03	1.02	1.04	1.03	1.04	1.04	1.06
SOUTH	KURL800	1.02	1.04	1.05	1.02	1.02	1.04	1.03	1.03	1.04	1.05
SOUTH	KURNOOL-III	1.01	1.04	1.05	1.02	1.02	1.03	1.02	1.03	1.04	1.05
SOUTH	CPETA800	1.01	1.04	1.05	1.03	1.02	1.04	1.03	1.03	1.03	1.05
SOUTH	MAHESHWARAM	1.02	1.05	1.07	1.03	1.03	1.05	1.03	1.04	1.05	1.07
SOUTH	NIZAMABAD	1.03	1.05	1.07	1.04	1.04	1.05	1.03	1.04	1.04	1.07
SOUTH	WARANGAL NEW	1.02	1.04	1.06	1.03	1.02	1.04	1.02	1.03	1.03	1.06
SOUTH	BIDAR PS SZ	1.02	1.05	1.07	1.02	1.04	1.05	1.02	1.04	1.05	1.07

Note: Highlighted cell indicates 400 kV Bus Voltage>=1.05 P.U.

Under Voltage Nodes

400kV Bus Voltage >=1.05 PU

Area Name	Bus Name	V-Sc1	V-Sc2	V-Sc3	V-Sc4	V-Sc5	V-Sc6	V-Sc7	V-Sc8	V-Sc9	Min
WEST	JAIGAD II	1.11	0.95	0.96	0.99	0.95	0.95	0.98	0.95	0.97	0.95
WEST	DOLVI	1.10	0.93	0.93	0.98	0.91	0.92	0.97	0.92	0.94	0.91
EAST	DUBURI	1.01	0.97	0.91	1.00	0.95	1.02	1.01	1.00	1.03	0.91
EAST	MENDHASAL	0.99	0.96	0.92	0.99	0.95	1.00	1.01	1.00	1.02	0.92
EAST	PARADEEP4	1.00	0.96	0.89	0.99	0.94	1.02	1.01	0.99	1.03	0.89
EAST	PANDIABILI	1.00	0.96	0.92	1.00	0.95	1.01	1.01	1.00	1.02	0.92
EAST	MERAMNDLI-B	1.01	0.98	0.91	1.00	0.95	1.03	1.01	1.00	1.03	0.91
EAST	GMR-OD	1.01	0.98	0.91	1.00	0.95	1.03	1.01	1.00	1.03	0.91
EAST	NARENDRAPUR	0.99	0.96	0.92	0.99	0.94	1.00	1.01	0.99	1.01	0.92
EAST	BHADRAK-NEW	1.01	0.99	0.94	1.01	0.97	1.03	1.02	1.00	1.03	0.94
EAST	RNC-SIPT FSC	1.02	1.07	1.07	1.00	1.05	1.05	0.96	0.95	0.96	0.95
EAST	RNC-SIPT FSC	1.02	1.07	1.03	1.00	1.05	1.05	0.96	0.95	0.96	0.95

Highlighted cell indicates 400kV Bus Voltage<=0.95 P.U.

N-1 Contingency of 765 kV Transmission Lines

S.No	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% Loading	Scenario
1.	318030 RAIPUR_POOL 765.00 318999 KOTRA SPLT 765.00 2	OPEN LINE FROM BUS 318994 [CHAMPA SPL 765.00] TO BUS 318999 [KOTRA SPLT 765.00] CKT 2	3627.99	3656.22	3500	103.66	Sc-2
2.	318994 CHAMPA SPL 765.00 318999 KOTRA SPLT 765.00 2	OPEN LINE FROM BUS 318030 [RAIPUR_POOL 765.00] TO BUS 318999 [KOTRA SPLT 765.00] CKT 2	3627.22	3626.92	3500	103.63	Sc-2
3.	177000 VARNASI8 765.00 368025 VIN-POOL 765.00 1	OPEN LINE FROM BUS 177000 [VARNASI8 765.00] TO BUS 368025 [VIN-POOL 765.00] CKT 2	3628.55	3569.07	3500	103.67	Sc-2
4.	177000 VARNASI8 765.00 368025 VIN-POOL 765.00 2	OPEN LINE FROM BUS 177000 [VARNASI8 765.00] TO BUS 368025 [VIN-POOL 765.00] CKT 1	3628.55	3569.07	3500	103.67	Sc-2
5.	368024 SASAN 765.00 368025 VIN-POOL 765.00 1	OPEN LINE FROM BUS 368024 [SASAN 765.00] TO BUS 368025 [VIN-POOL 765.00] CKT 2	3506.3	3493.26	3500	100.18	Sc-2
6.	318030 RAIPUR_POOL 765.00 318999 KOTRA SPLT 765.00 2	OPEN LINE FROM BUS 318994 [CHAMPA SPL 765.00] TO BUS 318999 [KOTRA SPLT 765.00] CKT 2	3639.53	3666.98	3500	103.99	Sc-3
7.	318994 CHAMPA SPL 765.00 318999 KOTRA SPLT 765.00 2	OPEN LINE FROM BUS 318030 [RAIPUR_POOL 765.00] TO BUS 318999 [KOTRA SPLT 765.00] CKT 2	3639.68	3638.7	3500	103.99	Sc-3
8.	318031 TAMNAR 765.00 318998 DHRAM_SPL 765.00 1	OPEN LINE FROM BUS 318031 [TAMNAR 765.00] TO BUS 318998 [DHRAM_SPL 765.00] CKT 2	4144.39	4131.78	3500	118.41	Sc-5
9.	318031 TAMNAR 765.00 318998 DHRAM_SPL 765.00 2	OPEN LINE FROM BUS 318031 [TAMNAR 765.00] TO BUS 318998 [DHRAM_SPL 765.00] CKT 1	4144.39	4131.78	3500	118.41	Sc-5
10.	177000 VARNASI8 765.00 368025 VIN-POOL 765.00 1	OPEN LINE FROM BUS 177000 [VARNASI8 765.00] TO BUS 368025 [VIN-POOL 765.00] CKT 2	3937.79	3901.18	3500	112.51	Sc-5
11.	177000 VARNASI8 765.00 368025 VIN-POOL 765.00 2	OPEN LINE FROM BUS 177000 [VARNASI8 765.00] TO BUS 368025 [VIN-POOL 765.00] CKT 1	3937.79	3901.18	3500	112.51	Sc-5
12.	318030 RAIPUR_POOL 765.00 318999 KOTRA SPLT 765.00 2	OPEN LINE FROM BUS 318994 [CHAMPA SPL 765.00] TO BUS 318999 [KOTRA SPLT 765.00] CKT 2	3697.3	3734.19	3500	105.64	Sc-5
13.	318994 CHAMPA SPL 765.00 318999 KOTRA SPLT 765.00 2	OPEN LINE FROM BUS 318030 [RAIPUR_POOL 765.00] TO BUS 318999 [KOTRA SPLT 765.00] CKT 2	3689.44	3695.09	3500	105.41	Sc-5
14.	318031 TAMNAR 765.00 318998 DHRAM_SPL 765.00 1	OPEN LINE FROM BUS 318031 [TAMNAR 765.00] TO BUS 318998 [DHRAM_SPL 765.00] CKT 2	3848.7	3814.86	3500	109.96	Sc-6

S.No	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% Loading	Scenario
15.	318031 TAMNAR 765.00 318998 DHRAM_SPL 765.00 2	OPEN LINE FROM BUS 318031 [TAMNAR 765.00] TO BUS 318998 [DHRAM_SPL 765.00] CKT 1	3848.7	3814.86	3500	109.96	Sc-6
16.	318030 RAIPUR_POOL 765.00 318999 KOTRA SPLT 765.00 2	OPEN LINE FROM BUS 318994 [CHAMPA SPL 765.00] TO BUS 318999 [KOTRA SPLT 765.00] CKT 2	3675.09	3707.26	3500	105.00	Sc-6
17.	318994 CHAMPA SPL 765.00 318999 KOTRA SPLT 765.00 2	OPEN LINE FROM BUS 318030 [RAIPUR_POOL 765.00] TO BUS 318999 [KOTRA SPLT 765.00] CKT 2	3671.2	3674.01	3500	104.89	Sc-6
18.	167429 CHIT-NEW 765.00 167502 BEAWAR 765.00 1	OPEN LINE FROM BUS 167429 [CHIT-NEW 765.00] TO BUS 167502 [BEAWAR 765.00] CKT 2	3639.37	3738.59	3500	103.98	Sc-7
19.	167429 CHIT-NEW 765.00 167502 BEAWAR 765.00 2	OPEN LINE FROM BUS 167429 [CHIT-NEW 765.00] TO BUS 167502 [BEAWAR 765.00] CKT 1	3639.37	3738.59	3500	103.98	Sc-7

N-1 Contingency of 400 kV Transmission Lines

S. No	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% Loading	Scenario
1.	424027 STERLITE 400.00 424050 LAPANGA 400.00 1	OPEN LINE FROM BUS 424027 [STERLITE 400.00] TO BUS 424050 [LAPANGA 400.00] CKT 2	2066.96	2066.96	1093	189.11	Sc-1
2.	424027 STERLITE 400.00 424050 LAPANGA 400.00 2	OPEN LINE FROM BUS 424027 [STERLITE 400.00] TO BUS 424050 [LAPANGA 400.00] CKT 1	2066.96	2066.96	1093	189.11	Sc-1
3.	174417 RIHAND-G 400.00 174433 RIHAN-HV 400.00 1	OPEN LINE FROM BUS 174417 [RIHAND-G 400.00] TO BUS 174433 [RIHAN-HV 400.00] CKT 2	1514.56	1514.56	857	176.73	Sc-1
4.	174417 RIHAND-G 400.00 174433 RIHAN-HV 400.00 2	OPEN LINE FROM BUS 174417 [RIHAND-G 400.00] TO BUS 174433 [RIHAN-HV 400.00] CKT 1	1514.56	1514.56	857	176.73	Sc-1
5.	174424 DADR-NCR 400.00 174454 DADR-HVD 400.00 1	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 174454 [DADR-HVD 400.00] CKT 2	1445.01	1445.01	857	168.61	Sc-1
6.	174424 DADR-NCR 400.00 174454 DADR-HVD 400.00 2	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 174454 [DADR-HVD 400.00] CKT 1	1445.01	1445.01	857	168.61	Sc-1
7.	114401 BAGLIHAR4 400.00 114476 NEWWANPO 400.00 1	OPEN LINE FROM BUS 114422 [KISHENPUR 400.00] TO BUS 114476 [NEWWANPO 400.00] CKT 1	1102.38	1102.38	857	128.63	Sc-1
8.	164402 BARMER-4 400.00 164405 BHINMAL 400.00 1	OPEN LINE FROM BUS 164402 [BARMER-4 400.00] TO BUS 164405 [BHINMAL 400.00] CKT 2	1018.21	1038.41	857	118.81	Sc-1
9.	164402 BARMER-4 400.00 164405 BHINMAL 400.00 2	OPEN LINE FROM BUS 164402 [BARMER-4 400.00] TO BUS 164405 [BHINMAL 400.00] CKT 1	1018.21	1038.41	857	118.81	Sc-1
10.	424022 MENDHASAL 400.00 424040 MERAMUNDLI 400.00 1	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 424040 [MERAMUNDLI 400.00] CKT 2	980.3	984.07	850	115.33	Sc-1
11.	424022 MENDHASAL 400.00 424040 MERAMUNDLI 400.00 2	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 424040 [MERAMUNDLI 400.00] CKT 1	980.3	984.07	850	115.33	Sc-1
12.	164405 BHINMAL 400.00 354019 ZERDA 400.00 1	OPEN LINE FROM BUS 164405 [BHINMAL 400.00] TO BUS 164418 [KANKROLI 400.00] CKT 1	962.41	980.98	857	112.30	Sc-1
13.	174438 LUCK4-PG 400.00 174451 LUCK74-P 400.00 1	OPEN LINE FROM BUS 174438 [LUCK4-PG 400.00] TO BUS 174451 [LUCK74-P 400.00] CKT 2	1930.81	1930.81	1714	112.65	Sc-1
14.	174438 LUCK4-PG 400.00 174451 LUCK74-P 400.00 2	OPEN LINE FROM BUS 174438 [LUCK4-PG 400.00] TO BUS 174451 [LUCK74-P 400.00] CKT 1	1930.81	1930.81	1714	112.65	Sc-1
15.	194425 ROORKEE 400.00 194426 RISHIKE4_PT 400.00 1	OPEN LINE FROM BUS 174001 [NEHTAUR 400.00] TO BUS 194426 [RISHIKE4_PT 400.00] CKT 1	947.35	947.4	857	110.54	Sc-1

S. No	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% Loading	Scenario
16.	5 DGM-BYP-NICL400.00 354101 NICOL TORREN400.00 2	OPEN LINE FROM BUS 354014 [PIRANA_P 400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	885.99	926.61	857	103.38	Sc-1
17.	5 DGM-BYP-NICL400.00 354017 RANCHODPURA 400.00 2	OPEN LINE FROM BUS 354014 [PIRANA_P 400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	894.05	924.36	857	104.32	Sc-1
18.	164400 MERTA 400.00 164434 JODH KANKANI400.00 1	OPEN LINE FROM BUS 167773 [JAIPUR 765.00] TO BUS 167799 [JODH KANKANI765.00] CKT 1	885.74	915.25	857	103.35	Sc-1
19.	354014 PIRANA_P 400.00 354101 NICOL TORREN400.00 2	OPEN LINE FROM BUS 5 [DGM-BYP-NICL400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	885.99	912.47	857	103.38	Sc-1
20.	514101 MAHESWRM 400.00 514104 MAHESH-TS 400.00 1	OPEN LINE FROM BUS 514101 [MAHESWRM 400.00] TO BUS 514104 [MAHESH-TS 400.00] CKT 2	2298.95	2292.82	2186	105.17	Sc-1
21.	514101 MAHESWRM 400.00 514104 MAHESH-TS 400.00 2	OPEN LINE FROM BUS 514101 [MAHESWRM 400.00] TO BUS 514104 [MAHESH-TS 400.00] CKT 1	2298.95	2292.82	2186	105.17	Sc-1
22.	214010 MISA-PG 400.00 214030 BALIPARA-PG 400.00 1	OPEN LINE FROM BUS 214010 [MISA-PG 400.00] TO BUS 214030 [BALIPARA-PG 400.00] CKT 2	871.73	888.88	850	102.56	Sc-1
23.	214010 MISA-PG 400.00 214030 BALIPARA-PG 400.00 2	OPEN LINE FROM BUS 214010 [MISA-PG 400.00] TO BUS 214030 [BALIPARA-PG 400.00] CKT 1	871.73	888.88	850	102.56	Sc-1
24.	164110 JAISALMER-2 400.00 164402 BARMER-4 400.00 1	OPEN LINE FROM BUS 164110 [JAISALMER-2 400.00] TO BUS 164402 [BARMER-4 400.00] CKT 2	863.74	877.4	857	100.79	Sc-1
25.	174400 AGRAUP4 400.00 174922 AGRA 400.00 2	OPEN LINE FROM BUS 174414 [AGRANEW 400.00] TO BUS 174922 [AGRA 400.00] CKT 2	865.7	865.7	857	101.02	Sc-1
26.	424027 STERLITE 400.00 424050 LAPANGA 400.00 1	OPEN LINE FROM BUS 424027 [STERLITE 400.00] TO BUS 424050 [LAPANGA 400.00] CKT 2	2262.91	2262.91	1093	207.04	Sc-2
27.	424027 STERLITE 400.00 424050 LAPANGA 400.00 2	OPEN LINE FROM BUS 424027 [STERLITE 400.00] TO BUS 424050 [LAPANGA 400.00] CKT 1	2262.91	2262.91	1093	207.04	Sc-2
28.	174424 DADR-NCR 400.00 174454 DADR-HVD 400.00 1	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 174454 [DADR-HVD 400.00] CKT 2	1541.71	1541.71	857	179.90	Sc-2
29.	174424 DADR-NCR 400.00 174454 DADR-HVD 400.00 2	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 174454 [DADR-HVD 400.00] CKT 1	1541.71	1541.71	857	179.90	Sc-2
30.	174417 RIHAND-G 400.00 174433 RIHAN-HV 400.00 1	OPEN LINE FROM BUS 174417 [RIHAND-G 400.00] TO BUS 174433 [RIHAN-HV 400.00] CKT 2	1514.56	1514.56	857	176.73	Sc-2
31.	174417 RIHAND-G 400.00 174433 RIHAN-HV 400.00 2	OPEN LINE FROM BUS 174417 [RIHAND-G 400.00] TO BUS 174433 [RIHAN-HV 400.00] CKT 1	1514.56	1514.56	857	176.73	Sc-2

S. No	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% Loading	Scenario
32.	174400 AGRAUP4 400.00 174922 AGRA 400.00 2	OPEN LINE FROM BUS 174414 [AGRANEW 400.00] TO BUS 174922 [AGRA 400.00] CKT 2	1398.6	1398.6	857	163.20	Sc-2
33.	424022 MENDHASAL 400.00 424040 MERAMUNDLI 400.00 1	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 424040 [MERAMUNDLI 400.00] CKT 2	1228.77	1310.94	850	144.56	Sc-2
34.	424022 MENDHASAL 400.00 424040 MERAMUNDLI 400.00 2	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 424040 [MERAMUNDLI 400.00] CKT 1	1228.77	1310.94	850	144.56	Sc-2
35.	174000 MEJA 400.00 174474 ALLAHABA 400.00 1	OPEN LINE FROM BUS 174000 [MEJA 400.00] TO BUS 174474 [ALLAHABA 400.00] CKT 2	1085.58	1083.21	857	126.67	Sc-2
36.	174000 MEJA 400.00 174474 ALLAHABA 400.00 2	OPEN LINE FROM BUS 174000 [MEJA 400.00] TO BUS 174474 [ALLAHABA 400.00] CKT 1	1085.58	1083.21	857	126.67	Sc-2
37.	154463 JHATIKALA-PG400.00 154708 JHATIKARASP 400.00 1	OPEN LINE FROM BUS 154708 [JHATIKARASP 400.00] TO BUS 157708 [JHATI-PG 765.00] CKT 1	1081.54	1064.69	857	126.20	Sc-2
38.	504027 KRISH-AP 400.00 504103 NELLORE-AP 400.00 1	OPEN LINE FROM BUS 504027 [KRISH-AP 400.00] TO BUS 504103 [NELLORE-AP 400.00] CKT 2	1170.07	1170.07	948	123.43	Sc-2
39.	504027 KRISH-AP 400.00 504103 NELLORE-AP 400.00 2	OPEN LINE FROM BUS 504027 [KRISH-AP 400.00] TO BUS 504103 [NELLORE-AP 400.00] CKT 1	1170.07	1170.07	948	123.43	Sc-2
40.	174414 AGRANEW 400.00 174922 AGRA 400.00 2	OPEN LINE FROM BUS 174400 [AGRAUP4 400.00] TO BUS 174922 [AGRA 400.00] CKT 2	1003.18	1003.18	857	117.06	Sc-2
41.	5 DGM-BYP-NICL400.00 354101 NICOL TORREN400.00 2	OPEN LINE FROM BUS 354014 [PIRANA_P 400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	942.08	983.86	857	109.93	Sc-2
42.	5 DGM-BYP-NICL400.00 354017 RANCHODPURA 400.00 2	OPEN LINE FROM BUS 354014 [PIRANA_P 400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	951.49	981.57	857	111.03	Sc-2
43.	424018 ANGUL-A 400.00 424030 JINDAL-JITPL400.00 1	OPEN LINE FROM BUS 424018 [ANGUL-A 400.00] TO BUS 424030 [JINDAL-JITPL400.00] CKT 2	1209.53	1209.53	1093	110.66	Sc-2
44.	424018 ANGUL-A 400.00 424030 JINDAL-JITPL400.00 2	OPEN LINE FROM BUS 424018 [ANGUL-A 400.00] TO BUS 424030 [JINDAL-JITPL400.00] CKT 1	1209.53	1209.53	1093	110.66	Sc-2
45.	354014 PIRANA_P 400.00 354101 NICOL TORREN400.00 2	OPEN LINE FROM BUS 5 [DGM-BYP-NICL400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	942.08	948.23	857	109.93	Sc-2
46.	174927 GORAKHPU 400.00 814002 BUTWAL 400.00 1	OPEN LINE FROM BUS 174927 [GORAKHPU 400.00] TO BUS 814002 [BUTWAL 400.00] CKT 2	1853.48	1853.48	1714	108.14	Sc-2
47.	174927 GORAKHPU 400.00 814002 BUTWAL 400.00 2	OPEN LINE FROM BUS 174927 [GORAKHPU 400.00] TO BUS 814002 [BUTWAL 400.00] CKT 1	1853.48	1853.48	1714	108.14	Sc-2

S. No	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% Loading	Scenario
48.	544016 PUGALUR-NEW 400.00 544033 KARUR II 400.00 1	OPEN LINE FROM BUS 544016 [PUGALUR-NEW 400.00] TO BUS 544033 [KARUR II 400.00] CKT 2	2328.82	2328.82	2186	106.53	Sc-2
49.	544016 PUGALUR-NEW 400.00 544033 KARUR II 400.00 2	OPEN LINE FROM BUS 544016 [PUGALUR-NEW 400.00] TO BUS 544033 [KARUR II 400.00] CKT 1	2328.82	2328.82	2186	106.53	Sc-2
50.	424027 STERLITE 400.00 424050 LAPANGA 400.00 1	OPEN LINE FROM BUS 424027 [STERLITE 400.00] TO BUS 424050 [LAPANGA 400.00] CKT 2	2614.15	2637.71	1093	239.17	Sc-3
51.	424027 STERLITE 400.00 424050 LAPANGA 400.00 2	OPEN LINE FROM BUS 424027 [STERLITE 400.00] TO BUS 424050 [LAPANGA 400.00] CKT 1	2614.15	2637.71	1093	239.17	Sc-3
52.	424022 MENDHASAL 400.00 424040 MERAMUNDLI 400.00 1	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 424040 [MERAMUNDLI 400.00] CKT 2	1353.13	1591.8	850	159.19	Sc-3
53.	424022 MENDHASAL 400.00 424040 MERAMUNDLI 400.00 2	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 424040 [MERAMUNDLI 400.00] CKT 1	1353.13	1591.8	850	159.19	Sc-3
54.	174424 DADR-NCR 400.00 174454 DADR-HVD 400.00 1	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 174454 [DADR-HVD 400.00] CKT 2	1542.56	1542.56	857	180.00	Sc-3
55.	174424 DADR-NCR 400.00 174454 DADR-HVD 400.00 2	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 174454 [DADR-HVD 400.00] CKT 1	1542.56	1542.56	857	180.00	Sc-3
56.	174417 RIHAND-G 400.00 174433 RIHAN-HV 400.00 1	OPEN LINE FROM BUS 174417 [RIHAND-G 400.00] TO BUS 174433 [RIHAN-HV 400.00] CKT 2	1514.56	1514.56	857	176.73	Sc-3
57.	174417 RIHAND-G 400.00 174433 RIHAN-HV 400.00 2	OPEN LINE FROM BUS 174417 [RIHAND-G 400.00] TO BUS 174433 [RIHAN-HV 400.00] CKT 1	1514.56	1514.56	857	176.73	Sc-3
58.	174400 AGRAUP4 400.00 174922 AGRA 400.00 2	OPEN LINE FROM BUS 174414 [AGRANEW 400.00] TO BUS 174922 [AGRA 400.00] CKT 2	1450.2	1450.2	857	169.22	Sc-3
59.	154463 JHATIKALA-PG400.00 154708 JHATIKARASP 400.00 1	OPEN LINE FROM BUS 154708 [JHATIKARASP 400.00] TO BUS 157708 [JHATI-PG 765.00] CKT 1	1418.03	1396.91	857	165.46	Sc-3
60.	174000 MEJA 400.00 174474 ALLAHABA 400.00 1	OPEN LINE FROM BUS 174000 [MEJA 400.00] TO BUS 174474 [ALLAHABA 400.00] CKT 2	1063.56	1061.9	857	124.10	Sc-3
61.	174000 MEJA 400.00 174474 ALLAHABA 400.00 2	OPEN LINE FROM BUS 174000 [MEJA 400.00] TO BUS 174474 [ALLAHABA 400.00] CKT 1	1063.56	1061.9	857	124.10	Sc-3
62.	174414 AGRANEW 400.00 174922 AGRA 400.00 2	OPEN LINE FROM BUS 174400 [AGRAUP4 400.00] TO BUS 174922 [AGRA 400.00] CKT 2	1035.54	1035.54	857	120.83	Sc-3
63.	504027 KRISH-AP 400.00 504103 NELLORE-AP 400.00 1	OPEN LINE FROM BUS 504027 [KRISH-AP 400.00] TO BUS 504103 [NELLORE-AP 400.00] CKT 2	1134.73	1134.73	948	119.70	Sc-3

S. No	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% Loading	Scenario
64.	504027 KRISH-AP 400.00 504103 NELLORE-AP 400.00 2	OPEN LINE FROM BUS 504027 [KRISH-AP 400.00] TO BUS 504103 [NELLORE-AP 400.00] CKT 1	1134.73	1134.73	948	119.70	Sc-3
65.	424018 ANGUL-A 400.00 424030 JINDAL-JITPL400.00 1	OPEN LINE FROM BUS 424018 [ANGUL-A 400.00] TO BUS 424030 [JINDAL-JITPL400.00] CKT 2	1211.35	1211.35	1093	110.83	Sc-3
66.	424018 ANGUL-A 400.00 424030 JINDAL-JITPL400.00 2	OPEN LINE FROM BUS 424018 [ANGUL-A 400.00] TO BUS 424030 [JINDAL-JITPL400.00] CKT 1	1211.35	1211.35	1093	110.83	Sc-3
67.	544016 PUGALUR-NEW 400.00 544033 KARUR II 400.00 1	OPEN LINE FROM BUS 544016 [PUGALUR-NEW 400.00] TO BUS 544033 [KARUR II 400.00] CKT 2	2382.43	2382.43	2186	108.99	Sc-3
68.	544016 PUGALUR-NEW 400.00 544033 KARUR II 400.00 2	OPEN LINE FROM BUS 544016 [PUGALUR-NEW 400.00] TO BUS 544033 [KARUR II 400.00] CKT 1	2382.43	2382.43	2186	108.99	Sc-3
69.	154426 BAWANA-G 400.00 154427 BAWANA 400.00 1	OPEN LINE FROM BUS 154426 [BAWANA-G 400.00] TO BUS 154427 [BAWANA 400.00] CKT 2	906.7	904.26	857	105.80	Sc-3
70.	154426 BAWANA-G 400.00 154427 BAWANA 400.00 2	OPEN LINE FROM BUS 154426 [BAWANA-G 400.00] TO BUS 154427 [BAWANA 400.00] CKT 1	906.7	904.26	857	105.80	Sc-3
71.	174439 DADRI_SPLT 400.00 174488 MURADNAG-2 400.00 1	OPEN LINE FROM BUS 154702 [HARSH VIHAR 400.00] TO BUS 174439 [DADRI_SPLT 400.00] CKT 2	910.42	902.67	857	106.23	Sc-3
72.	424027 STERLITE 400.00 424050 LAPANGA 400.00 1	OPEN LINE FROM BUS 424027 [STERLITE 400.00] TO BUS 424050 [LAPANGA 400.00] CKT 2	2013.48	2013.48	1093	184.22	Sc-4
73.	424027 STERLITE 400.00 424050 LAPANGA 400.00 2	OPEN LINE FROM BUS 424027 [STERLITE 400.00] TO BUS 424050 [LAPANGA 400.00] CKT 1	2013.48	2013.48	1093	184.22	Sc-4
74.	174424 DADR-NCR 400.00 174454 DADR-HVD 400.00 1	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 174454 [DADR-HVD 400.00] CKT 2	1539.16	1539.16	857	179.60	Sc-4
75.	174424 DADR-NCR 400.00 174454 DADR-HVD 400.00 2	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 174454 [DADR-HVD 400.00] CKT 1	1539.16	1539.16	857	179.60	Sc-4
76.	174417 RIHAND-G 400.00 174433 RIHAN-HV 400.00 1	OPEN LINE FROM BUS 174417 [RIHAND-G 400.00] TO BUS 174433 [RIHAN-HV 400.00] CKT 2	1514.56	1514.56	857	176.73	Sc-4
77.	174417 RIHAND-G 400.00 174433 RIHAN-HV 400.00 2	OPEN LINE FROM BUS 174417 [RIHAND-G 400.00] TO BUS 174433 [RIHAN-HV 400.00] CKT 1	1514.56	1514.56	857	176.73	Sc-4
78.	5 DGM-BYP-NICL400.00 354101 NICOL TORREN400.00 2	OPEN LINE FROM BUS 354014 [PIRANA_P 400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	1142.27	1231.4	857	133.29	Sc-4
79.	5 DGM-BYP-NICL400.00 354017 RANCHODPURA 400.00 2	OPEN LINE FROM BUS 354014 [PIRANA_P 400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	1158.88	1229.06	857	135.23	Sc-4

S. No	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% Loading	Scenario
80.	114401 BAGLIHAR4 400.00 114476 NEWWANPO 400.00 1	OPEN LINE FROM BUS 114422 [KISHENPUR 400.00] TO BUS 114476 [NEWWANPO 400.00] CKT 1	1182.46	1182.46	857	137.98	Sc-4
81.	354014 PIRANA_P 400.00 354101 NICOL TORREN400.00 2	OPEN LINE FROM BUS 5 [DGM-BYP-NICL400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	1142.27	1181.24	857	133.29	Sc-4
82.	164405 BHINMAL 400.00 354019 ZERDA 400.00 1	OPEN LINE FROM BUS 164405 [BHINMAL 400.00] TO BUS 164418 [KANKROLI 400.00] CKT 1	1154.36	1151.35	857	134.70	Sc-4
83.	164402 BARMER-4 400.00 164405 BHINMAL 400.00 1	OPEN LINE FROM BUS 164402 [BARMER-4 400.00] TO BUS 164405 [BHINMAL 400.00] CKT 2	1140.36	1147.04	857	133.06	Sc-4
84.	164402 BARMER-4 400.00 164405 BHINMAL 400.00 2	OPEN LINE FROM BUS 164402 [BARMER-4 400.00] TO BUS 164405 [BHINMAL 400.00] CKT 1	1140.36	1147.04	857	133.06	Sc-4
85.	424022 MENDHASAL 400.00 424040 MERAMUNDLI 400.00 1	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 424040 [MERAMUNDLI 400.00] CKT 2	977.92	981.56	850	115.05	Sc-4
86.	424022 MENDHASAL 400.00 424040 MERAMUNDLI 400.00 2	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 424040 [MERAMUNDLI 400.00] CKT 1	977.92	981.56	850	115.05	Sc-4
87.	374003 LONIKAND I 400.00 374058 LONIKANDII 400.00 1	OPEN LINE FROM BUS 374003 [LONIKAND I 400.00] TO BUS 374058 [LONIKANDII 400.00] CKT 2	962.46	959.75	857	112.31	Sc-4
88.	374003 LONIKAND I 400.00 374058 LONIKANDII 400.00 2	OPEN LINE FROM BUS 374003 [LONIKAND I 400.00] TO BUS 374058 [LONIKANDII 400.00] CKT 1	962.39	959.67	857	112.30	Sc-4
89.	374002 KHARGAR 400.00 374217 NAVI-MUM 400.00 1	OPEN LINE FROM BUS 374002 [KHARGAR 400.00] TO BUS 374051 [PADGHEGIS 400.00] CKT 1	938.2	951.85	857	109.47	Sc-4
90.	194425 ROORKEE 400.00 194426 RISHIKE4_PT 400.00 1	OPEN LINE FROM BUS 174001 [NEHTAUR 400.00] TO BUS 194426 [RISHIKE4_PT 400.00] CKT 1	937.4	936.48	857	109.38	Sc-4
91.	164110 JAISALMER-2 400.00 164402 BARMER-4 400.00 1	OPEN LINE FROM BUS 164110 [JAISALMER-2 400.00] TO BUS 164402 [BARMER-4 400.00] CKT 2	903.72	910.74	857	105.45	Sc-4
92.	164400 MERTA 400.00 164434 JODH KANKANI400.00 1	OPEN LINE FROM BUS 167773 [JAIPUR 765.00] TO BUS 167799 [JODH KANKANI765.00] CKT 1	894.62	908.93	857	104.39	Sc-4
93.	174400 AGRAUP4 400.00 174922 AGRA 400.00 2	OPEN LINE FROM BUS 174414 [AGRANEW 400.00] TO BUS 174922 [AGRA 400.00] CKT 2	896.72	896.72	857	104.63	Sc-4
94.	144469 BHIWANI-PG 400.00 144480 JINDPG 400.00 1	OPEN LINE FROM BUS 144469 [BHIWANI-PG 400.00] TO BUS 144480 [JINDPG 400.00] CKT 2	894.69	893.76	857	104.40	Sc-4
95.	144469 BHIWANI-PG 400.00 144480 JINDPG 400.00 2	OPEN LINE FROM BUS 144469 [BHIWANI-PG 400.00] TO BUS 144480 [JINDPG 400.00] CKT 1	894.69	893.76	857	104.40	Sc-4

S. No	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% Loading	Scenario
96.	164110 JAISALMER-2 400.00 164402 BARMER-4 400.00 2	OPEN LINE FROM BUS 164110 [JAISALMER-2 400.00] TO BUS 164402 [BARMER-4 400.00] CKT 1	886.4	893.01	857	103.43	Sc-4
97.	354050 PRANTIJ 400.00 354137 SANKHARI 400.00 1	OPEN LINE FROM BUS 354050 [PRANTIJ 400.00] TO BUS 354137 [SANKHARI 400.00] CKT 2	863.67	875.66	857	100.78	Sc-4
98.	354050 PRANTIJ 400.00 354137 SANKHARI 400.00 2	OPEN LINE FROM BUS 354050 [PRANTIJ 400.00] TO BUS 354137 [SANKHARI 400.00] CKT 1	863.67	875.66	857	100.78	Sc-4
99.	504007 CUDP 400.00 504024 CHITOR 400.00 1	OPEN LINE FROM BUS 544084 [TIRUVLM SE-B400.00] TO BUS 544087 [TIRUVLM SE-A400.00] CKT 1	861.27	846.73	852	101.09	Sc-4
100.	424027 STERLITE 400.00 424050 LAPANGA 400.00 1	OPEN LINE FROM BUS 424027 [STERLITE 400.00] TO BUS 424050 [LAPANGA 400.00] CKT 2	2397.29	2412.13	1093	219.33	Sc-5
101.	424027 STERLITE 400.00 424050 LAPANGA 400.00 2	OPEN LINE FROM BUS 424027 [STERLITE 400.00] TO BUS 424050 [LAPANGA 400.00] CKT 1	2397.29	2412.13	1093	219.33	Sc-5
102.	174417 RIHAND-G 400.00 174433 RIHAN-HV 400.00 1	OPEN LINE FROM BUS 174417 [RIHAND-G 400.00] TO BUS 174433 [RIHAN-HV 400.00] CKT 2	1514.56	1514.56	857	176.73	Sc-5
103.	174417 RIHAND-G 400.00 174433 RIHAN-HV 400.00 2	OPEN LINE FROM BUS 174417 [RIHAND-G 400.00] TO BUS 174433 [RIHAN-HV 400.00] CKT 1	1514.56	1514.56	857	176.73	Sc-5
104.	174424 DADR-NCR 400.00 174454 DADR-HVD 400.00 1	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 174454 [DADR-HVD 400.00] CKT 2	1452.05	1452.05	857	169.43	Sc-5
105.	174424 DADR-NCR 400.00 174454 DADR-HVD 400.00 2	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 174454 [DADR-HVD 400.00] CKT 1	1452.05	1452.05	857	169.43	Sc-5
106.	424022 MENDHASAL 400.00 424040 MERAMUNDLI 400.00 1	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 424040 [MERAMUNDLI 400.00] CKT 2	1254.97	1370.32	850	147.64	Sc-5
107.	424022 MENDHASAL 400.00 424040 MERAMUNDLI 400.00 2	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 424040 [MERAMUNDLI 400.00] CKT 1	1254.97	1370.32	850	147.64	Sc-5
108.	174400 AGRAUP4 400.00 174922 AGRA 400.00 2	OPEN LINE FROM BUS 174414 [AGRANEW 400.00] TO BUS 174922 [AGRA 400.00] CKT 2	1299.68	1299.68	857	151.65	Sc-5
109.	5 DGM-BYP-NICL400.00 354101 NICOL TORREN400.00 2	OPEN LINE FROM BUS 354014 [PIRANA_P 400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	1181.92	1280.35	857	137.91	Sc-5
110.	5 DGM-BYP-NICL400.00 354017 RANCHODPURA 400.00 2	OPEN LINE FROM BUS 354014 [PIRANA_P 400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	1200.18	1278	857	140.04	Sc-5
111.	354014 PIRANA_P 400.00 354101 NICOL TORREN400.00 2	OPEN LINE FROM BUS 5 [DGM-BYP-NICL400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	1181.92	1208.91	857	137.91	Sc-5

S. No	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% Loading	Scenario
112.	504027 KRISH-AP 400.00 504103 NELLORE-AP 400.00 1	OPEN LINE FROM BUS 504027 [KRISH-AP 400.00] TO BUS 504103 [NELLORE-AP 400.00] CKT 2	1118.84	1131.81	948	118.02	Sc-5
113.	504027 KRISH-AP 400.00 504103 NELLORE-AP 400.00 2	OPEN LINE FROM BUS 504027 [KRISH-AP 400.00] TO BUS 504103 [NELLORE-AP 400.00] CKT 1	1118.84	1131.81	948	118.02	Sc-5
114.	314019 BALCO-CPP 400.00 314032 DHARAMJAIGAR400.00 1	OPEN LINE FROM BUS 314019 [BALCO-CPP 400.00] TO BUS 314032 [DHARAMJAIGAR400.00] CKT 2	1020	1020	857	119.02	Sc-5
115.	314019 BALCO-CPP 400.00 314032 DHARAMJAIGAR400.00 2	OPEN LINE FROM BUS 314019 [BALCO-CPP 400.00] TO BUS 314032 [DHARAMJAIGAR400.00] CKT 1	1020	1020	857	119.02	Sc-5
116.	174000 MEJA 400.00 174474 ALLAHABA 400.00 1	OPEN LINE FROM BUS 174000 [MEJA 400.00] TO BUS 174474 [ALLAHABA 400.00] CKT 2	1018.81	1018.81	857	118.88	Sc-5
117.	174000 MEJA 400.00 174474 ALLAHABA 400.00 2	OPEN LINE FROM BUS 174000 [MEJA 400.00] TO BUS 174474 [ALLAHABA 400.00] CKT 1	1018.81	1018.81	857	118.88	Sc-5
118.	544016 PUGALUR-NEW 400.00 544033 KARUR II 400.00 1	OPEN LINE FROM BUS 544016 [PUGALUR-NEW 400.00] TO BUS 544033 [KARUR II 400.00] CKT 2	2491.28	2491.28	2186	113.97	Sc-5
119.	544016 PUGALUR-NEW 400.00 544033 KARUR II 400.00 2	OPEN LINE FROM BUS 544016 [PUGALUR-NEW 400.00] TO BUS 544033 [KARUR II 400.00] CKT 1	2491.28	2491.28	2186	113.97	Sc-5
120.	354002 GANCS4 400.00 354022 HAZIRA4 400.00 1	OPEN LINE FROM BUS 354002 [GANCS4 400.00] TO BUS 354022 [HAZIRA4 400.00] CKT 2	880.02	947.95	857	102.69	Sc-5
121.	354002 GANCS4 400.00 354022 HAZIRA4 400.00 2	OPEN LINE FROM BUS 354002 [GANCS4 400.00] TO BUS 354022 [HAZIRA4 400.00] CKT 1	880.02	947.95	857	102.69	Sc-5
122.	174927 GORAKHPU 400.00 814002 BUTWAL 400.00 1	OPEN LINE FROM BUS 174927 [GORAKHPU 400.00] TO BUS 814002 [BUTWAL 400.00] CKT 2	1857.01	1857.01	1714	108.34	Sc-5
123.	174927 GORAKHPU 400.00 814002 BUTWAL 400.00 2	OPEN LINE FROM BUS 174927 [GORAKHPU 400.00] TO BUS 814002 [BUTWAL 400.00] CKT 1	1857.01	1857.01	1714	108.34	Sc-5
124.	114401 BAGLIHAR4 400.00 114476 NEWWANPO 400.00 1	OPEN LINE FROM BUS 114422 [KISHENPUR 400.00] TO BUS 114476 [NEWWANPO 400.00] CKT 1	919.16	919.16	857	107.25	Sc-5
125.	174414 AGRANEW 400.00 174922 AGRA 400.00 2	OPEN LINE FROM BUS 174400 [AGRAUP4 400.00] TO BUS 174922 [AGRA 400.00] CKT 2	913.79	913.79	857	106.63	Sc-5
126.	154463 JHATIKALA-PG400.00 154708 JHATIKARASP 400.00 1	OPEN LINE FROM BUS 154708 [JHATIKARASP 400.00] TO BUS 157708 [JHATI-PG 765.00] CKT 1	889.21	884.78	857	103.76	Sc-5
127.	424018 ANGUL-A 400.00 424030 JINDAL-JITPL400.00 1	OPEN LINE FROM BUS 424018 [ANGUL-A 400.00] TO BUS 424030 [JINDAL-JITPL400.00] CKT 2	1125.87	1125.87	1093	103.01	Sc-5

S. No	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% Loading	Scenario
128.	424018 ANGUL-A 400.00 424030 JINDAL-JITPL400.00 2	OPEN LINE FROM BUS 424018 [ANGUL-A 400.00] TO BUS 424030 [JINDAL-JITPL400.00] CKT 1	1125.87	1125.87	1093	103.01	Sc-5
129.	314008 SIPAT4 400.00 474049 RNC-SIPT FSC400.00 1	OPEN LINE FROM BUS 474046 [RANCHI 400.00] TO BUS 474048 [RNC-SIPT FSC400.00] CKT 2	862.68	850.47	850	101.49	Sc-5
130.	314008 SIPAT4 400.00 474048 RNC-SIPT FSC400.00 2	OPEN LINE FROM BUS 474046 [RANCHI 400.00] TO BUS 474049 [RNC-SIPT FSC400.00] CKT 1	862.67	850.46	850	101.49	Sc-5
131.	474046 RANCHI 400.00 474049 RNC-SIPT FSC400.00 1	OPEN LINE FROM BUS 474046 [RANCHI 400.00] TO BUS 474048 [RNC-SIPT FSC400.00] CKT 2	860	801.77	850	101.18	Sc-5
132.	474046 RANCHI 400.00 474048 RNC-SIPT FSC400.00 2	OPEN LINE FROM BUS 474046 [RANCHI 400.00] TO BUS 474049 [RNC-SIPT FSC400.00] CKT 1	859.99	801.77	850	101.18	Sc-5
133.	174424 DADR-NCR 400.00 174454 DADR-HVD 400.00 1	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 174454 [DADR-HVD 400.00] CKT 2	1520.31	1520.31	857	177.40	Sc-6
134.	174424 DADR-NCR 400.00 174454 DADR-HVD 400.00 2	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 174454 [DADR-HVD 400.00] CKT 1	1520.31	1520.31	857	177.40	Sc-6
135.	174417 RIHAND-G 400.00 174433 RIHAN-HV 400.00 1	OPEN LINE FROM BUS 174417 [RIHAND-G 400.00] TO BUS 174433 [RIHAN-HV 400.00] CKT 2	1514.56	1514.56	857	176.73	Sc-6
136.	174417 RIHAND-G 400.00 174433 RIHAN-HV 400.00 2	OPEN LINE FROM BUS 174417 [RIHAND-G 400.00] TO BUS 174433 [RIHAN-HV 400.00] CKT 1	1514.56	1514.56	857	176.73	Sc-6
137.	424027 STERLITE 400.00 424050 LAPANGA 400.00 1	OPEN LINE FROM BUS 424027 [STERLITE 400.00] TO BUS 424050 [LAPANGA 400.00] CKT 2	1885.72	1885.72	1093	172.53	Sc-6
138.	424027 STERLITE 400.00 424050 LAPANGA 400.00 2	OPEN LINE FROM BUS 424027 [STERLITE 400.00] TO BUS 424050 [LAPANGA 400.00] CKT 1	1885.72	1885.72	1093	172.53	Sc-6
139.	154463 JHATIKALA-PG400.00 154708 JHATIKARASP 400.00 1	OPEN LINE FROM BUS 154708 [JHATIKARASP 400.00] TO BUS 157708 [JHATI-PG 765.00] CKT 1	1271.86	1256.66	857	148.41	Sc-6
140.	5 DGM-BYP-NICL400.00 354101 NICOL TORREN400.00 2	OPEN LINE FROM BUS 354014 [PIRANA_P 400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	1061.73	1122.57	857	123.89	Sc-6
141.	5 DGM-BYP-NICL400.00 354017 RANCHODPURA 400.00 2	OPEN LINE FROM BUS 354014 [PIRANA_P 400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	1074.91	1120.24	857	125.43	Sc-6
142.	424022 MENDHASAL 400.00 424040 MERAMUNDLI 400.00 1	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 424040 [MERAMUNDLI 400.00] CKT 2	1083.34	1085.21	850	127.45	Sc-6
143.	424022 MENDHASAL 400.00 424040 MERAMUNDLI 400.00 2	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 424040 [MERAMUNDLI 400.00] CKT 1	1083.34	1085.21	850	127.45	Sc-6

S. No	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% Loading	Scenario
144.	354014 PIRANA_P 400.00 354101 NICOL TORREN400.00 2	OPEN LINE FROM BUS 5 [DGM-BYP-NICL400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	1061.73	1071.12	857	123.89	Sc-6
145.	174400 AGRAUP4 400.00 174922 AGRA 400.00 2	OPEN LINE FROM BUS 174414 [AGRANEW 400.00] TO BUS 174922 [AGRA 400.00] CKT 2	1049.23	1049.23	857	122.43	Sc-6
146.	314019 BALCO-CPP 400.00 314032 DHARAMJAIGAR400.00 1	OPEN LINE FROM BUS 314019 [BALCO-CPP 400.00] TO BUS 314032 [DHARAMJAIGAR400.00] CKT 2	1015.22	1015.22	857	118.46	Sc-6
147.	314019 BALCO-CPP 400.00 314032 DHARAMJAIGAR400.00 2	OPEN LINE FROM BUS 314019 [BALCO-CPP 400.00] TO BUS 314032 [DHARAMJAIGAR400.00] CKT 1	1015.22	1015.22	857	118.46	Sc-6
148.	424018 ANGUL-A 400.00 424030 JINDAL-JITPL400.00 1	OPEN LINE FROM BUS 424018 [ANGUL-A 400.00] TO BUS 424030 [JINDAL-JITPL400.00] CKT 2	1201.02	1201.02	1093	109.88	Sc-6
149.	424018 ANGUL-A 400.00 424030 JINDAL-JITPL400.00 2	OPEN LINE FROM BUS 424018 [ANGUL-A 400.00] TO BUS 424030 [JINDAL-JITPL400.00] CKT 1	1201.02	1201.02	1093	109.88	Sc-6
150.	544016 PUGALUR-NEW 400.00 544033 KARUR II 400.00 1	OPEN LINE FROM BUS 544016 [PUGALUR-NEW 400.00] TO BUS 544033 [KARUR II 400.00] CKT 2	2388.26	2388.26	2186	109.25	Sc-6
151.	544016 PUGALUR-NEW 400.00 544033 KARUR II 400.00 2	OPEN LINE FROM BUS 544016 [PUGALUR-NEW 400.00] TO BUS 544033 [KARUR II 400.00] CKT 1	2388.26	2388.26	2186	109.25	Sc-6
152.	154426 BAWANA-G 400.00 154427 BAWANA 400.00 1	OPEN LINE FROM BUS 154426 [BAWANA-G 400.00] TO BUS 154427 [BAWANA 400.00] CKT 2	919.55	917.5	857	107.30	Sc-6
153.	154426 BAWANA-G 400.00 154427 BAWANA 400.00 2	OPEN LINE FROM BUS 154426 [BAWANA-G 400.00] TO BUS 154427 [BAWANA 400.00] CKT 1	919.55	917.5	857	107.30	Sc-6
154.	174000 MEJA 400.00 174474 ALLAHABA 400.00 1	OPEN LINE FROM BUS 174000 [MEJA 400.00] TO BUS 174474 [ALLAHABA 400.00] CKT 2	906.87	904.85	857	105.82	Sc-6
155.	174000 MEJA 400.00 174474 ALLAHABA 400.00 2	OPEN LINE FROM BUS 174000 [MEJA 400.00] TO BUS 174474 [ALLAHABA 400.00] CKT 1	906.87	904.85	857	105.82	Sc-6
156.	504027 KRISH-AP 400.00 504103 NELLORE-AP 400.00 1	OPEN LINE FROM BUS 504027 [KRISH-AP 400.00] TO BUS 504103 [NELLORE-AP 400.00] CKT 2	983.78	983.78	948	103.77	Sc-6
157.	504027 KRISH-AP 400.00 504103 NELLORE-AP 400.00 2	OPEN LINE FROM BUS 504027 [KRISH-AP 400.00] TO BUS 504103 [NELLORE-AP 400.00] CKT 1	983.78	983.78	948	103.77	Sc-6
158.	134406 RAJPURA_TH4 400.00 134407 RAJPURA4 400.00 1	OPEN LINE FROM BUS 134406 [RAJPURA_TH4 400.00] TO BUS 134407 [RAJPURA4 400.00] CKT 2	895.96	868.4	857	104.55	Sc-6
159.	134406 RAJPURA_TH4 400.00 134407 RAJPURA4 400.00 2	OPEN LINE FROM BUS 134406 [RAJPURA_TH4 400.00] TO BUS 134407 [RAJPURA4 400.00] CKT 1	895.96	868.4	857	104.55	Sc-6

S. No	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% Loading	Scenario
160.	174424 DADR-NCR 400.00 174454 DADR-HVD 400.00 1	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 174454 [DADR-HVD 400.00] CKT 2	1849.16	1849.16	857	215.77	Sc-7
161.	174424 DADR-NCR 400.00 174454 DADR-HVD 400.00 2	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 174454 [DADR-HVD 400.00] CKT 1	1849.16	1849.16	857	215.77	Sc-7
162.	164405 BHINMAL 400.00 354019 ZERDA 400.00 1	OPEN LINE FROM BUS 164418 [KANKROLI 400.00] TO BUS 354019 [ZERDA 400.00] CKT 1	1686.9	1706.29	857	196.84	Sc-7
163.	174417 RIHAND-G 400.00 174433 RIHAN-HV 400.00 1	OPEN LINE FROM BUS 174417 [RIHAND-G 400.00] TO BUS 174433 [RIHAN-HV 400.00] CKT 2	1514.56	1514.56	857	176.73	Sc-7
164.	174417 RIHAND-G 400.00 174433 RIHAN-HV 400.00 2	OPEN LINE FROM BUS 174417 [RIHAND-G 400.00] TO BUS 174433 [RIHAN-HV 400.00] CKT 1	1514.56	1514.56	857	176.73	Sc-7
165.	374003 LONIKAND I 400.00 374058 LONIKANDII 400.00 1	OPEN LINE FROM BUS 374003 [LONIKAND I 400.00] TO BUS 374058 [LONIKANDII 400.00] CKT 2	1437.31	1463.12	857	167.71	Sc-7
166.	374003 LONIKAND I 400.00 374058 LONIKANDII 400.00 2	OPEN LINE FROM BUS 374003 [LONIKAND I 400.00] TO BUS 374058 [LONIKANDII 400.00] CKT 1	1437.2	1463	857	167.70	Sc-7
167.	164402 BARMER-4 400.00 164405 BHINMAL 400.00 1	OPEN LINE FROM BUS 164402 [BARMER-4 400.00] TO BUS 164405 [BHINMAL 400.00] CKT 2	1343.43	1424.27	857	156.76	Sc-7
168.	164402 BARMER-4 400.00 164405 BHINMAL 400.00 2	OPEN LINE FROM BUS 164402 [BARMER-4 400.00] TO BUS 164405 [BHINMAL 400.00] CKT 1	1343.43	1424.27	857	156.76	Sc-7
169.	114401 BAGLIHAR4 400.00 114476 NEWWANPO 400.00 1	OPEN LINE FROM BUS 114422 [KISHENPUR 400.00] TO BUS 114476 [NEWWANPO 400.00] CKT 1	1129.44	1129.44	857	131.79	Sc-7
170.	5 DGM-BYP-NICL400.00 354101 NICOL TORREN400.00 2	OPEN LINE FROM BUS 354014 [PIRANA_P 400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	1050.25	1123.02	857	122.55	Sc-7
171.	5 DGM-BYP-NICL400.00 354017 RANCHODPURA 400.00 2	OPEN LINE FROM BUS 354014 [PIRANA_P 400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	1063.5	1120.71	857	124.10	Sc-7
172.	364005 NAGDA-4 400.00 364039 MANDSAUR-4 400.00 1	OPEN LINE FROM BUS 364005 [NAGDA-4 400.00] TO BUS 364039 [MANDSAUR-4 400.00] CKT 2	1091.15	1119.32	857	127.32	Sc-7
173.	364005 NAGDA-4 400.00 364039 MANDSAUR-4 400.00 2	OPEN LINE FROM BUS 364005 [NAGDA-4 400.00] TO BUS 364039 [MANDSAUR-4 400.00] CKT 1	1091.15	1119.32	857	127.32	Sc-7
174.	164419 RAPS_C4 400.00 364021 SHUJALPR-4 400.00 1	OPEN LINE FROM BUS 164419 [RAPS_C4 400.00] TO BUS 364021 [SHUJALPR-4 400.00] CKT 2	1109.68	1109.68	857	129.48	Sc-7
175.	164419 RAPS_C4 400.00 364021 SHUJALPR-4 400.00 2	OPEN LINE FROM BUS 164419 [RAPS_C4 400.00] TO BUS 364021 [SHUJALPR-4 400.00] CKT 1	1109.68	1109.68	857	129.48	Sc-7

S. No	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% Loading	Scenario
176.	374002 KHARGAR 400.00 374217 NAVI-MUM 400.00 1	OPEN LINE FROM BUS 374002 [KHARGAR 400.00] TO BUS 374051 [PADGHEGIS 400.00] CKT 1	1053.19	1099.49	857	122.89	Sc-7
177.	354014 PIRANA_P 400.00 354101 NICOL TORREN400.00 2	OPEN LINE FROM BUS 5 [DGM-BYP-NICL400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	1050.25	1085.34	857	122.55	Sc-7
178.	164110 JAISALMER-2 400.00 164402 BARMER-4 400.00 1	OPEN LINE FROM BUS 164110 [JAISALMER-2 400.00] TO BUS 164402 [BARMER-4 400.00] CKT 2	1075.72	1081.1	857	125.52	Sc-7
179.	164110 JAISALMER-2 400.00 164402 BARMER-4 400.00 2	OPEN LINE FROM BUS 164110 [JAISALMER-2 400.00] TO BUS 164402 [BARMER-4 400.00] CKT 1	1054.91	1059.73	857	123.09	Sc-7
180.	424027 STERLITE 400.00 424050 LAPANGA 400.00 1	OPEN LINE FROM BUS 424027 [STERLITE 400.00] TO BUS 424050 [LAPANGA 400.00] CKT 2	1320.21	1320.21	1093	120.79	Sc-7
181.	424027 STERLITE 400.00 424050 LAPANGA 400.00 2	OPEN LINE FROM BUS 424027 [STERLITE 400.00] TO BUS 424050 [LAPANGA 400.00] CKT 1	1320.21	1320.21	1093	120.79	Sc-7
182.	374002 KHARGAR 400.00 374051 PADGHEGIS 400.00 1	OPEN LINE FROM BUS 374051 [PADGHEGIS 400.00] TO BUS 374217 [NAVI-MUM 400.00] CKT 1	1893.73	1973.58	1714	110.49	Sc-7
183.	374051 PADGHEGIS 400.00 374217 NAVI-MUM 400.00 1	OPEN LINE FROM BUS 374002 [KHARGAR 400.00] TO BUS 374051 [PADGHEGIS 400.00] CKT 1	1857.74	1935.75	1714	108.39	Sc-7
184.	374017 TAPS4 400.00 374070 VELGAON4 400.00 2	OPEN LINE FROM BUS 374017 [TAPS4 400.00] TO BUS 374070 [VELGAON4 400.00] CKT 1	945.79	967.8	857	110.36	Sc-7
185.	174000 MEJA 400.00 174474 ALLAHABA 400.00 1	OPEN LINE FROM BUS 174000 [MEJA 400.00] TO BUS 174474 [ALLAHABA 400.00] CKT 2	971.53	966.6	857	113.36	Sc-7
186.	174000 MEJA 400.00 174474 ALLAHABA 400.00 2	OPEN LINE FROM BUS 174000 [MEJA 400.00] TO BUS 174474 [ALLAHABA 400.00] CKT 1	971.53	966.6	857	113.36	Sc-7
187.	374045 PUNE-PG-GIS 400.00 374058 LONIKANDII 400.00 1	OPEN LINE FROM BUS 374045 [PUNE-PG-GIS 400.00] TO BUS 374058 [LONIKANDII 400.00] CKT 2	1277.12	1305.7	1158	110.29	Sc-7
188.	374045 PUNE-PG-GIS 400.00 374058 LONIKANDII 400.00 2	OPEN LINE FROM BUS 374045 [PUNE-PG-GIS 400.00] TO BUS 374058 [LONIKANDII 400.00] CKT 1	1277.12	1305.7	1158	110.29	Sc-7
189.	164418 KANKROLI 400.00 354019 ZERDA 400.00 1	OPEN LINE FROM BUS 164405 [BHINMAL 400.00] TO BUS 354019 [ZERDA 400.00] CKT 1	964.69	964.69	857	112.57	Sc-7
190.	164418 KANKROLI 400.00 164433 JODH SURPURA400.00 1	OPEN LINE FROM BUS 167773 [JAIPUR 765.00] TO BUS 167799 [JODH KANKANI765.00] CKT 1	954.18	958.04	857	111.34	Sc-7
191.	354002 GANCS4 400.00 354003 DEHGM4 400.00 1	OPEN LINE FROM BUS 354002 [GANCS4 400.00] TO BUS 354003 [DEHGM4 400.00] CKT 2	895.57	910.22	857	104.50	Sc-7

S. No	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% Loading	Scenario
192.	354002 GANCS4 400.00 354003 DEHGM4 400.00 2	OPEN LINE FROM BUS 354002 [GANCS4 400.00] TO BUS 354003 [DEHGM4 400.00] CKT 1	895.57	910.22	857	104.50	Sc-7
193.	364029 CHEGAON 400.00 364030 MALWA 400.00 1	OPEN LINE FROM BUS 364029 [CHEGAON 400.00] TO BUS 364030 [MALWA 400.00] CKT 2	894.13	894.13	857	104.33	Sc-7
194.	364029 CHEGAON 400.00 364030 MALWA 400.00 2	OPEN LINE FROM BUS 364029 [CHEGAON 400.00] TO BUS 364030 [MALWA 400.00] CKT 1	894.13	894.13	857	104.33	Sc-7
195.	504027 KRISH-AP 400.00 504103 NELLORE-AP 400.00 1	OPEN LINE FROM BUS 504027 [KRISH-AP 400.00] TO BUS 504103 [NELLORE-AP 400.00] CKT 2	977.25	977.25	948	103.09	Sc-7
196.	504027 KRISH-AP 400.00 504103 NELLORE-AP 400.00 2	OPEN LINE FROM BUS 504027 [KRISH-AP 400.00] TO BUS 504103 [NELLORE-AP 400.00] CKT 1	977.25	977.25	948	103.09	Sc-7
197.	174424 DADR-NCR 400.00 174454 DADR-HVD 400.00 1	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 174454 [DADR-HVD 400.00] CKT 2	1819.36	1819.36	857	212.29	Sc-8
198.	174424 DADR-NCR 400.00 174454 DADR-HVD 400.00 2	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 174454 [DADR-HVD 400.00] CKT 1	1819.36	1819.36	857	212.29	Sc-8
199.	174417 RIHAND-G 400.00 174433 RIHAN-HV 400.00 1	OPEN LINE FROM BUS 174417 [RIHAND-G 400.00] TO BUS 174433 [RIHAN-HV 400.00] CKT 2	1514.56	1514.56	857	176.73	Sc-8
200.	174417 RIHAND-G 400.00 174433 RIHAN-HV 400.00 2	OPEN LINE FROM BUS 174417 [RIHAND-G 400.00] TO BUS 174433 [RIHAN-HV 400.00] CKT 1	1514.56	1514.56	857	176.73	Sc-8
201.	414010 KAHALGAON-B 400.00 444019 FARAKKA 400.00 1	OPEN LINE FROM BUS 414010 [KAHALGAON-B 400.00] TO BUS 444019 [FARAKKA 400.00] CKT 2	1129.52	1126.22	852	132.57	Sc-8
202.	414010 KAHALGAON-B 400.00 444019 FARAKKA 400.00 2	OPEN LINE FROM BUS 414010 [KAHALGAON-B 400.00] TO BUS 444019 [FARAKKA 400.00] CKT 1	1129.52	1126.22	852	132.57	Sc-8
203.	504027 KRISH-AP 400.00 504103 NELLORE-AP 400.00 1	OPEN LINE FROM BUS 504027 [KRISH-AP 400.00] TO BUS 504103 [NELLORE-AP 400.00] CKT 2	1230.35	1230.35	948	129.78	Sc-8
204.	504027 KRISH-AP 400.00 504103 NELLORE-AP 400.00 2	OPEN LINE FROM BUS 504027 [KRISH-AP 400.00] TO BUS 504103 [NELLORE-AP 400.00] CKT 1	1230.35	1230.35	948	129.78	Sc-8
205.	424027 STERLITE 400.00 424050 LAPANGA 400.00 1	OPEN LINE FROM BUS 424027 [STERLITE 400.00] TO BUS 424050 [LAPANGA 400.00] CKT 2	1413.14	1413.14	1093	129.29	Sc-8
206.	424027 STERLITE 400.00 424050 LAPANGA 400.00 2	OPEN LINE FROM BUS 424027 [STERLITE 400.00] TO BUS 424050 [LAPANGA 400.00] CKT 1	1413.14	1413.14	1093	129.29	Sc-8
207.	174000 MEJA 400.00 174474 ALLAHABA 400.00 1	OPEN LINE FROM BUS 174000 [MEJA 400.00] TO BUS 174474 [ALLAHABA 400.00] CKT 2	1038.75	1035.93	857	121.21	Sc-8

S. No	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% Loading	Scenario
208.	174000 MEJA 400.00 174474 ALLAHABA 400.00 2	OPEN LINE FROM BUS 174000 [MEJA 400.00] TO BUS 174474 [ALLAHABA 400.00] CKT 1	1038.75	1035.93	857	121.21	Sc-8
209.	314019 BALCO-CPP 400.00 314032 DHARAMJAIGAR400.00 1	OPEN LINE FROM BUS 314019 [BALCO-CPP 400.00] TO BUS 314032 [DHARAMJAIGAR400.00] CKT 2	1021.02	1021.02	857	119.14	Sc-8
210.	314019 BALCO-CPP 400.00 314032 DHARAMJAIGAR400.00 2	OPEN LINE FROM BUS 314019 [BALCO-CPP 400.00] TO BUS 314032 [DHARAMJAIGAR400.00] CKT 1	1021.02	1021.02	857	119.14	Sc-8
211.	5 DGM-BYP-NICL400.00 354101 NICOL TORREN400.00 2	OPEN LINE FROM BUS 354014 [PIRANA_P 400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	943.65	969.47	857	110.11	Sc-8
212.	5 DGM-BYP-NICL400.00 354017 RANCHODPURA 400.00 2	OPEN LINE FROM BUS 354014 [PIRANA_P 400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	952.62	967.16	857	111.16	Sc-8
213.	354014 PIRANA_P 400.00 354101 NICOL TORREN400.00 2	OPEN LINE FROM BUS 5 [DGM-BYP-NICL400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	943.65	937.71	857	110.11	Sc-8
214.	154426 BAWANA-G 400.00 154427 BAWANA 400.00 1	OPEN LINE FROM BUS 154426 [BAWANA-G 400.00] TO BUS 154427 [BAWANA 400.00] CKT 2	937.92	922.86	857	109.44	Sc-8
215.	154426 BAWANA-G 400.00 154427 BAWANA 400.00 2	OPEN LINE FROM BUS 154426 [BAWANA-G 400.00] TO BUS 154427 [BAWANA 400.00] CKT 1	937.92	922.86	857	109.44	Sc-8
216.	424022 MENDHASAL 400.00 424040 MERAMUNDLI 400.00 1	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 424040 [MERAMUNDLI 400.00] CKT 2	889.51	888.54	850	104.65	Sc-8
217.	424022 MENDHASAL 400.00 424040 MERAMUNDLI 400.00 2	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 424040 [MERAMUNDLI 400.00] CKT 1	889.51	888.54	850	104.65	Sc-8
218.	424018 ANGUL-A 400.00 424030 JINDAL-JITPL400.00 1	OPEN LINE FROM BUS 424018 [ANGUL-A 400.00] TO BUS 424030 [JINDAL-JITPL400.00] CKT 2	1131.59	1131.59	1093	103.53	Sc-8
219.	424018 ANGUL-A 400.00 424030 JINDAL-JITPL400.00 2	OPEN LINE FROM BUS 424018 [ANGUL-A 400.00] TO BUS 424030 [JINDAL-JITPL400.00] CKT 1	1131.59	1131.59	1093	103.53	Sc-8
220.	154463 JHATIKALA-PG400.00 154708 JHATIKARASP 400.00 1	OPEN LINE FROM BUS 154708 [JHATIKARASP 400.00] TO BUS 157708 [JHATI-PG 765.00] CKT 1	906.5	880.6	857	105.78	Sc-8
221.	174424 DADR-NCR 400.00 174454 DADR-HVD 400.00 1	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 174454 [DADR-HVD 400.00] CKT 2	1790.56	1790.56	857	208.93	Sc-9
222.	174424 DADR-NCR 400.00 174454 DADR-HVD 400.00 2	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 174454 [DADR-HVD 400.00] CKT 1	1790.56	1790.56	857	208.93	Sc-9
223.	174417 RIHAND-G 400.00 174433 RIHAN-HV 400.00 1	OPEN LINE FROM BUS 174417 [RIHAND-G 400.00] TO BUS 174433 [RIHAN-HV 400.00] CKT 2	1514.56	1514.56	857	176.73	Sc-9

S. No	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% Loading	Scenario
224.	174417 RIHAND-G 400.00 174433 RIHAN-HV 400.00 2	OPEN LINE FROM BUS 174417 [RIHAND-G 400.00] TO BUS 174433 [RIHAN-HV 400.00] CKT 1	1514.56	1514.56	857	176.73	Sc-9
225.	504027 KRISH-AP 400.00 504103 NELLORE-AP 400.00 1	OPEN LINE FROM BUS 504027 [KRISH-AP 400.00] TO BUS 504103 [NELLORE-AP 400.00] CKT 2	1167.95	1167.95	948	123.20	Sc-9
226.	504027 KRISH-AP 400.00 504103 NELLORE-AP 400.00 2	OPEN LINE FROM BUS 504027 [KRISH-AP 400.00] TO BUS 504103 [NELLORE-AP 400.00] CKT 1	1167.95	1167.95	948	123.20	Sc-9
227.	154426 BAWANA-G 400.00 154427 BAWANA 400.00 1	OPEN LINE FROM BUS 154426 [BAWANA-G 400.00] TO BUS 154427 [BAWANA 400.00] CKT 2	960.2	940.21	857	112.04	Sc-9
228.	154426 BAWANA-G 400.00 154427 BAWANA 400.00 2	OPEN LINE FROM BUS 154426 [BAWANA-G 400.00] TO BUS 154427 [BAWANA 400.00] CKT 1	960.2	940.21	857	112.04	Sc-9
229.	374003 LONIKAND I 400.00 374058 LONIKANDII 400.00 1	OPEN LINE FROM BUS 374003 [LONIKAND I 400.00] TO BUS 374058 [LONIKANDII 400.00] CKT 2	955.07	939.33	857	111.44	Sc-9
230.	374003 LONIKAND I 400.00 374058 LONIKANDII 400.00 2	OPEN LINE FROM BUS 374003 [LONIKAND I 400.00] TO BUS 374058 [LONIKANDII 400.00] CKT 1	954.99	939.26	857	111.43	Sc-9
231.	154463 JHATIKALA-PG400.00 154708 JHATIKARASP 400.00 1	OPEN LINE FROM BUS 144400 [JHAJJAR4 400.00] TO BUS 144402 [DAULATABAD4 400.00] CKT 2	919.67	898.34	857	107.31	Sc-9
232.	5 DGM-BYP-NICL400.00 354101 NICOL TORREN400.00 2	OPEN LINE FROM BUS 354014 [PIRANA_P 400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	859.93	878.03	857	100.34	Sc-9
233.	5 DGM-BYP-NICL400.00 354017 RANCHODPURA 400.00 2	OPEN LINE FROM BUS 354014 [PIRANA_P 400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	866.79	875.75	857	101.14	Sc-9
234.	424018 ANGUL-A 400.00 424030 JINDAL-JITPL400.00 1	OPEN LINE FROM BUS 424018 [ANGUL-A 400.00] TO BUS 424030 [JINDAL-JITPL400.00] CKT 2	1109.36	1109.36	1093	101.50	Sc-9
235.	424018 ANGUL-A 400.00 424030 JINDAL-JITPL400.00 2	OPEN LINE FROM BUS 424018 [ANGUL-A 400.00] TO BUS 424030 [JINDAL-JITPL400.00] CKT 1	1109.36	1109.36	1093	101.50	Sc-9
236.	354014 PIRANA_P 400.00 354101 NICOL TORREN400.00 2	OPEN LINE FROM BUS 5 [DGM-BYP-NICL400.00] TO BUS 354101 [NICOL TORREN400.00] CKT 2	859.93	857.8	857	100.34	Sc-9

N-1 Contingency of 765/400 kV Transformers

S. No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
1.	144469 BHIWANI-PG 400.00 147704 BHIWN-PG 765.00 3	OPEN LINE FROM BUS 144469 [BHIWANI-PG 400.00] TO BUS 147704 [BHIWN-PG 765.00] CKT 1	1297.16	1558.62	1000	155.86	Sc-1
2.	354202 KHAVDA-II 400.00 358202 KHAVDA-II 765.00 3	OPEN LINE FROM BUS 354202 [KHAVDA-II 400.00] TO BUS 358202 [KHAVDA-II 765.00] CKT 5	1085.11	2175.92	1500	145.06	Sc-1
3.	354202 KHAVDA-II 400.00 358202 KHAVDA-II 765.00 5	OPEN LINE FROM BUS 354202 [KHAVDA-II 400.00] TO BUS 358202 [KHAVDA-II 765.00] CKT 3	1085.11	2175.92	1500	145.06	Sc-1
4.	354292 KHAVDA-IIS 400.00 358202 KHAVDA-II 765.00 1	OPEN LINE FROM BUS 354292 [KHAVDA-IIS 400.00] TO BUS 358202 [KHAVDA-II 765.00] CKT 3	1085.11	2175.92	1500	145.06	Sc-1
5.	354292 KHAVDA-IIS 400.00 358202 KHAVDA-II 765.00 3	OPEN LINE FROM BUS 354292 [KHAVDA-IIS 400.00] TO BUS 358202 [KHAVDA-II 765.00] CKT 1	1085.11	2175.92	1500	145.06	Sc-1
6.	504049 KURNOOL-III 400.00 508049 KURNOOL-III 765.00 1	OPEN LINE FROM BUS 504049 [KURNOOL-III 400.00] TO BUS 508049 [KURNOOL-III 765.00] CKT 2	1290.22	1838.07	1500	122.54	Sc-1
7.	504049 KURNOOL-III 400.00 508049 KURNOOL-III 765.00 2	OPEN LINE FROM BUS 504049 [KURNOOL-III 400.00] TO BUS 508049 [KURNOOL-III 765.00] CKT 1	1290.22	1838.07	1500	122.54	Sc-1
8.	504049 KURNOOL-III 400.00 508049 KURNOOL-III 765.00 3	OPEN LINE FROM BUS 504049 [KURNOOL-III 400.00] TO BUS 508049 [KURNOOL-III 765.00] CKT 1	1290.22	1838.07	1500	122.54	Sc-1
9.	144469 BHIWANI-PG 400.00 147704 BHIWN-PG 765.00 1	OPEN LINE FROM BUS 144469 [BHIWANI-PG 400.00] TO BUS 147704 [BHIWN-PG 765.00] CKT 3	864.77	1155.49	1000	115.55	Sc-1
10.	144469 BHIWANI-PG 400.00 147704 BHIWN-PG 765.00 2	OPEN LINE FROM BUS 144469 [BHIWANI-PG 400.00] TO BUS 147704 [BHIWN-PG 765.00] CKT 3	864.77	1155.49	1000	115.55	Sc-1
11.	374045 PUNE-PG-GIS 400.00 378045 PUNE-PG-GIS 765.00 1	OPEN LINE FROM BUS 374045 [PUNE-PG-GIS 400.00] TO BUS 378045 [PUNE-PG-GIS 765.00] CKT 2	1212.69	1730.67	1500	115.38	Sc-1
12.	374045 PUNE-PG-GIS 400.00 378045 PUNE-PG-GIS 765.00 2	OPEN LINE FROM BUS 374045 [PUNE-PG-GIS 400.00] TO BUS 378045 [PUNE-PG-GIS 765.00] CKT 1	1212.69	1730.67	1500	115.38	Sc-1
13.	354203 KHAVDA-III 400.00 358203 KHAVDA-III 765.00 1	OPEN LINE FROM BUS 354203 [KHAVDA-III 400.00] TO BUS 358203 [KHAVDA-III 765.00] CKT 2	1085.45	1630.66	1500	108.71	Sc-1
14.	354203 KHAVDA-III 400.00 358203 KHAVDA-III 765.00 2	OPEN LINE FROM BUS 354203 [KHAVDA-III 400.00] TO BUS 358203 [KHAVDA-III 765.00] CKT 1	1085.45	1630.66	1500	108.71	Sc-1
15.	354203 KHAVDA-III 400.00 358203 KHAVDA-III 765.00 3	OPEN LINE FROM BUS 354203 [KHAVDA-III 400.00] TO BUS 358203 [KHAVDA-III 765.00] CKT 1	1085.45	1630.66	1500	108.71	Sc-1

S. No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
16.	354201 KHAVDA2 400.00 358299 KHAVDA2 765.00 1	OPEN LINE FROM BUS 354201 [KHAVDA2 400.00] TO BUS 358299 [KHAVDA2 765.00] CKT 2	1083.63	1627.58	1500	108.51	Sc-1
17.	354201 KHAVDA2 400.00 358299 KHAVDA2 765.00 2	OPEN LINE FROM BUS 354201 [KHAVDA2 400.00] TO BUS 358299 [KHAVDA2 765.00] CKT 1	1083.63	1627.58	1500	108.51	Sc-1
18.	354201 KHAVDA2 400.00 358299 KHAVDA2 765.00 3	OPEN LINE FROM BUS 354201 [KHAVDA2 400.00] TO BUS 358299 [KHAVDA2 765.00] CKT 1	1083.63	1627.58	1500	108.51	Sc-1
19.	164480 FATEHG-2 400.00 167480 FATEH-2 765.00 1	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 167480 [FATEH-2 765.00] CKT 2	1382.2	1626.12	1500	108.41	Sc-1
20.	164480 FATEHG-2 400.00 167480 FATEH-2 765.00 2	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 167480 [FATEH-2 765.00] CKT 1	1382.2	1626.12	1500	108.41	Sc-1
21.	164480 FATEHG-2 400.00 167480 FATEH-2 765.00 3	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 167480 [FATEH-2 765.00] CKT 1	1382.2	1626.12	1500	108.41	Sc-1
22.	164480 FATEHG-2 400.00 167480 FATEH-2 765.00 4	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 167480 [FATEH-2 765.00] CKT 1	1382.2	1626.12	1500	108.41	Sc-1
23.	164480 FATEHG-2 400.00 167480 FATEH-2 765.00 5	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 167480 [FATEH-2 765.00] CKT 1	1382.2	1626.12	1500	108.41	Sc-1
24.	164480 FATEHG-2 400.00 167480 FATEH-2 765.00 6	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 167480 [FATEH-2 765.00] CKT 1	1382.2	1626.12	1500	108.41	Sc-1
25.	354208 NAVSARI-NEW 400.00 358208 NAVSARI-NEW 765.00 1	OPEN LINE FROM BUS 354208 [NAVSARI-NEW 400.00] TO BUS 358208 [NAVSARI-NEW 765.00] CKT 2	1221.28	1618.93	1500	107.93	Sc-1
26.	354208 NAVSARI-NEW 400.00 358208 NAVSARI-NEW 765.00 2	OPEN LINE FROM BUS 354208 [NAVSARI-NEW 400.00] TO BUS 358208 [NAVSARI-NEW 765.00] CKT 1	1221.28	1618.93	1500	107.93	Sc-1
27.	354208 NAVSARI-NEW 400.00 358208 NAVSARI-NEW 765.00 3	OPEN LINE FROM BUS 354208 [NAVSARI-NEW 400.00] TO BUS 358208 [NAVSARI-NEW 765.00] CKT 1	1221.28	1618.93	1500	107.93	Sc-1
28.	164498 BHADLA-2 400.00 167498 BHADLA-2 765.00 1	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 167498 [BHADLA-2 765.00] CKT 2	1291.44	1550.5	1500	103.37	Sc-1
29.	164498 BHADLA-2 400.00 167498 BHADLA-2 765.00 2	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 167498 [BHADLA-2 765.00] CKT 1	1291.44	1550.5	1500	103.37	Sc-1
30.	164498 BHADLA-2 400.00 167498 BHADLA-2 765.00 3	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 167498 [BHADLA-2 765.00] CKT 1	1291.44	1550.5	1500	103.37	Sc-1
31.	164498 BHADLA-2 400.00 167498 BHADLA-2 765.00 4	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 167498 [BHADLA-2 765.00] CKT 1	1291.44	1550.5	1500	103.37	Sc-1

S. No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
32.	164498 BHADLA-2 400.00 167498 BHADLA-2 765.00 5	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 167498 [BHADLA-2 765.00] CKT 1	1291.44	1550.5	1500	103.37	Sc-1
33.	164434 JODH KANKANI400.00 167799 JODH KANKANI765.00 1	OPEN LINE FROM BUS 164434 [JODH KANKANI400.00] TO BUS 167799 [JODH KANKANI765.00] CKT 2	1091.45	1510.46	1500	100.70	Sc-1
34.	164434 JODH KANKANI400.00 167799 JODH KANKANI765.00 2	OPEN LINE FROM BUS 164434 [JODH KANKANI400.00] TO BUS 167799 [JODH KANKANI765.00] CKT 1	1091.45	1510.46	1500	100.70	Sc-1
35.	164434 JODH KANKANI400.00 167799 JODH KANKANI765.00 3	OPEN LINE FROM BUS 164434 [JODH KANKANI400.00] TO BUS 167799 [JODH KANKANI765.00] CKT 1	1091.45	1510.46	1500	100.70	Sc-1
36.	374051 PADGHEGIS 400.00 378051 PADGHEGIS 765.00 1	OPEN LINE FROM BUS 374051 [PADGHEGIS 400.00] TO BUS 378051 [PADGHEGIS 765.00] CKT 2	1180.45	1509.45	1500	100.63	Sc-1
37.	374051 PADGHEGIS 400.00 378051 PADGHEGIS 765.00 2	OPEN LINE FROM BUS 374051 [PADGHEGIS 400.00] TO BUS 378051 [PADGHEGIS 765.00] CKT 1	1180.45	1509.45	1500	100.63	Sc-1
38.	374051 PADGHEGIS 400.00 378051 PADGHEGIS 765.00 3	OPEN LINE FROM BUS 374051 [PADGHEGIS 400.00] TO BUS 378051 [PADGHEGIS 765.00] CKT 1	1180.45	1509.45	1500	100.63	Sc-1
39.	444090 JEERAT-NEW 400.00 448008 JEERAT7 765.00 1	OPEN LINE FROM BUS 444090 [JEERAT-NEW 400.00] TO BUS 448008 [JEERAT7 765.00] CKT 2	988.23	1630.15	1500	108.68	Sc-2
40.	444090 JEERAT-NEW 400.00 448008 JEERAT7 765.00 2	OPEN LINE FROM BUS 444090 [JEERAT-NEW 400.00] TO BUS 448008 [JEERAT7 765.00] CKT 1	988.23	1630.15	1500	108.68	Sc-2
41.	444090 JEERAT-NEW 400.00 448008 JEERAT7 765.00 1	OPEN LINE FROM BUS 444090 [JEERAT-NEW 400.00] TO BUS 448008 [JEERAT7 765.00] CKT 2	947.21	1562.77	1500	104.18	Sc-3
42.	444090 JEERAT-NEW 400.00 448008 JEERAT7 765.00 2	OPEN LINE FROM BUS 444090 [JEERAT-NEW 400.00] TO BUS 448008 [JEERAT7 765.00] CKT 1	947.21	1562.77	1500	104.18	Sc-3
43.	144469 BHIWANI-PG 400.00 147704 BHIWN-PG 765.00 3	OPEN LINE FROM BUS 144469 [BHIWANI-PG 400.00] TO BUS 147704 [BHIWN-PG 765.00] CKT 1	1346.77	1617.25	1000	161.73	Sc-4
44.	354202 KHAVDA-II 400.00 358202 KHAVDA-II 765.00 3	OPEN LINE FROM BUS 354202 [KHAVDA-II 400.00] TO BUS 358202 [KHAVDA-II 765.00] CKT 5	1124.19	2258.93	1500	150.60	Sc-4
45.	354202 KHAVDA-II 400.00 358202 KHAVDA-II 765.00 5	OPEN LINE FROM BUS 354202 [KHAVDA-II 400.00] TO BUS 358202 [KHAVDA-II 765.00] CKT 3	1124.19	2258.93	1500	150.60	Sc-4
46.	354292 KHAVDA-IIS 400.00 358202 KHAVDA-II 765.00 1	OPEN LINE FROM BUS 354292 [KHAVDA-IIS 400.00] TO BUS 358202 [KHAVDA-II 765.00] CKT 3	1124.19	2258.93	1500	150.60	Sc-4
47.	354292 KHAVDA-IIS 400.00 358202 KHAVDA-II 765.00 3	OPEN LINE FROM BUS 354292 [KHAVDA-IIS 400.00] TO BUS 358202 [KHAVDA-II 765.00] CKT 1	1124.19	2258.93	1500	150.60	Sc-4

S. No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
48.	504049 KURNOOL-III 400.00 508049 KURNOOL-III 765.00 1	OPEN LINE FROM BUS 504049 [KURNOOL-III 400.00] TO BUS 508049 [KURNOOL-III 765.00] CKT 2	1294.18	1840.94	1500	122.73	Sc-4
49.	504049 KURNOOL-III 400.00 508049 KURNOOL-III 765.00 2	OPEN LINE FROM BUS 504049 [KURNOOL-III 400.00] TO BUS 508049 [KURNOOL-III 765.00] CKT 1	1294.18	1840.94	1500	122.73	Sc-4
50.	504049 KURNOOL-III 400.00 508049 KURNOOL-III 765.00 3	OPEN LINE FROM BUS 504049 [KURNOOL-III 400.00] TO BUS 508049 [KURNOOL-III 765.00] CKT 1	1294.18	1840.94	1500	122.73	Sc-4
51.	374051 PADGHEGIS 400.00 378051 PADGHEGIS 765.00 1	OPEN LINE FROM BUS 374051 [PADGHEGIS 400.00] TO BUS 378051 [PADGHEGIS 765.00] CKT 2	1431.31	1833.7	1500	122.25	Sc-4
52.	374051 PADGHEGIS 400.00 378051 PADGHEGIS 765.00 2	OPEN LINE FROM BUS 374051 [PADGHEGIS 400.00] TO BUS 378051 [PADGHEGIS 765.00] CKT 1	1431.31	1833.7	1500	122.25	Sc-4
53.	374051 PADGHEGIS 400.00 378051 PADGHEGIS 765.00 3	OPEN LINE FROM BUS 374051 [PADGHEGIS 400.00] TO BUS 378051 [PADGHEGIS 765.00] CKT 1	1431.31	1833.7	1500	122.25	Sc-4
54.	354208 NAVSARI-NEW 400.00 358208 NAVSARI-NEW 765.00 1	OPEN LINE FROM BUS 354208 [NAVSARI-NEW 400.00] TO BUS 358208 [NAVSARI-NEW 765.00] CKT 2	1371.45	1815.37	1500	121.02	Sc-4
55.	354208 NAVSARI-NEW 400.00 358208 NAVSARI-NEW 765.00 2	OPEN LINE FROM BUS 354208 [NAVSARI-NEW 400.00] TO BUS 358208 [NAVSARI-NEW 765.00] CKT 1	1371.45	1815.37	1500	121.02	Sc-4
56.	354208 NAVSARI-NEW 400.00 358208 NAVSARI-NEW 765.00 3	OPEN LINE FROM BUS 354208 [NAVSARI-NEW 400.00] TO BUS 358208 [NAVSARI-NEW 765.00] CKT 1	1371.45	1815.37	1500	121.02	Sc-4
57.	374045 PUNE-PG-GIS 400.00 378045 PUNE-PG-GIS 765.00 1	OPEN LINE FROM BUS 374045 [PUNE-PG-GIS 400.00] TO BUS 378045 [PUNE-PG-GIS 765.00] CKT 2	1263.25	1804.21	1500	120.28	Sc-4
58.	374045 PUNE-PG-GIS 400.00 378045 PUNE-PG-GIS 765.00 2	OPEN LINE FROM BUS 374045 [PUNE-PG-GIS 400.00] TO BUS 378045 [PUNE-PG-GIS 765.00] CKT 1	1263.25	1804.21	1500	120.28	Sc-4
59.	144469 BHIWANI-PG 400.00 147704 BHIWN-PG 765.00 1	OPEN LINE FROM BUS 144469 [BHIWANI-PG 400.00] TO BUS 147704 [BHIWN-PG 765.00] CKT 3	897.85	1198.48	1000	119.85	Sc-4
60.	144469 BHIWANI-PG 400.00 147704 BHIWN-PG 765.00 2	OPEN LINE FROM BUS 144469 [BHIWANI-PG 400.00] TO BUS 147704 [BHIWN-PG 765.00] CKT 3	897.85	1198.48	1000	119.85	Sc-4
61.	354203 KHAVDA-III 400.00 358203 KHAVDA-III 765.00 1	OPEN LINE FROM BUS 354203 [KHAVDA-III 400.00] TO BUS 358203 [KHAVDA-III 765.00] CKT 2	1124.02	1689.95	1500	112.66	Sc-4
62.	354203 KHAVDA-III 400.00 358203 KHAVDA-III 765.00 2	OPEN LINE FROM BUS 354203 [KHAVDA-III 400.00] TO BUS 358203 [KHAVDA-III 765.00] CKT 1	1124.02	1689.95	1500	112.66	Sc-4
63.	354203 KHAVDA-III 400.00 358203 KHAVDA-III 765.00 3	OPEN LINE FROM BUS 354203 [KHAVDA-III 400.00] TO BUS 358203 [KHAVDA-III 765.00] CKT 1	1124.02	1689.95	1500	112.66	Sc-4

S. No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
64.	354201 KHAVDA2 400.00 358299 KHAVDA2 765.00 1	OPEN LINE FROM BUS 354201 [KHAVDA2 400.00] TO BUS 358299 [KHAVDA2 765.00] CKT 2	1123.67	1688.93	1500	112.60	Sc-4
65.	354201 KHAVDA2 400.00 358299 KHAVDA2 765.00 2	OPEN LINE FROM BUS 354201 [KHAVDA2 400.00] TO BUS 358299 [KHAVDA2 765.00] CKT 1	1123.67	1688.93	1500	112.60	Sc-4
66.	354201 KHAVDA2 400.00 358299 KHAVDA2 765.00 3	OPEN LINE FROM BUS 354201 [KHAVDA2 400.00] TO BUS 358299 [KHAVDA2 765.00] CKT 1	1123.67	1688.93	1500	112.60	Sc-4
67.	164480 FATEHG-2 400.00 167480 FATEH-2 765.00 1	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 167480 [FATEH-2 765.00] CKT 2	1366.38	1606.91	1500	107.13	Sc-4
68.	164480 FATEHG-2 400.00 167480 FATEH-2 765.00 2	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 167480 [FATEH-2 765.00] CKT 1	1366.38	1606.91	1500	107.13	Sc-4
69.	164480 FATEHG-2 400.00 167480 FATEH-2 765.00 3	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 167480 [FATEH-2 765.00] CKT 1	1366.38	1606.91	1500	107.13	Sc-4
70.	164480 FATEHG-2 400.00 167480 FATEH-2 765.00 4	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 167480 [FATEH-2 765.00] CKT 1	1366.38	1606.91	1500	107.13	Sc-4
71.	164480 FATEHG-2 400.00 167480 FATEH-2 765.00 5	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 167480 [FATEH-2 765.00] CKT 1	1366.38	1606.91	1500	107.13	Sc-4
72.	164480 FATEHG-2 400.00 167480 FATEH-2 765.00 6	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 167480 [FATEH-2 765.00] CKT 1	1366.38	1606.91	1500	107.13	Sc-4
73.	164498 BHADLA-2 400.00 167498 BHADLA-2 765.00 1	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 167498 [BHADLA-2 765.00] CKT 2	1275.87	1531.67	1500	102.11	Sc-4
74.	164498 BHADLA-2 400.00 167498 BHADLA-2 765.00 2	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 167498 [BHADLA-2 765.00] CKT 1	1275.87	1531.67	1500	102.11	Sc-4
75.	164498 BHADLA-2 400.00 167498 BHADLA-2 765.00 3	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 167498 [BHADLA-2 765.00] CKT 1	1275.87	1531.67	1500	102.11	Sc-4
76.	164498 BHADLA-2 400.00 167498 BHADLA-2 765.00 4	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 167498 [BHADLA-2 765.00] CKT 1	1275.87	1531.67	1500	102.11	Sc-4
77.	164498 BHADLA-2 400.00 167498 BHADLA-2 765.00 5	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 167498 [BHADLA-2 765.00] CKT 1	1275.87	1531.67	1500	102.11	Sc-4
78.	144669 BHIWANI SR 400.00 147704 BHIWN-PG 765.00 2	OPEN LINE FROM BUS 144469 [BHIWANI-PG 400.00] TO BUS 147704 [BHIWN-PG 765.00] CKT 3	852.34	1011.26	1000	101.13	Sc-4
79.	444090 JEERAT-NEW 400.00 448008 JEERAT7 765.00 1	OPEN LINE FROM BUS 444090 [JEERAT-NEW 400.00] TO BUS 448008 [JEERAT7 765.00] CKT 2	1019.46	1680	1500	112.00	Sc-5

S. No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
80.	444090 JEERAT-NEW 400.00 448008 JEERAT7 765.00 2	OPEN LINE FROM BUS 444090 [JEERAT-NEW 400.00] TO BUS 448008 [JEERAT7 765.00] CKT 1	1019.46	1680	1500	112.00	Sc-5
81.	174258 ORAI 400.00 177258 ORAI 765.00 1	OPEN LINE FROM BUS 174258 [ORAI 400.00] TO BUS 177258 [ORAI 765.00] CKT 2	772.76	1113.09	1000	111.31	Sc-5
82.	174258 ORAI 400.00 177258 ORAI 765.00 2	OPEN LINE FROM BUS 174258 [ORAI 400.00] TO BUS 177258 [ORAI 765.00] CKT 1	772.76	1113.09	1000	111.31	Sc-5
83.	364012 SATNA-74 400.00 368012 SATNA-7 765.00 1	OPEN LINE FROM BUS 364012 [SATNA-74 400.00] TO BUS 368012 [SATNA-7 765.00] CKT 2	684.51	1005.07	1000	100.51	Sc-5
84.	364012 SATNA-74 400.00 368012 SATNA-7 765.00 2	OPEN LINE FROM BUS 364012 [SATNA-74 400.00] TO BUS 368012 [SATNA-7 765.00] CKT 1	684.51	1005.07	1000	100.51	Sc-5
85.	314029 RAIGARH_POOL400.00 318029 RAIGARH_KOTR765.00 3	OPEN LINE FROM BUS 314029 [RAIGARH_POOL400.00] TO BUS 318029 [RAIGARH_KOTR765.00] CKT 4	1071.22	1504.59	1500	100.31	Sc-5
86.	314029 RAIGARH_POOL400.00 318029 RAIGARH_KOTR765.00 4	OPEN LINE FROM BUS 314029 [RAIGARH_POOL400.00] TO BUS 318029 [RAIGARH_KOTR765.00] CKT 3	1071.22	1504.59	1500	100.31	Sc-5
87.	314029 RAIGARH_POOL400.00 318029 RAIGARH_KOTR765.00 5	OPEN LINE FROM BUS 314029 [RAIGARH_POOL400.00] TO BUS 318029 [RAIGARH_KOTR765.00] CKT 3	1071.07	1504.38	1500	100.29	Sc-5
88.	444090 JEERAT-NEW 400.00 448008 JEERAT7 765.00 1	OPEN LINE FROM BUS 444090 [JEERAT-NEW 400.00] TO BUS 448008 [JEERAT7 765.00] CKT 2	938.55	1550.85	1500	103.39	Sc-6
89.	444090 JEERAT-NEW 400.00 448008 JEERAT7 765.00 2	OPEN LINE FROM BUS 444090 [JEERAT-NEW 400.00] TO BUS 448008 [JEERAT7 765.00] CKT 1	938.55	1550.85	1500	103.39	Sc-6
90.	374045 PUNE-PG-GIS 400.00 378045 PUNE-PG-GIS 765.00 1	OPEN LINE FROM BUS 374045 [PUNE-PG-GIS 400.00] TO BUS 378045 [PUNE-PG-GIS 765.00] CKT 2	1358.63	1948.33	1500	129.89	Sc-7
91.	374045 PUNE-PG-GIS 400.00 378045 PUNE-PG-GIS 765.00 2	OPEN LINE FROM BUS 374045 [PUNE-PG-GIS 400.00] TO BUS 378045 [PUNE-PG-GIS 765.00] CKT 1	1358.63	1948.33	1500	129.89	Sc-7
92.	374051 PADGHEGIS 400.00 378051 PADGHEGIS 765.00 1	OPEN LINE FROM BUS 374051 [PADGHEGIS 400.00] TO BUS 378051 [PADGHEGIS 765.00] CKT 2	1461.99	1877.28	1500	125.15	Sc-7
93.	374051 PADGHEGIS 400.00 378051 PADGHEGIS 765.00 2	OPEN LINE FROM BUS 374051 [PADGHEGIS 400.00] TO BUS 378051 [PADGHEGIS 765.00] CKT 1	1461.99	1877.28	1500	125.15	Sc-7
94.	374051 PADGHEGIS 400.00 378051 PADGHEGIS 765.00 3	OPEN LINE FROM BUS 374051 [PADGHEGIS 400.00] TO BUS 378051 [PADGHEGIS 765.00] CKT 1	1461.99	1877.28	1500	125.15	Sc-7
95.	354202 KHAVDA-II 400.00 358202 KHAVDA-II 765.00 3	OPEN LINE FROM BUS 354202 [KHAVDA-II 400.00] TO BUS 358202 [KHAVDA-II 765.00] CKT 5	912.58	1828.4	1500	121.89	Sc-7

S. No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
96.	354202 KHAVDA-II 400.00 358202 KHAVDA-II 765.00 5	OPEN LINE FROM BUS 354202 [KHAVDA-II 400.00] TO BUS 358202 [KHAVDA-II 765.00] CKT 3	912.58	1828.4	1500	121.89	Sc-7
97.	354292 KHAVDA-IIS 400.00 358202 KHAVDA-II 765.00 1	OPEN LINE FROM BUS 354292 [KHAVDA-IIS 400.00] TO BUS 358202 [KHAVDA-II 765.00] CKT 3	912.58	1828.4	1500	121.89	Sc-7
98.	354292 KHAVDA-IIS 400.00 358202 KHAVDA-II 765.00 3	OPEN LINE FROM BUS 354292 [KHAVDA-IIS 400.00] TO BUS 358202 [KHAVDA-II 765.00] CKT 1	912.58	1828.4	1500	121.89	Sc-7
99.	354208 NAVSARI-NEW 400.00 358208 NAVSARI-NEW 765.00 1	OPEN LINE FROM BUS 354208 [NAVSARI-NEW 400.00] TO BUS 358208 [NAVSARI-NEW 765.00] CKT 2	1361.41	1804.23	1500	120.28	Sc-7
100.	354208 NAVSARI-NEW 400.00 358208 NAVSARI-NEW 765.00 2	OPEN LINE FROM BUS 354208 [NAVSARI-NEW 400.00] TO BUS 358208 [NAVSARI-NEW 765.00] CKT 1	1361.41	1804.23	1500	120.28	Sc-7
101.	354208 NAVSARI-NEW 400.00 358208 NAVSARI-NEW 765.00 3	OPEN LINE FROM BUS 354208 [NAVSARI-NEW 400.00] TO BUS 358208 [NAVSARI-NEW 765.00] CKT 1	1361.41	1804.23	1500	120.28	Sc-7
102.	174258 ORAI 400.00 177258 ORAI 765.00 1	OPEN LINE FROM BUS 174258 [ORAI 400.00] TO BUS 177258 [ORAI 765.00] CKT 2	833.11	1189.36	1000	118.94	Sc-7
103.	174258 ORAI 400.00 177258 ORAI 765.00 2	OPEN LINE FROM BUS 174258 [ORAI 400.00] TO BUS 177258 [ORAI 765.00] CKT 1	833.11	1189.36	1000	118.94	Sc-7
104.	514101 MAHESWRM 400.00 518051 MAHESHWARAM 765.00 1	OPEN LINE FROM BUS 514101 [MAHESWRM 400.00] TO BUS 518051 [MAHESHWARAM 765.00] CKT 2	1272.86	1711.39	1500	114.09	Sc-7
105.	514101 MAHESWRM 400.00 518051 MAHESHWARAM 765.00 2	OPEN LINE FROM BUS 514101 [MAHESWRM 400.00] TO BUS 518051 [MAHESHWARAM 765.00] CKT 1	1272.86	1711.39	1500	114.09	Sc-7
106.	144469 BHIWANI-PG 400.00 147704 BHIWN-PG 765.00 3	OPEN LINE FROM BUS 144469 [BHIWANI-PG 400.00] TO BUS 147704 [BHIWN-PG 765.00] CKT 1	894.18	1074.14	1000	107.41	Sc-7
107.	354111 DHOLERA4 400.00 358111 VATAMAN 765.00 3	OPEN LINE FROM BUS 354111 [DHOLERA4 400.00] TO BUS 358111 [VATAMAN 765.00] CKT 4	781.62	1565.37	1500	104.36	Sc-7
108.	354111 DHOLERA4 400.00 358111 VATAMAN 765.00 4	OPEN LINE FROM BUS 354111 [DHOLERA4 400.00] TO BUS 358111 [VATAMAN 765.00] CKT 3	781.62	1565.37	1500	104.36	Sc-7
109.	164481 FATEHG-3 400.00 167481 FATEHG-3 765.00 1	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 167481 [FATEHG-3 765.00] CKT 2	1268.28	1509.74	1500	100.65	Sc-7
110.	164481 FATEHG-3 400.00 167481 FATEHG-3 765.00 2	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 167481 [FATEHG-3 765.00] CKT 1	1268.28	1509.74	1500	100.65	Sc-7
111.	164481 FATEHG-3 400.00 167481 FATEHG-3 765.00 3	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 167481 [FATEHG-3 765.00] CKT 1	1268.28	1509.74	1500	100.65	Sc-7

S. No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
112.	164481 FATEHG-3 400.00 167481 FATEHG-3 765.00 4	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 167481 [FATEHG-3 765.00] CKT 1	1268.28	1509.74	1500	100.65	Sc-7
113.	164481 FATEHG-3 400.00 167481 FATEHG-3 765.00 5	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 167481 [FATEHG-3 765.00] CKT 1	1268.28	1509.74	1500	100.65	Sc-7
114.	164481 FATEHG-3 400.00 167481 FATEHG-3 765.00 6	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 167481 [FATEHG-3 765.00] CKT 1	1268.28	1509.74	1500	100.65	Sc-7

N-1 Contingency of 400/220 kV Transformers

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
1.	164422 RAMG-I 400.00 162422 RAMGARH-I 220.00 1	OPEN LINE FROM BUS 164422 [RAMG-I 400.00] TO BUS 162422 [RAMGARH-I 220.00] CKT 2	445.34	894.92	500	178.98	Sc-1
2.	164422 RAMG-I 400.00 162422 RAMGARH-I 220.00 2	OPEN LINE FROM BUS 164422 [RAMG-I 400.00] TO BUS 162422 [RAMGARH-I 220.00] CKT 1	445.34	894.92	500	178.98	Sc-1
3.	114422 KISHENPUR 400.00 112235 KISHENPUR 220.00 1	OPEN LINE FROM BUS 114422 [KISHENPUR 400.00] TO BUS 112235 [KISHENPUR 220.00] CKT 2	392.76	490.09	315	155.58	Sc-1
4.	114422 KISHENPUR 400.00 112235 KISHENPUR 220.00 2	OPEN LINE FROM BUS 114422 [KISHENPUR 400.00] TO BUS 112235 [KISHENPUR 220.00] CKT 1	392.76	490.09	315	155.58	Sc-1
5.	114422 KISHENPUR 400.00 112235 KISHENPUR 220.00 3	OPEN LINE FROM BUS 114422 [KISHENPUR 400.00] TO BUS 112235 [KISHENPUR 220.00] CKT 1	392.76	490.09	315	155.58	Sc-1
6.	164459 BHADLA PG 400.00 162659 BHADLA-SPLT 220.00 1	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162659 [BHADLA-SPLT 220.00] CKT 2	368.02	736.04	500	147.21	Sc-1
7.	164459 BHADLA PG 400.00 162659 BHADLA-SPLT 220.00 2	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162659 [BHADLA-SPLT 220.00] CKT 1	368.02	736.04	500	147.21	Sc-1
8.	484002 BOKARO-A 400.00 482001 BOKARO TPS 220.00 1	OPEN LINE FROM BUS 484002 [BOKARO-A 400.00] TO BUS 482001 [BOKARO TPS 220.00] CKT 2	317.33	462.22	315	146.74	Sc-1
9.	484002 BOKARO-A 400.00 482001 BOKARO TPS 220.00 2	OPEN LINE FROM BUS 484002 [BOKARO-A 400.00] TO BUS 482001 [BOKARO TPS 220.00] CKT 1	317.33	462.22	315	146.74	Sc-1
10.	164498 BHADLA-2 400.00 162499 BHAD-2 SPLT 220.00 1	OPEN LINE FROM BUS 164404 [BHADLA 400.00] TO BUS 164456 [BIKANE-4 400.00] CKT 1	1412.6	1418.4	1000	141.84	Sc-1

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
11.	444012 KOLAGHAT 400.00 442012 KTPS220 220.00 1	OPEN LINE FROM BUS 444012 [KOLAGHAT 400.00] TO BUS 442012 [KTPS220 220.00] CKT 2	299.48	442.58	315	140.50	Sc-1
12.	444012 KOLAGHAT 400.00 442012 KTPS220 220.00 2	OPEN LINE FROM BUS 444012 [KOLAGHAT 400.00] TO BUS 442012 [KTPS220 220.00] CKT 1	299.48	442.58	315	140.50	Sc-1
13.	194054 PIPALKOTI SW400.00 192054 PIPALKOTI SW220.00 1	OPEN LINE FROM BUS 194054 [PIPALKOTI SW400.00] TO BUS 192054 [PIPALKOTI SW220.00] CKT 2	167.67	336.21	240	140.09	Sc-1
14.	194054 PIPALKOTI SW400.00 192054 PIPALKOTI SW220.00 2	OPEN LINE FROM BUS 194054 [PIPALKOTI SW400.00] TO BUS 192054 [PIPALKOTI SW220.00] CKT 1	167.67	336.21	240	140.09	Sc-1
15.	324002 MAGARWADA-DD400.00 322002 MAGARWADA 220.00 1	OPEN LINE FROM BUS 324002 [MAGARWADA-DD400.00] TO BUS 322002 [MAGARWADA 220.00] CKT 2	209.69	429.23	315	136.26	Sc-1
16.	324002 MAGARWADA-DD400.00 322002 MAGARWADA 220.00 2	OPEN LINE FROM BUS 324002 [MAGARWADA-DD400.00] TO BUS 322002 [MAGARWADA 220.00] CKT 1	209.69	429.23	315	136.26	Sc-1
17.	374028 NAGOTHANE 400.00 372150 NAGOTHA2 220.00 1	OPEN LINE FROM BUS 374028 [NAGOTHANE 400.00] TO BUS 372150 [NAGOTHA2 220.00] CKT 2	252.22	391.88	315	124.41	Sc-1
18.	374028 NAGOTHANE 400.00 372150 NAGOTHA2 220.00 3	OPEN LINE FROM BUS 374028 [NAGOTHANE 400.00] TO BUS 372150 [NAGOTHA2 220.00] CKT 2	252.22	391.88	315	124.41	Sc-1
19.	164480 FATEHG-2 400.00 162480 FATEH-2 220.00 1	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 162480 [FATEH-2 220.00] CKT 2	494.53	618.86	500	123.77	Sc-1
20.	164480 FATEHG-2 400.00 162480 FATEH-2 220.00 2	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 162480 [FATEH-2 220.00] CKT 1	494.53	618.86	500	123.77	Sc-1
21.	164480 FATEHG-2 400.00 162480 FATEH-2 220.00 3	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 162480 [FATEH-2 220.00] CKT 1	494.53	618.86	500	123.77	Sc-1
22.	164480 FATEHG-2 400.00 162480 FATEH-2 220.00 4	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 162480 [FATEH-2 220.00] CKT 1	494.53	618.86	500	123.77	Sc-1
23.	164480 FATEHG-2 400.00 162480 FATEH-2 220.00 5	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 162480 [FATEH-2 220.00] CKT 1	494.53	618.86	500	123.77	Sc-1
24.	164480 FATEHG-2 400.00 163480 FATEH-SPL 2 220.00 1	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 163480 [FATEH-SPL 2 220.00] CKT 2	490.54	613.86	500	122.77	Sc-1
25.	164480 FATEHG-2 400.00 163480 FATEH-SPL 2 220.00 2	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 163480 [FATEH-SPL 2 220.00] CKT 1	490.54	613.86	500	122.77	Sc-1
26.	164480 FATEHG-2 400.00 163480 FATEH-SPL 2 220.00 3	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 163480 [FATEH-SPL 2 220.00] CKT 1	490.54	613.86	500	122.77	Sc-1

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
27.	164480 FATEHG-2 400.00 163480 FATEH-SPL 2 220.00 4	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 163480 [FATEH-SPL 2 220.00] CKT 1	490.54	613.86	500	122.77	Sc-1
28.	164480 FATEHG-2 400.00 163480 FATEH-SPL 2 220.00 5	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 163480 [FATEH-SPL 2 220.00] CKT 1	490.54	613.86	500	122.77	Sc-1
29.	424022 MENDHASAL 400.00 422586 MENDHASAL 220.00 1	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 422586 [MENDHASAL 220.00] CKT 2	282.06	384.54	315	122.08	Sc-1
30.	424022 MENDHASAL 400.00 422586 MENDHASAL 220.00 2	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 422586 [MENDHASAL 220.00] CKT 1	282.06	384.54	315	122.08	Sc-1
31.	164498 BHADLA-2 400.00 162498 BHADLA-2 220.00 1	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162498 [BHADLA-2 220.00] CKT 2	483.47	605.15	500	121.03	Sc-1
32.	164498 BHADLA-2 400.00 162498 BHADLA-2 220.00 2	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162498 [BHADLA-2 220.00] CKT 1	483.47	605.15	500	121.03	Sc-1
33.	164498 BHADLA-2 400.00 162498 BHADLA-2 220.00 3	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162498 [BHADLA-2 220.00] CKT 1	483.47	605.15	500	121.03	Sc-1
34.	164498 BHADLA-2 400.00 162498 BHADLA-2 220.00 4	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162498 [BHADLA-2 220.00] CKT 1	483.47	605.15	500	121.03	Sc-1
35.	164498 BHADLA-2 400.00 162498 BHADLA-2 220.00 5	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162498 [BHADLA-2 220.00] CKT 1	483.47	605.15	500	121.03	Sc-1
36.	144006 SONAROAD 400.00 142212 SOHNAROAD 220.00 1	OPEN LINE FROM BUS 144006 [SONAROAD 400.00] TO BUS 142212 [SOHNAROAD 220.00] CKT 2	409.72	599.58	500	119.92	Sc-1
37.	144006 SONAROAD 400.00 142212 SOHNAROAD 220.00 2	OPEN LINE FROM BUS 144006 [SONAROAD 400.00] TO BUS 142212 [SOHNAROAD 220.00] CKT 1	409.72	599.58	500	119.92	Sc-1
38.	164481 FATEHG-3 400.00 162481 FATEHG-3 220.00 1	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 162481 [FATEHG-3 220.00] CKT 2	479.08	599.46	500	119.89	Sc-1
39.	164481 FATEHG-3 400.00 162481 FATEHG-3 220.00 2	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 162481 [FATEHG-3 220.00] CKT 1	479.08	599.46	500	119.89	Sc-1
40.	164481 FATEHG-3 400.00 162481 FATEHG-3 220.00 3	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 162481 [FATEHG-3 220.00] CKT 1	479.08	599.46	500	119.89	Sc-1
41.	164481 FATEHG-3 400.00 162481 FATEHG-3 220.00 4	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 162481 [FATEHG-3 220.00] CKT 1	479.08	599.46	500	119.89	Sc-1
42.	164481 FATEHG-3 400.00 162481 FATEHG-3 220.00 5	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 162481 [FATEHG-3 220.00] CKT 1	479.08	599.46	500	119.89	Sc-1

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
43.	444421 BIDHAN NGR 400.00 442686 BIDHANNGR-WB220.00 1	OPEN LINE FROM BUS 444421 [BIDHAN NGR 400.00] TO BUS 442686 [BIDHANNGR-WB220.00] CKT 3	291.43	374.57	315	118.91	Sc-1
44.	444421 BIDHAN NGR 400.00 442686 BIDHANNGR-WB220.00 2	OPEN LINE FROM BUS 444421 [BIDHAN NGR 400.00] TO BUS 442686 [BIDHANNGR-WB220.00] CKT 3	291.43	374.57	315	118.91	Sc-1
45.	444421 BIDHAN NGR 400.00 442686 BIDHANNGR-WB220.00 3	OPEN LINE FROM BUS 444421 [BIDHAN NGR 400.00] TO BUS 442686 [BIDHANNGR-WB220.00] CKT 1	291.43	374.56	315	118.91	Sc-1
46.	444015 CHANDITALA_N400.00 442015 CHANDITALA_N220.00 1	OPEN LINE FROM BUS 444015 [CHANDITALA_N400.00] TO BUS 442015 [CHANDITALA_N220.00] CKT 2	297.16	363.69	315	115.46	Sc-1
47.	444015 CHANDITALA_N400.00 442015 CHANDITALA_N220.00 2	OPEN LINE FROM BUS 444015 [CHANDITALA_N400.00] TO BUS 442015 [CHANDITALA_N220.00] CKT 1	297.16	363.69	315	115.46	Sc-1
48.	444015 CHANDITALA_N400.00 442015 CHANDITALA_N220.00 3	OPEN LINE FROM BUS 444015 [CHANDITALA_N400.00] TO BUS 442015 [CHANDITALA_N220.00] CKT 1	297.16	363.69	315	115.46	Sc-1
49.	164404 BHADLA 400.00 162285 BHADLA-S 220.00 1	OPEN LINE FROM BUS 164404 [BHADLA 400.00] TO BUS 162285 [BHADLA-S 220.00] CKT 2	452.26	569.13	500	113.83	Sc-1
50.	164404 BHADLA 400.00 162285 BHADLA-S 220.00 2	OPEN LINE FROM BUS 164404 [BHADLA 400.00] TO BUS 162285 [BHADLA-S 220.00] CKT 1	452.26	569.13	500	113.83	Sc-1
51.	164404 BHADLA 400.00 162285 BHADLA-S 220.00 3	OPEN LINE FROM BUS 164404 [BHADLA 400.00] TO BUS 162285 [BHADLA-S 220.00] CKT 1	452.26	569.13	500	113.83	Sc-1
52.	164404 BHADLA 400.00 162285 BHADLA-S 220.00 4	OPEN LINE FROM BUS 164404 [BHADLA 400.00] TO BUS 162285 [BHADLA-S 220.00] CKT 1	452.26	569.13	500	113.83	Sc-1
53.	164461 FATEHG-3 SPL400.00 162361 FATEHG-III 220.00 1	OPEN LINE FROM BUS 164461 [FATEHG-3 SPL400.00] TO BUS 162361 [FATEHG-III 220.00] CKT 2	452.22	566.15	500	113.23	Sc-1
54.	164461 FATEHG-3 SPL400.00 162361 FATEHG-III 220.00 2	OPEN LINE FROM BUS 164461 [FATEHG-3 SPL400.00] TO BUS 162361 [FATEHG-III 220.00] CKT 1	452.22	566.15	500	113.23	Sc-1
55.	164461 FATEHG-3 SPL400.00 162361 FATEHG-III 220.00 3	OPEN LINE FROM BUS 164461 [FATEHG-3 SPL400.00] TO BUS 162361 [FATEHG-III 220.00] CKT 1	452.22	566.15	500	113.23	Sc-1
56.	164461 FATEHG-3 SPL400.00 162361 FATEHG-III 220.00 4	OPEN LINE FROM BUS 164461 [FATEHG-3 SPL400.00] TO BUS 162361 [FATEHG-III 220.00] CKT 1	452.22	566.15	500	113.23	Sc-1
57.	164461 FATEHG-3 SPL400.00 162361 FATEHG-III 220.00 5	OPEN LINE FROM BUS 164461 [FATEHG-3 SPL400.00] TO BUS 162361 [FATEHG-III 220.00] CKT 1	452.22	566.15	500	113.23	Sc-1
58.	164459 BHADLA PG 400.00 162359 BHADLA-PG 220.00 1	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162359 [BHADLA-PG 220.00] CKT 2	465.5	558.97	500	111.79	Sc-1

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
59.	164459 BHADLA PG 400.00 162359 BHADLA-PG 220.00 2	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162359 [BHADLA-PG 220.00] CKT 1	465.5	558.97	500	111.79	Sc-1
60.	164459 BHADLA PG 400.00 162359 BHADLA-PG 220.00 3	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162359 [BHADLA-PG 220.00] CKT 1	465.5	558.97	500	111.79	Sc-1
61.	164459 BHADLA PG 400.00 162359 BHADLA-PG 220.00 4	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162359 [BHADLA-PG 220.00] CKT 1	465.5	558.97	500	111.79	Sc-1
62.	164459 BHADLA PG 400.00 162359 BHADLA-PG 220.00 5	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162359 [BHADLA-PG 220.00] CKT 1	465.5	558.97	500	111.79	Sc-1
63.	164459 BHADLA PG 400.00 162359 BHADLA-PG 220.00 6	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162359 [BHADLA-PG 220.00] CKT 1	465.5	558.97	500	111.79	Sc-1
64.	444018 KHARAGPR-WB 400.00 442018 KHARAGPR-WB 220.00 1	OPEN LINE FROM BUS 444018 [KHARAGPR-WB 400.00] TO BUS 442018 [KHARAGPR-WB 220.00] CKT 2	255.38	351.57	315	111.61	Sc-1
65.	444018 KHARAGPR-WB 400.00 442018 KHARAGPR-WB 220.00 2	OPEN LINE FROM BUS 444018 [KHARAGPR-WB 400.00] TO BUS 442018 [KHARAGPR-WB 220.00] CKT 1	255.38	351.57	315	111.61	Sc-1
66.	444018 KHARAGPR-WB 400.00 442018 KHARAGPR-WB 220.00 3	OPEN LINE FROM BUS 444018 [KHARAGPR-WB 400.00] TO BUS 442018 [KHARAGPR-WB 220.00] CKT 1	255.38	351.57	315	111.61	Sc-1
67.	164484 BHADLA-3 400.00 162484 BHADLA-3 220.00 1	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 162484 [BHADLA-3 220.00] CKT 2	445.34	557.16	500	111.43	Sc-1
68.	164484 BHADLA-3 400.00 162484 BHADLA-3 220.00 2	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 162484 [BHADLA-3 220.00] CKT 1	445.34	557.16	500	111.43	Sc-1
69.	164484 BHADLA-3 400.00 162484 BHADLA-3 220.00 3	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 162484 [BHADLA-3 220.00] CKT 1	445.34	557.16	500	111.43	Sc-1
70.	164484 BHADLA-3 400.00 162484 BHADLA-3 220.00 4	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 162484 [BHADLA-3 220.00] CKT 1	445.34	557.16	500	111.43	Sc-1
71.	164484 BHADLA-3 400.00 162484 BHADLA-3 220.00 5	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 162484 [BHADLA-3 220.00] CKT 1	445.34	557.16	500	111.43	Sc-1
72.	164484 BHADLA-3 400.00 163484 BHADLA3-SPL 220.00 1	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 163484 [BHADLA3-SPL 220.00] CKT 2	445.34	557.16	500	111.43	Sc-1
73.	164484 BHADLA-3 400.00 163484 BHADLA3-SPL 220.00 2	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 163484 [BHADLA3-SPL 220.00] CKT 1	445.34	557.16	500	111.43	Sc-1
74.	164484 BHADLA-3 400.00 163484 BHADLA3-SPL 220.00 3	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 163484 [BHADLA3-SPL 220.00] CKT 1	445.34	557.16	500	111.43	Sc-1

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
75.	164484 BHADLA-3 400.00 163484 BHADLA3-SPL 220.00 4	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 163484 [BHADLA3-SPL 220.00] CKT 1	445.34	557.16	500	111.43	Sc-1
76.	164484 BHADLA-3 400.00 163484 BHADLA3-SPL 220.00 5	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 163484 [BHADLA3-SPL 220.00] CKT 1	445.34	557.16	500	111.43	Sc-1
77.	164456 BIKANE-4 400.00 162253 BIKANE-4 220.00 1	OPEN LINE FROM BUS 164404 [BHADLA 400.00] TO BUS 164456 [BIKANE-4 400.00] CKT 1	242.51	344.07	315	109.23	Sc-1
78.	164409 HINDAU-4 400.00 162207 HINDAU-4 220.00 1	OPEN LINE FROM BUS 164409 [HINDAU-4 400.00] TO BUS 162207 [HINDAU-4 220.00] CKT 2	229.03	344.01	315	109.21	Sc-1
79.	164409 HINDAU-4 400.00 162207 HINDAU-4 220.00 2	OPEN LINE FROM BUS 164409 [HINDAU-4 400.00] TO BUS 162207 [HINDAU-4 220.00] CKT 1	229.03	344.01	315	109.21	Sc-1
80.	484001 KODERMA-DVC 400.00 482007 KODEMA_DVC 220.00 1	OPEN LINE FROM BUS 484001 [KODERMA-DVC 400.00] TO BUS 482007 [KODEMA_DVC 220.00] CKT 2	218.39	342.47	315	108.72	Sc-1
81.	484001 KODERMA-DVC 400.00 482007 KODEMA_DVC 220.00 2	OPEN LINE FROM BUS 484001 [KODERMA-DVC 400.00] TO BUS 482007 [KODEMA_DVC 220.00] CKT 1	218.39	342.47	315	108.72	Sc-1
82.	374099 WARDHA SPLT 400.00 372071 WARDH_PG 220.00 2	OPEN LINE FROM BUS 374099 [WARDHA SPLT 400.00] TO BUS 372071 [WARDH_PG 220.00] CKT 4	238.47	334.93	315	106.33	Sc-1
83.	374099 WARDHA SPLT 400.00 372071 WARDH_PG 220.00 3	OPEN LINE FROM BUS 374099 [WARDHA SPLT 400.00] TO BUS 372071 [WARDH_PG 220.00] CKT 4	238.47	334.93	315	106.33	Sc-1
84.	214015 KHUMTAI 400.00 212015 KHUMTAI 220.00 1	OPEN LINE FROM BUS 214015 [KHUMTAI 400.00] TO BUS 212015 [KHUMTAI 220.00] CKT 2	330.95	528.92	500	105.78	Sc-1
85.	214015 KHUMTAI 400.00 212015 KHUMTAI 220.00 2	OPEN LINE FROM BUS 214015 [KHUMTAI 400.00] TO BUS 212015 [KHUMTAI 220.00] CKT 1	330.95	528.92	500	105.78	Sc-1
86.	114013 PANG400SP3 400.00 114011 PANG220SP3 220.00 1	OPEN LINE FROM BUS 114013 [PANG400SP3 400.00] TO BUS 114011 [PANG220SP3 220.00] CKT 2	276.19	332.36	315	105.51	Sc-1
87.	114013 PANG400SP3 400.00 114011 PANG220SP3 220.00 2	OPEN LINE FROM BUS 114013 [PANG400SP3 400.00] TO BUS 114011 [PANG220SP3 220.00] CKT 1	276.19	332.36	315	105.51	Sc-1
88.	114013 PANG400SP3 400.00 114011 PANG220SP3 220.00 3	OPEN LINE FROM BUS 114013 [PANG400SP3 400.00] TO BUS 114011 [PANG220SP3 220.00] CKT 1	276.19	332.36	315	105.51	Sc-1
89.	114013 PANG400SP3 400.00 114011 PANG220SP3 220.00 4	OPEN LINE FROM BUS 114013 [PANG400SP3 400.00] TO BUS 114011 [PANG220SP3 220.00] CKT 1	276.19	332.36	315	105.51	Sc-1
90.	114013 PANG400SP3 400.00 114011 PANG220SP3 220.00 5	OPEN LINE FROM BUS 114013 [PANG400SP3 400.00] TO BUS 114011 [PANG220SP3 220.00] CKT 1	276.19	332.36	315	105.51	Sc-1

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
91.	114013 PANG400SP3 400.00 114011 PANG220SP3 220.00 6	OPEN LINE FROM BUS 114013 [PANG400SP3 400.00] TO BUS 114011 [PANG220SP3 220.00] CKT 1	276.19	332.36	315	105.51	Sc-1
92.	114012 PANG400SP2 400.00 114010 PANG220SP2 220.00 1	OPEN LINE FROM BUS 114012 [PANG400SP2 400.00] TO BUS 114010 [PANG220SP2 220.00] CKT 2	276.18	332.34	315	105.50	Sc-1
93.	114012 PANG400SP2 400.00 114010 PANG220SP2 220.00 2	OPEN LINE FROM BUS 114012 [PANG400SP2 400.00] TO BUS 114010 [PANG220SP2 220.00] CKT 1	276.18	332.34	315	105.50	Sc-1
94.	114012 PANG400SP2 400.00 114010 PANG220SP2 220.00 3	OPEN LINE FROM BUS 114012 [PANG400SP2 400.00] TO BUS 114010 [PANG220SP2 220.00] CKT 1	276.18	332.34	315	105.50	Sc-1
95.	114012 PANG400SP2 400.00 114010 PANG220SP2 220.00 4	OPEN LINE FROM BUS 114012 [PANG400SP2 400.00] TO BUS 114010 [PANG220SP2 220.00] CKT 1	276.18	332.34	315	105.50	Sc-1
96.	114012 PANG400SP2 400.00 114010 PANG220SP2 220.00 5	OPEN LINE FROM BUS 114012 [PANG400SP2 400.00] TO BUS 114010 [PANG220SP2 220.00] CKT 1	276.18	332.34	315	105.50	Sc-1
97.	114012 PANG400SP2 400.00 114010 PANG220SP2 220.00 6	OPEN LINE FROM BUS 114012 [PANG400SP2 400.00] TO BUS 114010 [PANG220SP2 220.00] CKT 1	276.18	332.34	315	105.50	Sc-1
98.	114008 PANG 400 SP1400.00 114009 LEH_PANG SP 220.00 1	OPEN LINE FROM BUS 114008 [PANG 400 SP1400.00] TO BUS 114009 [LEH_PANG SP 220.00] CKT 2	276.17	332.31	315	105.50	Sc-1
99.	114008 PANG 400 SP1400.00 114009 LEH_PANG SP 220.00 2	OPEN LINE FROM BUS 114008 [PANG 400 SP1400.00] TO BUS 114009 [LEH_PANG SP 220.00] CKT 1	276.17	332.31	315	105.50	Sc-1
100.	114008 PANG 400 SP1400.00 114009 LEH_PANG SP 220.00 3	OPEN LINE FROM BUS 114008 [PANG 400 SP1400.00] TO BUS 114009 [LEH_PANG SP 220.00] CKT 1	276.17	332.31	315	105.50	Sc-1
101.	114008 PANG 400 SP1400.00 114009 LEH_PANG SP 220.00 4	OPEN LINE FROM BUS 114008 [PANG 400 SP1400.00] TO BUS 114009 [LEH_PANG SP 220.00] CKT 1	276.17	332.31	315	105.50	Sc-1
102.	114008 PANG 400 SP1400.00 114009 LEH_PANG SP 220.00 5	OPEN LINE FROM BUS 114008 [PANG 400 SP1400.00] TO BUS 114009 [LEH_PANG SP 220.00] CKT 1	276.17	332.31	315	105.50	Sc-1
103.	114008 PANG 400 SP1400.00 114009 LEH_PANG SP 220.00 6	OPEN LINE FROM BUS 114008 [PANG 400 SP1400.00] TO BUS 114009 [LEH_PANG SP 220.00] CKT 1	276.17	332.31	315	105.50	Sc-1
104.	164482 FATEHG-4 400.00 162482 FATEHG-4 220.00 1	OPEN LINE FROM BUS 164482 [FATEHG-4 400.00] TO BUS 162482 [FATEHG-4 220.00] CKT 2	415.87	520.11	500	104.02	Sc-1
105.	164482 FATEHG-4 400.00 162482 FATEHG-4 220.00 2	OPEN LINE FROM BUS 164482 [FATEHG-4 400.00] TO BUS 162482 [FATEHG-4 220.00] CKT 1	415.87	520.11	500	104.02	Sc-1
106.	164482 FATEHG-4 400.00 162482 FATEHG-4 220.00 3	OPEN LINE FROM BUS 164482 [FATEHG-4 400.00] TO BUS 162482 [FATEHG-4 220.00] CKT 1	415.87	520.11	500	104.02	Sc-1

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
107.	164482 FATEHG-4 400.00 162482 FATEHG-4 220.00 4	OPEN LINE FROM BUS 164482 [FATEHG-4 400.00] TO BUS 162482 [FATEHG-4 220.00] CKT 1	415.87	520.11	500	104.02	Sc-1
108.	164482 FATEHG-4 400.00 162482 FATEHG-4 220.00 5	OPEN LINE FROM BUS 164482 [FATEHG-4 400.00] TO BUS 162482 [FATEHG-4 220.00] CKT 1	415.87	520.11	500	104.02	Sc-1
109.	174431 KANPUR 400.00 172103 KANPU-PG 220.00 1	OPEN LINE FROM BUS 174431 [KANPUR 400.00] TO BUS 172103 [KANPU-PG 220.00] CKT 2	258.21	327.26	315	103.89	Sc-1
110.	174431 KANPUR 400.00 172103 KANPU-PG 220.00 2	OPEN LINE FROM BUS 174431 [KANPUR 400.00] TO BUS 172103 [KANPU-PG 220.00] CKT 1	258.21	327.26	315	103.89	Sc-1
111.	374028 NAGOTHANE 400.00 372150 NAGOTHA2 220.00 2	OPEN LINE FROM BUS 374028 [NAGOTHANE 400.00] TO BUS 372150 [NAGOTHA2 220.00] CKT 1	399.4	515.22	500	103.04	Sc-1
112.	364012 SATNA-74 400.00 362022 SATNAPG-742 220.00 1	OPEN LINE FROM BUS 364012 [SATNA-74 400.00] TO BUS 362022 [SATNAPG-742 220.00] CKT 3	219.52	319.42	315	101.40	Sc-1
113.	364012 SATNA-74 400.00 362022 SATNAPG-742 220.00 2	OPEN LINE FROM BUS 364012 [SATNA-74 400.00] TO BUS 362022 [SATNAPG-742 220.00] CKT 3	219.52	319.42	315	101.40	Sc-1
114.	194054 PIPALKOTI SW400.00 192054 PIPALKOTI SW220.00 1	OPEN LINE FROM BUS 194054 [PIPALKOTI SW400.00] TO BUS 192054 [PIPALKOTI SW220.00] CKT 2	220.16	442.75	240	184.48	Sc-2
115.	194054 PIPALKOTI SW400.00 192054 PIPALKOTI SW220.00 2	OPEN LINE FROM BUS 194054 [PIPALKOTI SW400.00] TO BUS 192054 [PIPALKOTI SW220.00] CKT 1	220.16	442.75	240	184.48	Sc-2
116.	424022 MENDHASAL 400.00 422586 MENDHASAL 220.00 1	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 422586 [MENDHASAL 220.00] CKT 2	344.73	471.9	315	149.81	Sc-2
117.	424022 MENDHASAL 400.00 422586 MENDHASAL 220.00 2	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 422586 [MENDHASAL 220.00] CKT 1	344.73	471.9	315	149.81	Sc-2
118.	374038 KORADI-II 400.00 372393 KORADI-II 220.00 1	OPEN LINE FROM BUS 374038 [KORADI-II 400.00] TO BUS 372393 [KORADI-II 220.00] CKT 2	511.91	744.5	500	148.90	Sc-2
119.	374038 KORADI-II 400.00 372393 KORADI-II 220.00 2	OPEN LINE FROM BUS 374038 [KORADI-II 400.00] TO BUS 372393 [KORADI-II 220.00] CKT 1	511.91	744.5	500	148.90	Sc-2
120.	324002 MAGARWADA-DD400.00 322002 MAGARWADA 220.00 1	OPEN LINE FROM BUS 324002 [MAGARWADA-DD400.00] TO BUS 322002 [MAGARWADA 220.00] CKT 2	222.67	456.48	315	144.91	Sc-2
121.	324002 MAGARWADA-DD400.00 322002 MAGARWADA 220.00 2	OPEN LINE FROM BUS 324002 [MAGARWADA-DD400.00] TO BUS 322002 [MAGARWADA 220.00] CKT 1	222.67	456.48	315	144.91	Sc-2
122.	524016 GULBRG 400.00 523090 GLBRGA220 220.00 1	OPEN LINE FROM BUS 524016 [GULBRG 400.00] TO BUS 523090 [GLBRGA220 220.00] CKT 2	382.16	697.48	500	139.50	Sc-2

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
123.	524016 GULBRG 400.00 523090 GLBRGA220 220.00 2	OPEN LINE FROM BUS 524016 [GULBRG 400.00] TO BUS 523090 [GLBRGA220 220.00] CKT 1	382.16	697.48	500	139.50	Sc-2
124.	144006 SONAROAD 400.00 142212 SOHNAROAD 220.00 1	OPEN LINE FROM BUS 144006 [SONAROAD 400.00] TO BUS 142212 [SOHNAROAD 220.00] CKT 2	460.17	673.11	500	134.62	Sc-2
125.	144006 SONAROAD 400.00 142212 SOHNAROAD 220.00 2	OPEN LINE FROM BUS 144006 [SONAROAD 400.00] TO BUS 142212 [SOHNAROAD 220.00] CKT 1	460.17	673.11	500	134.62	Sc-2
126.	174424 DADR-NCR 400.00 172104 DADRI_G2 220.00 3	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 172104 [DADRI_G2 220.00] CKT 4	303.85	607.82	500	121.56	Sc-2
127.	174424 DADR-NCR 400.00 172104 DADRI_G2 220.00 4	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 172104 [DADRI_G2 220.00] CKT 3	303.85	607.82	500	121.56	Sc-2
128.	354015 MUNDRA-APL 400.00 352015 MUNDRA-APL 220.00 1	OPEN LINE FROM BUS 354015 [MUNDRA-APL 400.00] TO BUS 352015 [MUNDRA-APL 220.00] CKT 2	275.32	379.31	315	120.42	Sc-2
129.	354015 MUNDRA-APL 400.00 352015 MUNDRA-APL 220.00 2	OPEN LINE FROM BUS 354015 [MUNDRA-APL 400.00] TO BUS 352015 [MUNDRA-APL 220.00] CKT 1	275.32	379.31	315	120.42	Sc-2
130.	454001 DURGAPUR TPS400.00 452001 DURGAPUR TPS220.00 1	OPEN LINE FROM BUS 454001 [DURGAPUR TPS400.00] TO BUS 452001 [DURGAPUR TPS220.00] CKT 2	279.65	372.8	315	118.35	Sc-2
131.	454001 DURGAPUR TPS400.00 452001 DURGAPUR TPS220.00 2	OPEN LINE FROM BUS 454001 [DURGAPUR TPS400.00] TO BUS 452001 [DURGAPUR TPS220.00] CKT 1	279.65	372.8	315	118.35	Sc-2
132.	444015 CHANDITALA_N400.00 442015 CHANDITALA_N220.00 1	OPEN LINE FROM BUS 444015 [CHANDITALA_N400.00] TO BUS 442015 [CHANDITALA_N220.00] CKT 2	303.97	372.76	315	118.34	Sc-2
133.	444015 CHANDITALA_N400.00 442015 CHANDITALA_N220.00 2	OPEN LINE FROM BUS 444015 [CHANDITALA_N400.00] TO BUS 442015 [CHANDITALA_N220.00] CKT 1	303.97	372.76	315	118.34	Sc-2
134.	444015 CHANDITALA_N400.00 442015 CHANDITALA_N220.00 3	OPEN LINE FROM BUS 444015 [CHANDITALA_N400.00] TO BUS 442015 [CHANDITALA_N220.00] CKT 1	303.97	372.76	315	118.34	Sc-2
135.	164409 HINDAU-4 400.00 162207 HINDAU-4 220.00 1	OPEN LINE FROM BUS 164409 [HINDAU-4 400.00] TO BUS 162207 [HINDAU-4 220.00] CKT 2	238.76	358.3	315	113.75	Sc-2
136.	164409 HINDAU-4 400.00 162207 HINDAU-4 220.00 2	OPEN LINE FROM BUS 164409 [HINDAU-4 400.00] TO BUS 162207 [HINDAU-4 220.00] CKT 1	238.76	358.3	315	113.75	Sc-2
137.	444018 KHARAGPR-WB 400.00 442018 KHARAGPR-WB 220.00 1	OPEN LINE FROM BUS 444018 [KHARAGPR-WB 400.00] TO BUS 442018 [KHARAGPR-WB 220.00] CKT 2	253.95	348.74	315	110.71	Sc-2
138.	444018 KHARAGPR-WB 400.00 442018 KHARAGPR-WB 220.00 2	OPEN LINE FROM BUS 444018 [KHARAGPR-WB 400.00] TO BUS 442018 [KHARAGPR-WB 220.00] CKT 1	253.95	348.74	315	110.71	Sc-2

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
139.	444018 KHARAGPR-WB 400.00 442018 KHARAGPR-WB 220.00 3	OPEN LINE FROM BUS 444018 [KHARAGPR-WB 400.00] TO BUS 442018 [KHARAGPR-WB 220.00] CKT 1	253.95	348.74	315	110.71	Sc-2
140.	174265 REWA 400.00 172112 REWAROAD 220.00 1	OPEN LINE FROM BUS 174474 [ALLAHABA 400.00] TO BUS 172100 [ALLAHABA 220.00] CKT 1	312.78	347.85	315	110.43	Sc-2
141.	124441 NANJ PS 400.00 122441 NANJ PS 220.00 1	OPEN LINE FROM BUS 124441 [NANJ PS 400.00] TO BUS 122441 [NANJ PS 220.00] CKT 2	168.1	338.02	315	107.31	Sc-2
142.	124441 NANJ PS 400.00 122441 NANJ PS 220.00 2	OPEN LINE FROM BUS 124441 [NANJ PS 400.00] TO BUS 122441 [NANJ PS 220.00] CKT 1	168.1	338.02	315	107.31	Sc-2
143.	444012 KOLAGHAT 400.00 442012 KTPS220 220.00 1	OPEN LINE FROM BUS 444012 [KOLAGHAT 400.00] TO BUS 442012 [KTPS220 220.00] CKT 2	226.65	335.83	315	106.61	Sc-2
144.	444012 KOLAGHAT 400.00 442012 KTPS220 220.00 2	OPEN LINE FROM BUS 444012 [KOLAGHAT 400.00] TO BUS 442012 [KTPS220 220.00] CKT 1	226.65	335.83	315	106.61	Sc-2
145.	484002 BOKARO-A 400.00 482001 BOKARO TPS 220.00 1	OPEN LINE FROM BUS 484002 [BOKARO-A 400.00] TO BUS 482001 [BOKARO TPS 220.00] CKT 2	228.09	332.54	315	105.57	Sc-2
146.	484002 BOKARO-A 400.00 482001 BOKARO TPS 220.00 2	OPEN LINE FROM BUS 484002 [BOKARO-A 400.00] TO BUS 482001 [BOKARO TPS 220.00] CKT 1	228.09	332.54	315	105.57	Sc-2
147.	174472 OBRA4 400.00 172062 OBRA2 220.00 3	OPEN LINE FROM BUS 174472 [OBRA4 400.00] TO BUS 172062 [OBRA2 220.00] CKT 1	196.37	252.52	240	105.22	Sc-2
148.	174472 OBRA4 400.00 172062 OBRA2 220.00 1	OPEN LINE FROM BUS 174472 [OBRA4 400.00] TO BUS 172062 [OBRA2 220.00] CKT 2	257.64	331.32	315	105.18	Sc-2
149.	174472 OBRA4 400.00 172062 OBRA2 220.00 2	OPEN LINE FROM BUS 174472 [OBRA4 400.00] TO BUS 172062 [OBRA2 220.00] CKT 1	257.64	331.32	315	105.18	Sc-2
150.	444008 JEERAT 400.00 442685 JEERAT 220.00 1	OPEN LINE FROM BUS 444008 [JEERAT 400.00] TO BUS 442685 [JEERAT 220.00] CKT 2	282.18	331.04	315	105.09	Sc-2
151.	444008 JEERAT 400.00 442685 JEERAT 220.00 2	OPEN LINE FROM BUS 444008 [JEERAT 400.00] TO BUS 442685 [JEERAT 220.00] CKT 1	282.18	331.04	315	105.09	Sc-2
152.	444008 JEERAT 400.00 442685 JEERAT 220.00 3	OPEN LINE FROM BUS 444008 [JEERAT 400.00] TO BUS 442685 [JEERAT 220.00] CKT 1	282.18	331.04	315	105.09	Sc-2
153.	444008 JEERAT 400.00 442685 JEERAT 220.00 4	OPEN LINE FROM BUS 444008 [JEERAT 400.00] TO BUS 442685 [JEERAT 220.00] CKT 1	282.18	331.04	315	105.09	Sc-2
154.	174922 AGRA 400.00 172115 AGRA-PG 220.00 1	OPEN LINE FROM BUS 174922 [AGRA 400.00] TO BUS 172115 [AGRA-PG 220.00] CKT 2	249.38	325.48	315	103.33	Sc-2

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
155.	174922 AGRA 400.00 172115 AGRA-PG 220.00 2	OPEN LINE FROM BUS 174922 [AGRA 400.00] TO BUS 172115 [AGRA-PG 220.00] CKT 1	249.38	325.48	315	103.33	Sc-2
156.	114422 KISHENPUR 400.00 112235 KISHENPUR 220.00 1	OPEN LINE FROM BUS 114422 [KISHENPUR 400.00] TO BUS 112235 [KISHENPUR 220.00] CKT 2	259.05	323.47	315	102.69	Sc-2
157.	114422 KISHENPUR 400.00 112235 KISHENPUR 220.00 2	OPEN LINE FROM BUS 114422 [KISHENPUR 400.00] TO BUS 112235 [KISHENPUR 220.00] CKT 1	259.05	323.47	315	102.69	Sc-2
158.	114422 KISHENPUR 400.00 112235 KISHENPUR 220.00 3	OPEN LINE FROM BUS 114422 [KISHENPUR 400.00] TO BUS 112235 [KISHENPUR 220.00] CKT 1	259.05	323.47	315	102.69	Sc-2
159.	164457 SURATG-4 400.00 162257 SURATGARH-42220.00 1	OPEN LINE FROM BUS 164457 [SURATG-4 400.00] TO BUS 162257 [SURATGARH-42220.00] CKT 2	233.42	323.3	315	102.63	Sc-2
160.	164457 SURATG-4 400.00 162257 SURATGARH-42220.00 2	OPEN LINE FROM BUS 164457 [SURATG-4 400.00] TO BUS 162257 [SURATGARH-42220.00] CKT 1	233.42	323.3	315	102.63	Sc-2
161.	424208 NARENDRAPUR 400.00 422804 NARENDRAPUR2220.00 1	OPEN LINE FROM BUS 424208 [NARENDRAPUR 400.00] TO BUS 422804 [NARENDRAPUR2220.00] CKT 2	202.1	322.89	315	102.50	Sc-2
162.	424208 NARENDRAPUR 400.00 422804 NARENDRAPUR2220.00 2	OPEN LINE FROM BUS 424208 [NARENDRAPUR 400.00] TO BUS 422804 [NARENDRAPUR2220.00] CKT 1	202.1	322.89	315	102.50	Sc-2
163.	424033 PANDIABILI 400.00 422033 PANDIABILI 220.00 1	OPEN LINE FROM BUS 424033 [PANDIABILI 400.00] TO BUS 422033 [PANDIABILI 220.00] CKT 2	224.29	316.66	315	100.53	Sc-2
164.	424033 PANDIABILI 400.00 422033 PANDIABILI 220.00 2	OPEN LINE FROM BUS 424033 [PANDIABILI 400.00] TO BUS 422033 [PANDIABILI 220.00] CKT 1	224.29	316.66	315	100.53	Sc-2
165.	424022 MENDHASAL 400.00 422586 MENDHASAL 220.00 1	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 422586 [MENDHASAL 220.00] CKT 2	406.11	561.91	315	178.38	Sc-3
166.	424022 MENDHASAL 400.00 422586 MENDHASAL 220.00 2	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 422586 [MENDHASAL 220.00] CKT 1	406.11	561.91	315	178.38	Sc-3
167.	484002 BOKARO-A 400.00 482001 BOKARO TPS 220.00 1	OPEN LINE FROM BUS 484002 [BOKARO-A 400.00] TO BUS 482001 [BOKARO TPS 220.00] CKT 2	345.67	509.09	315	161.62	Sc-3
168.	484002 BOKARO-A 400.00 482001 BOKARO TPS 220.00 2	OPEN LINE FROM BUS 484002 [BOKARO-A 400.00] TO BUS 482001 [BOKARO TPS 220.00] CKT 1	345.67	509.09	315	161.62	Sc-3
169.	374038 KORADI-II 400.00 372393 KORADI-II 220.00 1	OPEN LINE FROM BUS 374038 [KORADI-II 400.00] TO BUS 372393 [KORADI-II 220.00] CKT 2	499.07	725.86	500	145.17	Sc-3
170.	374038 KORADI-II 400.00 372393 KORADI-II 220.00 2	OPEN LINE FROM BUS 374038 [KORADI-II 400.00] TO BUS 372393 [KORADI-II 220.00] CKT 1	499.07	725.86	500	145.17	Sc-3

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
171.	454001 DURGAPUR TPS400.00 452001 DURGAPUR TPS220.00 1	OPEN LINE FROM BUS 454001 [DURGAPUR TPS400.00] TO BUS 452001 [DURGAPUR TPS220.00] CKT 2	329.81	440.83	315	139.95	Sc-3
172.	454001 DURGAPUR TPS400.00 452001 DURGAPUR TPS220.00 2	OPEN LINE FROM BUS 454001 [DURGAPUR TPS400.00] TO BUS 452001 [DURGAPUR TPS220.00] CKT 1	329.81	440.83	315	139.95	Sc-3
173.	194054 PIPALKOTI SW400.00 192054 PIPALKOTI SW220.00 1	OPEN LINE FROM BUS 194054 [PIPALKOTI SW400.00] TO BUS 192054 [PIPALKOTI SW220.00] CKT 2	162.52	325.79	240	135.75	Sc-3
174.	194054 PIPALKOTI SW400.00 192054 PIPALKOTI SW220.00 2	OPEN LINE FROM BUS 194054 [PIPALKOTI SW400.00] TO BUS 192054 [PIPALKOTI SW220.00] CKT 1	162.52	325.79	240	135.75	Sc-3
175.	484001 KODERMA-DVC 400.00 482007 KODEMA_DVC 220.00 1	OPEN LINE FROM BUS 484001 [KODERMA-DVC 400.00] TO BUS 482007 [KODEMA_DVC 220.00] CKT 2	262.42	414.04	315	131.44	Sc-3
176.	484001 KODERMA-DVC 400.00 482007 KODEMA_DVC 220.00 2	OPEN LINE FROM BUS 484001 [KODERMA-DVC 400.00] TO BUS 482007 [KODEMA_DVC 220.00] CKT 1	262.42	414.04	315	131.44	Sc-3
177.	424208 NARENDRAPUR 400.00 422804 NARENDRAPUR2220.00 1	OPEN LINE FROM BUS 424208 [NARENDRAPUR 400.00] TO BUS 422804 [NARENDRAPUR2220.00] CKT 2	248.36	399.47	315	126.82	Sc-3
178.	424208 NARENDRAPUR 400.00 422804 NARENDRAPUR2220.00 2	OPEN LINE FROM BUS 424208 [NARENDRAPUR 400.00] TO BUS 422804 [NARENDRAPUR2220.00] CKT 1	248.36	399.47	315	126.82	Sc-3
179.	144006 SONAROAD 400.00 142212 SOHNAROAD 220.00 1	OPEN LINE FROM BUS 144006 [SONAROAD 400.00] TO BUS 142212 [SOHNAROAD 220.00] CKT 2	418.93	612.68	500	122.54	Sc-3
180.	144006 SONAROAD 400.00 142212 SOHNAROAD 220.00 2	OPEN LINE FROM BUS 144006 [SONAROAD 400.00] TO BUS 142212 [SOHNAROAD 220.00] CKT 1	418.93	612.68	500	122.54	Sc-3
181.	444015 CHANDITALA_N400.00 442015 CHANDITALA_N220.00 1	OPEN LINE FROM BUS 444015 [CHANDITALA_N400.00] TO BUS 442015 [CHANDITALA_N220.00] CKT 2	311.09	381.54	315	121.12	Sc-3
182.	444015 CHANDITALA_N400.00 442015 CHANDITALA_N220.00 2	OPEN LINE FROM BUS 444015 [CHANDITALA_N400.00] TO BUS 442015 [CHANDITALA_N220.00] CKT 1	311.09	381.54	315	121.12	Sc-3
183.	444015 CHANDITALA_N400.00 442015 CHANDITALA_N220.00 3	OPEN LINE FROM BUS 444015 [CHANDITALA_N400.00] TO BUS 442015 [CHANDITALA_N220.00] CKT 1	311.09	381.54	315	121.12	Sc-3
184.	424033 PANDIABILI 400.00 422033 PANDIABILI 220.00 1	OPEN LINE FROM BUS 424033 [PANDIABILI 400.00] TO BUS 422033 [PANDIABILI 220.00] CKT 2	264.12	374.48	315	118.88	Sc-3
185.	424033 PANDIABILI 400.00 422033 PANDIABILI 220.00 2	OPEN LINE FROM BUS 424033 [PANDIABILI 400.00] TO BUS 422033 [PANDIABILI 220.00] CKT 1	264.12	374.48	315	118.88	Sc-3
186.	324002 MAGARWADA-DD400.00 322002 MAGARWADA 220.00 1	OPEN LINE FROM BUS 324002 [MAGARWADA-DD400.00] TO BUS 322002 [MAGARWADA 220.00] CKT 2	180.98	367.92	315	116.80	Sc-3

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
187.	324002 MAGARWADA-DD400.00 322002 MAGARWADA 220.00 2	OPEN LINE FROM BUS 324002 [MAGARWADA-DD400.00] TO BUS 322002 [MAGARWADA 220.00] CKT 1	180.98	367.92	315	116.80	Sc-3
188.	174265 REWA 400.00 172112 REWAROAD 220.00 1	OPEN LINE FROM BUS 174474 [ALLAHABA 400.00] TO BUS 172100 [ALLAHABA 220.00] CKT 1	325.26	362.75	315	115.16	Sc-3
189.	164409 HINDAU-4 400.00 162207 HINDAU-4 220.00 1	OPEN LINE FROM BUS 164409 [HINDAU-4 400.00] TO BUS 162207 [HINDAU-4 220.00] CKT 2	232.07	348.44	315	110.62	Sc-3
190.	164409 HINDAU-4 400.00 162207 HINDAU-4 220.00 2	OPEN LINE FROM BUS 164409 [HINDAU-4 400.00] TO BUS 162207 [HINDAU-4 220.00] CKT 1	232.07	348.44	315	110.62	Sc-3
191.	354015 MUNDRA-APL 400.00 352015 MUNDRA-APL 220.00 1	OPEN LINE FROM BUS 354015 [MUNDRA-APL 400.00] TO BUS 352015 [MUNDRA-APL 220.00] CKT 2	250.34	344.78	315	109.45	Sc-3
192.	354015 MUNDRA-APL 400.00 352015 MUNDRA-APL 220.00 2	OPEN LINE FROM BUS 354015 [MUNDRA-APL 400.00] TO BUS 352015 [MUNDRA-APL 220.00] CKT 1	250.34	344.78	315	109.45	Sc-3
193.	444018 KHARAGPR-WB 400.00 442018 KHARAGPR-WB 220.00 1	OPEN LINE FROM BUS 444018 [KHARAGPR-WB 400.00] TO BUS 442018 [KHARAGPR-WB 220.00] CKT 2	250.11	343.34	315	109.00	Sc-3
194.	444018 KHARAGPR-WB 400.00 442018 KHARAGPR-WB 220.00 2	OPEN LINE FROM BUS 444018 [KHARAGPR-WB 400.00] TO BUS 442018 [KHARAGPR-WB 220.00] CKT 1	250.11	343.34	315	109.00	Sc-3
195.	444018 KHARAGPR-WB 400.00 442018 KHARAGPR-WB 220.00 3	OPEN LINE FROM BUS 444018 [KHARAGPR-WB 400.00] TO BUS 442018 [KHARAGPR-WB 220.00] CKT 1	250.11	343.34	315	109.00	Sc-3
196.	174472 OBRA4 400.00 172062 OBRA2 220.00 3	OPEN LINE FROM BUS 174472 [OBRA4 400.00] TO BUS 172062 [OBRA2 220.00] CKT 1	201.68	259.39	240	108.08	Sc-3
197.	174472 OBRA4 400.00 172062 OBRA2 220.00 1	OPEN LINE FROM BUS 174472 [OBRA4 400.00] TO BUS 172062 [OBRA2 220.00] CKT 2	264.62	340.33	315	108.04	Sc-3
198.	174472 OBRA4 400.00 172062 OBRA2 220.00 2	OPEN LINE FROM BUS 174472 [OBRA4 400.00] TO BUS 172062 [OBRA2 220.00] CKT 1	264.62	340.33	315	108.04	Sc-3
199.	454003 RAGHUNATHTPS400.00 452003 RAGHUNATHTPS220.00 1	OPEN LINE FROM BUS 454003 [RAGHUNATHTPS400.00] TO BUS 452003 [RAGHUNATHTPS220.00] CKT 2	234.48	338.81	315	107.56	Sc-3
200.	454003 RAGHUNATHTPS400.00 452003 RAGHUNATHTPS220.00 2	OPEN LINE FROM BUS 454003 [RAGHUNATHTPS400.00] TO BUS 452003 [RAGHUNATHTPS220.00] CKT 1	234.48	338.81	315	107.56	Sc-3
201.	174922 AGRA 400.00 172115 AGRA-PG 220.00 1	OPEN LINE FROM BUS 174922 [AGRA 400.00] TO BUS 172115 [AGRA-PG 220.00] CKT 2	259.18	338.08	315	107.33	Sc-3
202.	174922 AGRA 400.00 172115 AGRA-PG 220.00 2	OPEN LINE FROM BUS 174922 [AGRA 400.00] TO BUS 172115 [AGRA-PG 220.00] CKT 1	259.18	338.08	315	107.33	Sc-3

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
203.	444008 JEERAT 400.00 442685 JEERAT 220.00 1	OPEN LINE FROM BUS 444008 [JEERAT 400.00] TO BUS 442685 [JEERAT 220.00] CKT 2	286.13	335.71	315	106.57	Sc-3
204.	444008 JEERAT 400.00 442685 JEERAT 220.00 2	OPEN LINE FROM BUS 444008 [JEERAT 400.00] TO BUS 442685 [JEERAT 220.00] CKT 1	286.13	335.71	315	106.57	Sc-3
205.	444008 JEERAT 400.00 442685 JEERAT 220.00 3	OPEN LINE FROM BUS 444008 [JEERAT 400.00] TO BUS 442685 [JEERAT 220.00] CKT 1	286.13	335.71	315	106.57	Sc-3
206.	444008 JEERAT 400.00 442685 JEERAT 220.00 4	OPEN LINE FROM BUS 444008 [JEERAT 400.00] TO BUS 442685 [JEERAT 220.00] CKT 1	286.13	335.71	315	106.57	Sc-3
207.	444012 KOLAGHAT 400.00 442012 KTPS220 220.00 1	OPEN LINE FROM BUS 444012 [KOLAGHAT 400.00] TO BUS 442012 [KTPS220 220.00] CKT 2	224.49	332.79	315	105.65	Sc-3
208.	444012 KOLAGHAT 400.00 442012 KTPS220 220.00 2	OPEN LINE FROM BUS 444012 [KOLAGHAT 400.00] TO BUS 442012 [KTPS220 220.00] CKT 1	224.49	332.79	315	105.65	Sc-3
209.	424050 LAPANGA 400.00 422805 LAPANGA2 220.00 1	OPEN LINE FROM BUS 424050 [LAPANGA 400.00] TO BUS 422805 [LAPANGA2 220.00] CKT 2	237.33	331.55	315	105.25	Sc-3
210.	424050 LAPANGA 400.00 422805 LAPANGA2 220.00 2	OPEN LINE FROM BUS 424050 [LAPANGA 400.00] TO BUS 422805 [LAPANGA2 220.00] CKT 1	237.33	331.55	315	105.25	Sc-3
211.	174058 ORAI 400.00 172124 ORAI 42 220.00 3	OPEN LINE FROM BUS 174058 [ORAI 400.00] TO BUS 172124 [ORAI 42 220.00] CKT 2	164.62	245.75	240	102.40	Sc-3
212.	174512 ALIGARH 400.00 172087 ALIGARH 220.00 1	OPEN LINE FROM BUS 174512 [ALIGARH 400.00] TO BUS 172087 [ALIGARH 220.00] CKT 2	366.84	508.57	500	101.71	Sc-3
213.	174512 ALIGARH 400.00 172087 ALIGARH 220.00 2	OPEN LINE FROM BUS 174512 [ALIGARH 400.00] TO BUS 172087 [ALIGARH 220.00] CKT 1	366.84	508.57	500	101.71	Sc-3
214.	524016 GULBRG 400.00 523090 GLBRGA220 220.00 1	OPEN LINE FROM BUS 524016 [GULBRG 400.00] TO BUS 523090 [GLBRGA220 220.00] CKT 2	279.46	508.54	500	101.71	Sc-3
215.	524016 GULBRG 400.00 523090 GLBRGA220 220.00 2	OPEN LINE FROM BUS 524016 [GULBRG 400.00] TO BUS 523090 [GLBRGA220 220.00] CKT 1	279.46	508.54	500	101.71	Sc-3
216.	164457 SURATG-4 400.00 162257 SURATGARH-42220.00 1	OPEN LINE FROM BUS 164457 [SURATG-4 400.00] TO BUS 162257 [SURATGARH-42220.00] CKT 2	228.98	317.61	315	100.83	Sc-3
217.	164457 SURATG-4 400.00 162257 SURATGARH-42220.00 2	OPEN LINE FROM BUS 164457 [SURATG-4 400.00] TO BUS 162257 [SURATGARH-42220.00] CKT 1	228.98	317.61	315	100.83	Sc-3
218.	164422 RAMG-I 400.00 162422 RAMGARH-I 220.00 1	OPEN LINE FROM BUS 164422 [RAMG-I 400.00] TO BUS 162422 [RAMGARH-I 220.00] CKT 2	445.14	894.51	500	178.90	Sc-4

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
219.	164422 RAMG-I 400.00 162422 RAMGARH-I 220.00 2	OPEN LINE FROM BUS 164422 [RAMG-I 400.00] TO BUS 162422 [RAMGARH-I 220.00] CKT 1	445.14	894.51	500	178.90	Sc-4
220.	114422 KISHENPUR 400.00 112235 KISHENPUR 220.00 1	OPEN LINE FROM BUS 114422 [KISHENPUR 400.00] TO BUS 112235 [KISHENPUR 220.00] CKT 2	426.88	533.15	315	169.25	Sc-4
221.	114422 KISHENPUR 400.00 112235 KISHENPUR 220.00 2	OPEN LINE FROM BUS 114422 [KISHENPUR 400.00] TO BUS 112235 [KISHENPUR 220.00] CKT 1	426.88	533.15	315	169.25	Sc-4
222.	114422 KISHENPUR 400.00 112235 KISHENPUR 220.00 3	OPEN LINE FROM BUS 114422 [KISHENPUR 400.00] TO BUS 112235 [KISHENPUR 220.00] CKT 1	426.88	533.15	315	169.25	Sc-4
223.	484002 BOKARO-A 400.00 482001 BOKARO TPS 220.00 1	OPEN LINE FROM BUS 484002 [BOKARO-A 400.00] TO BUS 482001 [BOKARO TPS 220.00] CKT 2	335.08	488.73	315	155.15	Sc-4
224.	484002 BOKARO-A 400.00 482001 BOKARO TPS 220.00 2	OPEN LINE FROM BUS 484002 [BOKARO-A 400.00] TO BUS 482001 [BOKARO TPS 220.00] CKT 1	335.08	488.73	315	155.15	Sc-4
225.	164459 BHADLA PG 400.00 162659 BHADLA-SPLT 220.00 1	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162659 [BHADLA-SPLT 220.00] CKT 2	367.85	735.71	500	147.14	Sc-4
226.	164459 BHADLA PG 400.00 162659 BHADLA-SPLT 220.00 2	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162659 [BHADLA-SPLT 220.00] CKT 1	367.85	735.71	500	147.14	Sc-4
227.	444012 KOLAGHAT 400.00 442012 KTPS220 220.00 1	OPEN LINE FROM BUS 444012 [KOLAGHAT 400.00] TO BUS 442012 [KTPS220 220.00] CKT 2	307.26	454.03	315	144.14	Sc-4
228.	444012 KOLAGHAT 400.00 442012 KTPS220 220.00 2	OPEN LINE FROM BUS 444012 [KOLAGHAT 400.00] TO BUS 442012 [KTPS220 220.00] CKT 1	307.26	454.03	315	144.14	Sc-4
229.	164498 BHADLA-2 400.00 162499 BHAD-2 SPLT 220.00 1	OPEN LINE FROM BUS 164404 [BHADLA 400.00] TO BUS 164456 [BIKANE-4 400.00] CKT 1	1406.13	1409.52	1000	140.95	Sc-4
230.	194054 PIPALKOTI SW400.00 192054 PIPALKOTI SW220.00 1	OPEN LINE FROM BUS 194054 [PIPALKOTI SW400.00] TO BUS 192054 [PIPALKOTI SW220.00] CKT 2	167.7	336.26	240	140.11	Sc-4
231.	194054 PIPALKOTI SW400.00 192054 PIPALKOTI SW220.00 2	OPEN LINE FROM BUS 194054 [PIPALKOTI SW400.00] TO BUS 192054 [PIPALKOTI SW220.00] CKT 1	167.7	336.26	240	140.11	Sc-4
232.	324002 MAGARWADA-DD400.00 322002 MAGARWADA 220.00 1	OPEN LINE FROM BUS 324002 [MAGARWADA-DD400.00] TO BUS 322002 [MAGARWADA 220.00] CKT 2	212.94	436.32	315	138.51	Sc-4
233.	324002 MAGARWADA-DD400.00 322002 MAGARWADA 220.00 2	OPEN LINE FROM BUS 324002 [MAGARWADA-DD400.00] TO BUS 322002 [MAGARWADA 220.00] CKT 1	212.94	436.32	315	138.51	Sc-4
234.	374057 DOLVI 400.00 372244 NDIL 220.00 1	OPEN LINE FROM BUS 374057 [DOLVI 400.00] TO BUS 372244 [NDIL 220.00] CKT 2	294.13	655.88	500	131.18	Sc-4

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
235.	374057 DOLVI 400.00 372244 NDIL 220.00 2	OPEN LINE FROM BUS 374057 [DOLVI 400.00] TO BUS 372244 [NDIL 220.00] CKT 1	294.13	655.88	500	131.18	Sc-4
236.	354035 VADODARA 400.00 352210 VADODARAPG 220.00 1	OPEN LINE FROM BUS 354035 [VADODARA 400.00] TO BUS 352210 [VADODARAPG 220.00] CKT 2	460.28	628.84	500	125.77	Sc-4
237.	354035 VADODARA 400.00 352210 VADODARAPG 220.00 2	OPEN LINE FROM BUS 354035 [VADODARA 400.00] TO BUS 352210 [VADODARAPG 220.00] CKT 1	460.28	628.84	500	125.77	Sc-4
238.	424022 MENDHASAL 400.00 422586 MENDHASAL 220.00 1	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 422586 [MENDHASAL 220.00] CKT 2	287.51	392.19	315	124.50	Sc-4
239.	424022 MENDHASAL 400.00 422586 MENDHASAL 220.00 2	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 422586 [MENDHASAL 220.00] CKT 1	287.51	392.19	315	124.50	Sc-4
240.	164480 FATEHG-2 400.00 162480 FATEH-2 220.00 1	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 162480 [FATEH-2 220.00] CKT 2	493.5	617.64	500	123.53	Sc-4
241.	164480 FATEHG-2 400.00 162480 FATEH-2 220.00 2	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 162480 [FATEH-2 220.00] CKT 1	493.5	617.64	500	123.53	Sc-4
242.	164480 FATEHG-2 400.00 162480 FATEH-2 220.00 3	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 162480 [FATEH-2 220.00] CKT 1	493.5	617.64	500	123.53	Sc-4
243.	164480 FATEHG-2 400.00 162480 FATEH-2 220.00 4	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 162480 [FATEH-2 220.00] CKT 1	493.5	617.64	500	123.53	Sc-4
244.	164480 FATEHG-2 400.00 162480 FATEH-2 220.00 5	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 162480 [FATEH-2 220.00] CKT 1	493.5	617.64	500	123.53	Sc-4
245.	164480 FATEHG-2 400.00 163480 FATEH-SPL 2 220.00 1	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 163480 [FATEH-SPL 2 220.00] CKT 2	489.52	612.65	500	122.53	Sc-4
246.	164480 FATEHG-2 400.00 163480 FATEH-SPL 2 220.00 2	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 163480 [FATEH-SPL 2 220.00] CKT 1	489.52	612.65	500	122.53	Sc-4
247.	164480 FATEHG-2 400.00 163480 FATEH-SPL 2 220.00 3	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 163480 [FATEH-SPL 2 220.00] CKT 1	489.52	612.65	500	122.53	Sc-4
248.	164480 FATEHG-2 400.00 163480 FATEH-SPL 2 220.00 4	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 163480 [FATEH-SPL 2 220.00] CKT 1	489.52	612.65	500	122.53	Sc-4
249.	164480 FATEHG-2 400.00 163480 FATEH-SPL 2 220.00 5	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 163480 [FATEH-SPL 2 220.00] CKT 1	489.52	612.65	500	122.53	Sc-4
250.	444421 BIDHAN NGR 400.00 442686 BIDHANNGR-WB220.00 1	OPEN LINE FROM BUS 444421 [BIDHAN NGR 400.00] TO BUS 442686 [BIDHANNGR-WB220.00] CKT 3	296.12	380.41	315	120.77	Sc-4

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
251.	444421 BIDHAN NGR 400.00 442686 BIDHANNGR-WB220.00 2	OPEN LINE FROM BUS 444421 [BIDHAN NGR 400.00] TO BUS 442686 [BIDHANNGR-WB220.00] CKT 3	296.12	380.41	315	120.77	Sc-4
252.	444421 BIDHAN NGR 400.00 442686 BIDHANNGR-WB220.00 3	OPEN LINE FROM BUS 444421 [BIDHAN NGR 400.00] TO BUS 442686 [BIDHANNGR-WB220.00] CKT 1	296.12	380.41	315	120.77	Sc-4
253.	164498 BHADLA-2 400.00 162498 BHADLA-2 220.00 1	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162498 [BHADLA-2 220.00] CKT 2	481.3	602.46	500	120.49	Sc-4
254.	164498 BHADLA-2 400.00 162498 BHADLA-2 220.00 2	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162498 [BHADLA-2 220.00] CKT 1	481.3	602.46	500	120.49	Sc-4
255.	164498 BHADLA-2 400.00 162498 BHADLA-2 220.00 3	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162498 [BHADLA-2 220.00] CKT 1	481.3	602.46	500	120.49	Sc-4
256.	164498 BHADLA-2 400.00 162498 BHADLA-2 220.00 4	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162498 [BHADLA-2 220.00] CKT 1	481.3	602.46	500	120.49	Sc-4
257.	164498 BHADLA-2 400.00 162498 BHADLA-2 220.00 5	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162498 [BHADLA-2 220.00] CKT 1	481.3	602.46	500	120.49	Sc-4
258.	164481 FATEHG-3 400.00 162481 FATEHG-3 220.00 1	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 162481 [FATEHG-3 220.00] CKT 2	478.87	599.18	500	119.84	Sc-4
259.	164481 FATEHG-3 400.00 162481 FATEHG-3 220.00 2	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 162481 [FATEHG-3 220.00] CKT 1	478.87	599.18	500	119.84	Sc-4
260.	164481 FATEHG-3 400.00 162481 FATEHG-3 220.00 3	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 162481 [FATEHG-3 220.00] CKT 1	478.87	599.18	500	119.84	Sc-4
261.	164481 FATEHG-3 400.00 162481 FATEHG-3 220.00 4	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 162481 [FATEHG-3 220.00] CKT 1	478.87	599.18	500	119.84	Sc-4
262.	164481 FATEHG-3 400.00 162481 FATEHG-3 220.00 5	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 162481 [FATEHG-3 220.00] CKT 1	478.87	599.18	500	119.84	Sc-4
263.	444015 CHANDITALA_N400.00 442015 CHANDITALA_N220.00 1	OPEN LINE FROM BUS 444015 [CHANDITALA_N400.00] TO BUS 442015 [CHANDITALA_N220.00] CKT 2	306.97	375.79	315	119.30	Sc-4
264.	444015 CHANDITALA_N400.00 442015 CHANDITALA_N220.00 2	OPEN LINE FROM BUS 444015 [CHANDITALA_N400.00] TO BUS 442015 [CHANDITALA_N220.00] CKT 1	306.97	375.79	315	119.30	Sc-4
265.	444015 CHANDITALA_N400.00 442015 CHANDITALA_N220.00 3	OPEN LINE FROM BUS 444015 [CHANDITALA_N400.00] TO BUS 442015 [CHANDITALA_N220.00] CKT 1	306.97	375.79	315	119.30	Sc-4
266.	354012 SUGEN 400.00 352012 SUGEN 220.00 1	OPEN LINE FROM BUS 354012 [SUGEN 400.00] TO BUS 352012 [SUGEN 220.00] CKT 2	300.49	372.1	315	118.13	Sc-4

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
267.	354012 SUGEN 400.00 352012 SUGEN 220.00 2	OPEN LINE FROM BUS 354012 [SUGEN 400.00] TO BUS 352012 [SUGEN 220.00] CKT 1	300.49	372.1	315	118.13	Sc-4
268.	354012 SUGEN 400.00 352012 SUGEN 220.00 3	OPEN LINE FROM BUS 354012 [SUGEN 400.00] TO BUS 352012 [SUGEN 220.00] CKT 1	300.49	372.1	315	118.13	Sc-4
269.	144006 SONAROAD 400.00 142212 SOHNAROAD 220.00 1	OPEN LINE FROM BUS 144006 [SONAROAD 400.00] TO BUS 142212 [SOHNAROAD 220.00] CKT 2	402.75	589.31	500	117.86	Sc-4
270.	144006 SONAROAD 400.00 142212 SOHNAROAD 220.00 2	OPEN LINE FROM BUS 144006 [SONAROAD 400.00] TO BUS 142212 [SOHNAROAD 220.00] CKT 1	402.75	589.31	500	117.86	Sc-4
271.	484001 KODERMA-DVC 400.00 482007 KODEMA_DVC 220.00 1	OPEN LINE FROM BUS 484001 [KODERMA-DVC 400.00] TO BUS 482007 [KODEMA_DVC 220.00] CKT 2	232.2	364.37	315	115.67	Sc-4
272.	484001 KODERMA-DVC 400.00 482007 KODEMA_DVC 220.00 2	OPEN LINE FROM BUS 484001 [KODERMA-DVC 400.00] TO BUS 482007 [KODEMA_DVC 220.00] CKT 1	232.2	364.37	315	115.67	Sc-4
273.	164409 HINDAU-4 400.00 162207 HINDAU-4 220.00 1	OPEN LINE FROM BUS 164409 [HINDAU-4 400.00] TO BUS 162207 [HINDAU-4 220.00] CKT 2	240.93	361.46	315	114.75	Sc-4
274.	164409 HINDAU-4 400.00 162207 HINDAU-4 220.00 2	OPEN LINE FROM BUS 164409 [HINDAU-4 400.00] TO BUS 162207 [HINDAU-4 220.00] CKT 1	240.93	361.46	315	114.75	Sc-4
275.	354208 NAVSARI-NEW 400.00 352298 NAVSARI-NEW 220.00 1	OPEN LINE FROM BUS 354208 [NAVSARI-NEW 400.00] TO BUS 352298 [NAVSARI-NEW 220.00] CKT 2	468.9	572.92	500	114.58	Sc-4
276.	354208 NAVSARI-NEW 400.00 352298 NAVSARI-NEW 220.00 2	OPEN LINE FROM BUS 354208 [NAVSARI-NEW 400.00] TO BUS 352298 [NAVSARI-NEW 220.00] CKT 1	468.9	572.92	500	114.58	Sc-4
277.	354208 NAVSARI-NEW 400.00 352298 NAVSARI-NEW 220.00 3	OPEN LINE FROM BUS 354208 [NAVSARI-NEW 400.00] TO BUS 352298 [NAVSARI-NEW 220.00] CKT 1	468.9	572.92	500	114.58	Sc-4
278.	444018 KHARAGPR-WB 400.00 442018 KHARAGPR-WB 220.00 1	OPEN LINE FROM BUS 444018 [KHARAGPR-WB 400.00] TO BUS 442018 [KHARAGPR-WB 220.00] CKT 2	261.08	359.19	315	114.03	Sc-4
279.	444018 KHARAGPR-WB 400.00 442018 KHARAGPR-WB 220.00 2	OPEN LINE FROM BUS 444018 [KHARAGPR-WB 400.00] TO BUS 442018 [KHARAGPR-WB 220.00] CKT 1	261.08	359.19	315	114.03	Sc-4
280.	444018 KHARAGPR-WB 400.00 442018 KHARAGPR-WB 220.00 3	OPEN LINE FROM BUS 444018 [KHARAGPR-WB 400.00] TO BUS 442018 [KHARAGPR-WB 220.00] CKT 1	261.08	359.19	315	114.03	Sc-4
281.	374099 WARDHA SPLT 400.00 372071 WARDH_PG 220.00 2	OPEN LINE FROM BUS 374099 [WARDHA SPLT 400.00] TO BUS 372071 [WARDH_PG 220.00] CKT 4	255.58	359.03	315	113.98	Sc-4
282.	374099 WARDHA SPLT 400.00 372071 WARDH_PG 220.00 3	OPEN LINE FROM BUS 374099 [WARDHA SPLT 400.00] TO BUS 372071 [WARDH_PG 220.00] CKT 4	255.58	359.03	315	113.98	Sc-4

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
283.	164461 FATEHG-3 SPL400.00 162361 FATEHG-III 220.00 1	OPEN LINE FROM BUS 164461 [FATEHG-3 SPL400.00] TO BUS 162361 [FATEHG-III 220.00] CKT 2	451.08	564.58	500	112.92	Sc-4
284.	164461 FATEHG-3 SPL400.00 162361 FATEHG-III 220.00 2	OPEN LINE FROM BUS 164461 [FATEHG-3 SPL400.00] TO BUS 162361 [FATEHG-III 220.00] CKT 1	451.08	564.58	500	112.92	Sc-4
285.	164461 FATEHG-3 SPL400.00 162361 FATEHG-III 220.00 3	OPEN LINE FROM BUS 164461 [FATEHG-3 SPL400.00] TO BUS 162361 [FATEHG-III 220.00] CKT 1	451.08	564.58	500	112.92	Sc-4
286.	164461 FATEHG-3 SPL400.00 162361 FATEHG-III 220.00 4	OPEN LINE FROM BUS 164461 [FATEHG-3 SPL400.00] TO BUS 162361 [FATEHG-III 220.00] CKT 1	451.08	564.58	500	112.92	Sc-4
287.	164461 FATEHG-3 SPL400.00 162361 FATEHG-III 220.00 5	OPEN LINE FROM BUS 164461 [FATEHG-3 SPL400.00] TO BUS 162361 [FATEHG-III 220.00] CKT 1	451.08	564.58	500	112.92	Sc-4
288.	164459 BHADLA PG 400.00 162359 BHADLA-PG 220.00 1	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162359 [BHADLA-PG 220.00] CKT 2	464.62	557.88	500	111.58	Sc-4
289.	164459 BHADLA PG 400.00 162359 BHADLA-PG 220.00 2	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162359 [BHADLA-PG 220.00] CKT 1	464.62	557.88	500	111.58	Sc-4
290.	164459 BHADLA PG 400.00 162359 BHADLA-PG 220.00 3	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162359 [BHADLA-PG 220.00] CKT 1	464.62	557.88	500	111.58	Sc-4
291.	164459 BHADLA PG 400.00 162359 BHADLA-PG 220.00 4	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162359 [BHADLA-PG 220.00] CKT 1	464.62	557.88	500	111.58	Sc-4
292.	164459 BHADLA PG 400.00 162359 BHADLA-PG 220.00 5	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162359 [BHADLA-PG 220.00] CKT 1	464.62	557.88	500	111.58	Sc-4
293.	164459 BHADLA PG 400.00 162359 BHADLA-PG 220.00 6	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162359 [BHADLA-PG 220.00] CKT 1	464.62	557.88	500	111.58	Sc-4
294.	164484 BHADLA-3 400.00 162484 BHADLA-3 220.00 1	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 162484 [BHADLA-3 220.00] CKT 2	445.14	556.91	500	111.38	Sc-4
295.	164484 BHADLA-3 400.00 162484 BHADLA-3 220.00 2	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 162484 [BHADLA-3 220.00] CKT 1	445.14	556.91	500	111.38	Sc-4
296.	164484 BHADLA-3 400.00 162484 BHADLA-3 220.00 3	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 162484 [BHADLA-3 220.00] CKT 1	445.14	556.91	500	111.38	Sc-4
297.	164484 BHADLA-3 400.00 162484 BHADLA-3 220.00 4	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 162484 [BHADLA-3 220.00] CKT 1	445.14	556.91	500	111.38	Sc-4
298.	164484 BHADLA-3 400.00 162484 BHADLA-3 220.00 5	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 162484 [BHADLA-3 220.00] CKT 1	445.14	556.91	500	111.38	Sc-4

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
299.	164484 BHADLA-3 400.00 163484 BHADLA3-SPL 220.00 1	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 163484 [BHADLA3-SPL 220.00] CKT 2	445.14	556.91	500	111.38	Sc-4
300.	164484 BHADLA-3 400.00 163484 BHADLA3-SPL 220.00 2	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 163484 [BHADLA3-SPL 220.00] CKT 1	445.14	556.91	500	111.38	Sc-4
301.	164484 BHADLA-3 400.00 163484 BHADLA3-SPL 220.00 3	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 163484 [BHADLA3-SPL 220.00] CKT 1	445.14	556.91	500	111.38	Sc-4
302.	164484 BHADLA-3 400.00 163484 BHADLA3-SPL 220.00 4	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 163484 [BHADLA3-SPL 220.00] CKT 1	445.14	556.91	500	111.38	Sc-4
303.	164484 BHADLA-3 400.00 163484 BHADLA3-SPL 220.00 5	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 163484 [BHADLA3-SPL 220.00] CKT 1	445.14	556.91	500	111.38	Sc-4
304.	164404 BHADLA 400.00 162285 BHADLA-S 220.00 1	OPEN LINE FROM BUS 164404 [BHADLA 400.00] TO BUS 162285 [BHADLA-S 220.00] CKT 2	435.97	548.6	500	109.72	Sc-4
305.	164404 BHADLA 400.00 162285 BHADLA-S 220.00 2	OPEN LINE FROM BUS 164404 [BHADLA 400.00] TO BUS 162285 [BHADLA-S 220.00] CKT 1	435.97	548.6	500	109.72	Sc-4
306.	164404 BHADLA 400.00 162285 BHADLA-S 220.00 3	OPEN LINE FROM BUS 164404 [BHADLA 400.00] TO BUS 162285 [BHADLA-S 220.00] CKT 1	435.97	548.6	500	109.72	Sc-4
307.	164404 BHADLA 400.00 162285 BHADLA-S 220.00 4	OPEN LINE FROM BUS 164404 [BHADLA 400.00] TO BUS 162285 [BHADLA-S 220.00] CKT 1	435.97	548.6	500	109.72	Sc-4
308.	114013 PANG400SP3 400.00 114011 PANG220SP3 220.00 1	OPEN LINE FROM BUS 114013 [PANG400SP3 400.00] TO BUS 114011 [PANG220SP3 220.00] CKT 2	276.07	332.2	315	105.46	Sc-4
309.	114013 PANG400SP3 400.00 114011 PANG220SP3 220.00 2	OPEN LINE FROM BUS 114013 [PANG400SP3 400.00] TO BUS 114011 [PANG220SP3 220.00] CKT 1	276.07	332.2	315	105.46	Sc-4
310.	114013 PANG400SP3 400.00 114011 PANG220SP3 220.00 3	OPEN LINE FROM BUS 114013 [PANG400SP3 400.00] TO BUS 114011 [PANG220SP3 220.00] CKT 1	276.07	332.2	315	105.46	Sc-4
311.	114013 PANG400SP3 400.00 114011 PANG220SP3 220.00 4	OPEN LINE FROM BUS 114013 [PANG400SP3 400.00] TO BUS 114011 [PANG220SP3 220.00] CKT 1	276.07	332.2	315	105.46	Sc-4
312.	114013 PANG400SP3 400.00 114011 PANG220SP3 220.00 5	OPEN LINE FROM BUS 114013 [PANG400SP3 400.00] TO BUS 114011 [PANG220SP3 220.00] CKT 1	276.07	332.2	315	105.46	Sc-4
313.	114013 PANG400SP3 400.00 114011 PANG220SP3 220.00 6	OPEN LINE FROM BUS 114013 [PANG400SP3 400.00] TO BUS 114011 [PANG220SP3 220.00] CKT 1	276.07	332.2	315	105.46	Sc-4
314.	114012 PANG400SP2 400.00 114010 PANG220SP2 220.00 1	OPEN LINE FROM BUS 114012 [PANG400SP2 400.00] TO BUS 114010 [PANG220SP2 220.00] CKT 2	276.06	332.18	315	105.45	Sc-4

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
315.	114012 PANG400SP2 400.00 114010 PANG220SP2 220.00 2	OPEN LINE FROM BUS 114012 [PANG400SP2 400.00] TO BUS 114010 [PANG220SP2 220.00] CKT 1	276.06	332.18	315	105.45	Sc-4
316.	114012 PANG400SP2 400.00 114010 PANG220SP2 220.00 3	OPEN LINE FROM BUS 114012 [PANG400SP2 400.00] TO BUS 114010 [PANG220SP2 220.00] CKT 1	276.06	332.18	315	105.45	Sc-4
317.	114012 PANG400SP2 400.00 114010 PANG220SP2 220.00 4	OPEN LINE FROM BUS 114012 [PANG400SP2 400.00] TO BUS 114010 [PANG220SP2 220.00] CKT 1	276.06	332.18	315	105.45	Sc-4
318.	114012 PANG400SP2 400.00 114010 PANG220SP2 220.00 5	OPEN LINE FROM BUS 114012 [PANG400SP2 400.00] TO BUS 114010 [PANG220SP2 220.00] CKT 1	276.06	332.18	315	105.45	Sc-4
319.	114012 PANG400SP2 400.00 114010 PANG220SP2 220.00 6	OPEN LINE FROM BUS 114012 [PANG400SP2 400.00] TO BUS 114010 [PANG220SP2 220.00] CKT 1	276.06	332.18	315	105.45	Sc-4
320.	114008 PANG 400 SP1400.00 114009 LEH_PANG SP 220.00 1	OPEN LINE FROM BUS 114008 [PANG 400 SP1400.00] TO BUS 114009 [LEH_PANG SP 220.00] CKT 2	276.05	332.16	315	105.45	Sc-4
321.	114008 PANG 400 SP1400.00 114009 LEH_PANG SP 220.00 2	OPEN LINE FROM BUS 114008 [PANG 400 SP1400.00] TO BUS 114009 [LEH_PANG SP 220.00] CKT 1	276.05	332.16	315	105.45	Sc-4
322.	114008 PANG 400 SP1400.00 114009 LEH_PANG SP 220.00 3	OPEN LINE FROM BUS 114008 [PANG 400 SP1400.00] TO BUS 114009 [LEH_PANG SP 220.00] CKT 1	276.05	332.16	315	105.45	Sc-4
323.	114008 PANG 400 SP1400.00 114009 LEH_PANG SP 220.00 4	OPEN LINE FROM BUS 114008 [PANG 400 SP1400.00] TO BUS 114009 [LEH_PANG SP 220.00] CKT 1	276.05	332.16	315	105.45	Sc-4
324.	114008 PANG 400 SP1400.00 114009 LEH_PANG SP 220.00 5	OPEN LINE FROM BUS 114008 [PANG 400 SP1400.00] TO BUS 114009 [LEH_PANG SP 220.00] CKT 1	276.05	332.16	315	105.45	Sc-4
325.	114008 PANG 400 SP1400.00 114009 LEH_PANG SP 220.00 6	OPEN LINE FROM BUS 114008 [PANG 400 SP1400.00] TO BUS 114009 [LEH_PANG SP 220.00] CKT 1	276.05	332.16	315	105.45	Sc-4
326.	164482 FATEHG-4 400.00 162482 FATEHG-4 220.00 1	OPEN LINE FROM BUS 164482 [FATEHG-4 400.00] TO BUS 162482 [FATEHG-4 220.00] CKT 2	415.68	519.88	500	103.98	Sc-4
327.	164482 FATEHG-4 400.00 162482 FATEHG-4 220.00 2	OPEN LINE FROM BUS 164482 [FATEHG-4 400.00] TO BUS 162482 [FATEHG-4 220.00] CKT 1	415.68	519.88	500	103.98	Sc-4
328.	164482 FATEHG-4 400.00 162482 FATEHG-4 220.00 3	OPEN LINE FROM BUS 164482 [FATEHG-4 400.00] TO BUS 162482 [FATEHG-4 220.00] CKT 1	415.68	519.88	500	103.98	Sc-4
329.	164482 FATEHG-4 400.00 162482 FATEHG-4 220.00 4	OPEN LINE FROM BUS 164482 [FATEHG-4 400.00] TO BUS 162482 [FATEHG-4 220.00] CKT 1	415.68	519.88	500	103.98	Sc-4
330.	164482 FATEHG-4 400.00 162482 FATEHG-4 220.00 5	OPEN LINE FROM BUS 164482 [FATEHG-4 400.00] TO BUS 162482 [FATEHG-4 220.00] CKT 1	415.68	519.88	500	103.98	Sc-4

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
331.	364021 SHUJALPR-4 400.00 362068 SHUJALP-42 220.00 1	OPEN LINE FROM BUS 364021 [SHUJALPR-4 400.00] TO BUS 362068 [SHUJALP-42 220.00] CKT 2	224.75	321.38	315	102.03	Sc-4
332.	364021 SHUJALPR-4 400.00 362068 SHUJALP-42 220.00 3	OPEN LINE FROM BUS 364021 [SHUJALPR-4 400.00] TO BUS 362068 [SHUJALP-42 220.00] CKT 2	224.75	321.38	315	102.03	Sc-4
333.	214015 KHUMTAI 400.00 212015 KHUMTAI 220.00 1	OPEN LINE FROM BUS 214015 [KHUMTAI 400.00] TO BUS 212015 [KHUMTAI 220.00] CKT 2	315.13	503.93	500	100.79	Sc-4
334.	214015 KHUMTAI 400.00 212015 KHUMTAI 220.00 2	OPEN LINE FROM BUS 214015 [KHUMTAI 400.00] TO BUS 212015 [KHUMTAI 220.00] CKT 1	315.13	503.93	500	100.79	Sc-4
335.	354050 PRANTIJ 400.00 352151 PRANTIJ2 220.00 1	OPEN LINE FROM BUS 354050 [PRANTIJ 400.00] TO BUS 352151 [PRANTIJ2 220.00] CKT 2	335.62	502.3	500	100.46	Sc-4
336.	354050 PRANTIJ 400.00 352151 PRANTIJ2 220.00 2	OPEN LINE FROM BUS 354050 [PRANTIJ 400.00] TO BUS 352151 [PRANTIJ2 220.00] CKT 1	335.62	502.3	500	100.46	Sc-4
337.	174431 KANPUR 400.00 172103 KANPU-PG 220.00 1	OPEN LINE FROM BUS 174431 [KANPUR 400.00] TO BUS 172103 [KANPU-PG 220.00] CKT 2	249.55	316.33	315	100.42	Sc-4
338.	174431 KANPUR 400.00 172103 KANPU-PG 220.00 2	OPEN LINE FROM BUS 174431 [KANPUR 400.00] TO BUS 172103 [KANPU-PG 220.00] CKT 1	249.55	316.33	315	100.42	Sc-4
339.	164456 BIKANE-4 400.00 162253 BIKANE-4 220.00 1	OPEN LINE FROM BUS 164404 [BHADLA 400.00] TO BUS 164456 [BIKANE-4 400.00] CKT 1	212.05	315.3	315	100.10	Sc-4
340.	194054 PIPALKOTI SW400.00 192054 PIPALKOTI SW220.00 1	OPEN LINE FROM BUS 194054 [PIPALKOTI SW400.00] TO BUS 192054 [PIPALKOTI SW220.00] CKT 2	230.56	463.97	240	193.32	Sc-5
341.	194054 PIPALKOTI SW400.00 192054 PIPALKOTI SW220.00 2	OPEN LINE FROM BUS 194054 [PIPALKOTI SW400.00] TO BUS 192054 [PIPALKOTI SW220.00] CKT 1	230.56	463.97	240	193.32	Sc-5
342.	374038 KORADI-II 400.00 372393 KORADI-II 220.00 1	OPEN LINE FROM BUS 374038 [KORADI-II 400.00] TO BUS 372393 [KORADI-II 220.00] CKT 2	556.46	808.79	500	161.76	Sc-5
343.	374038 KORADI-II 400.00 372393 KORADI-II 220.00 2	OPEN LINE FROM BUS 374038 [KORADI-II 400.00] TO BUS 372393 [KORADI-II 220.00] CKT 1	556.46	808.79	500	161.76	Sc-5
344.	424022 MENDHASAL 400.00 422586 MENDHASAL 220.00 1	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 422586 [MENDHASAL 220.00] CKT 2	358.6	491.95	315	156.17	Sc-5
345.	424022 MENDHASAL 400.00 422586 MENDHASAL 220.00 2	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 422586 [MENDHASAL 220.00] CKT 1	358.6	491.95	315	156.17	Sc-5
346.	144006 SONAROAD 400.00 142212 SOHNAROAD 220.00 1	OPEN LINE FROM BUS 144006 [SONAROAD 400.00] TO BUS 142212 [SOHNAROAD 220.00] CKT 2	501.25	733.29	500	146.66	Sc-5

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
347.	144006 SONAROAD 400.00 142212 SOHNAROAD 220.00 2	OPEN LINE FROM BUS 144006 [SONAROAD 400.00] TO BUS 142212 [SOHNAROAD 220.00] CKT 1	501.25	733.29	500	146.66	Sc-5
348.	524016 GULBRG 400.00 523090 GLBRGA220 220.00 1	OPEN LINE FROM BUS 524016 [GULBRG 400.00] TO BUS 523090 [GLBRGA220 220.00] CKT 2	391.97	721.38	500	144.28	Sc-5
349.	524016 GULBRG 400.00 523090 GLBRGA220 220.00 2	OPEN LINE FROM BUS 524016 [GULBRG 400.00] TO BUS 523090 [GLBRGA220 220.00] CKT 1	391.97	721.38	500	144.28	Sc-5
350.	324002 MAGARWADA-DD400.00 322002 MAGARWADA 220.00 1	OPEN LINE FROM BUS 324002 [MAGARWADA-DD400.00] TO BUS 322002 [MAGARWADA 220.00] CKT 2	220.22	451.5	315	143.33	Sc-5
351.	324002 MAGARWADA-DD400.00 322002 MAGARWADA 220.00 2	OPEN LINE FROM BUS 324002 [MAGARWADA-DD400.00] TO BUS 322002 [MAGARWADA 220.00] CKT 1	220.22	451.5	315	143.33	Sc-5
352.	114422 KISHENPUR 400.00 112235 KISHENPUR 220.00 1	OPEN LINE FROM BUS 114422 [KISHENPUR 400.00] TO BUS 112235 [KISHENPUR 220.00] CKT 2	356.91	445.72	315	141.50	Sc-5
353.	114422 KISHENPUR 400.00 112235 KISHENPUR 220.00 2	OPEN LINE FROM BUS 114422 [KISHENPUR 400.00] TO BUS 112235 [KISHENPUR 220.00] CKT 1	356.91	445.72	315	141.50	Sc-5
354.	114422 KISHENPUR 400.00 112235 KISHENPUR 220.00 3	OPEN LINE FROM BUS 114422 [KISHENPUR 400.00] TO BUS 112235 [KISHENPUR 220.00] CKT 1	356.91	445.72	315	141.50	Sc-5
355.	484002 BOKARO-A 400.00 482001 BOKARO TPS 220.00 1	OPEN LINE FROM BUS 484002 [BOKARO-A 400.00] TO BUS 482001 [BOKARO TPS 220.00] CKT 2	297.78	432.83	315	137.41	Sc-5
356.	484002 BOKARO-A 400.00 482001 BOKARO TPS 220.00 2	OPEN LINE FROM BUS 484002 [BOKARO-A 400.00] TO BUS 482001 [BOKARO TPS 220.00] CKT 1	297.78	432.83	315	137.41	Sc-5
357.	164409 HINDAU-4 400.00 162207 HINDAU-4 220.00 1	OPEN LINE FROM BUS 164409 [HINDAU-4 400.00] TO BUS 162207 [HINDAU-4 220.00] CKT 2	274.97	411.2	315	130.54	Sc-5
358.	164409 HINDAU-4 400.00 162207 HINDAU-4 220.00 2	OPEN LINE FROM BUS 164409 [HINDAU-4 400.00] TO BUS 162207 [HINDAU-4 220.00] CKT 1	274.97	411.2	315	130.54	Sc-5
359.	174424 DADR-NCR 400.00 172104 DADRI_G2 220.00 3	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 172104 [DADRI_G2 220.00] CKT 4	318.17	636.58	500	127.32	Sc-5
360.	174424 DADR-NCR 400.00 172104 DADRI_G2 220.00 4	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 172104 [DADRI_G2 220.00] CKT 3	318.17	636.58	500	127.32	Sc-5
361.	444015 CHANDITALA_N400.00 442015 CHANDITALA_N220.00 1	OPEN LINE FROM BUS 444015 [CHANDITALA_N400.00] TO BUS 442015 [CHANDITALA_N220.00] CKT 2	324.14	397.55	315	126.21	Sc-5
362.	444015 CHANDITALA_N400.00 442015 CHANDITALA_N220.00 2	OPEN LINE FROM BUS 444015 [CHANDITALA_N400.00] TO BUS 442015 [CHANDITALA_N220.00] CKT 1	324.14	397.55	315	126.21	Sc-5

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
363.	444015 CHANDITALA_N400.00 442015 CHANDITALA_N220.00 3	OPEN LINE FROM BUS 444015 [CHANDITALA_N400.00] TO BUS 442015 [CHANDITALA_N220.00] CKT 1	324.14	397.55	315	126.21	Sc-5
364.	454001 DURGAPUR TPS400.00 452001 DURGAPUR TPS220.00 1	OPEN LINE FROM BUS 454001 [DURGAPUR TPS400.00] TO BUS 452001 [DURGAPUR TPS220.00] CKT 2	293.61	391.75	315	124.37	Sc-5
365.	454001 DURGAPUR TPS400.00 452001 DURGAPUR TPS220.00 2	OPEN LINE FROM BUS 454001 [DURGAPUR TPS400.00] TO BUS 452001 [DURGAPUR TPS220.00] CKT 1	293.61	391.75	315	124.37	Sc-5
366.	174265 REWA 400.00 172112 REWAROAD 220.00 1	OPEN LINE FROM BUS 174474 [ALLAHABA 400.00] TO BUS 172100 [ALLAHABA 220.00] CKT 1	339.19	379.57	315	120.50	Sc-5
367.	174922 AGRA 400.00 172115 AGRA-PG 220.00 1	OPEN LINE FROM BUS 174922 [AGRA 400.00] TO BUS 172115 [AGRA-PG 220.00] CKT 2	287.19	374.68	315	118.95	Sc-5
368.	174922 AGRA 400.00 172115 AGRA-PG 220.00 2	OPEN LINE FROM BUS 174922 [AGRA 400.00] TO BUS 172115 [AGRA-PG 220.00] CKT 1	287.19	374.68	315	118.95	Sc-5
369.	444012 KOLAGHAT 400.00 442012 KTPS220 220.00 1	OPEN LINE FROM BUS 444012 [KOLAGHAT 400.00] TO BUS 442012 [KTPS220 220.00] CKT 2	249.58	370.47	315	117.61	Sc-5
370.	444012 KOLAGHAT 400.00 442012 KTPS220 220.00 2	OPEN LINE FROM BUS 444012 [KOLAGHAT 400.00] TO BUS 442012 [KTPS220 220.00] CKT 1	249.58	370.47	315	117.61	Sc-5
371.	444018 KHARAGPR-WB 400.00 442018 KHARAGPR-WB 220.00 1	OPEN LINE FROM BUS 444018 [KHARAGPR-WB 400.00] TO BUS 442018 [KHARAGPR-WB 220.00] CKT 2	269.29	369.93	315	117.44	Sc-5
372.	444018 KHARAGPR-WB 400.00 442018 KHARAGPR-WB 220.00 2	OPEN LINE FROM BUS 444018 [KHARAGPR-WB 400.00] TO BUS 442018 [KHARAGPR-WB 220.00] CKT 1	269.29	369.93	315	117.44	Sc-5
373.	444018 KHARAGPR-WB 400.00 442018 KHARAGPR-WB 220.00 3	OPEN LINE FROM BUS 444018 [KHARAGPR-WB 400.00] TO BUS 442018 [KHARAGPR-WB 220.00] CKT 1	269.29	369.93	315	117.44	Sc-5
374.	174058 ORAI 400.00 172124 ORAI 42 220.00 3	OPEN LINE FROM BUS 174058 [ORAI 400.00] TO BUS 172124 [ORAI 42 220.00] CKT 2	185.02	276.64	240	115.27	Sc-5
375.	124441 NANJ PS 400.00 122441 NANJ PS 220.00 1	OPEN LINE FROM BUS 124441 [NANJ PS 400.00] TO BUS 122441 [NANJ PS 220.00] CKT 2	176.09	354.39	315	112.50	Sc-5
376.	124441 NANJ PS 400.00 122441 NANJ PS 220.00 2	OPEN LINE FROM BUS 124441 [NANJ PS 400.00] TO BUS 122441 [NANJ PS 220.00] CKT 1	176.09	354.39	315	112.50	Sc-5
377.	164457 SURATG-4 400.00 162257 SURATGARH-42220.00 1	OPEN LINE FROM BUS 164457 [SURATG-4 400.00] TO BUS 162257 [SURATGARH-42220.00] CKT 2	254.63	351.43	315	111.57	Sc-5
378.	164457 SURATG-4 400.00 162257 SURATGARH-42220.00 2	OPEN LINE FROM BUS 164457 [SURATG-4 400.00] TO BUS 162257 [SURATGARH-42220.00] CKT 1	254.63	351.43	315	111.57	Sc-5

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
379.	444008 JEERAT 400.00 442685 JEERAT 220.00 1	OPEN LINE FROM BUS 444008 [JEERAT 400.00] TO BUS 442685 [JEERAT 220.00] CKT 2	295.75	347	315	110.16	Sc-5
380.	444008 JEERAT 400.00 442685 JEERAT 220.00 2	OPEN LINE FROM BUS 444008 [JEERAT 400.00] TO BUS 442685 [JEERAT 220.00] CKT 1	295.75	347	315	110.16	Sc-5
381.	444008 JEERAT 400.00 442685 JEERAT 220.00 3	OPEN LINE FROM BUS 444008 [JEERAT 400.00] TO BUS 442685 [JEERAT 220.00] CKT 1	295.75	347	315	110.16	Sc-5
382.	444008 JEERAT 400.00 442685 JEERAT 220.00 4	OPEN LINE FROM BUS 444008 [JEERAT 400.00] TO BUS 442685 [JEERAT 220.00] CKT 1	295.75	347	315	110.16	Sc-5
383.	454003 RAGHUNATHTPS400.00 452003 RAGHUNATHTPS220.00 1	OPEN LINE FROM BUS 454003 [RAGHUNATHTPS400.00] TO BUS 452003 [RAGHUNATHTPS220.00] CKT 2	240.32	346.43	315	109.98	Sc-5
384.	454003 RAGHUNATHTPS400.00 452003 RAGHUNATHTPS220.00 2	OPEN LINE FROM BUS 454003 [RAGHUNATHTPS400.00] TO BUS 452003 [RAGHUNATHTPS220.00] CKT 1	240.32	346.43	315	109.98	Sc-5
385.	484001 KODERMA-DVC 400.00 482007 KODEMA_DVC 220.00 1	OPEN LINE FROM BUS 484001 [KODERMA-DVC 400.00] TO BUS 482007 [KODEMA_DVC 220.00] CKT 2	218.68	344.07	315	109.23	Sc-5
386.	484001 KODERMA-DVC 400.00 482007 KODEMA_DVC 220.00 2	OPEN LINE FROM BUS 484001 [KODERMA-DVC 400.00] TO BUS 482007 [KODEMA_DVC 220.00] CKT 1	218.68	344.07	315	109.23	Sc-5
387.	424208 NARENDRAPUR 400.00 422804 NARENDRAPUR2220.00 1	OPEN LINE FROM BUS 424208 [NARENDRAPUR 400.00] TO BUS 422804 [NARENDRAPUR2220.00] CKT 2	213.13	340.89	315	108.22	Sc-5
388.	424208 NARENDRAPUR 400.00 422804 NARENDRAPUR2220.00 2	OPEN LINE FROM BUS 424208 [NARENDRAPUR 400.00] TO BUS 422804 [NARENDRAPUR2220.00] CKT 1	213.13	340.89	315	108.22	Sc-5
389.	174474 ALLAHABA 400.00 172100 ALLAHABA 220.00 1	OPEN LINE FROM BUS 174474 [ALLAHABA 400.00] TO BUS 172100 [ALLAHABA 220.00] CKT 2	279.89	336.26	315	106.75	Sc-5
390.	174474 ALLAHABA 400.00 172100 ALLAHABA 220.00 2	OPEN LINE FROM BUS 174474 [ALLAHABA 400.00] TO BUS 172100 [ALLAHABA 220.00] CKT 1	279.89	336.26	315	106.75	Sc-5
391.	174474 ALLAHABA 400.00 172100 ALLAHABA 220.00 3	OPEN LINE FROM BUS 174474 [ALLAHABA 400.00] TO BUS 172100 [ALLAHABA 220.00] CKT 1	279.89	336.26	315	106.75	Sc-5
392.	144460 PANCHKULA-PG400.00 142285 NAGGAL 220.00 1	OPEN LINE FROM BUS 144460 [PANCHKULA-PG400.00] TO BUS 142285 [NAGGAL 220.00] CKT 3	235.47	335.76	315	106.59	Sc-5
393.	144460 PANCHKULA-PG400.00 142285 NAGGAL 220.00 2	OPEN LINE FROM BUS 144460 [PANCHKULA-PG400.00] TO BUS 142285 [NAGGAL 220.00] CKT 3	235.47	335.76	315	106.59	Sc-5
394.	174472 OBRA4 400.00 172062 OBRA2 220.00 3	OPEN LINE FROM BUS 174472 [OBRA4 400.00] TO BUS 172062 [OBRA2 220.00] CKT 1	198.85	255.65	240	106.52	Sc-5

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
395.	174472 OBRA4 400.00 172062 OBRA2 220.00 1	OPEN LINE FROM BUS 174472 [OBRA4 400.00] TO BUS 172062 [OBRA2 220.00] CKT 2	260.9	335.43	315	106.49	Sc-5
396.	174472 OBRA4 400.00 172062 OBRA2 220.00 2	OPEN LINE FROM BUS 174472 [OBRA4 400.00] TO BUS 172062 [OBRA2 220.00] CKT 1	260.9	335.43	315	106.49	Sc-5
397.	354015 MUNDRA-APL 400.00 352015 MUNDRA-APL 220.00 1	OPEN LINE FROM BUS 354015 [MUNDRA-APL 400.00] TO BUS 352015 [MUNDRA-APL 220.00] CKT 2	242.64	334.26	315	106.11	Sc-5
398.	354015 MUNDRA-APL 400.00 352015 MUNDRA-APL 220.00 2	OPEN LINE FROM BUS 354015 [MUNDRA-APL 400.00] TO BUS 352015 [MUNDRA-APL 220.00] CKT 1	242.64	334.26	315	106.11	Sc-5
399.	174512 ALIGARH 400.00 172087 ALIGARH 220.00 1	OPEN LINE FROM BUS 174512 [ALIGARH 400.00] TO BUS 172087 [ALIGARH 220.00] CKT 2	380.21	527.28	500	105.46	Sc-5
400.	174512 ALIGARH 400.00 172087 ALIGARH 220.00 2	OPEN LINE FROM BUS 174512 [ALIGARH 400.00] TO BUS 172087 [ALIGARH 220.00] CKT 1	380.21	527.28	500	105.46	Sc-5
401.	424033 PANDIABILI 400.00 422033 PANDIABILI 220.00 1	OPEN LINE FROM BUS 424033 [PANDIABILI 400.00] TO BUS 422033 [PANDIABILI 220.00] CKT 2	233.22	329.54	315	104.62	Sc-5
402.	424033 PANDIABILI 400.00 422033 PANDIABILI 220.00 2	OPEN LINE FROM BUS 424033 [PANDIABILI 400.00] TO BUS 422033 [PANDIABILI 220.00] CKT 1	233.22	329.54	315	104.62	Sc-5
403.	164420 KOTA 400.00 162919 KOTA 220.00 1	OPEN LINE FROM BUS 164420 [KOTA 400.00] TO BUS 162919 [KOTA 220.00] CKT 2	254.14	326.49	315	103.65	Sc-5
404.	164420 KOTA 400.00 162919 KOTA 220.00 2	OPEN LINE FROM BUS 164420 [KOTA 400.00] TO BUS 162919 [KOTA 220.00] CKT 1	254.14	326.49	315	103.65	Sc-5
405.	174058 ORAI 400.00 172124 ORAI 42 220.00 2	OPEN LINE FROM BUS 174058 [ORAI 400.00] TO BUS 172124 [ORAI 42 220.00] CKT 3	242.93	324.36	315	102.97	Sc-5
406.	134322 ROPAR4 400.00 132322 ROPAR42 220.00 1	OPEN LINE FROM BUS 134322 [ROPAR4 400.00] TO BUS 132322 [ROPAR42 220.00] CKT 2	363.86	513.14	500	102.63	Sc-5
407.	134322 ROPAR4 400.00 132322 ROPAR42 220.00 2	OPEN LINE FROM BUS 134322 [ROPAR4 400.00] TO BUS 132322 [ROPAR42 220.00] CKT 1	363.86	513.14	500	102.63	Sc-5
408.	354012 SUGEN 400.00 352012 SUGEN 220.00 1	OPEN LINE FROM BUS 354012 [SUGEN 400.00] TO BUS 352012 [SUGEN 220.00] CKT 2	260.46	322.62	315	102.42	Sc-5
409.	354012 SUGEN 400.00 352012 SUGEN 220.00 2	OPEN LINE FROM BUS 354012 [SUGEN 400.00] TO BUS 352012 [SUGEN 220.00] CKT 1	260.46	322.62	315	102.42	Sc-5
410.	354012 SUGEN 400.00 352012 SUGEN 220.00 3	OPEN LINE FROM BUS 354012 [SUGEN 400.00] TO BUS 352012 [SUGEN 220.00] CKT 1	260.46	322.62	315	102.42	Sc-5

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
411.	164416 AJMER 400.00 162329 AJMER42 220.00 1	OPEN LINE FROM BUS 164416 [AJMER 400.00] TO BUS 162329 [AJMER42 220.00] CKT 2	231.43	320.44	315	101.73	Sc-5
412.	164416 AJMER 400.00 162329 AJMER42 220.00 2	OPEN LINE FROM BUS 164416 [AJMER 400.00] TO BUS 162329 [AJMER42 220.00] CKT 1	231.43	320.44	315	101.73	Sc-5
413.	164434 JODH KANKANI400.00 162334 JODHPURN-42 220.00 1	OPEN LINE FROM BUS 164434 [JODH KANKANI400.00] TO BUS 162334 [JODHPURN-42 220.00] CKT 2	243.77	315.58	315	100.18	Sc-5
414.	484002 BOKARO-A 400.00 482001 BOKARO TPS 220.00 1	OPEN LINE FROM BUS 484002 [BOKARO-A 400.00] TO BUS 482001 [BOKARO TPS 220.00] CKT 2	339.72	493.96	315	156.81	Sc-6
415.	484002 BOKARO-A 400.00 482001 BOKARO TPS 220.00 2	OPEN LINE FROM BUS 484002 [BOKARO-A 400.00] TO BUS 482001 [BOKARO TPS 220.00] CKT 1	339.72	493.96	315	156.81	Sc-6
416.	374038 KORADI-II 400.00 372393 KORADI-II 220.00 1	OPEN LINE FROM BUS 374038 [KORADI-II 400.00] TO BUS 372393 [KORADI-II 220.00] CKT 2	507.57	737.3	500	147.46	Sc-6
417.	374038 KORADI-II 400.00 372393 KORADI-II 220.00 2	OPEN LINE FROM BUS 374038 [KORADI-II 400.00] TO BUS 372393 [KORADI-II 220.00] CKT 1	507.57	737.3	500	147.46	Sc-6
418.	194054 PIPALKOTI SW400.00 192054 PIPALKOTI SW220.00 1	OPEN LINE FROM BUS 194054 [PIPALKOTI SW400.00] TO BUS 192054 [PIPALKOTI SW220.00] CKT 2	168.25	337.37	240	140.57	Sc-6
419.	194054 PIPALKOTI SW400.00 192054 PIPALKOTI SW220.00 2	OPEN LINE FROM BUS 194054 [PIPALKOTI SW400.00] TO BUS 192054 [PIPALKOTI SW220.00] CKT 1	168.25	337.37	240	140.57	Sc-6
420.	454001 DURGAPUR TPS400.00 452001 DURGAPUR TPS220.00 1	OPEN LINE FROM BUS 454001 [DURGAPUR TPS400.00] TO BUS 452001 [DURGAPUR TPS220.00] CKT 2	328.89	439.17	315	139.42	Sc-6
421.	454001 DURGAPUR TPS400.00 452001 DURGAPUR TPS220.00 2	OPEN LINE FROM BUS 454001 [DURGAPUR TPS400.00] TO BUS 452001 [DURGAPUR TPS220.00] CKT 1	328.89	439.17	315	139.42	Sc-6
422.	164409 HINDAU-4 400.00 162207 HINDAU-4 220.00 1	OPEN LINE FROM BUS 164409 [HINDAU-4 400.00] TO BUS 162207 [HINDAU-4 220.00] CKT 2	278.63	418.96	315	133.00	Sc-6
423.	164409 HINDAU-4 400.00 162207 HINDAU-4 220.00 2	OPEN LINE FROM BUS 164409 [HINDAU-4 400.00] TO BUS 162207 [HINDAU-4 220.00] CKT 1	278.63	418.96	315	133.00	Sc-6
424.	484001 KODERMA-DVC 400.00 482007 KODEMA_DVC 220.00 1	OPEN LINE FROM BUS 484001 [KODERMA-DVC 400.00] TO BUS 482007 [KODEMA_DVC 220.00] CKT 2	254.57	401.31	315	127.40	Sc-6
425.	484001 KODERMA-DVC 400.00 482007 KODEMA_DVC 220.00 2	OPEN LINE FROM BUS 484001 [KODERMA-DVC 400.00] TO BUS 482007 [KODEMA_DVC 220.00] CKT 1	254.57	401.31	315	127.40	Sc-6
426.	424022 MENDHASAL 400.00 422586 MENDHASAL 220.00 1	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 422586 [MENDHASAL 220.00] CKT 2	285.7	389	315	123.49	Sc-6

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
427.	424022 MENDHASAL 400.00 422586 MENDHASAL 220.00 2	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 422586 [MENDHASAL 220.00] CKT 1	285.7	389	315	123.49	Sc-6
428.	164434 JODH KANKANI400.00 162334 JODHPURN-42 220.00 1	OPEN LINE FROM BUS 164434 [JODH KANKANI400.00] TO BUS 162334 [JODHPURN-42 220.00] CKT 2	295.96	382.87	315	121.55	Sc-6
429.	444015 CHANDITALA_N400.00 442015 CHANDITALA_N220.00 1	OPEN LINE FROM BUS 444015 [CHANDITALA_N400.00] TO BUS 442015 [CHANDITALA_N220.00] CKT 2	308.56	378.41	315	120.13	Sc-6
430.	444015 CHANDITALA_N400.00 442015 CHANDITALA_N220.00 2	OPEN LINE FROM BUS 444015 [CHANDITALA_N400.00] TO BUS 442015 [CHANDITALA_N220.00] CKT 1	308.56	378.41	315	120.13	Sc-6
431.	444015 CHANDITALA_N400.00 442015 CHANDITALA_N220.00 3	OPEN LINE FROM BUS 444015 [CHANDITALA_N400.00] TO BUS 442015 [CHANDITALA_N220.00] CKT 1	308.56	378.41	315	120.13	Sc-6
432.	164420 KOTA 400.00 162919 KOTA 220.00 1	OPEN LINE FROM BUS 164420 [KOTA 400.00] TO BUS 162919 [KOTA 220.00] CKT 2	290.21	372.5	315	118.25	Sc-6
433.	164420 KOTA 400.00 162919 KOTA 220.00 2	OPEN LINE FROM BUS 164420 [KOTA 400.00] TO BUS 162919 [KOTA 220.00] CKT 1	290.21	372.5	315	118.25	Sc-6
434.	164416 AJMER 400.00 162329 AJMER42 220.00 1	OPEN LINE FROM BUS 164416 [AJMER 400.00] TO BUS 162329 [AJMER42 220.00] CKT 2	261.31	362.93	315	115.22	Sc-6
435.	164416 AJMER 400.00 162329 AJMER42 220.00 2	OPEN LINE FROM BUS 164416 [AJMER 400.00] TO BUS 162329 [AJMER42 220.00] CKT 1	261.31	362.93	315	115.22	Sc-6
436.	164457 SURATG-4 400.00 162257 SURATGARH-42220.00 1	OPEN LINE FROM BUS 164457 [SURATG-4 400.00] TO BUS 162257 [SURATGARH-42220.00] CKT 2	260.45	359.06	315	113.99	Sc-6
437.	164457 SURATG-4 400.00 162257 SURATGARH-42220.00 2	OPEN LINE FROM BUS 164457 [SURATG-4 400.00] TO BUS 162257 [SURATGARH-42220.00] CKT 1	260.45	359.06	315	113.99	Sc-6
438.	444018 KHARAGPR-WB 400.00 442018 KHARAGPR-WB 220.00 1	OPEN LINE FROM BUS 444018 [KHARAGPR-WB 400.00] TO BUS 442018 [KHARAGPR-WB 220.00] CKT 2	258.26	354.69	315	112.60	Sc-6
439.	444018 KHARAGPR-WB 400.00 442018 KHARAGPR-WB 220.00 2	OPEN LINE FROM BUS 444018 [KHARAGPR-WB 400.00] TO BUS 442018 [KHARAGPR-WB 220.00] CKT 1	258.26	354.69	315	112.60	Sc-6
440.	444018 KHARAGPR-WB 400.00 442018 KHARAGPR-WB 220.00 3	OPEN LINE FROM BUS 444018 [KHARAGPR-WB 400.00] TO BUS 442018 [KHARAGPR-WB 220.00] CKT 1	258.26	354.69	315	112.60	Sc-6
441.	444012 KOLAGHAT 400.00 442012 KTPS220 220.00 1	OPEN LINE FROM BUS 444012 [KOLAGHAT 400.00] TO BUS 442012 [KTPS220 220.00] CKT 2	237.29	351.72	315	111.66	Sc-6
442.	444012 KOLAGHAT 400.00 442012 KTPS220 220.00 2	OPEN LINE FROM BUS 444012 [KOLAGHAT 400.00] TO BUS 442012 [KTPS220 220.00] CKT 1	237.29	351.72	315	111.66	Sc-6

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
443.	524016 GULBRG 400.00 523090 GLBRGA220 220.00 1	OPEN LINE FROM BUS 524016 [GULBRG 400.00] TO BUS 523090 [GLBRGA220 220.00] CKT 2	304.98	557.21	500	111.44	Sc-6
444.	524016 GULBRG 400.00 523090 GLBRGA220 220.00 2	OPEN LINE FROM BUS 524016 [GULBRG 400.00] TO BUS 523090 [GLBRGA220 220.00] CKT 1	304.98	557.21	500	111.44	Sc-6
445.	454003 RAGHUNATHTPS400.00 452003 RAGHUNATHTPS220.00 1	OPEN LINE FROM BUS 454003 [RAGHUNATHTPS400.00] TO BUS 452003 [RAGHUNATHTPS220.00] CKT 2	240.48	347.07	315	110.18	Sc-6
446.	454003 RAGHUNATHTPS400.00 452003 RAGHUNATHTPS220.00 2	OPEN LINE FROM BUS 454003 [RAGHUNATHTPS400.00] TO BUS 452003 [RAGHUNATHTPS220.00] CKT 1	240.48	347.07	315	110.18	Sc-6
447.	144006 SONAROAD 400.00 142212 SOHNAROAD 220.00 1	OPEN LINE FROM BUS 144006 [SONAROAD 400.00] TO BUS 142212 [SOHNAROAD 220.00] CKT 2	376.1	550.1	500	110.02	Sc-6
448.	144006 SONAROAD 400.00 142212 SOHNAROAD 220.00 2	OPEN LINE FROM BUS 144006 [SONAROAD 400.00] TO BUS 142212 [SOHNAROAD 220.00] CKT 1	376.1	550.1	500	110.02	Sc-6
449.	174922 AGRA 400.00 172115 AGRA-PG 220.00 1	OPEN LINE FROM BUS 174922 [AGRA 400.00] TO BUS 172115 [AGRA-PG 220.00] CKT 2	260.23	338.92	315	107.59	Sc-6
450.	174922 AGRA 400.00 172115 AGRA-PG 220.00 2	OPEN LINE FROM BUS 174922 [AGRA 400.00] TO BUS 172115 [AGRA-PG 220.00] CKT 1	260.23	338.92	315	107.59	Sc-6
451.	324002 MAGARWADA-DD400.00 322002 MAGARWADA 220.00 1	OPEN LINE FROM BUS 324002 [MAGARWADA-DD400.00] TO BUS 322002 [MAGARWADA 220.00] CKT 2	164.57	333.7	315	105.94	Sc-6
452.	324002 MAGARWADA-DD400.00 322002 MAGARWADA 220.00 2	OPEN LINE FROM BUS 324002 [MAGARWADA-DD400.00] TO BUS 322002 [MAGARWADA 220.00] CKT 1	164.57	333.7	315	105.94	Sc-6
453.	444008 JEERAT 400.00 442685 JEERAT 220.00 1	OPEN LINE FROM BUS 444008 [JEERAT 400.00] TO BUS 442685 [JEERAT 220.00] CKT 2	283.09	332.14	315	105.44	Sc-6
454.	444008 JEERAT 400.00 442685 JEERAT 220.00 2	OPEN LINE FROM BUS 444008 [JEERAT 400.00] TO BUS 442685 [JEERAT 220.00] CKT 1	283.09	332.14	315	105.44	Sc-6
455.	444008 JEERAT 400.00 442685 JEERAT 220.00 3	OPEN LINE FROM BUS 444008 [JEERAT 400.00] TO BUS 442685 [JEERAT 220.00] CKT 1	283.09	332.14	315	105.44	Sc-6
456.	444008 JEERAT 400.00 442685 JEERAT 220.00 4	OPEN LINE FROM BUS 444008 [JEERAT 400.00] TO BUS 442685 [JEERAT 220.00] CKT 1	283.09	332.14	315	105.44	Sc-6
457.	164400 MERTA 400.00 162200 MERTA-42 220.00 1	OPEN LINE FROM BUS 164400 [MERTA 400.00] TO BUS 162200 [MERTA-42 220.00] CKT 2	237.22	329.15	315	104.49	Sc-6
458.	164400 MERTA 400.00 162200 MERTA-42 220.00 2	OPEN LINE FROM BUS 164400 [MERTA 400.00] TO BUS 162200 [MERTA-42 220.00] CKT 1	237.22	329.15	315	104.49	Sc-6

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
459.	174265 REWA 400.00 172112 REWAROAD 220.00 1	OPEN LINE FROM BUS 174474 [ALLAHABA 400.00] TO BUS 172100 [ALLAHABA 220.00] CKT 1	292.84	327.41	315	103.94	Sc-6
460.	164412 KALISI-4 400.00 162300 KALISIND 220.00 2	OPEN LINE FROM BUS 164412 [KALISI-4 400.00] TO BUS 164485 [SANGOD 400.00] CKT 1	426.53	507.03	500	101.41	Sc-6
461.	164428 CHITTOR4 400.00 162228 CHITTOR-42 220.00 1	OPEN LINE FROM BUS 164428 [CHITTOR4 400.00] TO BUS 162228 [CHITTOR-42 220.00] CKT 2	243.25	316.27	315	100.40	Sc-6
462.	164428 CHITTOR4 400.00 162228 CHITTOR-42 220.00 2	OPEN LINE FROM BUS 164428 [CHITTOR4 400.00] TO BUS 162228 [CHITTOR-42 220.00] CKT 1	243.25	316.27	315	100.40	Sc-6
463.	164428 CHITTOR4 400.00 162228 CHITTOR-42 220.00 3	OPEN LINE FROM BUS 164428 [CHITTOR4 400.00] TO BUS 162228 [CHITTOR-42 220.00] CKT 1	243.25	316.27	315	100.40	Sc-6
464.	484002 BOKARO-A 400.00 482001 BOKARO TPS 220.00 1	OPEN LINE FROM BUS 484002 [BOKARO-A 400.00] TO BUS 482001 [BOKARO TPS 220.00] CKT 2	393.07	570.3	315	181.05	Sc-7
465.	484002 BOKARO-A 400.00 482001 BOKARO TPS 220.00 2	OPEN LINE FROM BUS 484002 [BOKARO-A 400.00] TO BUS 482001 [BOKARO TPS 220.00] CKT 1	393.07	570.3	315	181.05	Sc-7
466.	164422 RAMG-I 400.00 162422 RAMGARH-I 220.00 1	OPEN LINE FROM BUS 164422 [RAMG-I 400.00] TO BUS 162422 [RAMGARH-I 220.00] CKT 2	441.39	886.9	500	177.38	Sc-7
467.	164422 RAMG-I 400.00 162422 RAMGARH-I 220.00 2	OPEN LINE FROM BUS 164422 [RAMG-I 400.00] TO BUS 162422 [RAMGARH-I 220.00] CKT 1	441.39	886.9	500	177.38	Sc-7
468.	364012 SATNA-74 400.00 362022 SATNAPG-742 220.00 1	OPEN LINE FROM BUS 364012 [SATNA-74 400.00] TO BUS 362022 [SATNAPG-742 220.00] CKT 3	371.27	541.48	315	171.90	Sc-7
469.	364012 SATNA-74 400.00 362022 SATNAPG-742 220.00 2	OPEN LINE FROM BUS 364012 [SATNA-74 400.00] TO BUS 362022 [SATNAPG-742 220.00] CKT 3	371.27	541.48	315	171.90	Sc-7
470.	364021 SHUJALPR-4 400.00 362068 SHUJALP-42 220.00 1	OPEN LINE FROM BUS 364021 [SHUJALPR-4 400.00] TO BUS 362068 [SHUJALP-42 220.00] CKT 2	338.03	483.63	315	153.53	Sc-7
471.	364021 SHUJALPR-4 400.00 362068 SHUJALP-42 220.00 3	OPEN LINE FROM BUS 364021 [SHUJALPR-4 400.00] TO BUS 362068 [SHUJALP-42 220.00] CKT 2	338.03	483.63	315	153.53	Sc-7
472.	364012 SATNA-74 400.00 362022 SATNAPG-742 220.00 3	OPEN LINE FROM BUS 364012 [SATNA-74 400.00] TO BUS 362022 [SATNAPG-742 220.00] CKT 1	589.48	735.06	500	147.01	Sc-7
473.	114422 KISHENPUR 400.00 112235 KISHENPUR 220.00 1	OPEN LINE FROM BUS 114422 [KISHENPUR 400.00] TO BUS 112235 [KISHENPUR 220.00] CKT 2	369.64	461.05	315	146.37	Sc-7
474.	114422 KISHENPUR 400.00 112235 KISHENPUR 220.00 2	OPEN LINE FROM BUS 114422 [KISHENPUR 400.00] TO BUS 112235 [KISHENPUR 220.00] CKT 1	369.64	461.05	315	146.37	Sc-7

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
475.	114422 KISHENPUR 400.00 112235 KISHENPUR 220.00 3	OPEN LINE FROM BUS 114422 [KISHENPUR 400.00] TO BUS 112235 [KISHENPUR 220.00] CKT 1	369.64	461.05	315	146.37	Sc-7
476.	164459 BHADLA PG 400.00 162659 BHADLA-SPLT 220.00 1	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162659 [BHADLA-SPLT 220.00] CKT 2	364.76	729.53	500	145.91	Sc-7
477.	164459 BHADLA PG 400.00 162659 BHADLA-SPLT 220.00 2	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162659 [BHADLA-SPLT 220.00] CKT 1	364.76	729.53	500	145.91	Sc-7
478.	164412 KALISI-4 400.00 162300 KALISIND 220.00 2	OPEN LINE FROM BUS 164485 [SANGOD 400.00] TO BUS 162485 [SANGOD 220.00] CKT 1	526.59	704.79	500	140.96	Sc-7
479.	164498 BHADLA-2 400.00 162499 BHAD-2 SPLT 220.00 1	OPEN LINE FROM BUS 164110 [JAISALMER-2 400.00] TO BUS 164401 [AKAL-4 400.00] CKT 1	1393.05	1393.05	1000	139.31	Sc-7
480.	324002 MAGARWADA-DD400.00 322002 MAGARWADA 220.00 1	OPEN LINE FROM BUS 324002 [MAGARWADA-DD400.00] TO BUS 322002 [MAGARWADA 220.00] CKT 2	206.52	422.65	315	134.17	Sc-7
481.	324002 MAGARWADA-DD400.00 322002 MAGARWADA 220.00 2	OPEN LINE FROM BUS 324002 [MAGARWADA-DD400.00] TO BUS 322002 [MAGARWADA 220.00] CKT 1	206.52	422.65	315	134.17	Sc-7
482.	364021 SHUJALPR-4 400.00 362068 SHUJALP-42 220.00 2	OPEN LINE FROM BUS 364021 [SHUJALPR-4 400.00] TO BUS 362068 [SHUJALP-42 220.00] CKT 1	536.56	662.13	500	132.43	Sc-7
483.	364009 JABALPUR-4 400.00 362067 JABALPUR-42 220.00 1	OPEN LINE FROM BUS 364009 [JABALPUR-4 400.00] TO BUS 362067 [JABALPUR-42 220.00] CKT 3	277.79	401.11	315	127.34	Sc-7
484.	364009 JABALPUR-4 400.00 362067 JABALPUR-42 220.00 2	OPEN LINE FROM BUS 364009 [JABALPUR-4 400.00] TO BUS 362067 [JABALPUR-42 220.00] CKT 3	277.79	401.11	315	127.34	Sc-7
485.	364039 MANDSAUR-4 400.00 362113 MANDSOUR-42 220.00 1	OPEN LINE FROM BUS 364039 [MANDSAUR-4 400.00] TO BUS 362113 [MANDSOUR-42 220.00] CKT 2	273.53	387.39	315	122.98	Sc-7
486.	364039 MANDSAUR-4 400.00 362113 MANDSOUR-42 220.00 2	OPEN LINE FROM BUS 364039 [MANDSAUR-4 400.00] TO BUS 362113 [MANDSOUR-42 220.00] CKT 1	273.53	387.39	315	122.98	Sc-7
487.	164480 FATEHG-2 400.00 162480 FATEH-2 220.00 1	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 162480 [FATEH-2 220.00] CKT 2	488.64	611.44	500	122.29	Sc-7
488.	164480 FATEHG-2 400.00 162480 FATEH-2 220.00 2	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 162480 [FATEH-2 220.00] CKT 1	488.64	611.44	500	122.29	Sc-7
489.	164480 FATEHG-2 400.00 162480 FATEH-2 220.00 3	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 162480 [FATEH-2 220.00] CKT 1	488.64	611.44	500	122.29	Sc-7
490.	164480 FATEHG-2 400.00 162480 FATEH-2 220.00 4	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 162480 [FATEH-2 220.00] CKT 1	488.64	611.44	500	122.29	Sc-7

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
491.	164480 FATEHG-2 400.00 162480 FATEH-2 220.00 5	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 162480 [FATEH-2 220.00] CKT 1	488.64	611.44	500	122.29	Sc-7
492.	164480 FATEHG-2 400.00 163480 FATEH-SPL 2 220.00 1	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 163480 [FATEH-SPL 2 220.00] CKT 2	484.7	606.5	500	121.30	Sc-7
493.	164480 FATEHG-2 400.00 163480 FATEH-SPL 2 220.00 2	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 163480 [FATEH-SPL 2 220.00] CKT 1	484.7	606.5	500	121.30	Sc-7
494.	164480 FATEHG-2 400.00 163480 FATEH-SPL 2 220.00 3	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 163480 [FATEH-SPL 2 220.00] CKT 1	484.7	606.5	500	121.30	Sc-7
495.	164480 FATEHG-2 400.00 163480 FATEH-SPL 2 220.00 4	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 163480 [FATEH-SPL 2 220.00] CKT 1	484.7	606.5	500	121.30	Sc-7
496.	164480 FATEHG-2 400.00 163480 FATEH-SPL 2 220.00 5	OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 163480 [FATEH-SPL 2 220.00] CKT 1	484.7	606.5	500	121.30	Sc-7
497.	374066 MALEGAON400 400.00 372435 MALEGAON220 220.00 1	OPEN LINE FROM BUS 374066 [MALEGAON400 400.00] TO BUS 372435 [MALEGAON220 220.00] CKT 2	402.82	603.58	500	120.72	Sc-7
498.	374066 MALEGAON400 400.00 372435 MALEGAON220 220.00 2	OPEN LINE FROM BUS 374066 [MALEGAON400 400.00] TO BUS 372435 [MALEGAON220 220.00] CKT 1	402.82	603.58	500	120.72	Sc-7
499.	164498 BHADLA-2 400.00 162498 BHADLA-2 220.00 1	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162498 [BHADLA-2 220.00] CKT 2	476.82	596.63	500	119.33	Sc-7
500.	164498 BHADLA-2 400.00 162498 BHADLA-2 220.00 2	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162498 [BHADLA-2 220.00] CKT 1	476.82	596.63	500	119.33	Sc-7
501.	164498 BHADLA-2 400.00 162498 BHADLA-2 220.00 3	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162498 [BHADLA-2 220.00] CKT 1	476.82	596.63	500	119.33	Sc-7
502.	164498 BHADLA-2 400.00 162498 BHADLA-2 220.00 4	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162498 [BHADLA-2 220.00] CKT 1	476.82	596.63	500	119.33	Sc-7
503.	164498 BHADLA-2 400.00 162498 BHADLA-2 220.00 5	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162498 [BHADLA-2 220.00] CKT 1	476.82	596.63	500	119.33	Sc-7
504.	164481 FATEHG-3 400.00 162481 FATEHG-3 220.00 1	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 162481 [FATEHG-3 220.00] CKT 2	474.83	594.12	500	118.82	Sc-7
505.	164481 FATEHG-3 400.00 162481 FATEHG-3 220.00 2	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 162481 [FATEHG-3 220.00] CKT 1	474.83	594.12	500	118.82	Sc-7
506.	164481 FATEHG-3 400.00 162481 FATEHG-3 220.00 3	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 162481 [FATEHG-3 220.00] CKT 1	474.83	594.12	500	118.82	Sc-7

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
507.	164481 FATEHG-3 400.00 162481 FATEHG-3 220.00 4	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 162481 [FATEHG-3 220.00] CKT 1	474.83	594.12	500	118.82	Sc-7
508.	164481 FATEHG-3 400.00 162481 FATEHG-3 220.00 5	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 162481 [FATEHG-3 220.00] CKT 1	474.83	594.12	500	118.82	Sc-7
509.	164409 HINDAU-4 400.00 162207 HINDAU-4 220.00 1	OPEN LINE FROM BUS 164409 [HINDAU-4 400.00] TO BUS 162207 [HINDAU-4 220.00] CKT 2	247.93	371.75	315	118.02	Sc-7
510.	164409 HINDAU-4 400.00 162207 HINDAU-4 220.00 2	OPEN LINE FROM BUS 164409 [HINDAU-4 400.00] TO BUS 162207 [HINDAU-4 220.00] CKT 1	247.93	371.75	315	118.02	Sc-7
511.	484001 KODERMA-DVC 400.00 482007 KODEMA_DVC 220.00 1	OPEN LINE FROM BUS 484001 [KODERMA-DVC 400.00] TO BUS 482007 [KODEMA_DVC 220.00] CKT 2	236.22	370.29	315	117.55	Sc-7
512.	484001 KODERMA-DVC 400.00 482007 KODEMA_DVC 220.00 2	OPEN LINE FROM BUS 484001 [KODERMA-DVC 400.00] TO BUS 482007 [KODEMA_DVC 220.00] CKT 1	236.22	370.29	315	117.55	Sc-7
513.	354035 VADODARA 400.00 352210 VADODARAPG 220.00 1	OPEN LINE FROM BUS 354035 [VADODARA 400.00] TO BUS 352210 [VADODARAPG 220.00] CKT 2	429.91	587.46	500	117.49	Sc-7
514.	354035 VADODARA 400.00 352210 VADODARAPG 220.00 2	OPEN LINE FROM BUS 354035 [VADODARA 400.00] TO BUS 352210 [VADODARAPG 220.00] CKT 1	429.91	587.46	500	117.49	Sc-7
515.	364042 SAGAR-4 400.00 362053 SAGAR-2 220.00 1	OPEN LINE FROM BUS 364042 [SAGAR-4 400.00] TO BUS 362053 [SAGAR-2 220.00] CKT 2	256.59	366.4	315	116.32	Sc-7
516.	364042 SAGAR-4 400.00 362053 SAGAR-2 220.00 2	OPEN LINE FROM BUS 364042 [SAGAR-4 400.00] TO BUS 362053 [SAGAR-2 220.00] CKT 1	256.59	366.4	315	116.32	Sc-7
517.	364007 GWALIOR-4 400.00 362009 GWALIOR-742 220.00 1	OPEN LINE FROM BUS 364007 [GWALIOR-4 400.00] TO BUS 362009 [GWALIOR-742 220.00] CKT 2	283.4	359.59	315	114.16	Sc-7
518.	364007 GWALIOR-4 400.00 362009 GWALIOR-742 220.00 2	OPEN LINE FROM BUS 364007 [GWALIOR-4 400.00] TO BUS 362009 [GWALIOR-742 220.00] CKT 1	283.4	359.59	315	114.16	Sc-7
519.	364007 GWALIOR-4 400.00 362009 GWALIOR-742 220.00 3	OPEN LINE FROM BUS 364007 [GWALIOR-4 400.00] TO BUS 362009 [GWALIOR-742 220.00] CKT 1	283.4	359.59	315	114.16	Sc-7
520.	374040 SOLAPUR-PG 400.00 372333 SOLPR-PG22 220.00 1	OPEN LINE FROM BUS 374040 [SOLAPUR-PG 400.00] TO BUS 372333 [SOLPR-PG22 220.00] CKT 3	246.93	353.97	315	112.37	Sc-7
521.	374040 SOLAPUR-PG 400.00 372333 SOLPR-PG22 220.00 2	OPEN LINE FROM BUS 374040 [SOLAPUR-PG 400.00] TO BUS 372333 [SOLPR-PG22 220.00] CKT 3	246.93	353.97	315	112.37	Sc-7
522.	354019 ZERDA 400.00 352019 ZERDA2 220.00 1	OPEN LINE FROM BUS 354019 [ZERDA 400.00] TO BUS 352019 [ZERDA2 220.00] CKT 2	284.88	353.23	315	112.14	Sc-7

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
523.	354019 ZERDA 400.00 352019 ZERDA2 220.00 2	OPEN LINE FROM BUS 354019 [ZERDA 400.00] TO BUS 352019 [ZERDA2 220.00] CKT 1	284.88	353.23	315	112.14	Sc-7
524.	354019 ZERDA 400.00 352019 ZERDA2 220.00 3	OPEN LINE FROM BUS 354019 [ZERDA 400.00] TO BUS 352019 [ZERDA2 220.00] CKT 1	284.88	353.23	315	112.14	Sc-7
525.	164461 FATEHG-3 SPL400.00 162361 FATEHG-III 220.00 1	OPEN LINE FROM BUS 164461 [FATEHG-3 SPL400.00] TO BUS 162361 [FATEHG-III 220.00] CKT 2	447.56	559.74	500	111.95	Sc-7
526.	164461 FATEHG-3 SPL400.00 162361 FATEHG-III 220.00 2	OPEN LINE FROM BUS 164461 [FATEHG-3 SPL400.00] TO BUS 162361 [FATEHG-III 220.00] CKT 1	447.56	559.74	500	111.95	Sc-7
527.	164461 FATEHG-3 SPL400.00 162361 FATEHG-III 220.00 3	OPEN LINE FROM BUS 164461 [FATEHG-3 SPL400.00] TO BUS 162361 [FATEHG-III 220.00] CKT 1	447.56	559.74	500	111.95	Sc-7
528.	164461 FATEHG-3 SPL400.00 162361 FATEHG-III 220.00 4	OPEN LINE FROM BUS 164461 [FATEHG-3 SPL400.00] TO BUS 162361 [FATEHG-III 220.00] CKT 1	447.56	559.74	500	111.95	Sc-7
529.	164461 FATEHG-3 SPL400.00 162361 FATEHG-III 220.00 5	OPEN LINE FROM BUS 164461 [FATEHG-3 SPL400.00] TO BUS 162361 [FATEHG-III 220.00] CKT 1	447.56	559.74	500	111.95	Sc-7
530.	374052 KUDUS 400.00 372254 KUDUS220 220.00 1	OPEN LINE FROM BUS 374052 [KUDUS 400.00] TO BUS 372254 [KUDUS220 220.00] CKT 2	460.61	555.29	500	111.06	Sc-7
531.	374052 KUDUS 400.00 372254 KUDUS220 220.00 2	OPEN LINE FROM BUS 374052 [KUDUS 400.00] TO BUS 372254 [KUDUS220 220.00] CKT 1	460.61	555.29	500	111.06	Sc-7
532.	164459 BHADLA PG 400.00 162359 BHADLA-PG 220.00 1	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162359 [BHADLA-PG 220.00] CKT 2	461.76	554.88	500	110.98	Sc-7
533.	164459 BHADLA PG 400.00 162359 BHADLA-PG 220.00 2	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162359 [BHADLA-PG 220.00] CKT 1	461.76	554.88	500	110.98	Sc-7
534.	164459 BHADLA PG 400.00 162359 BHADLA-PG 220.00 3	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162359 [BHADLA-PG 220.00] CKT 1	461.76	554.88	500	110.98	Sc-7
535.	164459 BHADLA PG 400.00 162359 BHADLA-PG 220.00 4	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162359 [BHADLA-PG 220.00] CKT 1	461.76	554.88	500	110.98	Sc-7
536.	164459 BHADLA PG 400.00 162359 BHADLA-PG 220.00 5	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162359 [BHADLA-PG 220.00] CKT 1	461.76	554.88	500	110.98	Sc-7
537.	164459 BHADLA PG 400.00 162359 BHADLA-PG 220.00 6	OPEN LINE FROM BUS 164459 [BHADLA PG 400.00] TO BUS 162359 [BHADLA-PG 220.00] CKT 1	461.76	554.88	500	110.98	Sc-7
538.	374018 BOISAR 400.00 372066 BOISAR-P 220.00 1	OPEN LINE FROM BUS 374018 [BOISAR 400.00] TO BUS 372066 [BOISAR-P 220.00] CKT 3	295.52	349.27	315	110.88	Sc-7

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
539.	374018 BOISAR 400.00 372066 BOISAR-P 220.00 2	OPEN LINE FROM BUS 374018 [BOISAR 400.00] TO BUS 372066 [BOISAR-P 220.00] CKT 3	295.52	349.27	315	110.88	Sc-7
540.	374018 BOISAR 400.00 372066 BOISAR-P 220.00 3	OPEN LINE FROM BUS 374018 [BOISAR 400.00] TO BUS 372066 [BOISAR-P 220.00] CKT 4	467.97	553.08	500	110.62	Sc-7
541.	374018 BOISAR 400.00 372066 BOISAR-P 220.00 4	OPEN LINE FROM BUS 374018 [BOISAR 400.00] TO BUS 372066 [BOISAR-P 220.00] CKT 3	467.97	553.08	500	110.62	Sc-7
542.	164484 BHADLA-3 400.00 162484 BHADLA-3 220.00 1	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 162484 [BHADLA-3 220.00] CKT 2	441.39	552.21	500	110.44	Sc-7
543.	164484 BHADLA-3 400.00 162484 BHADLA-3 220.00 2	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 162484 [BHADLA-3 220.00] CKT 1	441.39	552.21	500	110.44	Sc-7
544.	164484 BHADLA-3 400.00 162484 BHADLA-3 220.00 3	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 162484 [BHADLA-3 220.00] CKT 1	441.39	552.21	500	110.44	Sc-7
545.	164484 BHADLA-3 400.00 162484 BHADLA-3 220.00 4	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 162484 [BHADLA-3 220.00] CKT 1	441.39	552.21	500	110.44	Sc-7
546.	164484 BHADLA-3 400.00 162484 BHADLA-3 220.00 5	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 162484 [BHADLA-3 220.00] CKT 1	441.39	552.21	500	110.44	Sc-7
547.	164484 BHADLA-3 400.00 163484 BHADLA3-SPL 220.00 1	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 163484 [BHADLA3-SPL 220.00] CKT 2	441.39	552.21	500	110.44	Sc-7
548.	164484 BHADLA-3 400.00 163484 BHADLA3-SPL 220.00 2	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 163484 [BHADLA3-SPL 220.00] CKT 1	441.39	552.21	500	110.44	Sc-7
549.	164484 BHADLA-3 400.00 163484 BHADLA3-SPL 220.00 3	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 163484 [BHADLA3-SPL 220.00] CKT 1	441.39	552.21	500	110.44	Sc-7
550.	164484 BHADLA-3 400.00 163484 BHADLA3-SPL 220.00 4	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 163484 [BHADLA3-SPL 220.00] CKT 1	441.39	552.21	500	110.44	Sc-7
551.	164484 BHADLA-3 400.00 163484 BHADLA3-SPL 220.00 5	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 163484 [BHADLA3-SPL 220.00] CKT 1	441.39	552.21	500	110.44	Sc-7
552.	374029 CHAKAN 400.00 372234 CHAKNII2 220.00 1	OPEN LINE FROM BUS 374029 [CHAKAN 400.00] TO BUS 372234 [CHAKNII2 220.00] CKT 2	260.98	347.85	315	110.43	Sc-7
553.	374029 CHAKAN 400.00 372234 CHAKNII2 220.00 2	OPEN LINE FROM BUS 374029 [CHAKAN 400.00] TO BUS 372234 [CHAKNII2 220.00] CKT 1	260.98	347.85	315	110.43	Sc-7
554.	364009 JABALPUR-4 400.00 362067 JABALPUR-42 220.00 3	OPEN LINE FROM BUS 364009 [JABALPUR-4 400.00] TO BUS 362067 [JABALPUR-42 220.00] CKT 1	441.41	547.52	500	109.50	Sc-7

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
555.	354012 SUGEN 400.00 352012 SUGEN 220.00 1	OPEN LINE FROM BUS 354012 [SUGEN 400.00] TO BUS 352012 [SUGEN 220.00] CKT 2	277.06	342.54	315	108.74	Sc-7
556.	354012 SUGEN 400.00 352012 SUGEN 220.00 2	OPEN LINE FROM BUS 354012 [SUGEN 400.00] TO BUS 352012 [SUGEN 220.00] CKT 1	277.06	342.54	315	108.74	Sc-7
557.	354012 SUGEN 400.00 352012 SUGEN 220.00 3	OPEN LINE FROM BUS 354012 [SUGEN 400.00] TO BUS 352012 [SUGEN 220.00] CKT 1	277.06	342.54	315	108.74	Sc-7
558.	164420 KOTA 400.00 162919 KOTA 220.00 1	OPEN LINE FROM BUS 164420 [KOTA 400.00] TO BUS 162919 [KOTA 220.00] CKT 2	263.84	339.6	315	107.81	Sc-7
559.	164420 KOTA 400.00 162919 KOTA 220.00 2	OPEN LINE FROM BUS 164420 [KOTA 400.00] TO BUS 162919 [KOTA 220.00] CKT 1	263.84	339.6	315	107.81	Sc-7
560.	374012 PADGH4 400.00 372163 PADGHE22 220.00 2	OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 372163 [PADGHE22 220.00] CKT 1	279.4	335.28	315	106.44	Sc-7
561.	374012 PADGH4 400.00 372163 PADGHE22 220.00 3	OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 372163 [PADGHE22 220.00] CKT 1	279.4	335.28	315	106.44	Sc-7
562.	374012 PADGH4 400.00 372163 PADGHE22 220.00 4	OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 372163 [PADGHE22 220.00] CKT 1	279.4	335.28	315	106.44	Sc-7
563.	374012 PADGH4 400.00 372163 PADGHE22 220.00 5	OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 372163 [PADGHE22 220.00] CKT 1	442.43	530.93	500	106.19	Sc-7
564.	374012 PADGH4 400.00 372163 PADGHE22 220.00 1	OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 372163 [PADGHE22 220.00] CKT 5	543.9	629.19	600	104.87	Sc-7
565.	114013 PANG400SP3 400.00 114011 PANG220SP3 220.00 1	OPEN LINE FROM BUS 114013 [PANG400SP3 400.00] TO BUS 114011 [PANG220SP3 220.00] CKT 2	273.72	329.36	315	104.56	Sc-7
566.	114013 PANG400SP3 400.00 114011 PANG220SP3 220.00 2	OPEN LINE FROM BUS 114013 [PANG400SP3 400.00] TO BUS 114011 [PANG220SP3 220.00] CKT 1	273.72	329.36	315	104.56	Sc-7
567.	114013 PANG400SP3 400.00 114011 PANG220SP3 220.00 3	OPEN LINE FROM BUS 114013 [PANG400SP3 400.00] TO BUS 114011 [PANG220SP3 220.00] CKT 1	273.72	329.36	315	104.56	Sc-7
568.	114013 PANG400SP3 400.00 114011 PANG220SP3 220.00 4	OPEN LINE FROM BUS 114013 [PANG400SP3 400.00] TO BUS 114011 [PANG220SP3 220.00] CKT 1	273.72	329.36	315	104.56	Sc-7
569.	114013 PANG400SP3 400.00 114011 PANG220SP3 220.00 5	OPEN LINE FROM BUS 114013 [PANG400SP3 400.00] TO BUS 114011 [PANG220SP3 220.00] CKT 1	273.72	329.36	315	104.56	Sc-7
570.	114013 PANG400SP3 400.00 114011 PANG220SP3 220.00 6	OPEN LINE FROM BUS 114013 [PANG400SP3 400.00] TO BUS 114011 [PANG220SP3 220.00] CKT 1	273.72	329.36	315	104.56	Sc-7

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
571.	114012 PANG400SP2 400.00 114010 PANG220SP2 220.00 1	OPEN LINE FROM BUS 114012 [PANG400SP2 400.00] TO BUS 114010 [PANG220SP2 220.00] CKT 2	273.71	329.34	315	104.55	Sc-7
572.	114012 PANG400SP2 400.00 114010 PANG220SP2 220.00 2	OPEN LINE FROM BUS 114012 [PANG400SP2 400.00] TO BUS 114010 [PANG220SP2 220.00] CKT 1	273.71	329.34	315	104.55	Sc-7
573.	114012 PANG400SP2 400.00 114010 PANG220SP2 220.00 3	OPEN LINE FROM BUS 114012 [PANG400SP2 400.00] TO BUS 114010 [PANG220SP2 220.00] CKT 1	273.71	329.34	315	104.55	Sc-7
574.	114012 PANG400SP2 400.00 114010 PANG220SP2 220.00 4	OPEN LINE FROM BUS 114012 [PANG400SP2 400.00] TO BUS 114010 [PANG220SP2 220.00] CKT 1	273.71	329.34	315	104.55	Sc-7
575.	114012 PANG400SP2 400.00 114010 PANG220SP2 220.00 5	OPEN LINE FROM BUS 114012 [PANG400SP2 400.00] TO BUS 114010 [PANG220SP2 220.00] CKT 1	273.71	329.34	315	104.55	Sc-7
576.	114012 PANG400SP2 400.00 114010 PANG220SP2 220.00 6	OPEN LINE FROM BUS 114012 [PANG400SP2 400.00] TO BUS 114010 [PANG220SP2 220.00] CKT 1	273.71	329.34	315	104.55	Sc-7
577.	114008 PANG 400 SP1400.00 114009 LEH_PANG SP 220.00 1	OPEN LINE FROM BUS 114008 [PANG 400 SP1400.00] TO BUS 114009 [LEH_PANG SP 220.00] CKT 2	273.7	329.32	315	104.55	Sc-7
578.	114008 PANG 400 SP1400.00 114009 LEH_PANG SP 220.00 2	OPEN LINE FROM BUS 114008 [PANG 400 SP1400.00] TO BUS 114009 [LEH_PANG SP 220.00] CKT 1	273.7	329.32	315	104.55	Sc-7
579.	114008 PANG 400 SP1400.00 114009 LEH_PANG SP 220.00 3	OPEN LINE FROM BUS 114008 [PANG 400 SP1400.00] TO BUS 114009 [LEH_PANG SP 220.00] CKT 1	273.7	329.32	315	104.55	Sc-7
580.	114008 PANG 400 SP1400.00 114009 LEH_PANG SP 220.00 4	OPEN LINE FROM BUS 114008 [PANG 400 SP1400.00] TO BUS 114009 [LEH_PANG SP 220.00] CKT 1	273.7	329.32	315	104.55	Sc-7
581.	114008 PANG 400 SP1400.00 114009 LEH_PANG SP 220.00 5	OPEN LINE FROM BUS 114008 [PANG 400 SP1400.00] TO BUS 114009 [LEH_PANG SP 220.00] CKT 1	273.7	329.32	315	104.55	Sc-7
582.	114008 PANG 400 SP1400.00 114009 LEH_PANG SP 220.00 6	OPEN LINE FROM BUS 114008 [PANG 400 SP1400.00] TO BUS 114009 [LEH_PANG SP 220.00] CKT 1	273.7	329.32	315	104.55	Sc-7
583.	164411 CHABRA-4 400.00 162271 CHABRA-2 220.00 1	OPEN LINE FROM BUS 164485 [SANGOD 400.00] TO BUS 162485 [SANGOD 220.00] CKT 1	215.7	325.71	315	103.40	Sc-7
584.	504007 CUDP 400.00 502216 CHINAKAMPALL220.00 1	OPEN LINE FROM BUS 504007 [CUDP 400.00] TO BUS 502216 [CHINAKAMPALL220.00] CKT 3	236.18	325.3	315	103.27	Sc-7
585.	504007 CUDP 400.00 502216 CHINAKAMPALL220.00 2	OPEN LINE FROM BUS 504007 [CUDP 400.00] TO BUS 502216 [CHINAKAMPALL220.00] CKT 3	236.18	325.3	315	103.27	Sc-7
586.	164482 FATEHG-4 400.00 162482 FATEHG-4 220.00 1	OPEN LINE FROM BUS 164482 [FATEHG-4 400.00] TO BUS 162482 [FATEHG-4 220.00] CKT 2	412.18	515.5	500	103.10	Sc-7

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
587.	164482 FATEHG-4 400.00 162482 FATEHG-4 220.00 2	OPEN LINE FROM BUS 164482 [FATEHG-4 400.00] TO BUS 162482 [FATEHG-4 220.00] CKT 1	412.18	515.5	500	103.10	Sc-7
588.	164482 FATEHG-4 400.00 162482 FATEHG-4 220.00 3	OPEN LINE FROM BUS 164482 [FATEHG-4 400.00] TO BUS 162482 [FATEHG-4 220.00] CKT 1	412.18	515.5	500	103.10	Sc-7
589.	164482 FATEHG-4 400.00 162482 FATEHG-4 220.00 4	OPEN LINE FROM BUS 164482 [FATEHG-4 400.00] TO BUS 162482 [FATEHG-4 220.00] CKT 1	412.18	515.5	500	103.10	Sc-7
590.	164482 FATEHG-4 400.00 162482 FATEHG-4 220.00 5	OPEN LINE FROM BUS 164482 [FATEHG-4 400.00] TO BUS 162482 [FATEHG-4 220.00] CKT 1	412.18	515.5	500	103.10	Sc-7
591.	534048 KOTTAYAM4 400.00 532259 KOTTAYAM2 220.00 1	OPEN LINE FROM BUS 534048 [KOTTAYAM4 400.00] TO BUS 532259 [KOTTAYAM2 220.00] CKT 2	249.34	320.87	315	101.86	Sc-7
592.	534048 KOTTAYAM4 400.00 532259 KOTTAYAM2 220.00 2	OPEN LINE FROM BUS 534048 [KOTTAYAM4 400.00] TO BUS 532259 [KOTTAYAM2 220.00] CKT 1	249.34	320.87	315	101.86	Sc-7
593.	354208 NAVSARI-NEW 400.00 352298 NAVSARI-NEW 220.00 1	OPEN LINE FROM BUS 354208 [NAVSARI-NEW 400.00] TO BUS 352298 [NAVSARI-NEW 220.00] CKT 2	413.74	506.55	500	101.31	Sc-7
594.	354208 NAVSARI-NEW 400.00 352298 NAVSARI-NEW 220.00 2	OPEN LINE FROM BUS 354208 [NAVSARI-NEW 400.00] TO BUS 352298 [NAVSARI-NEW 220.00] CKT 1	413.74	506.55	500	101.31	Sc-7
595.	354208 NAVSARI-NEW 400.00 352298 NAVSARI-NEW 220.00 3	OPEN LINE FROM BUS 354208 [NAVSARI-NEW 400.00] TO BUS 352298 [NAVSARI-NEW 220.00] CKT 1	413.74	506.55	500	101.31	Sc-7
596.	424022 MENDHASAL 400.00 422586 MENDHASAL 220.00 1	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 422586 [MENDHASAL 220.00] CKT 2	233.14	317.55	315	100.81	Sc-7
597.	424022 MENDHASAL 400.00 422586 MENDHASAL 220.00 2	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 422586 [MENDHASAL 220.00] CKT 1	233.14	317.55	315	100.81	Sc-7
598.	374070 VELGAON4 400.00 372471 VELGAON 220.00 2	OPEN LINE FROM BUS 374070 [VELGAON4 400.00] TO BUS 372471 [VELGAON 220.00] CKT 3	425.84	503.54	500	100.71	Sc-7
599.	374070 VELGAON4 400.00 372471 VELGAON 220.00 3	OPEN LINE FROM BUS 374070 [VELGAON4 400.00] TO BUS 372471 [VELGAON 220.00] CKT 2	425.84	503.54	500	100.71	Sc-7
600.	374070 VELGAON4 400.00 372471 VELGAON 220.00 1	OPEN LINE FROM BUS 374070 [VELGAON4 400.00] TO BUS 372471 [VELGAON 220.00] CKT 2	425.78	503.47	500	100.69	Sc-7
601.	524016 GULBRG 400.00 523090 GLBRGA220 220.00 1	OPEN LINE FROM BUS 524016 [GULBRG 400.00] TO BUS 523090 [GLBRGA220 220.00] CKT 2	403.53	754.28	500	150.86	Sc-8
602.	524016 GULBRG 400.00 523090 GLBRGA220 220.00 2	OPEN LINE FROM BUS 524016 [GULBRG 400.00] TO BUS 523090 [GLBRGA220 220.00] CKT 1	403.53	754.28	500	150.86	Sc-8

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
603.	374038 KORADI-II 400.00 372393 KORADI-II 220.00 1	OPEN LINE FROM BUS 374038 [KORADI-II 400.00] TO BUS 372393 [KORADI-II 220.00] CKT 2	507.46	737.3	500	147.46	Sc-8
604.	374038 KORADI-II 400.00 372393 KORADI-II 220.00 2	OPEN LINE FROM BUS 374038 [KORADI-II 400.00] TO BUS 372393 [KORADI-II 220.00] CKT 1	507.46	737.3	500	147.46	Sc-8
605.	484002 BOKARO-A 400.00 482001 BOKARO TPS 220.00 1	OPEN LINE FROM BUS 484002 [BOKARO-A 400.00] TO BUS 482001 [BOKARO TPS 220.00] CKT 2	301.93	437.95	315	139.03	Sc-8
606.	484002 BOKARO-A 400.00 482001 BOKARO TPS 220.00 2	OPEN LINE FROM BUS 484002 [BOKARO-A 400.00] TO BUS 482001 [BOKARO TPS 220.00] CKT 1	301.93	437.95	315	139.03	Sc-8
607.	364012 SATNA-74 400.00 362022 SATNAPG-742 220.00 1	OPEN LINE FROM BUS 364012 [SATNA-74 400.00] TO BUS 362022 [SATNAPG-742 220.00] CKT 3	278.45	406.46	315	129.03	Sc-8
608.	364012 SATNA-74 400.00 362022 SATNAPG-742 220.00 2	OPEN LINE FROM BUS 364012 [SATNA-74 400.00] TO BUS 362022 [SATNAPG-742 220.00] CKT 3	278.45	406.46	315	129.03	Sc-8
609.	174424 DADR-NCR 400.00 172104 DADRI_G2 220.00 3	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 172104 [DADRI_G2 220.00] CKT 4	317.31	634.76	500	126.95	Sc-8
610.	174424 DADR-NCR 400.00 172104 DADRI_G2 220.00 4	OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 172104 [DADRI_G2 220.00] CKT 3	317.31	634.76	500	126.95	Sc-8
611.	424022 MENDHASAL 400.00 422586 MENDHASAL 220.00 1	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 422586 [MENDHASAL 220.00] CKT 2	283.97	387.28	315	122.95	Sc-8
612.	424022 MENDHASAL 400.00 422586 MENDHASAL 220.00 2	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 422586 [MENDHASAL 220.00] CKT 1	283.97	387.28	315	122.95	Sc-8
613.	194054 PIPALKOTI SW400.00 192054 PIPALKOTI SW220.00 1	OPEN LINE FROM BUS 194054 [PIPALKOTI SW400.00] TO BUS 192054 [PIPALKOTI SW220.00] CKT 2	145.45	291.3	240	121.38	Sc-8
614.	194054 PIPALKOTI SW400.00 192054 PIPALKOTI SW220.00 2	OPEN LINE FROM BUS 194054 [PIPALKOTI SW400.00] TO BUS 192054 [PIPALKOTI SW220.00] CKT 1	145.45	291.3	240	121.38	Sc-8
615.	324002 MAGARWADA-DD400.00 322002 MAGARWADA 220.00 1	OPEN LINE FROM BUS 324002 [MAGARWADA-DD400.00] TO BUS 322002 [MAGARWADA 220.00] CKT 2	185.28	376.97	315	119.67	Sc-8
616.	324002 MAGARWADA-DD400.00 322002 MAGARWADA 220.00 2	OPEN LINE FROM BUS 324002 [MAGARWADA-DD400.00] TO BUS 322002 [MAGARWADA 220.00] CKT 1	185.28	376.97	315	119.67	Sc-8
617.	164412 KALISI-4 400.00 162300 KALISIND 220.00 2	OPEN LINE FROM BUS 164412 [KALISI-4 400.00] TO BUS 164485 [SANGOD 400.00] CKT 1	505.01	579.06	500	115.81	Sc-8
618.	164434 JODH KANKANI400.00 162334 JODHPURN-42 220.00 1	OPEN LINE FROM BUS 164434 [JODH KANKANI400.00] TO BUS 162334 [JODHPURN-42 220.00] CKT 2	281.67	364.72	315	115.78	Sc-8

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
619.	364012 SATNA-74 400.00 362022 SATNAPG-742 220.00 3	OPEN LINE FROM BUS 364012 [SATNA-74 400.00] TO BUS 362022 [SATNAPG-742 220.00] CKT 1	442.12	551.5	500	110.30	Sc-8
620.	164457 SURATG-4 400.00 162257 SURATGARH-42220.00 1	OPEN LINE FROM BUS 164457 [SURATG-4 400.00] TO BUS 162257 [SURATGARH-42220.00] CKT 2	249.08	344.18	315	109.26	Sc-8
621.	164457 SURATG-4 400.00 162257 SURATGARH-42220.00 2	OPEN LINE FROM BUS 164457 [SURATG-4 400.00] TO BUS 162257 [SURATGARH-42220.00] CKT 1	249.08	344.18	315	109.26	Sc-8
622.	484001 KODERMA-DVC 400.00 482007 KODEMA_DVC 220.00 1	OPEN LINE FROM BUS 484001 [KODERMA-DVC 400.00] TO BUS 482007 [KODEMA_DVC 220.00] CKT 2	207.56	326.25	315	103.57	Sc-8
623.	484001 KODERMA-DVC 400.00 482007 KODEMA_DVC 220.00 2	OPEN LINE FROM BUS 484001 [KODERMA-DVC 400.00] TO BUS 482007 [KODEMA_DVC 220.00] CKT 1	207.56	326.25	315	103.57	Sc-8
624.	514001 RAMGUNDM STP400.00 512001 NTPC-RMGD 220.00 2	OPEN LINE FROM BUS 514001 [RAMGUNDM STP400.00] TO BUS 512001 [NTPC-RMGD 220.00] CKT 1	216.74	256.14	250	102.46	Sc-8
625.	514001 RAMGUNDM STP400.00 512001 NTPC-RMGD 220.00 3	OPEN LINE FROM BUS 514001 [RAMGUNDM STP400.00] TO BUS 512001 [NTPC-RMGD 220.00] CKT 1	216.74	256.14	250	102.46	Sc-8
626.	514001 RAMGUNDM STP400.00 512001 NTPC-RMGD 220.00 1	OPEN LINE FROM BUS 514001 [RAMGUNDM STP400.00] TO BUS 512001 [NTPC-RMGD 220.00] CKT 4	273.09	322.73	315	102.45	Sc-8
627.	514001 RAMGUNDM STP400.00 512001 NTPC-RMGD 220.00 4	OPEN LINE FROM BUS 514001 [RAMGUNDM STP400.00] TO BUS 512001 [NTPC-RMGD 220.00] CKT 1	273.09	322.73	315	102.45	Sc-8
628.	504204 KALIKIRI 400.00 502296 KALIKIRI 42 220.00 E1	OPEN LINE FROM BUS 504204 [KALIKIRI 400.00] TO BUS 502296 [KALIKIRI 42 220.00] CKT E2	177.33	256.28	252	101.70	Sc-8
629.	504204 KALIKIRI 400.00 502296 KALIKIRI 42 220.00 E2	OPEN LINE FROM BUS 504204 [KALIKIRI 400.00] TO BUS 502296 [KALIKIRI 42 220.00] CKT E1	177.33	256.28	252	101.70	Sc-8
630.	374062 NANDED40 400.00 372325 KUMBHARGAON2220.00 1	OPEN LINE FROM BUS 374062 [NANDED40 400.00] TO BUS 372325 [KUMBHARGAON2220.00] CKT 2	322.2	506.04	500	101.21	Sc-8
631.	374062 NANDED40 400.00 372325 KUMBHARGAON2220.00 2	OPEN LINE FROM BUS 374062 [NANDED40 400.00] TO BUS 372325 [KUMBHARGAON2220.00] CKT 1	322.2	506.04	500	101.21	Sc-8
632.	374038 KORADI-II 400.00 372393 KORADI-II 220.00 1	OPEN LINE FROM BUS 374038 [KORADI-II 400.00] TO BUS 372393 [KORADI-II 220.00] CKT 2	442.64	643.75	500	128.75	Sc-9
633.	374038 KORADI-II 400.00 372393 KORADI-II 220.00 2	OPEN LINE FROM BUS 374038 [KORADI-II 400.00] TO BUS 372393 [KORADI-II 220.00] CKT 1	442.64	643.75	500	128.75	Sc-9
634.	484002 BOKARO-A 400.00 482001 BOKARO TPS 220.00 1	OPEN LINE FROM BUS 484002 [BOKARO-A 400.00] TO BUS 482001 [BOKARO TPS 220.00] CKT 2	263.78	382.56	315	121.45	Sc-9

S.No	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% Loading	Scenario
635.	484002 BOKARO-A 400.00 482001 BOKARO TPS 220.00 2	OPEN LINE FROM BUS 484002 [BOKARO-A 400.00] TO BUS 482001 [BOKARO TPS 220.00] CKT 1	263.78	382.56	315	121.45	Sc-9
636.	524016 GULBRG 400.00 523090 GLBRGA220 220.00 1	OPEN LINE FROM BUS 524016 [GULBRG 400.00] TO BUS 523090 [GLBRGA220 220.00] CKT 2	295.05	548.28	500	109.66	Sc-9
637.	524016 GULBRG 400.00 523090 GLBRGA220 220.00 2	OPEN LINE FROM BUS 524016 [GULBRG 400.00] TO BUS 523090 [GLBRGA220 220.00] CKT 1	295.05	548.28	500	109.66	Sc-9
638.	164434 JODH KANKANI400.00 162334 JODHPURN-42 220.00 1	OPEN LINE FROM BUS 164434 [JODH KANKANI400.00] TO BUS 162334 [JODHPURN-42 220.00] CKT 2	249.94	324.14	315	102.90	Sc-9
639.	364012 SATNA-74 400.00 362022 SATNAPG-742 220.00 1	OPEN LINE FROM BUS 364012 [SATNA-74 400.00] TO BUS 362022 [SATNAPG-742 220.00] CKT 3	218.02	317.15	315	100.68	Sc-9
640.	364012 SATNA-74 400.00 362022 SATNAPG-742 220.00 2	OPEN LINE FROM BUS 364012 [SATNA-74 400.00] TO BUS 362022 [SATNAPG-742 220.00] CKT 3	218.02	317.15	315	100.68	Sc-9

765kV Buses Exceeding Design Fault Current

Area	BusName	Sc-1	Sc-2	Sc-3	Sc-4	Sc-5	Sc-6	Sc-7	Sc-8	Sc-9	Max	Design Level	Remark
NORTH	BHADLA-2 765.00	39	30	30	39	31	31	41	31	31	41	40	ISTS
NORTH	JAIPUR 765.00	37	38	38	37	38	38	41	39	39	41	40	STU
NORTH	GNOIDAUP 765.00	37	41	41	38	42	42	41	42	42	42	40	STU
NORTH	ALIGARH 765.00	40	43	43	41	44	44	44	44	44	44	40	ISTS
WEST	BLPSR WR 765.00	40	42	42	42	44	44	44	44	44	44	40	ISTS
WEST	BINA-PG-7 765.00	39	41	41	41	41	41	42	41	41	42	40	ISTS
WEST	JABALPR-POOL765.00	45	50	50	50	52	52	52	52	52	52	50	ISTS
WEST	WARDHA 765.00	38	40	40	40	40	40	40	42	42	42	40	ISTS
SOUTH	KURL800 765.00	42	42	42	43	43	43	43	43	42	43	40	ISTS
SOUTH	MAHESHWARAM 765.00	40	39	39	41	40	40	41	40	39	41	40	ISTS

Highlighted cell indicates 765 kV Bus Fault Current > Design level

400kV Buses Exceeding Design Fault Current

Area	BusName	Sc-1	Sc-2	Sc-3	Sc-4	Sc-5	Sc-6	Sc-7	Sc-8	Sc-9	Max	Design Level	Remark
WEST	KHARGAR 400.00	38	41	41	39	41	41	39	41	41	41	40	STU
WEST	LONIKAND I 400.00	38	40	40	39	40	40	39	40	40	40	40	STU
WEST	BABLESWAR 400.00	37	39	39	38	39	39	39	40	40	40	40	STU
WEST	BOISAR 400.00	38	40	40	38	40	40	38	40	40	40	40	ISTS
NORTH	NAKODAR4 400.00	36	43	43	37	43	43	42	43	43	43	40	STU
NORTH	PATIALA4 400.00	43	47	47	44	47	47	46	47	47	47	40	ISTS
NORTH	JALANDHAR4 400.00	40	45	45	41	45	45	44	45	45	45	40	ISTS
NORTH	MALERKOTLA4 400.00	37	40	40	37	40	40	39	40	40	40	40	ISTS
NORTH	SONAROAD 400.00	40	45	45	40	45	45	43	45	45	45	40	STU
NORTH	DAULATABAD4 400.00	39	45	45	39	45	45	41	45	45	45	40	STU
NORTH	JHAJAR_N 400.00	36	45	45	37	46	46	44	46	46	46	40	GEN
NORTH	KABULPUR 400.00	37	44	44	38	44	44	42	44	44	44	40	STU
NORTH	DHANONDA 400.00	45	54	54	46	54	54	52	54	54	54	40	STU
NORTH	PANCHKULA-PG400.00	43	47	47	44	47	47	46	47	47	47	40	ISTS
NORTH	BHIWANI-PG 400.00	48	52	52	49	52	52	52	52	52	52	50	ISTS
NORTH	ABDULLAP 400.00	46	51	51	47	51	51	49	51	51	51	40	ISTS
NORTH	KAITHAL 400.00	38	41	41	38	41	41	40	41	41	41	40	ISTS
NORTH	BALLABHG 400.00	37	41	41	37	42	42	38	42	42	42	40	ISTS
NORTH	BAWANA-G 400.00	41	53	53	41	53	53	43	53	53	53	40	STU
NORTH	BAWANA 400.00	41	53	53	41	54	54	44	54	54	54	40	STU
NORTH	BAMNAULI4 400.00	33	47	47	34	47	47	35	47	47	47	40	STU
NORTH	MANDOLA 400.00	38	43	43	38	44	44	40	43	43	44	40	ISTS
NORTH	MUNDKA 400.00	35	51	51	35	52	52	36	52	52	52	40	STU
NORTH	JHATIKALA-PG400.00	35	59	59	35	59	59	36	59	59	59	40	ISTS
NORTH	MANDOLASP2 400.00	38	43	43	38	44	44	40	43	43	44	40	ISTS
NORTH	MANDOLASP3 400.00	38	43	43	38	44	44	40	43	43	44	40	ISTS
NORTH	GOPAL PUR 400.00	39	43	43	40	43	43	41	43	43	43	40	STU

Area	BusName	Sc-1	Sc-2	Sc-3	Sc-4	Sc-5	Sc-6	Sc-7	Sc-8	Sc-9	Max	Design Level	Remark
NORTH	DWARKA 400.00	33	48	48	33	48	48	34	48	48	48	40	ISTS
NORTH	JHATIKARASP 400.00	37	59	59	37	59	59	38	59	59	59	40	ISTS
NORTH	BHADLA 400.00	43	35	35	43	36	36	44	36	36	44	40	STU
NORTH	BASSI 400.00	45	46	46	45	46	46	48	47	47	48	40	ISTS
NORTH	NEEMR-PG 400.00	46	50	50	46	51	51	50	51	51	51	40	ISTS
NORTH	SIKAR 400.00	38	40	40	38	41	41	42	41	41	42	40	ISTS
NORTH	JAIPUR_RS 400.00	47	48	48	47	48	48	50	49	49	50	40	STU
NORTH	BHADLA PG 400.00	50	39	39	51	39	39	52	40	40	52	50	ISTS
NORTH	ANTA-4 400.00	24	37	37	25	37	37	37	41	41	41	40	STU
NORTH	FATEHG-2 400.00	53	37	37	54	37	37	55	37	37	55	50	ISTS
NORTH	BHADLA-2 400.00	53	40	40	53	40	40	54	40	40	54	50	ISTS
NORTH	BHIWADI 400.00	43	46	46	44	47	47	46	47	47	47	40	ISTS
NORTH	DAUSA 400.00	41	34	34	41	34	34	43	34	34	43	40	ISTS
NORTH	MEJA 400.00	42	49	49	42	49	49	49	49	49	49	40	GEN
NORTH	MAINPURIUP 400.00	38	40	40	38	41	41	40	40	40	41	40	STU
NORTH	BARA 400.00	40	45	45	41	45	45	45	45	45	45	40	STU
NORTH	REWA 400.00	37	40	40	37	40	40	40	40	40	40	40	STU
NORTH	GNOIDAUP 400.00	50	56	56	50	57	57	54	57	57	57	40	STU
NORTH	HAPUR 400.00	38	41	41	39	42	42	40	41	41	42	40	STU
NORTH	GAZIABAD 400.00	39	42	42	39	43	43	41	42	42	43	40	STU
NORTH	UNNAO4 400.00	38	41	41	39	42	42	41	42	42	42	40	STU
NORTH	SIKANDERABAD400.00	37	42	42	37	42	42	41	42	42	42	40	STU
NORTH	AGRANEW 400.00	39	41	41	40	43	43	41	42	42	43	40	STU
NORTH	DADR-NCR 400.00	45	57	57	45	57	57	47	57	57	57	40	GEN
NORTH	GNOIDA4 400.00	47	56	56	48	56	56	51	56	56	56	40	STU
NORTH	LUCK4-PG 400.00	46	51	51	49	52	52	52	52	52	52	40	ISTS
NORTH	LUCK74-P 400.00	45	49	49	47	50	50	50	50	50	50	40	ISTS
NORTH	DADR-HVD 400.00	44	56	56	45	56	56	47	56	56	56	40	GEN

Area	BusName	Sc-1	Sc-2	Sc-3	Sc-4	Sc-5	Sc-6	Sc-7	Sc-8	Sc-9	Max	Design Level	Remark
NORTH	ANPARA4 400.00	49	54	54	52	54	54	54	54	54	54	40	GEN
NORTH	ANPARA-D 400.00	44	47	47	45	47	47	47	47	47	47	40	GEN
NORTH	ANPARAC 400.00	48	52	52	50	53	53	53	53	53	53	40	GEN
NORTH	ALLAHABA 400.00	46	50	50	46	51	51	51	51	51	51	40	ISTS
NORTH	BAL74-PG 400.00	41	45	45	43	46	46	46	48	48	48	40	ISTS
NORTH	SARNATH4 400.00	40	42	42	41	43	43	43	43	43	43	40	STU
NORTH	ALIGARH 400.00	36	41	41	37	41	41	40	41	41	41	40	ISTS
NORTH	MEERUT 400.00	58	63	63	59	64	64	61	64	64	64	40	ISTS
NORTH	AGRA 400.00	51	53	53	51	55	55	54	54	54	55	40	STU
NORTH	SINGRL4 400.00	43	44	44	43	44	44	44	44	44	44	40	GEN
NORTH	TIKRI KHURD 400.00	37	47	47	38	47	47	39	47	47	47	40	STU
WEST	SOLAPUR-PG 400.00	40	37	37	40	38	38	40	38	38	40	40	ISTS
WEST	JINDAL_EX 400.00	41	42	42	42	43	43	43	43	43	43	40	GEN
WEST	BIL-POOL 400.00	42	46	46	46	47	47	47	47	47	47	40	ISTS
WEST	CHORN4 400.00	39	43	43	40	44	44	42	44	44	44	40	STU
WEST	MUNDRA-APL 400.00	21	22	22	21	41	41	40	41	41	41	40	GEN
WEST	RANCHODPURA 400.00	37	39	39	37	41	41	39	41	41	41	40	STU
WEST	CGPL 400.00	44	44	44	44	44	44	45	44	44	45	40	GEN
WEST	SANKHARI 400.00	42	44	44	42	46	46	45	46	46	46	40	STU
WEST	BHOPAL-4 400.00	40	41	41	42	42	42	43	42	42	43	40	STU
WEST	BINA-4 400.00	37	40	40	40	40	40	41	40	40	41	40	STU
WEST	NAGDA-4 400.00	40	41	41	40	42	42	42	42	42	42	40	STU
WEST	JABALPUR-4 400.00	36	40	40	40	42	42	42	42	42	42	40	ISTS
WEST	ITARSI-4 400.00	38	40	40	39	41	41	41	41	41	41	40	ISTS
WEST	KHANDWA-4 400.00	36	38	38	36	40	40	40	40	40	40	40	ISTS
WEST	BINA-PG-74 400.00	38	40	40	41	40	40	41	40	40	41	40	ISTS
WEST	PARLI-GIRWAL400.00	41	42	42	42	43	43	43	43	43	43	40	STU
WEST	CHANDRAPUR I400.00	23	41	41	37	46	46	45	46	46	46	40	GEN

Area	BusName	Sc-1	Sc-2	Sc-3	Sc-4	Sc-5	Sc-6	Sc-7	Sc-8	Sc-9	Max	Design Level	Remark
WEST	BHADR4 400.00	23	36	36	33	41	41	40	41	41	41	40	ISTS
WEST	PADGH4 400.00	46	50	50	47	50	50	47	51	51	51	40	STU
WEST	AURANGBD-I 400.00	40	43	43	41	43	43	43	45	45	45	40	STU
WEST	CHANDRPR-II 400.00	23	41	41	37	46	46	45	46	46	46	40	GEN
WEST	PARLI-PG 400.00	43	44	44	45	45	45	45	45	45	45	40	ISTS
WEST	AURANGABD-II400.00	39	42	42	40	42	42	42	44	44	44	40	STU
WEST	AURANGBD-III400.00	38	40	40	39	41	41	40	43	43	43	40	STU
WEST	PADGHEGIS 400.00	55	59	59	55	59	59	56	60	60	60	50	ISTS
WEST	KUDUS 400.00	56	61	61	57	61	61	57	62	62	62	40	STU
WEST	LONIKANDII 400.00	38	40	40	39	40	40	39	40	40	40	40	STU
WEST	CHNDPUR_SW 400.00	23	39	39	36	44	44	43	44	44	44	40	GEN
WEST	NAVI-MUM 400.00	37	40	40	38	40	40	38	40	40	40	40	ISTS
EAST	PATNA 400.00	35	41	41	38	42	42	48	50	50	50	40	ISTS
EAST	BARH-I 400.00	28	31	31	30	32	32	45	46	46	46	40	GEN
EAST	FARAKKA 400.00	37	39	39	37	41	41	41	42	42	42	40	ISTS
EAST	SILIGURI-PG 400.00	39	40	40	39	40	40	40	40	40	40	40	ISTS
EAST	PATRATU 400.00	36	38	38	39	40	40	41	42	42	42	40	GEN
EAST	ESSAR 400.00	35	37	37	42	43	43	44	45	45	45	40	GEN
EAST	JHARKND-POOL400.00	35	38	38	43	44	44	46	46	46	46	40	ISTS
EAST	RANCHI 400.00	40	43	43	44	45	45	48	51	51	51	40	ISTS
SOUTH	POLLAVAR HEP400.00	43	45	45	43	45	45	44	45	46	46	40	STU
SOUTH	KURNOOL4 400.00	53	51	51	53	52	52	53	52	51	53	40	STU
SOUTH	SIMHADRI 400.00	27	30	30	28	40	40	38	40	41	41	40	ISTS
SOUTH	SIMHD-II 400.00	27	30	30	28	39	39	38	40	41	41	40	ISTS
SOUTH	VIZPOOL 400.00	28	30	30	29	40	40	39	40	42	42	40	STU
SOUTH	VEMAGIR4 400.00	36	45	45	37	48	48	40	48	56	56	40	STU
SOUTH	VIJ-AP 400.00	40	45	45	41	45	45	44	45	46	46	40	STU
SOUTH	KURL-NEW 400.00	56	55	55	57	56	56	56	56	55	57	50	ISTS

Area	BusName	Sc-1	Sc-2	Sc-3	Sc-4	Sc-5	Sc-6	Sc-7	Sc-8	Sc-9	Max	Design Level	Remark
SOUTH	VIJTP-IV 400.00	33	42	42	34	42	42	41	42	43	43	40	STU
SOUTH	THALAYAPALEM400.00	36	40	40	36	40	40	39	40	41	41	40	STU
SOUTH	GUDDIGUDEM 400.00	40	43	43	40	43	43	41	43	45	45	40	STU
SOUTH	KAKINADA SEZ400.00	32	36	36	33	40	40	37	40	43	43	40	STU
SOUTH	RAMGUNDM STP400.00	41	41	41	42	41	41	42	42	42	42	40	ISTS
SOUTH	HYDERABAD 400.00	39	40	40	40	41	41	41	41	41	41	40	ISTS
SOUTH	MAMIDIPALLY 400.00	44	47	47	47	47	47	48	48	47	48	40	STU
SOUTH	DICHPAL4 400.00	41	42	42	42	42	42	43	43	43	43	40	STU
SOUTH	GAJWEL4 400.00	38	39	39	40	39	39	43	43	43	43	40	STU
SOUTH	MAHESWRM 400.00	62	66	66	67	67	67	68	68	67	68	63	ISTS
SOUTH	MAHESH-TS 400.00	62	66	66	67	67	67	68	68	67	68	50	STU
SOUTH	RAIC 400.00	35	36	36	36	40	40	36	41	40	41	40	STU
SOUTH	NELMANG4 400.00	41	41	41	42	42	42	43	42	41	43	40	STU
SOUTH	UDMP 400.00	43	46	46	44	47	47	44	48	45	48	40	ISTS
SOUTH	PUGALUR4 400.00	38	40	40	38	41	41	37	42	38	42	40	ISTS
SOUTH	TIRUNEL4 400.00	42	44	44	42	48	48	44	48	48	48	40	ISTS
SOUTH	KANAPATT 400.00	38	40	40	39	43	43	39	43	42	43	40	STU
SOUTH	KAYATHAR4 400.00	36	37	37	36	41	41	37	41	39	41	40	STU

Highlighted cell indicates 400 kV Bus Fault Current >Design level

Annex-2.10

ISTS Network Expansion Plan upto 2026-27

A. Prior to Rolling Plan (upto Oct 2021)

1. Transmission lines

Sl. No.	Time Frame	Region	Transmission Line	Volatge level (kV)	S/c, D/c, M/c	Line length (ckm)	From end reactor	To end reactor
1.	2022-23	WR	Bhuj PS – Lakadia PS 765 kV D/c line (215ckm)	765	D/c	214		
2.	2022-23	WR	LILO of Bhachau – EPGL 400 kV D/c (triple) line at Lakadia PS (40ckm)	400	D/c	76		
3.	2022-23	WR	Lakadia – Vadodara 765 kV D/c line (658ckm)	765	D/c	658	330	330
4.	2022-23	WR	Lakadia PS – Banaskantha PS 765 kV D/c line (352ckm)	765	D/c	352		240
5.	2022-23	WR	Reconfiguration of Bhuj PS – Lakadia PS 765 kV D/c line so as to establish Bhuj II – Lakadia 765 kV D/C line as well as Bhuj – Bhuj II 765 kV D/C line (80 ckm)	765	D/c	212	240	
6.	2022-23	WR	Extension of Essar – Lakadia / Bhachau 400 kV D/c (triple snowbird) line upto Jam Khambhaliya PS (80 ckm)	400	D/c	38	63	63
7.	2022-23	WR	Dharamjaygarh Pool section B - Raigarh (Tamnar) Pool 765kV D/c line (140ckm)	765	D/c	137		
8.	2022-23	WR	LILO of one ckt. of Narendra (existing) – Narendra (New) 400kV D/c quad line at Xeldem -240ckm	400	D/c	187.35		
9.	2022-23	WR	Xeldem – Mapusa 400kV D/c (quad) line -80ckm	400	D/c	109.6		
10.	2022-23	WR	Xeldem (existing) - Xeldem (new) 220kV D/c line	220	D/c	40		
11.	2022-23	WR	LILO of the second circuit of Zerda – Ranchodpura 400 kV D/c line at Banaskantha (PG) PS	400	D/c	34.4		

Sl. No.	Time Frame	Region	Transmission Line	Volatge level (kV)	S/c, D/c, M/c	Line length (ckm)	From end reactor	To end reactor
12.	2022-23	WR	Re-conductoring of Kolhapur (PG) – Kolhapur 400 kV D/c line with conductor of minimum capacity of 2100 MVA/Ckt at nominal voltage along with bay up-gradation work at Kolhapur (MSETCL). -60KM	400	D/c	120		
13.	2022-23	WR	Khavda PS 1(GIS) – Bhuj PS 765 kV D/c line (120ckm)	765	D/c	120		
14.	2022-23	WR	Warora pool (Maharshtra) – Warangal(New) (Telangana) 765 kV D/c line	765	D/c	664	240	240
15.	2022-23	SR	Warora pool (Maharshtra) – Warangal(New) (Telangana) 765 kV D/c line	765	D/c	664	240	240
16.	2022-23	SR	Re-conductoring of the NP Kunta – Kolar 400 kV S/c line (twin Moose) section with high capacity conductors (like twin HTLS equivalent or Quad Moose).	400	S/c			
17.	2022-23	SR	Mangalore (Udupi PCL) – Kasargode 400kV (Quad) D/c line	400	D/c	231		
18.	2022-23	SR	Warangal (New) –Hyderabad 765 kV D/c line	765	D/c	268	240	
19.	2022-23	SR	Warangal (New) – Warangal (Existing) 400 kV (quad) D/c line	400	D/c	96		
20.	2022-23	SR	Hyderabad – Kurnool 765 kV D/c line.	765	D/c	337		240
21.	2022-23	SR	Warangal (New) – Chilakaluripeta 765kV D/c line	765	D/c	390	240	240
22.	2022-23	SR	NNTPS Switchyard - Ariyalur (Villupuram) 400kV D/c line	400	D/c	148		
23.	2022-23	NR	220kV D/c line from UT Chandigarh to 400/220kV Panchkula(PG) substati	220	D/c	50		
24.	2022-23	NR	LILO of both ckt. of 400 kV Dhauliganga-Bareilly (PGCIL) line (presently charged at 220 kV) at 400kV Jauljivi	400	D/c	6		

Sl. No.	Time Frame	Region	Transmission Line	Volatge level (kV)	S/c, D/c, M/c	Line length (ckm)	From end reactor	To end reactor
25.	2022-23	NR	Diversion of Dhauliganga-Bareilly 400kV D/c line (operated at 220kV) at Bareilly end from CB Ganj to Bareilly (PGCIL)	400	D/c	16		
26.	2022-23	NR	Disconnection of 220kV LILO arrangement of Dhauliganga-Bareilly at Pithoragarh and connecting it to Jauljivi 400/220kV S/s	220	D/c	24		
27.	2022-23	NR	Koteshwar Pooling Station - Rishikesh 400kV D/C (twin) line	400	D/c	83		
28.	2022-23	NR	Babai (RRVPNL) – Bhiwani (PG) 400kV D/C line	400	D/c	221		
29.	2022-23	NR	Removal of LILO of one circuit of Bhadla-Bikaner (RVPN) 400kV D/C line at Bikaner (PG) & Extension of this LILO section from Bikaner (PG) to Bikaner-II PS to form Bikaner-II PS-Bikaner (PG) 400kV D/C line	400	D/c	64		
30.	2022-23	NR	Removal of LILO of Bawana – Mandola 400kV D/c (Quad) line at Maharani Bagh /Gopalpur S/s. Extension of above LILO section from Maharani Bagh/ Gopalpur upto Narela S/s so as to form Maharanibagh – Narela 400kV D/c(Quad) and Maharanibagh-Gopalpur-Narela 400kV D/c (Quad) lines	400	D/c	28		
31.	2022-23	NR	Fatehgarh-III - Fatehgarh-II 400kV D/c line (Twin HTLS)	400	D/c	88		
32.	2022-23	NR	Fatehgarh-III - Jaisalmer-II (RVPNL) 400kV D/c line (Twin HTLS)	400	D/c	100		
33.	2022-23	NR	Bikaner-II PS – Khetri 400kV 2xD/c line (Twin HTLS line on M/c tower)	400	D/c	1088	80	

Sl. No.	Time Frame	Region	Transmission Line	Volatge level (kV)	S/c, D/c, M/c	Line length (ckm)	From end reactor	To end reactor
34.	2022-23	NR	Khetri - Bhiwadi 400kV D/c line (Twin HTLS)	400	D/c	236		
35.	2022-23	NR	Fatehgarh II - Bhadla II 765kV D/C Line (2nd)	765	D/c	375	240	240
36.	2022-23	NR	Bhadla II - Sikar II 765 kV D/C line	765	D/c	612	240	330
37.	2022-23	NR	Sikar II - Neemrana 400kV D/c line (Twin HTLS)	400	D/c	274		
38.	2022-23	NR	Sikar-II - Aligarh 765kV D/C Line	765	D/c	408	330	330
39.	2022-23	NER	Roing (POWERGRID) – Chapakhowa (AEGCL) 132kV D/c line along with asscoiated bays	132	D/c	67		
40.	2022-23	NER	LILO of Palatana – Surajmaninagar (ISTS) 400kV D/c line at 400/132kV Surajmaninagar (TSECL) S/ s along with associated 4 no. 400kV line bays – In matching timeframe of upgradation of 400/132kV Surajmaninagar (TSECL) substation	400	D/c	12		
41.	2022-23	NER	Installation of 400kV, 2x63MVAr switchable line reactors, one in each circuit of Silchar (POWERGRID) – Imphal (POWERGRID) 400kV D/c line at Imphal end	400				126
42.	2022-23	NER	Lower Subansiri – Biswanath Chariyali 400kV 2 x D/c (Twin Lapwing) line (341.5km): Matching with Lower Subansiri (2000MW) HEP	400	D/c	683		
43.	2022-23	ER	Jeerat (New) - Subahsgram 400kV D/c (quad) line	400	D/c	214		
44.	2022-23	ER	NKSTPP – Jharkhand Pool 400kV D/c (quad) line (50ckm)	400	D/c	50		
45.	2022-23	ER	Jeerat- Subhasgram 400kV D/c (Q) line	400	D/c	214		

Sl. No.	Time Frame	Region	Transmission Line	Volatge level (kV)	S/c, D/c, M/c	Line length (ckm)	From end reactor	To end reactor
46.	2023-24	WR	LILO of Apta – Kalwa/ Taloja 220kV D/c line (i.e. Apta – Kalwa and Apta – Taloja 220kV lines) at Navi Mumbai (PG)-2km	220	2xD/c	4		
47.	2023-24	WR	LILO of one ckt. of KPS1-Bhuj PS 765 kV D/c line at KPS2	765	D/c	2		
48.	2023-24	WR	KPS1-Khavda PS GIS (KPS2) 765 kV D/C line (to be established with by-passing of LILO of one ckt. of KPS1-Bhuj at KPS2 and utilisation of LILO section) -20Km	765	D/c	40		
49.	2023-24	WR	Neemuch PS – Chhit-torgarh (PG) S/s 400 kV D/C line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage)	400	D/c	260		
50.	2023-24	WR	Neemuch PS- Mandsaur S/stn 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage)	400	D/c	240		
51.	2023-24	WR	Pachora SEZ PP -Bhopal (Sterlite) 400 kV D/c line (Quad/HTLS) (320ckm) (with minimum capacity of 2100 MVA/ckt at nom-inal voltage) along with 80MVAr switchable line reactors on each circuit at Pachora end	400	D/c	320	80	
52.	2023-24	WR	LILO of both circuits of Parli (PG) – Pune (GIS) 400kV D/c line at Kallam PS (40ckm)	400	2xD/c	40		
53.	2023-24	WR	Provision of new 50MVAr switchable line reactor at Kallam PS end of Kallam – Pune(GIS) 400kV D/c line	400			50	
54.	2023-24	WR	LILO of KAPP – Vapi 400kV D/c line at Vapi-II	400	2xD/c	24		

Sl. No.	Time Frame	Region	Transmission Line	Volatge level (kV)	S/c, D/c, M/c	Line length (ckm)	From end reactor	To end reactor
55.	2023-24	WR	Vapi II – Sayali 220kV D/c line	220	D/c	44		
56.	2023-24	WR	Padghe (PG) – Kharghar 400kV D/c (quad) line to be terminated into one ckt. of Kharghar – Ghatkopar 400kV D/c (quad) line (thus forming Padghe (PG) – Kharghar 400kV S/c (quad) line, Padghe (PG) – Ghatkopar 400kV S/c (quad) line) - 60km	400	D/c	120		
57.	2023-24	WR	LILO of Padghe (PG) – Ghatkopar 400kV S/c line at Navi Mumbai GIS (PG) (with quad conductor) - 10km	400	D/c	20		
58.	2023-24	WR	LILO of Satna - Bina 400 kV (1st) D/c line at Chhatarpur PS*~ 60 km	400	2XD/c	240		
59.	2023-24	SR	Pooling station (near Munirabad /suitable location in Koppal distt.) - Narendra (New) GIS 400 kV D/c Line (with Quad Moose ACSR conductor)	400	D/c	250		
60.	2023-24	SR	Gadag PS - Narendra (New) PS 400 kV (high capacity equivalent to quad moose) D/C Line	400	D/c	200		
61.	2023-24	SR	Gadag PS - Koppal PS 400 kV (high capacity equivalent to quad moose) D/C Line	400	D/c	120		
62.	2023-24	SR	LILO of both circuits of Pugalur – Pugalur (HVDC) 400 kV D/c line (with Quad Moose ACSR Conductor) at Karur PS	400	D/c	100		
63.	2023-24	NR	Bhadla II - Sikar II 765 kV D/C line (2nd)	765	D/c	620	240	330
64.	2023-24	NR	Khetri – Narela 765 kV D/c line	765	D/c	180		330
65.	2023-24	NR	LILO of 765 kV Meerut-Bhiwani S/c line at Narela	765	D/c	50		

Sl. No.	Time Frame	Region	Transmission Line	Volatge level (kV)	S/c, D/c, M/c	Line length (ckm)	From end reactor	To end reactor
66.	2023-24	NR	400 kV D/c Khandukhal(S-rinagar) - Rampura (Kashi-pur) line (Twin HTLS*)	400	D/c	390		80
67.	2023-24	NER	Pare HEP (NEEPCO, Ar. Pradesh) – North Lakh-impur (AEGCL) 132kV D/c line with one circuit via Nirjuli (POWERGRID) (with ACSR Zebra conduc-tor) – (55km)	132	D/c	110		
68.	2023-24	NER	Bongaigaon (POWER-GRID) – Nangalbibra 400kV D/c line (initially operated at 220kV) – 280ckm	400	D/c	280		
69.	2023-24	NER	Hatsinghmari (Assam) – Ampati (Meghalaya) 132kV D/c line – 60 ckm	132	D/c	60		
70.	2023-24	ER	Sitamarhi (POWERGRID) - Dhalkebar (Nepal) 400kV D/c (Quad) line (Indian portion) – 80ckm	400	D/c	80		
71.	2023-24	ER	NKSTPP – Gaya 400kV D/c (quad) line (185ckm)	400	D/c	185		
72.	2024-25	WR	KPS3- KPS2 765 kV D/c line - 20km	765	D/c	40		
73.	2024-25	WR	KPS2 (GIS) – Lakadia 765 kV D/C line with 330 MVAr switchable line reactors at KPS2 end - 159KM	765	D/c	320	330	
74.	2024-25	WR	Ahmedabad – South Gu-jarat/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
75.	2024-25	WR	Lakadia PS – Ahmedabad 765kV D/c line with 240 MVAR switchable line reactors on both ends (500ckm)	765	D/c	500	240	240
76.	2024-25	WR	LILO of Pirana (PG) – Pi-rana (T) 400kV D/c line at Ahmedabad S/s with twin HTLS along with recon-ductoring of Pirana (PG) – Pirana(T) line with twin HTLS conductor	400	D/c	88		

Sl. No.	Time Frame	Region	Transmission Line	Volatge level (kV)	S/c, D/c, M/c	Line length (ckm)	From end reactor	To end reactor
77.	2024-25	SR	Kurnool-III Pooling station - Kurnool (new) 765 kV D/c Line	765	D/c	200		
78.	2024-25	SR	Kurnool-III Pooling station - Maheshwaram(PG) 765 kV D/c Line	765	D/c	500	240	240
79.	2024-25	SR	Bidar PS – Maheshwaram (PG) 765kV D/C line along with 1x240 MVAr switch-able Line Reactor on Bidar end of both ckts	765	D/c	320	240	0
80.	2024-25	SR	Ananthpuram PS - Kur-nool-III PS 400 kV (High capacity equivalent to quad moose) D/c Line	400	D/c	200		
81.	2024-25	SR	Anantapuram PS - Cud-dapah 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	0
82.	2024-25	SR	Upgradation/charging of Tuticorin PS - Dharmapuri (Salem New) 765 kV D/c line (initially charged at 400 kV) to its rated volt-age of 765 kV along with 1x330 MVAr switchable Line Reactor on both end of each circuit	765	D/c		330	330
83.	2024-25	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	
84.	2024-25	SR	Upgradation/charging of Madhugiri (Tumkur) - Nar-endra New 765 kV D/c line (initially charged at 400 kV) to its rated voltage of 765 kV along with 1x330 MVAr switchable Line Re-actor on both end of each circuit	765	D/c		330	330

Sl. No.	Time Frame	Region	Transmission Line	Volatge level (kV)	S/c, D/c, M/c	Line length (ckm)	From end reactor	To end reactor
85.	2024-25	NR	LILO of one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line	400	D/c	20		
86.	2024-25	NR	Stringing of 2nd circuit of Kishenpur – Dulhasti 400kV D/c line (Kishtwar – Kishenpur Section)	400	D/c	130		
87.	2024-25	NR	LILO of both 400 kV D/c Amargarh - Samba line at 400/220 kV Siot S/s	400	D/c	30		
88.	2024-25	NR	Laying of cable about 15km provided between Minam-arg and Zojila Top section of Alusteng –Drass 220kV section	220	S/c	15		
89.	2024-25	NR	Fatehgarh-4- Fatehgarh-3 400 kV D/c twin HLTS line	400	D/c	100		
90.	2024-25	NR	Fatehgarh 3- Bhadla-3 400kV D/c line(Quad)	400	D/c	400	50	50
91.	2024-25	NR	Fatehgarh-2 – Bhadla-3 400kV D/c line (Quad)	400	D/c	400	50	50
92.	2024-25	NR	Bhadla-3 – Sikar-II 765 kV D/c line	765	D/c	760	330	330
93.	2024-25	NR	Ramgarh – Bhadla-3 765kV D/c line	765	D/c	360	240	
94.	2024-25	NR	Sikar-II – Khetri 765 kV D/c line	765	D/c	180		
95.	2024-25	NR	Sikar-II – Narela 765 kV D/c line	765	D/c	520	240	340
96.	2024-25	NR	Jhatikara – Dwarka 400kV D/c line	400	D/c	40		
97.	2024-25	NR	LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar	765	D/c	180		
98.	2024-25	NR	LILO of 400kV Kota –Mer-ta line at Beawar	400	S/c	40		
99.	2024-25	NR	Fatehgarh-3– Beawar 765 kV D/c	765	D/c	350	330	330
100.	2024-25	NR	Fatehgarh-3– Beawar 765 kV D/c(2nd)	765	D/c	700	330	330
101.	2024-25	NR	LILO of both circuits of Jaipur (Phagi)- Gwalior 765 kV D/c at Dausa	765	D/c	160		240
102.	2024-25	NR	LILO of both circuits of Agra – Jaipur (South) 400kV D/c at Dausa	400	D/c	120		50

Sl. No.	Time Frame	Region	Transmission Line	Volatge level (kV)	S/c, D/c, M/c	Line length (ckm)	From end reactor	To end reactor
103.	2024-25	NR	Beawar – Dausa 765 kV D/c line	765	D/c	480	240	240
104.	2024-25	NER	Kathalguri (NEEPCO) – Namsai (POWERGRID) 220kV D/c line	220	D/c	150		
105.	2025-26	WR	Pachora SEZ PP – Shujalpur 400 kV D/c line (Quad/ HTLS) (with minimum capacity of 2100 MVA/ckt at nominal voltage)- 80km	400	D/c	160		
106.	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		
107.	2025-26	WR	LILO of Wardha - Warora Pool 400 kV D/c (Quad) line at Wardha SEZ PP - 85KM	400	2xD/c	340		
108.	2025-26	WR	Dholera PS – Vataman switching station 765 kV D/C line – 40 km.	765	D/c	80		
109.	2025-26	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	240	240
110.	2025-26	WR	LILO of Lakadia – Ahmedabad 765 kV D/c line at Halvad (LILO length~50 km)	765	2xD/c	200		
111.	2025-26	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
112.	2025-26	WR	LILO of Lakadia – Vadodara 765 kV D/c line at Vataman 765 kV switching station (~10 km LILO length).	765	2xD/c	40		

Sl. No.	Time Frame	Region	Transmission Line	Volatge level (kV)	S/c, D/c, M/c	Line length (ckm)	From end reactor	To end reactor
113.	2025-26	WR	Vataman switching station – Navsari(New) (South Gujarat) 765 kV D/c line (~200 km length) with 330 MVAr switchable line reactors on each ckt at Kosamba end.	765	D/c	400		330
114.	2025-26	NR	Bhadla-3 - Bhadla(HVDC) 400kV 2xD/c quad moose line(2km)	400	D/c	4		
115.	2025-26	NR	±800KV HVDC line (Hexa lapwing)(4x1500 MW) between Bhadla-3 & Fatehpur (950km) with DMR.	800(HVDC)	D/c	1900		
116.	2025-26	NR	LILO of both ckts of 765kV Varanasi – Kanpur (GIS) D/c at Fatehpur(30km)	765	D/c	60		
117.	2026-27	NR	400kV PS-1 - Pang D/c (quad moose) line	400	D/c	14		
118.	2026-27	NR	400kV PS-2 -Pang D/c (quad moose) line	400	D/c	54		
119.	2026-27	NR	400kV PS-3 -Pang D/c (quad moose) line	400	D/c	82		
120.	2026-27	NR	220kV Pang – Leh (Phyang) S/c line (Deer conductor) (S/c line on D/c tower)	220	S/c	158		
121.	2026-27	NR	Kaithal – Bahadurgarh (PG) 400 kV D/c Line (Twin HTLS)	400	D/c	340		
122.	2026-27	NR	Kaithal-Modipuram (Meerut) (UPPTCL) 765 kV D/c Line	400	D/c	420		240
123.	2026-27	NR	±350kV HVDC line between Pang & Kaithal PS (combination of 465km overhead line (Quad) and 15 km underground cable)	HVDC (350KV)	D/c	960		

2. Transformers

Sl. No	Time-frame	Region	Transformers	Voltage ratio (kV)	No. of trans-former	Rating of transformer (MVA)	Total transformation capacity (MVA)
1.	2022-23	WR	Establishment of 2x1500MVA, 765/400 kV Lakadia PS	765/400	2	1500	3000
2.	2022-23	WR	Establishment of 2x1500 MVA (765/400 kV) Bhuj-II PS (GIS)	765/400	2	1500	3000
3.	2022-23	WR	Establishment of 4x500 MVA (400/220 kV) Bhuj-II PS (GIS)	400/220	4	500	2000
4.	2022-23	WR	Establishment of 4x500MVA, 400/220kV Jam Khambhaliya PS (GIS)	400/220	4	500	2000
5.	2022-23	WR	1x500 MVA, 400/220 ICT at CGPL Mundra switch-yard	400/220	1	500	500
6.	2022-23	WR	Establishment of 2x500MVA, 400/220kV substation at Xeldem	400/220	2	500	1000
7.	2022-23	WR	1x500MVA, 400/220kV ICT (3rd) at Indore S/s along with associated ICT bays (400kV AIS & 220kV Hybrid/MTS) with 220kV ICT bay on extended bus.	400/220	1	500	500
8.	2022-23	WR	Establishment of Khavda PS1 (KPS1) 765/400kV, 3x1500MVA PS (GIS)	765/400	3	1500	4500
9.	2022-23	WR	Augmentation of Shujal-pur S/s by 400/220kV, 1x500MVA ICT (3rd)	400/220	1	500	500
10.	2022-23	SR	Augmentation of trans-formation capacity at Hiriyur and Kochi by 1x500 MVA, 400/220 kV ICT	400/220	2	500	1000
11.	2022-23	SR	Establishment of 2x500MVA, 400/220 kV GIS substation at Kasar-gode	400/220	2	500	1000
12.	2022-23	SR	Establishment of 765/400kV substations at Warangal (New) with 2x1500 MVA transform-ers	765/400	2	1500	3000

Sl. No	Time-frame	Region	Transformers	Voltage ratio (kV)	No. of trans-former	Rating of transformer (MVA)	Total transformation capacity (MVA)
13.	2022-23	SR	Addition of 1x500 MVA, 400/230kV ICTs (4th) at Tuticorin-II GIS sub-station.	400/230	1	500	500
14.	2022-23	SR	Augmentation with 400/220kV, 1x500 MVA Transformer (3rd) at Palakkad (PG) (2x 315 MVA already existing)	400/220	1	500	500
15.	2022-23	SR	Augmentation with 400/220 kV, 1x500 MVA Transformer (3rd) at Kolar (PG) (2x 500 MVA already existing)	400/220	1	500	500
16.	2022-23	SR	Augmentation with 765/400 kV, 1x1500 MVA Transformer (3rd) at Nizamabad (PG) (2x 1500 MVA already existing)	765/400	1	1500	1500
17.	2022-23	NR	Augmentation with 765/400kV, 1x1500MVA transformer (3rd) at Bhadla-II PS (1500MVA)	765/400	1	1500	1500
18.	2022-23	NR	Creation of 220 kV level at Bhadla-II PS with Installation of 400/220kV, 5x500MVA transformers at Bhadla-II PS (2500MVA)	400/220	5	500	2500
19.	2022-23	NR	4x500MVA, 400/220kV GIS at Dwarka-I (2000MVA)	400/220	4	500	2000
20.	2022-23	NR	Creation of 2x160MVA, 220/66 kV GIS S/s at UT Chandigarh (320MVA)	220/66	2	160	320
21.	2022-23	NR	Creation of 400/220kV, 2X315MVA GIS Substation in Jauljivi (630MVA)	400/220	2	315	630
22.	2022-23	NR	Augmentation with 765/400 kV,1x1500 MVA Transformer (5th) at Fatehgarh-II PS (1500MVA)	765/400	1	1500	1500
23.	2022-23	NR	Augmentation with 765/400 kV,1x1500 MVA Transformer (6th) at Fatehgarh-II PS (1500MVA)	765/400	1	1500	1500

Sl. No	Time-frame	Region	Transformers	Voltage ratio (kV)	No. of trans-former	Rating of transformer (MVA)	Total transformation capacity (MVA)
24.	2022-23	NR	Augmentation with 400/220 kV, 4x500 MVA Transformer (6th to 9th) at Fatehgarh-II PS with suitable Bus sectionalisation at 400 and 220 kV level and 7 nos. of 220 kV line bays (2000MVA)	400/220	4	500	2000
25.	2022-23	NR	Augmentation with 400/220kV,3x500MVA Transformer (6th to 8th) at Bhadla-II PS with suitable Bus sectionalisation at 400 and 220 kV level and 5 nos. of 220 line bays (1500MVA)	400/220	3	500	1500
26.	2022-23	NR	Augmentation with 765/400 kV ,1x1500 MVA transformer (4th) at Bhadla-II PS (1500MVA)	765/400	1	1500	1500
27.	2022-23	NR	Establishment of 400/220 kV, 4x500 MVA at Ramgarh – II PS	400/220	4	500	2000
28.	2022-23	NR	Establishment of 765/400 kV, 2x1500 MVA at Sikar – II	765/400	2	1500	3000
29.	2022-23	NR	2x500MVA, 400/220kV ICTs at Bikaner-II PS along with 4 nos. of 220kV line bays	400/220	2	500	1000
30.	2022-23	NR	Replacement of 1x315 MVA, 400/220 kV ICT by 1x500 MVA, 400/220kV ICT at Ludhiana (PG) S/s	400/220	1	185	185
31.	2022-23	NR	1x 500 MVA, 400/220 kV ICT at Kurukshetra (PG) S/s	400/220	1	500	500
32.	2022-23	NR	1x 500 MVA, 400/220 kV ICT at Patiala (PG) S/s	400/220	1	500	500
33.	2022-23	NER	Installation of 1x100MVA, 220/132kV ICT (3rd) at Salakati alongwith associated bays at both levels	220/132	1	100	100
34.	2022-23	ER	400/220kV, 315MVA (3rd ICT) at Ranchi New S/s	400/220	1	315	315

Sl. No	Time-frame	Region	Transformers	Voltage ratio (kV)	No. of trans-former	Rating of transformer (MVA)	Total transformation capacity (MVA)
35.	2022-23	ER	Shifting of 400kV side of 400/220kV, 315MVA ICT-I from Durgapur-A section to Durgapur-B section without physical shifting of ICT such that all three ICTs are on same 400kV bus section (if required, GIS bus duct could be used)	400/220	0	0	0
36.	2023-24	WR	Establishment of 765/400 kV, 4x1500MVA, KPS2 (GIS)	765/400	4	1500	6000
37.	2023-24	WR	Augmentation of Khav-da PS1 by 765/400 kV transformation capacity * (max. upto 4x1500 MVA)	765/400	4	1500	6000
38.	2023-24	WR	Establishment of 2x500 MVA, 400/220 kV Pooling Station (AIS) at Neemuch	400/220	2	500	1000
39.	2023-24	WR	Establishment of 400/220 kV, 3X500 MVA at Pachora SEZ PP	400/220	3	500	1500
40.	2023-24	WR	Establishment of 2x500MVA, 400/220kV at Kallam PS along with 4 nos. 220kV line bays at Kallam PS	400/220	2	500	1000
41.	2023-24	WR	Establishment of 2x500MVA, 400/220kV GIS S/s near Vapi / Amb-heti (Vapi-II)	400/220	2	500	1000
42.	2023-24	WR	Establishment of 3x500 MVA, 400/220 kV Pool-ing Station at Chhatarpur	400/220	3	500	1500
43.	2023-24	WR	Augumentation of 1x500MVA 400/220kV ICT (3rd) at Bhatapara (PG)	400/220	1	500	500
44.	2023-24	SR	Establishment of 5x500 MVA, 400/220 kV pooling station near Munirabad / suitable location in Kop-pal distt	400/220	5	500	2500

Sl. No	Time-frame	Region	Transformers	Voltage ratio (kV)	No. of trans-former	Rating of transformer (MVA)	Total transformation capacity (MVA)
45.	2023-24	SR	Establishment of 400/220 kV, 2x500 MVA Gadag Pooling Station	400/220	2	500	1000
46.	2023-24	SR	Augmentation of 400/220 kV, 3x500 MVA Gadag Pooling Station	400/220	3	500	1500
47.	2023-24	SR	Establishment of 2x500 MVA, 400/230 kV Karur Pooling Station	400/230	2	500	1000
48.	2023-24	SR	Augmentation of 3x500 MVA, 400/230 kV at Karur PS	400/230	3	500	1500
49.	2023-24	NR	Establishment of 765/400 kV, 3X1500 MVA GIS substation at Narela	765/400	3	1500	4500
50.	2023-24	NER	Establishment of new 220/132kV, 2x160MVA substation at Nangalbibra	220/132	2	160	320
51.	2023-24	ER	400/220kV, 2x500MVA ICTs along with associated bays (220kV bays in GIS and 400kV bays in AIS)	400/220	2	500	1000
52.	2024-25	WR	Establishment of 765/400 kV, 3x1500 MVA, KPS3 (GIS) with 1x330 MVAR 765 kV bus reactor and 1x125 MVAR 400 kV bus reactor.	765/400	3	1500	4500
53.	2024-25	WR	Establishment of 3x1500 MVA, 765/400 kV Ahmedabad S/s	765/400	3	1500	4500
54.	2024-25	SR	Establishment of 2x1500 MVA, 765/400 KV Pooling station at suitable location in Kurnool Distt. (Kurnool-III)	765/400	2	1500	3000
55.	2024-25	SR	Establishment of 5x500 MVA 400/220kV Pooling station at suitable location in Kurnool Distt. (Kurnool-III)	400/220	5	500	2500
56.	2024-25	SR	Augmentation of transformation capacity by 1x1500 MVA, 765/400 KV at Kurnool-III Pooling Station (in matching time frame of Kurnool Part-B)	765/400	1	1500	1500

Sl. No	Time-frame	Region	Transformers	Voltage ratio (kV)	No. of trans-former	Rating of transformer (MVA)	Total transformation capacity (MVA)
57.	2024-25	SR	Augmentation of trans-formation capacity by 4x500 MVA 400/220kV at Kurnool-III Pooling Station (in matching time frame of Kurnool Part-B)	765/400	4	500	2000
58.	2024-25	SR	Establishment of 3x1500MVA (765/400kV) Bidar PS	765/400	3	1500	4500
59.	2024-25	SR	Establishment of 5x500MVA (400/220kV) Bidar PS	400/220	5	500	2500
60.	2024-25	SR	Establishment of 400/220 kV, 7x500 MVA, Ananthpuram pooling station at suitable border location between Ananta-pur & Kurnool Distt	400/220	7	500	3500
61.	2024-25	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	2	1500	3000
62.	2024-25	SR	Upgradation of Dharma-puri (Salem New) to its rated voltage of 765kV level alongwith 2x1500 MVA, 765/400kV ICTs and 1x240 MVAr Bus Reactor	765/400	2	1500	3000
63.	2024-25	SR	Upgradation of Madhu-giri (Tumkur) to its rated voltage of 765kV level alongwith 2x1500 MVA, 765/400kV ICTs and 1x240 MVAr Bus Reactor	765/400	2	1500	3000
64.	2024-25	NR	Implementation of 2x200 MVA, 400/132 kV trans-former at Kishtwar Pool-ing Station along with 4 no. of 132 kV line bays	400/132	2	200	400
65.	2024-25	NR	Establishment of 2x315MVA, 400/220kV Siot(Rajouri) S/s with 1x125 MVAR (420 kV) bus reactors	400/220	2	315	630

Sl. No	Time-frame	Region	Transformers	Voltage ratio (kV)	No. of trans-former	Rating of transformer (MVA)	Total transformation capacity (MVA)
66.	2024-25	NR	Augmentation with 400/220kV, 1x500 MVA Transformer (3rd)at So-hawal (PG)	400/220	1	500	500
67.	2024-25	NR	Establishment of 2x500 MVA 400/220 kV pooling station at Fatehgarh-4 along with 2x125 MVAr Bus Reactor	400/220	2	500	1000
68.	2024-25	NR	Augmentation of 3x500 MVA400/220 kV pooling station at Fatehgarh-4	400/220	3	500	1500
69.	2024-25	NR	Establishment of 2x1500 MVA 765/400kV at Bhadla-3	765/400	2	1500	3000
70.	2024-25	NR	3x500 MVA 400/220 kV pooling station at Bhad-la-3	400/220	3	500	1500
71.	2024-25	NR	Augmentation of 7x500 MVA 400/220 kV trans-formation capacity at Bhadla-3	400/220	7	500	3500
72.	2024-25	NR	Establishment of 2x1500 MVA 765/400kV at Ramgarh	765/400	2	1500	3000
73.	2024-25	NR	2x500 MVA 400/220 kV pooling station at Ramgarh	400/220	2	500	1000
74.	2024-25	NR	Augmentation of 1x1500 MVA 765/400kV at Ramgarh PS	765/400	1	1500	1500
75.	2024-25	NR	Establishment of 3x1500 MVA 765/400kV at Fate-hgarh-3(new section)	765/400	3	1500	4500
76.	2024-25	NR	3x500 MVA 400/220 kV pooling station at Fateh-garh-3(new section)	400/220	3	500	1500
77.	2024-25	NR	Augmentation of 3x1500 MVA 765/400kV at Fate-hgarh-3(new section)	765/400	3	1500	4500
78.	2024-25	NR	2x500 MVA 400/220 kV pooling station at Fateh-garh-3(new section)	400/220	2	500	1000
79.	2024-25	NR	Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar	765/400	2	1500	3000

Sl. No	Time-frame	Region	Transformers	Voltage ratio (kV)	No. of trans-former	Rating of transformer (MVA)	Total transformation capacity (MVA)
80.	2024-25	NR	Establishment of 2x1500 MVA 765/400kV substation at suitable location near Dausa	765/400	2	1500	3000
81.	2024-25	NR	Augmentation with 400/220kV, 1x500MVA Transformer (10th) at Fatehgarh-2 PS	765/400	1	1500	1500
82.	2024-25	NR	Augmentation with 765/400kV, 1x1500MVA Transformer (5th) at Bhadla-2 PS	765/400	1	1500	1500
83.	2024-25	NR	Augmentation with 765/400kV, 1x1500MVA Transformer (3rd) at Bikaner (PG)	765/400	1	1500	1500
84.	2024-25	NR	Augmentation of 1x1500 MVA ICT (3rd), 765/400kV ICT at Jhatikara Substation (Bamnoli/Dwarka section)	765/400	1	1500	1500
85.	2024-25	NER	Upgradation of existing 132kV Namsai (POWERGRID) S/s to 220kV (with 220kV side as GIS)	220/132	2	160	320
86.	2025-26	WR	Establishment of 4x500MVA, 400/220kV ICTs at Lakadia (GIS) PS	400/220	4	500	2000
87.	2025-26	WR	Additional 1x500MVA 400/220kV (9th) ICT, for injection from any additional RE project (other than 4000MW injection under SECI bids upto Tranche IV) in existing Bhuj PS with associated 400 kV GIS bay and 220kV AIS bay.	400/220	1	500	500
88.	2025-26	WR	400/220 kV, 2x500 MVA ICT augmentation at Pachora PS	400/220	2	500	1000
89.	2025-26	WR	Establishment of 400/220 kV, 3x500 MVA at Solapur PP (near Mohol)	400/220	3	500	1500
90.	2025-26	WR	Establishment of 400/220 kV, 5X500 MVA at Wardha SEZ PP	400/220	5	500	2500

Sl. No	Time-frame	Region	Transformers	Voltage ratio (kV)	No. of trans-former	Rating of transformer (MVA)	Total transformation capacity (MVA)
91.	2025-26	WR	Establishment of 3x1500MVA, 765/400kV at Dholera PS	765/400	3	1500	4500
92.	2025-26	NR	Establishment of 5x1500MVA, 765/400KV ICTs at Fatehpur(HVDC)	765/400	5	1500	7500
93.	2026-27	NR	400/220/33kV, 315 MVA transformer at pang S/s	400/220	2	315	630
94.	2026-27	NR	765/400/33kV, 1500 MVA transformer at Kaithal S/s	765/400	3	1500	4500
95.	2026-27	NR	Augmentation of 765/400kV, 1500 MVA transformer of Bhiwani S/s	765/400	1	1500	1500

3. Bus Reactors

Sl. No.	Time Frame	Region	Bus Reactors	No of reactors	Rating of reactor	Total reactive compensation (MVAR)
1.	2022-23	WR	Establishement of 765kV 330MVAR Bus Reactor at Lakadia PS	1	330	330
2.	2022-23	WR	Establishment of 400kV 125MVAR Bus Reactor at Lakadia PS	1	125	125
3.	2022-23	WR	Establishement of 765kV 330MVAR Bus Reactor at Lakadia PS	1	330	330
4.	2022-23	WR	Establishement of 400kV 125MVAR Bus Reactor at Lakadia PS	1	125	125
5.	2022-23	WR	Establishement of 400kV 125MVAR Bus Reactor at Jam Khambhaliya PS	1	125	125
6.	2022-23	WR	Establishment of 1x125MVAR Bus Reac-tor at Xeldem S/s	1	125	125
7.	2022-23	WR	Establishment of 765kV 1x330MVAR Bus Reactor at Khavda PS1 (KPS1)	1	330	330
8.	2022-23	WR	Establishment of 400kV 1x125MVAR Bus Reactor at Khavda PS1 (KPS1)	1	125	125
9.	2022-23	SR	2X63 MVAr bus reactors at Kasargode Ss	2	63	126
10.	2022-23	SR	2X240 MVAr Bus Reactors at Warangal	2	240	480
11.	2022-23	NR	500 MVAr TCR at Kurushetra	1	500	500
12.	2022-23	NR	± 600 MVAr STATCOM at Fatehgarh-II substation with 4x125 MVAr MSC, 2x125 MVAr MSR	2	125	250
13.	2022-23	NR	± 600 MVAr STATCOM at Bhadla–II substation with 4x125 MVAr MSC, 2x125 MVAr MSR	2	125	250

Sl. No.	Time Frame	Region	Bus Reactors	No of reactors	Rating of reactor	Total reactive compensation (MVAR)
14.	2022-23	NR	Establishment of 400/220 kV, 4x500 MVA at Ramgarh – II PS	2	125	250
15.	2022-23	NR	Establishment of 400kV Pooling Station at Biakner-II	2	125	250
16.	2022-23	NR	1x125 MVAr(400 kV) Bus Reactor at Sikar-II	1	125	125
17.	2022-23	NR	2x330 MVAr(765 kV) Bus Reactor at Sikar-II	2	330	660
18.	2022-23	NR	2x330 MVAr(765 kV) Bus Reactor at Narela	2	330	660
19.	2022-23	NR	1x125 MVAr(400 kV) Bus Reactor at Narela	1	125	125
20.	2023-24	WR	Establishment of 2x330 MVAR 765 kV bus reactor at KPS2	2	330	660
21.	2023-24	WR	Establishment of 2x125 MVAR 400 kV bus reactor at KPS2	2	125	250
22.	2023-24	WR	Augmentation of Khavda PS1 with 1x330 MVAR 765 kV bus reactor on 2nd 765 kV bus section	1	330	330
23.	2023-24	WR	Augmentation of Khavda PS1 with 1x125 MVAR 420 kV bus reactor on 2nd 400 kV bus section	1	125	125
24.	2023-24	WR	Establishment of 1x125 MVAr Bus Reactor at Neemuch PS	1	125	125
25.	2023-24	WR	Establishment of 420kV 125 MVAR bus at reactor at Pachora SEZ PP	1	125	125
26.	2023-24	WR	Establishment of 1x125MVAr bus reactor at Kallam PS	1	125	125
27.	2023-24	WR	Establishment of 125MVAR Bus reactor at Vapi / Ambheti (Vapi-II)	1	125	125
28.	2023-24	WR	Establishment of 1X125 MVAR, 420 kV bus reactor at Chhatarpur PS	1	125	125
29.	2023-24	SR	2x125 MVAr, 400 kV bus reactor at Pooling station (near Munirabad /suitable location in Koppal Distt.)	2	125	250
30.	2023-24	SR	1x125 MVAr (400 kV) bus reactor at Gadag PS	1	125	125
31.	2023-24	SR	2x125 MVAr, 400 kV Bus reactors at Karur PS	2	125	250
32.	2023-24	NER	2 nos 31.5MVAr Bus reactor at Nangalbibra	2	32	63
33.	2024-25	WR	Establishment of 1x330 MVAR 765 kV bus reactor at KPS3(GIS)	1	330	330
34.	2024-25	WR	Establishment of 1x125 MVAR 400 kV bus reactor at KPS3(GIS)	1	125	125
35.	2024-25	WR	Establishment of 1x330 MVAR 765 kV bus reactor at Ahmedabad S/s	1	330	330

Sl. No.	Time Frame	Region	Bus Reactors	No of reactors	Rating of reactor	Total reactive compensation (MVAR)
36.	2024-25	WR	Establishment of 1x125 MVAR 400 kV bus reactor at Ahmedabad S/s	1	125	125
37.	2024-25	SR	1x330 MVAr (765kV) bus reactor at Kurnool-III PS	1	330	330
38.	2024-25	SR	1x125MVAr (400kV) bus reactor at Kurnool-III PS	1	125	125
39.	2024-25	SR	1x240 MVAr Bus Reactor at Bidar	1	240	240
40.	2024-25	SR	1x125 MVAr Bus Reactor at Bidar	1	125	125
41.	2024-25	SR	2x125 MVAr (400kV) bus reactor at Anantapur PS	2	125	250
42.	2024-25	SR	1x330 MVAr Bus Reactor at Tuticorin PS	1	330	330
43.	2024-25	SR	1x240 MVAr Bus Reactor at Dharmapuri (Salem New)	1	240	240
44.	2024-25	SR	1x240 MVAr Bus Reactor at Madhugiri (Tumkur)	1	240	240
45.	2024-25	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
46.	2024-25	NR	Establishment of 2x315MVA, 400/220kV Siot(Rajouri) S/s with 1x125 MVAR (420 kV) bus reactors	1	80	80
47.	2024-25	NR	2x25 MVAR, 220kV bus reactors at 220/66kV Drass S/s	2	25	50
48.	2024-25	NR	1x25 MVAR, 220kV bus reactors at 220/66kV Alusteng S/s	1	25	25
49.	2024-25	NR	Establishment of 2x500 MVA 400/220 kV pooling station at Fatehgarh-4 along with 2x125 MVAr Bus Reactor	2	125	250
50.	2024-25	NR	2x330 MVAr(765 kV) Bus Reactor at Bhadla-3	2	330	660
51.	2024-25	NR	2x125 MVAr(400 kV) Bus Reactor at Bhadla-3	2	125	250
52.	2024-25	NR	2x240 MVAr(765 kV) Bus Reactor at Ramgarh	2	240	480
53.	2024-25	NR	2x125 MVAr(400 kV) Bus Reactor at Ramgarh	2	125	250
54.	2024-25	NR	STATCOM at Ramgarh S/s: ± 2x300 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR	2	125	250
55.	2024-25	NR	STATCOM : ± 2x300 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR at Fatehgarh-III	2	125	250
56.	2024-25	NR	2x330 MVAr(765 kV) Bus Reactor at Beawar	2	330	660
57.	2024-25	NR	2x125 MVAr(400 kV) Bus Reactor at Beawar	2	125	250

Sl. No.	Time Frame	Region	Bus Reactors	No of reactors	Rating of reactor	Total reactive compensation (MVAR)
58.	2024-25	NR	2x330 MVAr(765 kV) Bus Reactor at Dausa	2	330	660
59.	2024-25	NR	2x125 MVAr(400 kV) Bus Reactor at Dausa	2	125	250
60.	2024-25	NER	1 no 50MVAr Bus reactor at Namsai	1	50	50
61.	2025-26	WR	Establishment of 125MVAR, 420kV Bus Reactor at Solapur PP (near Mohol)	1	125	125
62.	2025-26	WR	Establishment of 420kV 125 MVAR bus reactor at Wardha SEZ PP	1	125	125
63.	2025-26	WR	Establishment of 1x330MVAr, 765kV Bus reactor at Dholera PS	1	330	330
64.	2025-26	WR	Establishment of 1x125MVAr, 400kV Bus reactor at Dholera PS	1	125	125
65.	2025-26	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
66.	2025-26	WR	Establishment of 765 kV switching station near Vataman with 2x330MVAr, 765 kV bus reactor (with 110 MVAr 765 kV single phase reactor (spare unit for bus/line reactor)	2	330	660
67.	2025-26	NR	2x330MVAr (765kV) bus reactor at Fatehpur	2	330	660

4. Other Schemes

Sl. No.	Time Frame	Region	Scope (each element as separate row)	Voltage ratio (kV)
1.	2022-23	WR	Re-conductoring of Kolhapur (PG) – Kolhapur 400 kV D/c line with conductor of minimum capacity of 2100 MVA/Ckt at nominal voltage along with bay up-gradation work at Kolhapur (MSETCL). -60KM	400
2.	2022-23	WR	400kV Wardha Sub--station extension (400kV Bus splitting at Wardha SS)	400
3.	2022-23	WR	400 kV Boisar Substation Extension (Conversion of 80 MVAr fixed line reactor at Boisar end of Aurangabad – Boisar 400 kV D/c line to switchable line reactor alongwith NGR bypass arrangement)	400
4.	2022-23	SR	Upgradation of 400 kV bays equipments at NP Kunta and Kolar for NP Kunta – Kolar	400
5.	2022-23	SR	1 no. of 230 kV bay at Tuticorin-II GIS PS under ISTS	230
6.	2022-23	SR	One spare unit (1-Ph) of 80 MVAR reactor each at 765 kV Warangal New and Chilikaluripeta substation	765
7.	2022-23	SR	NGR bypass arrangement to use switchable line reactors (240 MVAR each) as bus reactors installed on each circuit of Vemagiri – Chilkaluripeta 765 kV D/c line	765
8.	2022-23	SR	NGR bypass arrangement at Chilkaluripeta to use switchable line reactors (240 MVAR each) as bus reactors installed on each circuit of Chilkaluripeta – Cuddapah 765 kV D/c line and Vemagiri-Chilakaluripeta 765kV D/c line	765
9.	2022-23	SR	1 no. of 400 kV bay at 765/400 kV Kurnool (New)	400
10.	2022-23	NR	At Kanpur12 Ohm Series Line reactor on Kanpur (old)–Kanpur (new) 400 kV D/c line at Kanpur (old) endFatehpur–Kanpur (old) 400kV D/c and Kanpur (old)-Panki 400kV D/c lines to be disconnected at Kanpur (old) end and connecting them directly to form Fatehpur-Panki 400 kV D/c lineAt Bhiwani and Hissar 12 Ohm Series Bus reactor at Bhiwani (PG) substation.Out of two 400kV D/c lines between Mohindergarh & Bhiwani, one 400 kV D/c line is owned by Adani and other is under implementation by POWERGRID. It is proposed that Mohindergarh–Bhiwani (PG) 400kV D/c line of POWERGRID and Bhiwani (PG)- Hissar (PG) 400kV D/c line to be by-passed at Bhiwani (PG) end so as to form direct Mohindergarh–Hissar 400kV D/c line of POWERGRID.iii) Remaining Bhiwani (PG)–Hissar (PG) 400kV D/c line (one circuit via Bhiwani (BBMB)) and Hissar (PG)–Moga (One circuit via Fatehbad) 400kV line is to be by-passed at Hissar end so as to form Bhiwani (PG)–Moga 400kV D/c direct line with following arrangement:o One Circuit of Bhiwani (PG) – Moga(PG) 400 kV line(via Hissar) o One Circuit of Bhiwani (PG) – Bhiwani (BBMB) – Fatehabad – Moga(PG) 400 kV line (via Hissar).	400
11.	2022-23	NR	2 nos. of 400kV line bays at Koteshwar	400
12.	2022-23	NER	Modification of 132kV SMT bus scheme to DM bus scheme in GIS alongwith 2 nos. 132kV GIS line bays	132
13.	2022-23	NER	Re-conductoring of Siliguri – Bongaigaon 400kV D/c line along wioth suitable modification in line bays equipment at both ends	400

Sl. No.	Time Frame	Region	Scope (each element as separate row)	Voltage ratio (kV)
14.	2022-23	NER	Re-conductoring of Alipurduar – Salakati 220kV D/c line along wioth suitable modification in line bays equipment at both ends	220
15.	2022-23	NER	Re-conductoring of BTPS – Salakati 220kV D/c line along wioth suitable modification in line bays equipment at both ends	220
16.	2022-23	NER	Re-conductoring of Dimapur – Imphal 132kV S/c line along wioth suitable modification in line bays equipment at both ends	132
17.	2022-23	NER	Re-conductoring of Loktak – Jiribam 132kV S/c line along wioth suitable modification in line bays equipment at both ends	132
18.	2022-23	NER	Conversion of 132kV level of 400/132kV Imphal S/s to Double Main Transfer Bus Scheme preferably with Bus Sectionalisation on AIS depending on layout or alternatively on GIS/ Hybrid GIS if layout does not permit AIS Bus sectionalisation	132
19.	2022-23	NER	Conversion of 132kV level of 132/33kV Nirjuli S/s to Double Main Transfer Bus Scheme preferably with Bus Sectionalisation on AIS depending on layout or alternatively on GIS/ Hybrid GIS if layout does not permit AIS Bus sectionalisation	132
20.	2022-23	ER	Modification of 132kV SMT bus scheme to DM bus scheme in GIS and 2 no additional 132kV GIS line bays at Malda (400/220/132kV)	132
21.	2023-24	WR	Conversion of 50MVAr fixed Line Reactors on each ckt of Parli (PG) – Pune (GIS) 400kV D/c line at Parli (PG) end into switchable.	400
22.	2023-24	NR	1 no. of 400 kV line bay at Rampura (Kashipur) S/s	400
23.	2023-24	NR	Upgradation of existing 400kV bays at Khandukhal (Srinagar)	400
24.	2023-24	NR	Upgradation of existing 1 no. of 400 kV diameter comprising line bay (Srinagar) and ICT bay alongwith associated Tie bay at Rampura (Kashipur)	400
25.	2023-24	NR	1 no. of 220 kV line bay at 400/220 kV Amritsar(PG) S/s (for 220kV Amritsar (PG) – Rashiana line)	220
26.	2023-24	NR	4 nos. of 220 kV line bay at at 400/220 kV Jind (PG) S/s	220
27.	2023-24	ER	Creation of 220kV GIS bus at Banka (POWERGRID) S/s	220
28.	2023-24	ER	400kV Bus extension works at Banka (PGCIL) 400/132kV Substation	400
29.	2025-26	WR	Conversion of 240 MVAr 765 kV switchable line reactor on each ckt at Lakadia end of Lakadia – Ahmedabad 765 kV D/c line (being LILOed at Halvad) into bus reactors with NGR by-passing arrangement	765
30.	2025-26	WR	Conversion of 330 MVAr 765 kV switchable line reactor on each ckt at Vadodara end of Lakadia – Vadodara 765 kV D/c line (being LILOed at Vataman) into bus reactors with NGR bypassing arrangement.	765
31.	2025-26	WR	1 number of 400kV bay at Solapur (PG) for St-II connectivity to M/s Toramba	400

B. This Rolling Plan (Nov'21 to Feb'22)

1. Transmission lines

Sl. No.	Time Frame	Region	Transmission Line	Volatge level (kV)	S/c, D/c, M/c	Line length (ckm)	From end reactor	To end reactor
1.	2023-24	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	0
2.	2023-24	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	0	0
3.	2023-24	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	0
4.	2023-24	WR	Jeypore – Jagdalpur 400kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage) along with associated bays at both ends	400	D/c	160	0	0
5.	2023-24	WR	Raipur Pool – Dhamtari 400 kV D/c line (conductor with min-imum capacity of 2100 MVA/ Ckt at nominal voltage) along with associated bays at both ends	400	D/c	160	0	0
6.	2023-24	WR	Narendra New (GIS) – Pune (GIS) 765kV D/c line with 1x330MVAr switchable line re-actor on each ckt at both ends	765	D/c	680	330	300
7.	2023-24	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	340	330	330
8.	2023-24	ER	Installation of 400kV, 2x63M-VAr switchable line reactors, one in each circuit of Kahalgaon - Durgapur 400kV D/c line	400	D/c		126	
9.	2024-25	WR	Banaskantha – Sankhari 400 kV 2nd D/c line	400	D/c	52	0	0
10.	2024-25	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	0	330

Sl. No.	Time Frame	Region	Transmission Line	Volatge level (kV)	S/c, D/c, M/c	Line length (ckm)	From end reactor	To end reactor
11.	2024-25	NR	Kaza-Wangtoo (HPPTCL) 400 kV D/c (Quad) line	400kV	D/c	360	80	
12.	2024-25	NR	Wangtoo (HPPTCL) - Panch-kula (PG) 400 kV D/c (Twin HTLS)	400kV	D/c	420		80
13.	2024-25	NER	Gogamukh - Gerukamukh 132kV D/c line	132	D/c	40		
14.	2024-25	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 Gog-amukh S/s	400	D/c	40		
15.	2025-26	NR	Nange (GIS) Pooling Station – Koldam 400 kV D/c line (Triple snowbird)	400kV	D/c	80		
16.	2025-26	NR	Bypassing one ckt of Koldam – Ropar/Ludhiana 400kV D/c line (Triple snowbird) at Koldam and connecting it with one of the circuit of Nange- Koldam 400kV D/c line(Triple snowbird), thus forming Nange- Ropar/ Ludhi-ana one line (Triple snowbird)	400kV	S/c	0		50
17.	2025-26	NR	400kV Kishenpur Kishtwar D/c (2nd) (Quad)	400kV	D/c	260		
18.	2025-26	NR	400kV New Wanpoh - Samba D/c (existing) line (bypassing of 400kV New Wanpoh – Kishen-pur D/c & Samba – Kishenpur D/c at Kishenpur)	400kV	D/c	0		

1. Transmission lines

Sl. No	Time-frame	Region	Transformers	Voltage ratio (kV)	No. of trans-former	Rating of transformer (MVA)	Total transformation capacity (MVA)
1.	2022-23	WR	Augmentation of transfor-mation capacity at Vadoda-ra 765/400/220kV S/s by 1x1500MVA, 765/400kV ICT (3rd) along with associated 765kV ICT bay	765/400	1	1500	1500
2.	2022-23	NR	Shifting and installation of 400/220 kV, 315 MVA ICT at Bhinmal (PG) S/s spared from Ludhiana (PG)	400/220	1	315	315

Sl. No	Time-frame	Region	Transformers	Voltage ratio (kV)	No. of trans-former	Rating of transformer (MVA)	Total transformation capacity (MVA)
3.	2023-24	WR	Augmentation of transformation capacity at Padghe (GIS) 765/400 kV substation by 1x1500 MVA ICT	765/400	1	1500	1500
4.	2023-24	WR	Establishment of 765/400/220 kV Navsari (new) (South Gujarat) S/s (GIS)	765/400	2	1500	3000
5.	2023-24	WR	Establishment of 765/400/220 kV Navsari (new) (South Gujarat) S/s (GIS)	400/220	3	500	1500
6.	2023-24	WR	Augmentation of transformation capacity at Raigarh(Kotra) by 1x1500MVA, 765/400kV ICT at Section-A (3rd ICT on Section A) and by 2x1500MVA, 765/400kV ICTs at Section-B (3rd & 4th ICTs on Section B) along with associated ICT bays	765/400	3	1500	4500
7.	2023-24	WR	Creation of 220kV level (GIS) at 765/400kV Shikrapur (PGCIL) (GIS) Substation with 2x500MVA, 400/220kV ICTs and 4 nos. of 220kV line bays.	400/220	2	500	1000
8.	2023-24	WR	Creation of 220 kV level (GIS) at 765/400 kV Raipur Pool S/s with Installation of 2x500 MVA, 400/220 kV ICTs along with associated ICT bays (220kV-GIS)	400/220	2	500	1000
9.	2023-24	WR	Augmentation of 1x500 MVA, 400/220 kV ICT at Raipur Pool S/s along with associated ICT bays (220kV-GIS)	400/220	1	500	500
10.	2023-24	WR	Creation of 220 kV level at 765/400 kV Dharamjaigarh S/s with Installation of 2x500 MVA, 400/220 kV ICTs along with associated ICT bays	400/220	2	500	1000
11.	2023-24	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

Sl. No	Time-frame	Region	Transformers	Voltage ratio (kV)	No. of trans-former	Rating of transformer (MVA)	Total transformation capacity (MVA)
12.	2023-24	SR	Augmentation of trans-formation capacity at Tuticorin-III by 1x500 MVA, 400/230 kV ICT (5th)	400/230	1	500	500
13.	2023-24	NR	Augmentation with 1x500MVA, 400/220kV transformer (3rd) at 400/220kV Jind (PG) S/s	400/220	1	500	500
14.	2024-25	WR	Augmentation of 765/400 kV Navsari (new) (South Gujarat) S/s (GIS)	765/400	1	1500	1500
15.	2024-25	WR	Augmentation of transfor-mation capacity at Banas-kantha 765/400 kV S/s by 1x1500 MVA ICT	765/400	1	1500	1500
16.	2024-25	NR	Establishment of 3x315 MVA (10x105 MVA single phase units including one spare) $ 400/132kV Kaza PS (GIS)	400/132	3	315	945
17.	2024-25	NR	Augmentation with 1x500MVA, 400/220kV transformer (3rd) at 400/220kV Bahadurgarh (PG) S/s	400/220	1	500	500
18.	2024-25	NER	400/220kV, 2x500MVA ICTs at Gogamukh	400/220	2	500	1000
19.	2024-25	NER	220/132kV, 2x200MVA ICTs at Gogamukh	220/132	2	200	400
20.	2025-26	NR	Establishment of 7x105 MVA, 400/220kV Nange GIS Pooling Station	400/220	2	315	630
21.	2025-26	NR	Upgradation of Kishen-pur S/s at 765kV level (4x800MVA)	765/400	4	800	3200

3. Bus Reactors

Sl. No.	Time Frame	Region	Bus Reactors	No of reactors	Rating of reactor	Total reactive compensation (MVAR)
1.	2023-24	WR	2x330 MVAr (765kV) bus reactor at Navsari (New) South Gujarat (GIS) S/s	2	330	660
2.	2023-24	WR	125 MVAr (400kV) bus reactor at Navsari (New) South Gujarat (GIS) S/s	1	125	125
3.	2023-24	SR	2x330 MVAr (765kV) bus reactor at Narendra (New) (GIS)	2	330	660
4.	2023-24	ER	1x125 MVAr Bus Reactor at Alipurduar (3rd)	1	125	125
5.	2024-25	NR	2x80 MVAr (420kV) Bus Reactors at Kaza PS	2	80	160
6.	2024-25	NER	2x125 MVAr, 400 kV Bus reactors at Gogoamukh	2	125	250
7.	2025-26	NR	125 MVAR (420kV) Bus Reactor at Nange (GIS) PS (1-Ph units along with one spare unit)	1	125	125
8.	2025-26	NR	125 MVAR (420kV) Bus Reactor at Koldam S/s (1-Ph units along with one spare unit)	1	125	125

4. Other Schemes

Sl. No.	Time Frame	Region	Scope (each element as separate row)	Voltage ratio (kV)
1.	2022-23	WR	Bypassing of Rachhodpura (GETCO) – Dehgam (PG) 400kV D/c line at Dehgam (PG) S/s and connecting it with Dehgam(PG) – Pirana 400kV D/c line (one circuit via Nicol) so as to form Ranchhodpura(GETCO) – Pirana(PG) 400kV D/c line (one circuit via Nicol).	400
2.	2023-24	WR	Splitting of 400 kV bus at 765/400/220 kV Indore S/s into two sections (A&B) through 400kV Bus Sectionalizer bays (GIS) & GIS Bus duct (as per schematic given above)	400
3.	2023-24	WR	Upgradation of 40% FSC associated with Wardha – Aurangabad 400kV D/c (Quad) line at Wardha S/s from 40kA (1s) to 50kA (1s) SC level	400
4.	2023-24	NR	2 nos of 220 kV line bays at 400/220 kV Bahadurgarh (PG) S/s	220
5.	2024-25	NR	2 nos of 220 kV line bays at 400/220 kV Bahadurgarh (PG) S/s	220
6.	2024-25	NR	2 nos of 220 kV line bays at 400/220 kV Sonepat (PG) S/s	220

Annex-2.11

Inter-Regional Transmission Capacity (MW)

Transmission Line	Present	Capacity at the End Of 13th Plan
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 - Sipat 400 kV D/c with series comp.	1200	1200
Rourkela/Jharsuguda - Raigarh/Raipur 400kV (2nd) D/c (with Series Comp.)	1400	1400
Ranchi - Dharamjayagarh/WR Pooiling Station 765kV S/c	2100	2100
Ranchi - Dharamjaygarh 765kV (2nd) S/c	2100	2100
Jharsuguda - Dharamjaygarh 765kV D/c	4200	4200
Jharsuguda - Dharamjaygarh 765kV (2nd) D/c	4200	4200
Jharsuguda - Raipur Pool 765kV D/c	4200	4200
Sub-total	**21,190**	**21,190**
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
Sub-total	**7,830**	**7,830**

Transmission Line	Present	Capacity at the End Of 13th Plan
EAST - NORTH EAST		
Birpara/Alipurduar - Salakati 220kV D/c	260	350
Siliguri - Bongaigaon 400kV D/c	1000	1600
Siliguri/Alipurduar - Bongaigaon 400kV D/c (Quad)	1600	1600
Sub-total	**2,860**	**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
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 D/c	4200	4200
Vindhyachal - Varanasi 765kV D/c	4200	4200
Sub-total	**36,720**	**36,720**
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
Raigarh - Pugulur ±800kV HVDC Bipole	6000	6000
LILO of Narendra - Narendra (New) 400kV (Quad) line at Xeldam (Goa)	-	1600
Sub-total	**18,120**	**23,920**
TOTAL	**112,250**	**118,740**
* Barsur (WR) – L. Sileru (SR) 220kV HVDC Monopole of 200MW capacity is currently not in operation.		

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