September 2022

ROLLING PLAN 2027-28

INTER-STATE TRANSMISSION SYSTEM (ISTS)

(INTERIM REPORT)

CENTRAL TRANSMISSION UTILITY

ROLLING PLAN 2027-28

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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 rdevelopment 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 and 2026-27 has been published in CTU website on 31st Dec 2021 and 31st March 2022 respectively. Further, this ISTS Rolling Plan report (interim) is being brought out wherein transmission system adequacy in ISTS has been assessed for 2027-28 time-frame.However, ISTS Rolling Plan report for 2027-28 time-frame (final) shall be published by 31st March 2023.

In **Chapter-2**, installed capacity & peak demand as on Mar'22 and projected installed capacity & demand by FY 2027-28 have been presented. All India installed capacity & peak demand are expected to increase from 404GW (including about 114.4GW RE + 47GW Hydro) & 203GW

respectively as on Mar'22 to about 594GW (including about 254GW RE + 71GW Hydro) & 316GW respectively by FY 2027-28.

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 316GW and 202GW respectively have been considered in 2027-28 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 2027-28, and its corresponding broad estimated cost has also been brought out in the report. Cumulatively by 2027-28, transmission schemes comprising of 33,019 ckm of transmission lines and transformation capacity of 2,42,940 MVA at estimated cost of Rs 1,10,744 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 1,30,340MW by 2027-28. 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 23GW is flowing from WR to NR in Summer evening peak scenario and power of the order of 21GW 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**.

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Chapter 1: Background and Objective

In the coming decades, India's huge infrastructure needs attributable to continued industrialisation and urbanisation would drive the demand for energy. Affordability and reliability of energy supply are the key concerns for its consumers. Despite having low per capita CO_2 emissions, India is the third-largest global emitter of CO_2. Diversifying the energy resources and by creating the right energy mix to meet the flourishing demand for energy and simultaneously reducing CO_2 emissions by embracing the cost-competitive renewable energy sector would help India to chart its way towards affordability, sustainability, security & growth in energy sector.

The large-scale penetration of renewables into the National Grid offers negligible carbon emissions that too at affordable 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 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 254 GW RE (Solar & Wind) is expected to be integrated into the grid by 2027-28.

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 and shall be named as interim Rolling Plan report and final Rolling Plan Report respectively. In this direction, reports on Network Plan 2024-25 & Rolling Plan 2026-2027 has already been brought out on 31st Dec 2021 & 31st March 2022 respectively and the same is available on CTU website. This ISTS Rolling Plan report (interim) is being brought out wherein transmission system adequacy in ISTS has been ascertained for 2027-28 time-frame. This report covers year wise ISTS requirement planned and under construction 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 2027-28 timeframe

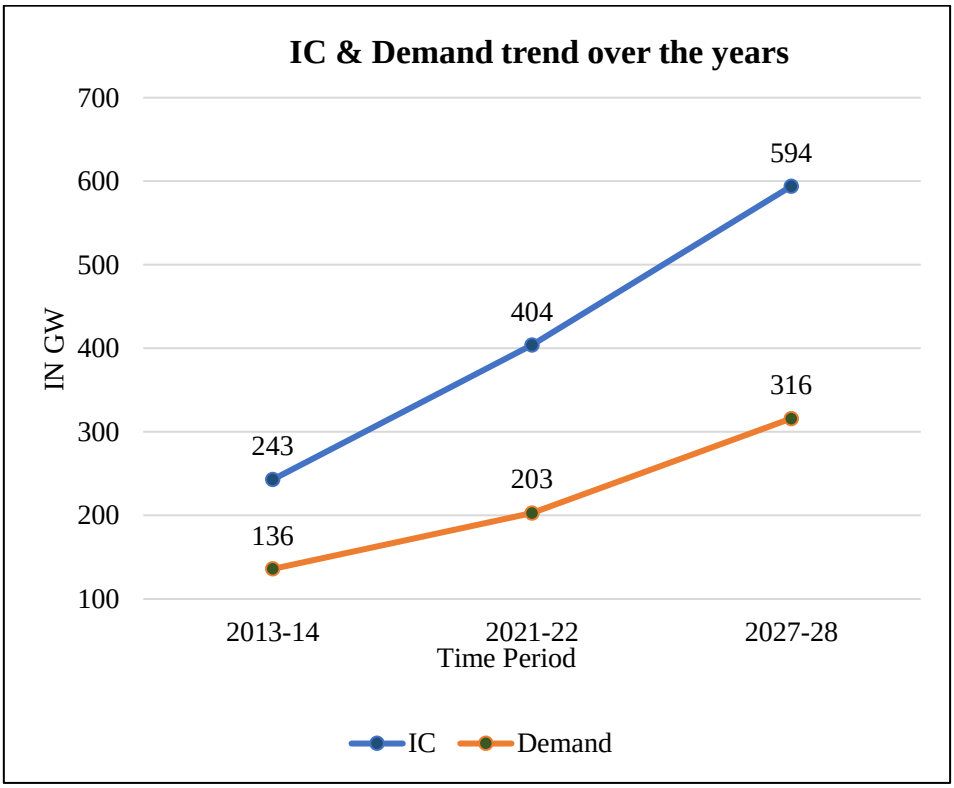
for nine perspective load-generation scenarios covering three seasons and three point on load curve (Solar max, evening peak and night off peak) of each season.

Remedial 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. More details in this regard would be brought out in the next Rolling plan report to be published by 31st March 2023.

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 Mar'22, a growth of about 49%. As per 19th EPS published by CEA, demand data projections are available only upto 2026-27 timeframe and All India demand is about 299 GW i.e. 6% higher than the year 2025-26. Accordingly same growth rate has been considered for projecting All India demand of year 2027-28 from the demand of 2026-27. The projected demand is expected to increase to about 316 GW by 2027-28, which translates to growth by about 56% from present scenario. 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 404 GW as on Mar'22, a growth of about 66%. Installed Capacity is further expected to be about 594 GW by 2027-28 thereby registering a growth of about 47%. Furthermore, presently RES excluding hydro generation is contributing around 114 GW (28% of installed capacity) which will increase to around 254 GW (43% of installed capacity) by 2027-28, a growth of 123% from present capacity.

Figure 2-1: Installed Capacity & Demand trend



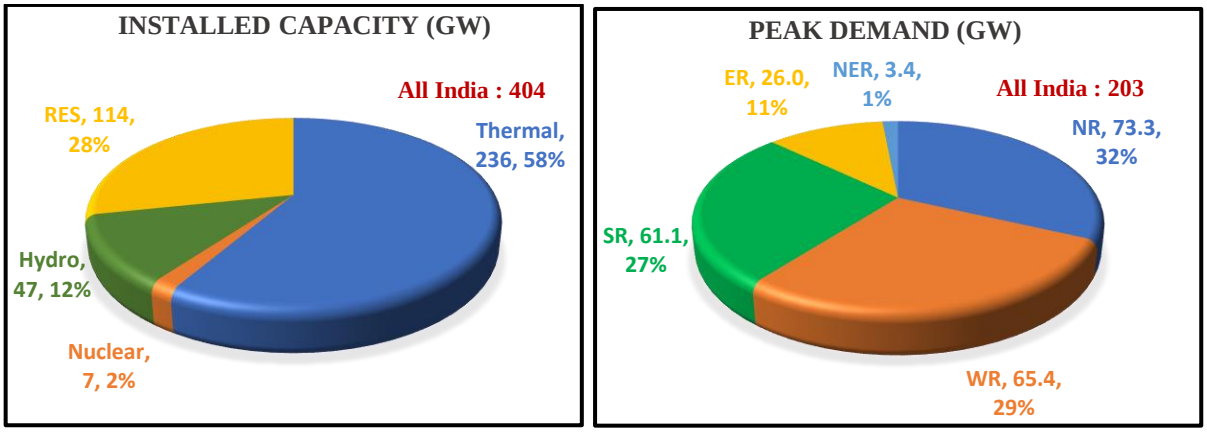
2.1 Present Power Supply Scenario as on Mar'22

The total installed capacity as on Mar'22 was about 404 GW and the peak demand was about 203 GW. The region-wise breakup for the source wsie installed capacity and peak demand as on Mar'22 is given in the Table 2-1 & Figure 2-2.

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

Region	Generation (GW)								Demand (GW)
	Thermal				Nuclear	Hydro	RES	Total	
	Coal	*Lignite*	*Gas*	*Diesel*					
NR	56.34	1.58	5.78	0.00	1.62	20.75	29.23	110.39	73.30
WR	74.57	1.40	10.81	0.00	1.84	7.56	34.76	127.71	65.43
SR	45.31	3.64	6.49	0.43	3.32	11.83	48.14	117.78	61.14
ER	27.25	0.00	0.08	0.00	0.00	4.76	1.77	34.22	26.02
NER	0.61	0.00	1.70	0.04	0.00	1.94	0.50	4.89	3.43
All India	**204.08**	**6.62**	**24.86**	**0.47**	**6.78**	**46.85**	**114.40**	**404.05**	**203.01**

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



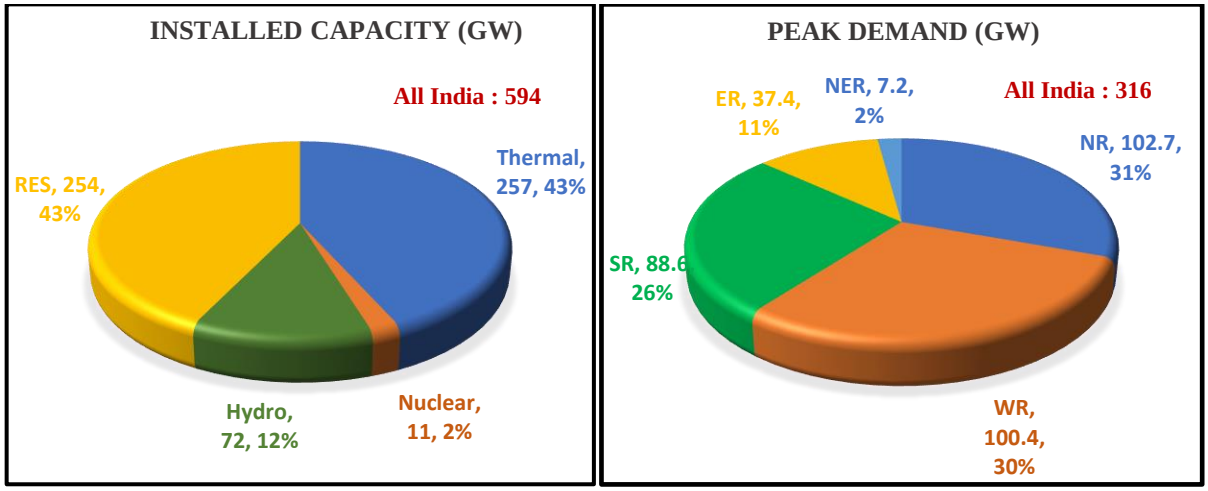
2.2 Envisaged Power Supply Scenario

All India peak demand for 2027-28 is expected to increase to 316 GW. To meet this increase in demand of about 113 GW from present, net 190 GW generation is envisaged to be added after considering the retirement of 15 GW of thermal generation by 2027-28. Details regarding the same are attached at **Annex-11.1**. Total installed capacity for 2027-28 shall be about 594 GW. The region-wise breakup for the installed capacity and projected peak demand for 2027-28 are tabulated in Table 2-2 & Figure 2-3:

Table 2-2: Projected Installed Capacity & Peak Demand by FY 2027-28

Region	Generation (GW)								Demand (GW)
	Thermal			Gas	Nuclear	Hydro	RES	Total	
	Central	State	IPP						
NR	11.44	41.01	0.00	3.58	4.42	26.27	93.05	179.77	102.74
WR	19.00	34.56	35.60	10.14	3.24	8.17	79.32	190.03	100.44
SR	12.87	36.59	4.64	2.37	3.82	18.03	80.00	158.32	88.58
ER	25.76	12.78	4.15	0.00	0.00	14.69	1.50	58.87	37.40
NER	0.75	0.00	0.00	1.85	0.00	4.38	0.20	7.18	7.22
All India	**69.82**	**124.93**	**44.39**	**17.94**	**11.48**	**71.53**	**254.08**	**594.17**	**316.08**

Figure 2-3:Projected Installed Capacity & Peak Demand by FY 2027-28



The region wise growth in demand and fuel type wise increase in installed generation capacity for 2027-28 from present time-frame is tabulated below in Table 2-3.

Table 2-3:Peak demand & Generation IC in 2021-22 and 2027-28

Peak Demand (GW)				
	Mar'22	*2027-28*	*Increment*	*CAGR*
NR	73.30	102.74	29.44	5.8%
WR	65.43	100.44	35.00	7.4%
SR	61.14	88.58	27.44	6.4%
ER	26.02	37.40	11.38	6.2%
NER	3.43	7.22	3.79	13.2%
All India	**203.01**	**316.08**	**113.06**	**7.7%**

Generation IC (GW)				
	Mar'22	*2027-28*	*Diff*	*CAGR*
Thermal	210.70	239.14	28.44	2.1%
Gas	24.86	17.94	-6.92	-5.3%
Nuclear	6.78	11.48	4.70	9.2%
Hydro	46.85	71.53	24.68	7.3%
Solar	50.30	178.55	128.25	23.5%
Other RE	64.10	75.52	11.43	2.8%
Total	**403.58**	**594.17**	**190.59**	**6.7%**

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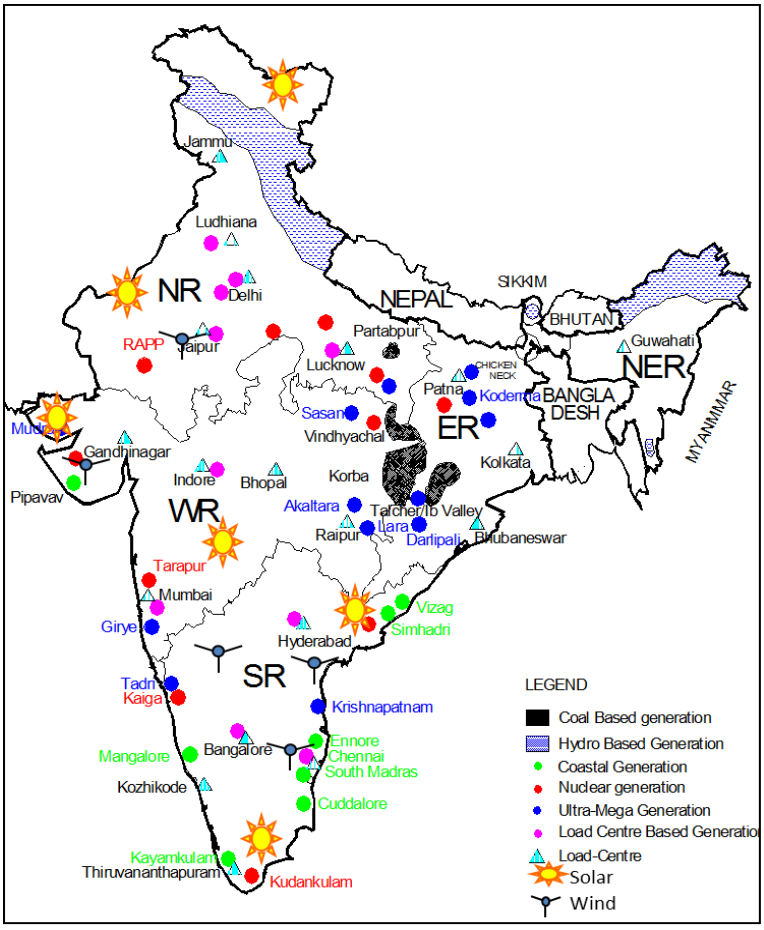
Chapter 3: All India Analysis

Renewable energy installed capapcity in Installed Capacity mix is expected to change from 28% at present to 43% by the year 2027-28. Further it is going to continuously change 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 2027-28 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'27: Solar max (Scenario-1), Evening Peak (Scenario-2) and Night off-peak (Scenario-3)
- Jun'27: Solar max (Scenario-4), Evening Peak (Scenario-5) and Night off-peak (Scenario-6)
- Feb'28: 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. To prepare load generation balance, details about the selection of points on load curve and generation despatching philosophies are discussed subsequently.

All India peak demand considered for 2027-28 is about 316 GW. 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. Further demand data corresponding to 2021-22 is also being analysed, which shall be used to revise the load generation balance in final report to be published by Mar'23.

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

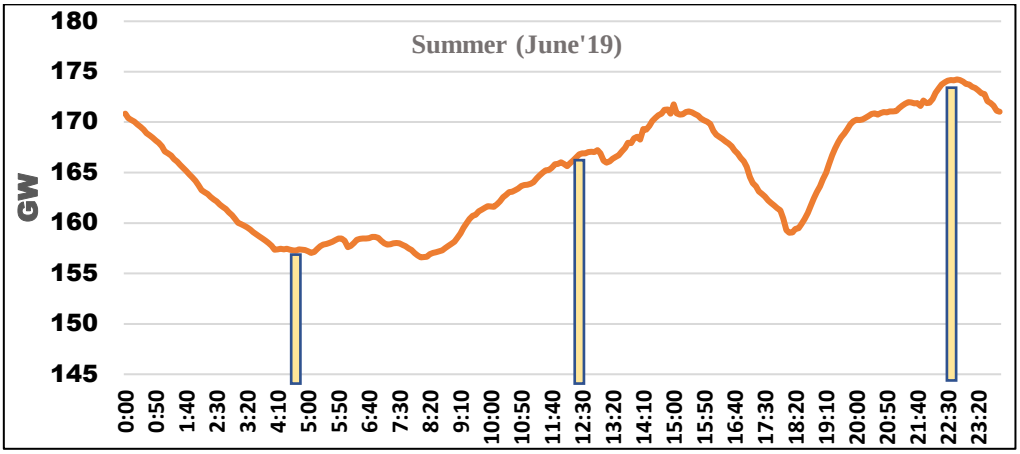


Figure 3-3: Monsoon (Aug'19) Load Curve

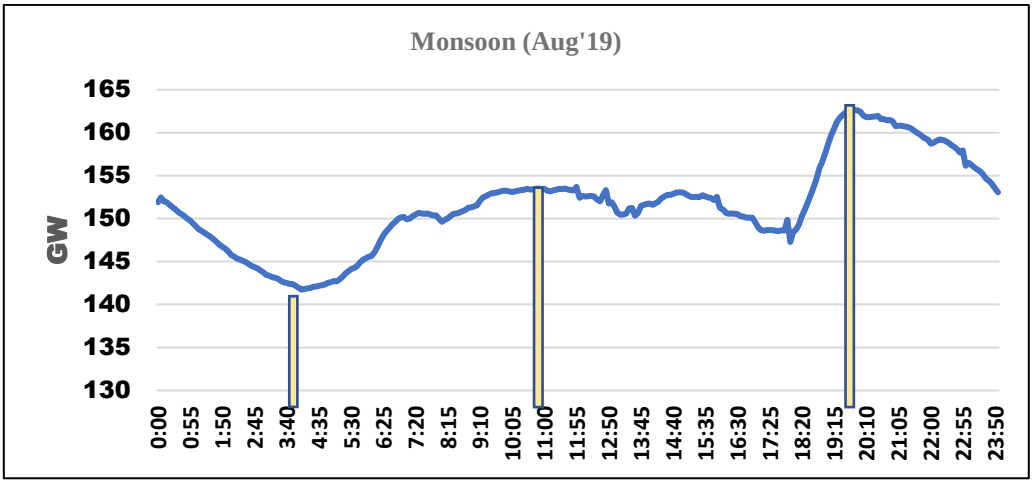
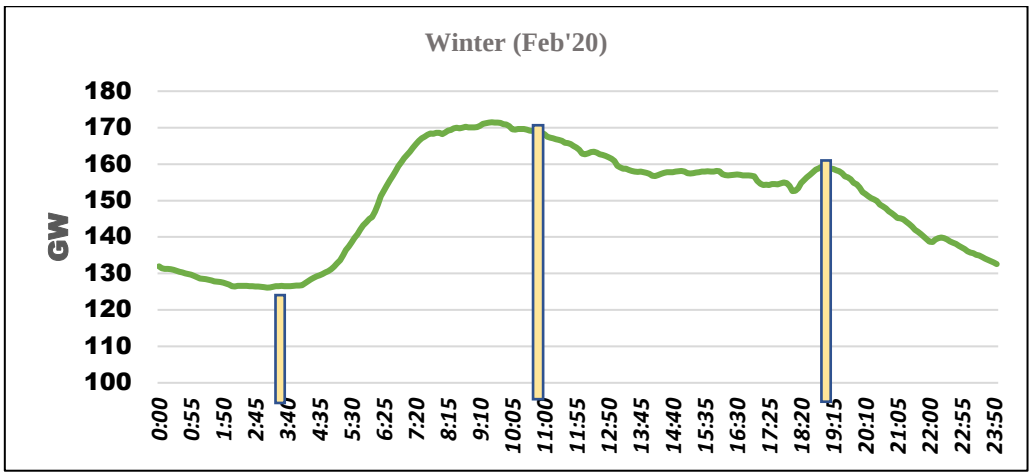
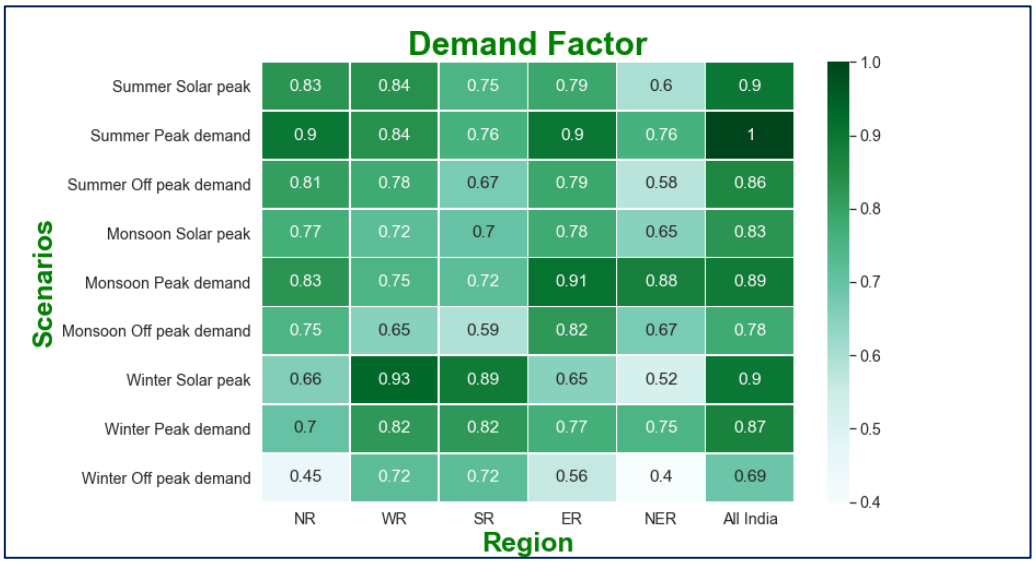


Figure 3-4:Winter (Feb'20) Load Curve



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 2027-28 time-frame as shown in Figure 3-5.

Figure 3-5:Demand factors considered for 2027-28-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. 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.

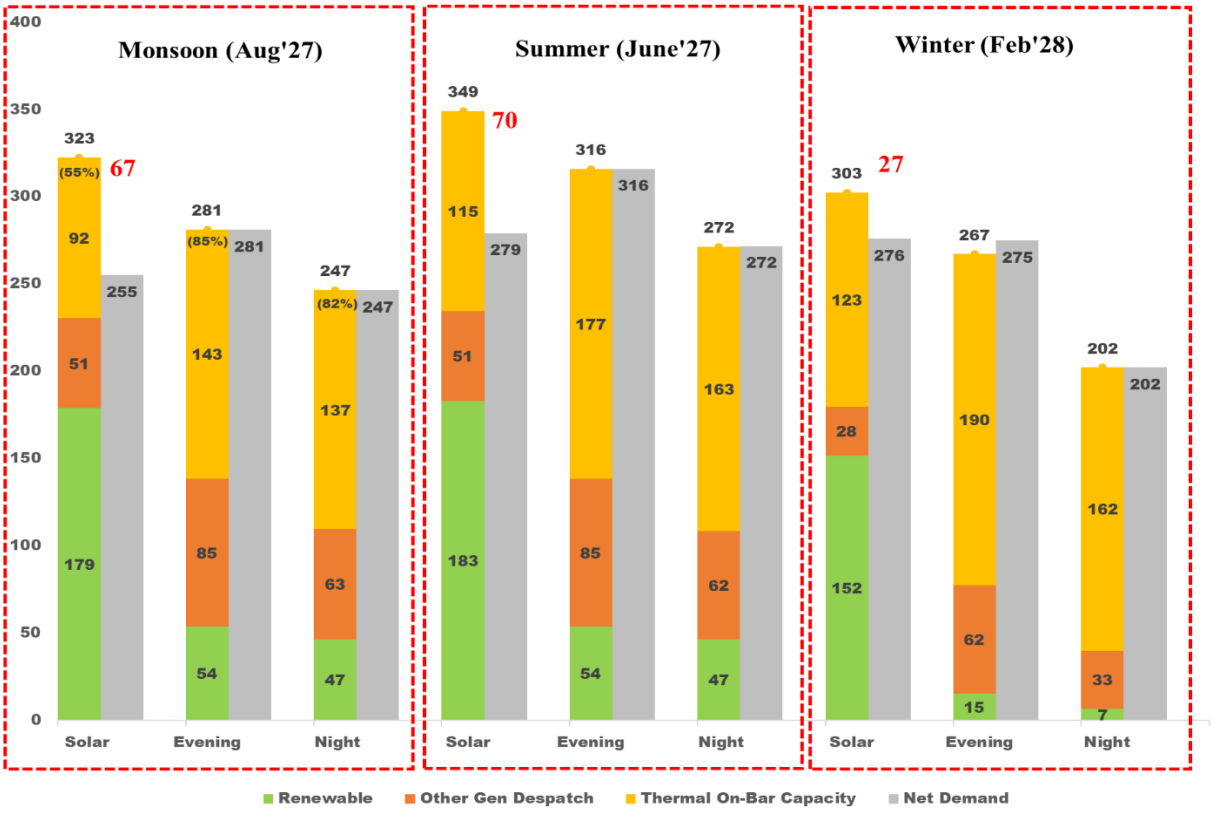
Evening peak scenario of each month was setup first as the number of thermal units required on bar shall be maximum. Total thermal generation requirement for the evening peak scenario was apportioned between State and Central sector thermal generations as per their installed capacity in each region. 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. In winter evening peak scenario (scenario-8) even after dispatching all the ISGS, CGS and IPP thermal plants, generation shortfall of the order of 8 GW was observed to meet the demand, which indicates the installation of additional thermal plants. 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.

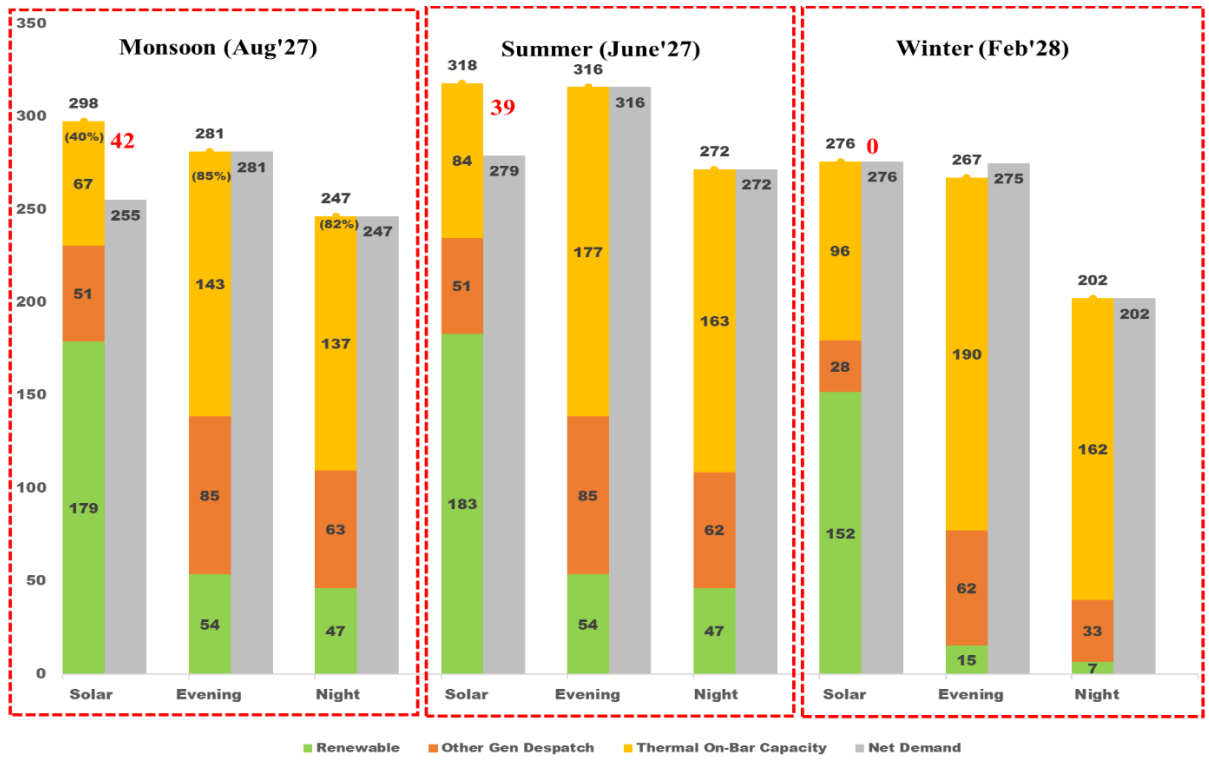
Figure 3-6:Generation surplus with Tech Min (55%) for Thermal Units



It may be observed that surplus generation of 67 GW, 70 GW, and 27 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 42 GW and 39 GW were observed during Solar max in Monsoon and Summer seasons respectively. Thus, energy storage system of about 42 GW capacity may be required to be installed in the grid to facilitate integration of about 254 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 2027-28, then thermal unit may need to be backed down to 14% to 15% 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-11.2.**

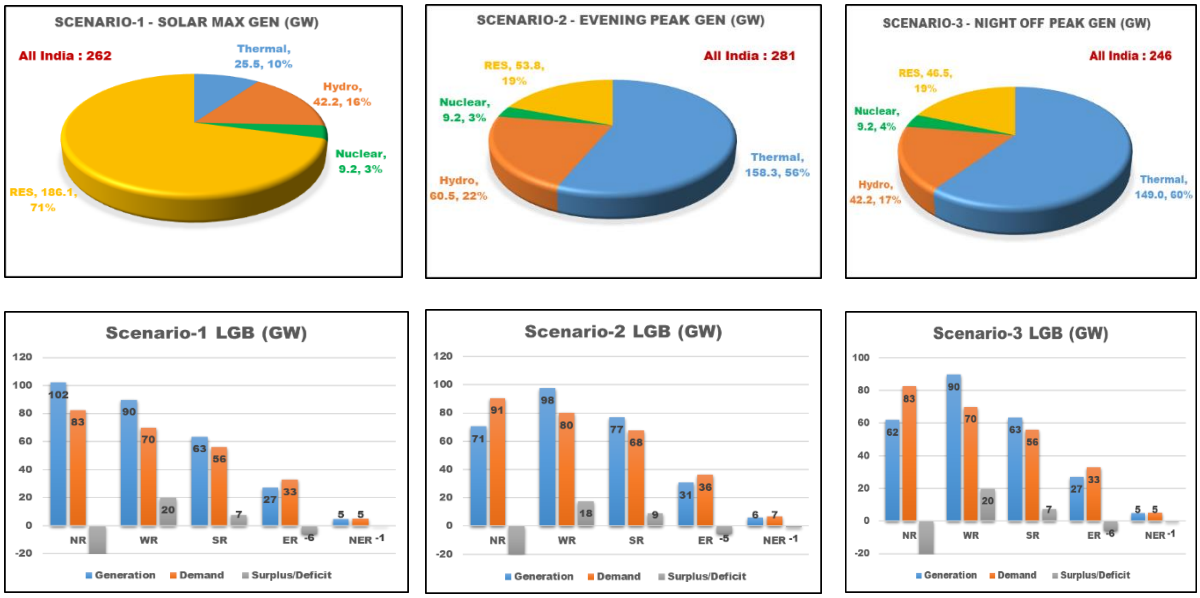
Out of these nine scenarios, Scenario-5(June'27 evening peak) and Scenario-9 (Feb'28 Night off peak) corresponds to two extreme cases with respect to demand i.e., highest demand (316 GW) and lowest demand (202 GW) scenarios respectively. In all other scenarios, all India demand is varying between these 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.

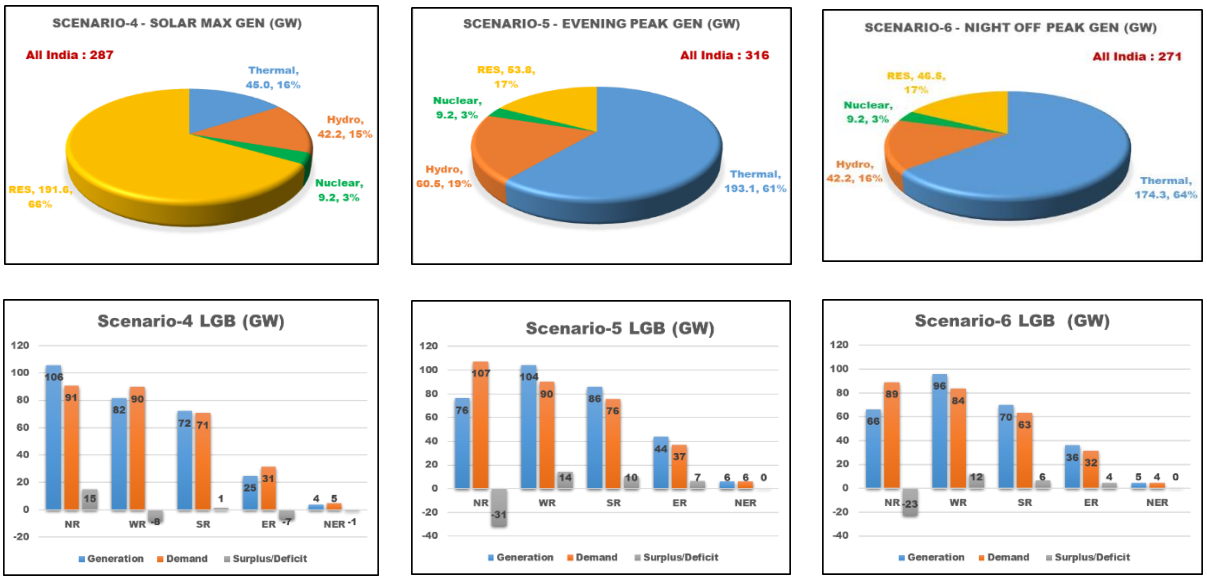
Monsoon Aug'2027

Figure 3-8:LGB for Monsoon Aug'2027



Summer June'2027

Figure 3-9: LGB for Summer June'2027



Winter Feb'2028

Figure 3-10:LGB for Winter Feb'2028

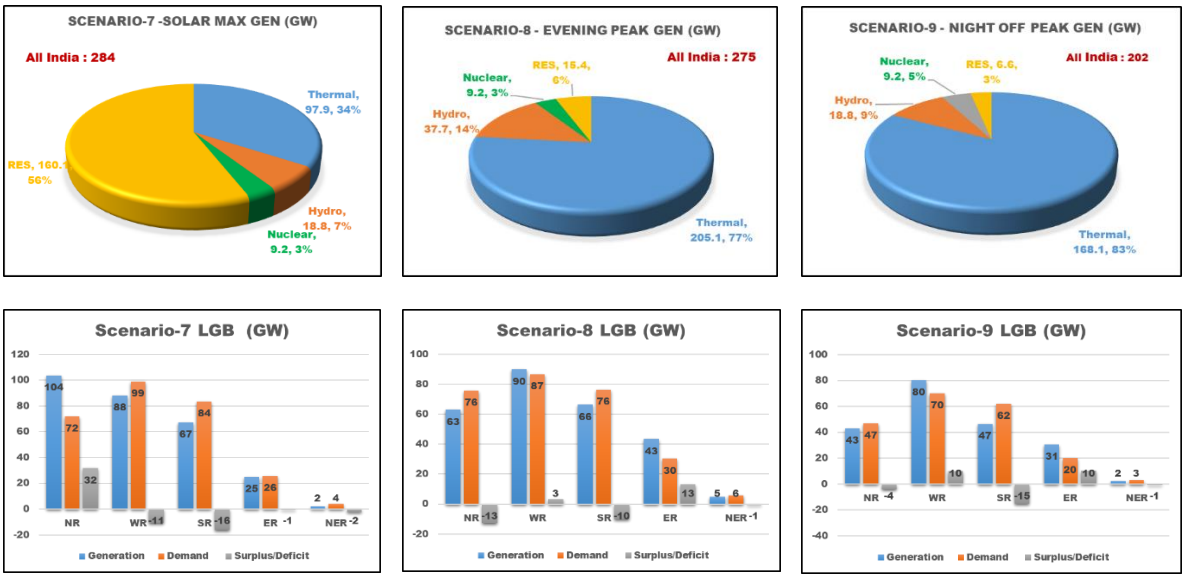


Table 3-1:Regional Surplus/Deficit summary in MW

Surplus (+) / Deficit (-)	Aug'27 (Monsoon)			Jun'27 (Summer)			Feb'28 (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	15627	-20958	-20649	12110	**-31092**	-23051	**28511**	-6316	-3206
WR	1764	19545	**21412**	-5299	16616	14835	**-8933**	5847	11066
SR	-91	9168	6682	1667	**10574**	6390	**-15844**	-10052	-15192
ER	**-19882**	-12357	-10729	-11251	-1582	-2078	-2191	**8350**	7422
NER	-1354	-886	-578	-1108	**68**	58	**-2247**	-931	-790

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.Figure 3-7
- WR generally exports the power with a maximum export of 21 GW in Monsoon (Aug) evening off peak scenario. Due to low availability of RE during Winter (Feb), WR becomes deficit to the tune of 8.9 GW.
- SR is importing as well as exporting power under various scenarios. Maximum export of power is 10 GW in Summer (June) evening peak scenario due to high wind generation, 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 Winter (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 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 2027-28 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 2027-28 are also considered for conducting these studies. Based on the studies performed, results of the study are analysed and deliberated below-

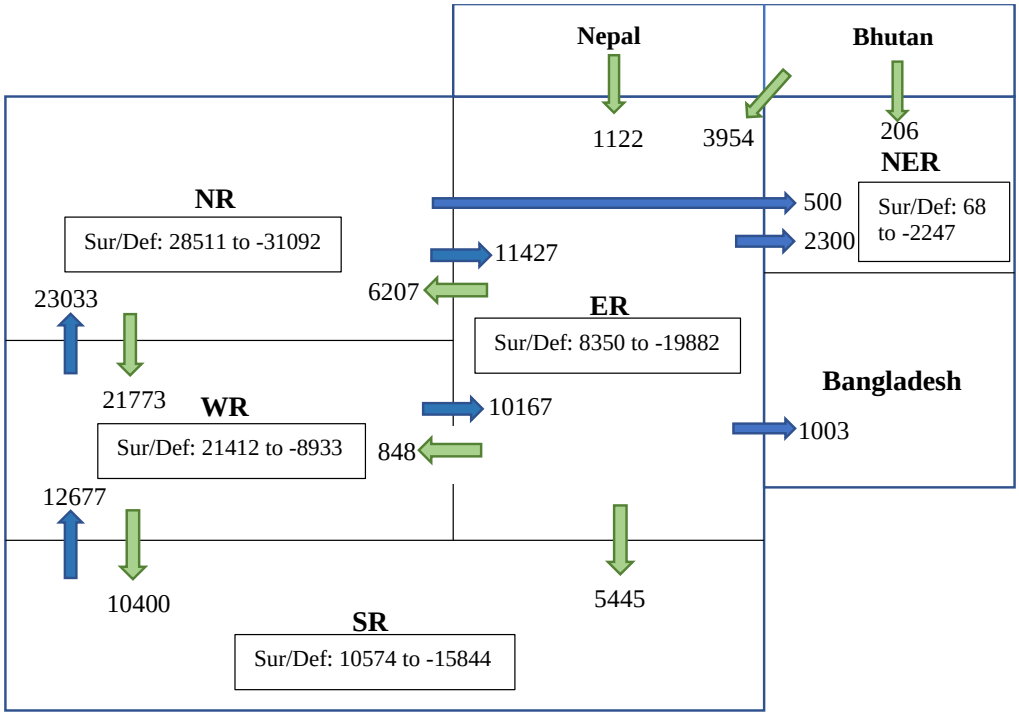
3.2.1 Load Flow Studies

a) Inter-Regional Flows

Inter-regional flows between various regions, based on simulation studies for 2027-28 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'27 (Monsoon)			Jun'27 (Summer)			Feb'28 (Winter)		
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	-5162	21327	19939	-6679	**23033**	18092	**-21773**	739	829
ER-NR	**-11427**	-2241	-734	-6379	**6207**	3519	-6857	4331	1760
ER-WR	-9392	-9128	**-10167**	-5993	-6260	-6105	-2439	**848**	123
ER-SR	2557	1743	2012	2947	2104	2973	**5445**	4096	4832
WR-SR	-2466	-10910	-8694	-4613	**-12677**	-9362	**10400**	5957	10360
NER-ER	-1376	-1342	-1067	-1137	-409	-447	**-2300**	-1422	-1359



From the above it can be seen that-

- Power on WR-NR corridor is flowing in both directions in different scenarios. Maximum power of the order of 23 GW is flowing from WR to NR in June evening peak scenario whereas maximum power flow of the order of 21 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 11 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 0.8 GW and 10 GW respectively.
- Power on ER-SR corridor is always flowing towards SR in all the scenarios with maximum flow of 5.4 GW and minimum flow of 1.7 GW.
- Power on WR-SR is flowing towards WR in Monsoon and summer season with a maximum flow of 12 GW whereas in winter season power is flowing towards SR with maximum flow of 10.4 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-11.3.** Power flow exceeding the 70% of 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 70% of 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 341 nos. of 765 kV lines and about 2308 nos. of 400 kV lines. Line flow pattern of these lines in all scenarios are tabulated at **Annex-11.4** 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

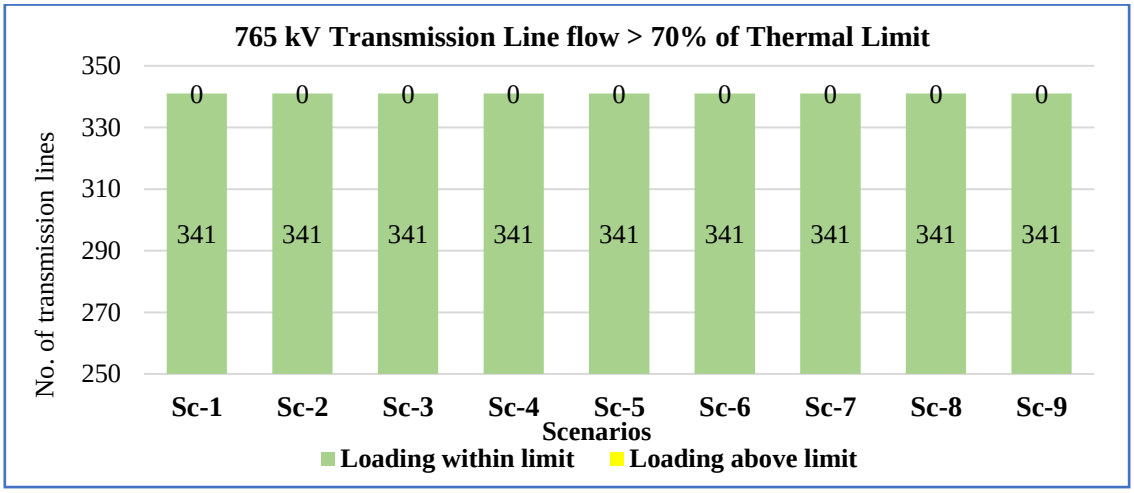
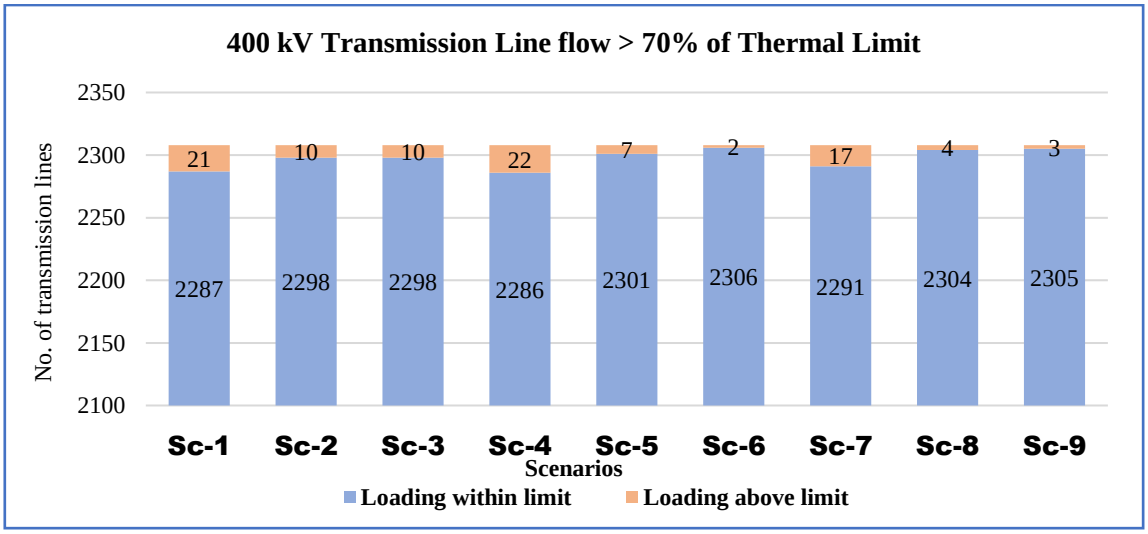
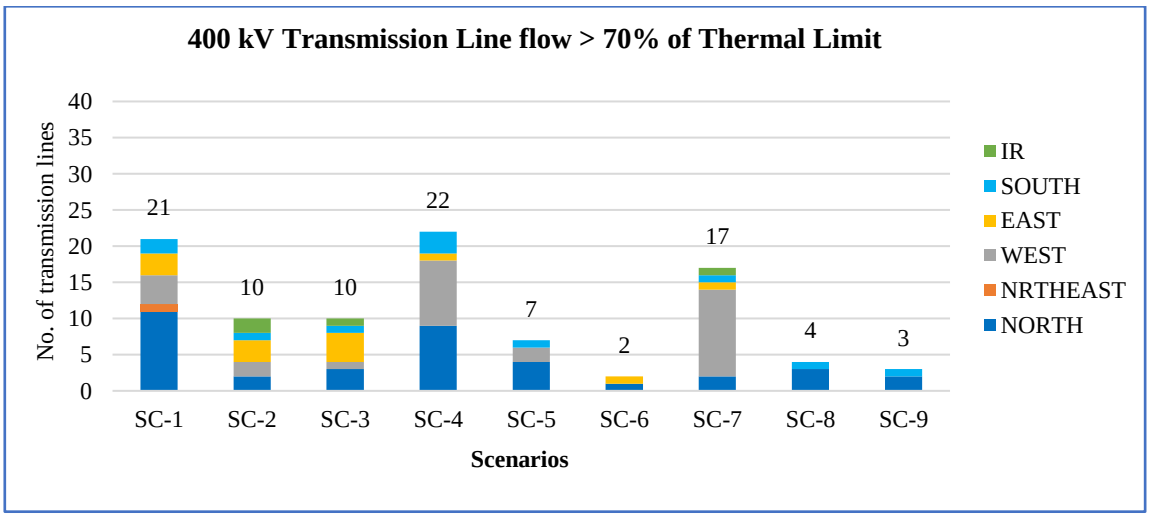


Figure 3-12:400kV Tr. line flow > 70% of thermal limit under base case



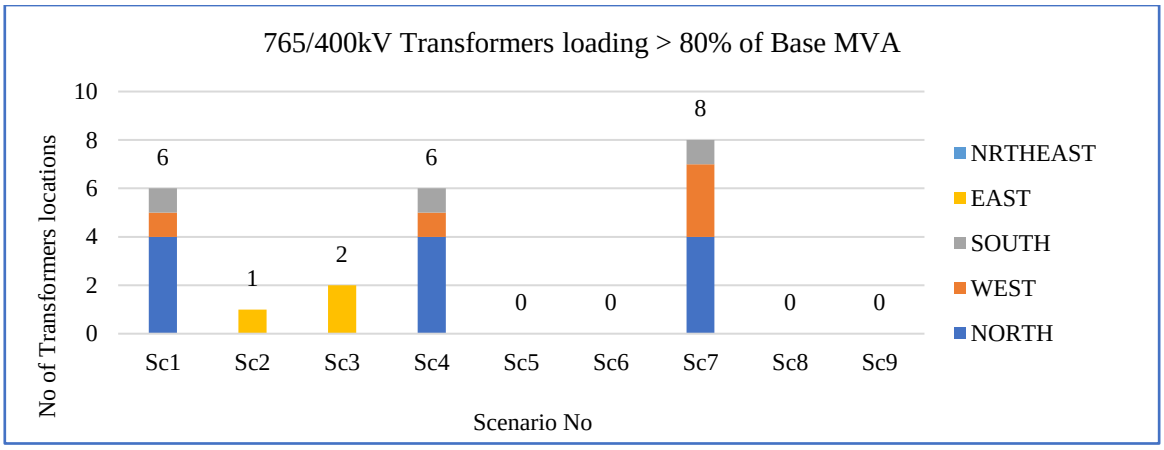


Power flow on all 765kV lines is below 70% of thermal limit in base case itself. About 21, 22 and 17 nos. of 400 kV lines in Scenarios-1, 4, and 7 (Solar max scenarios) respectively are loaded above 70% of the thermal limit. However, to understand the criticality of this loading, detailed contingency studies have been carried out, which are discussed in subsequent sections.

c) Transformer Loadings

In the time frame under study, there would be about 337 nos. of 765/400 kV transformer at 132 nos. of 765/400 kV substations. Loading patterns of these transformers obtained from simulation studies are tabulated in **Annex-11.5** 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.

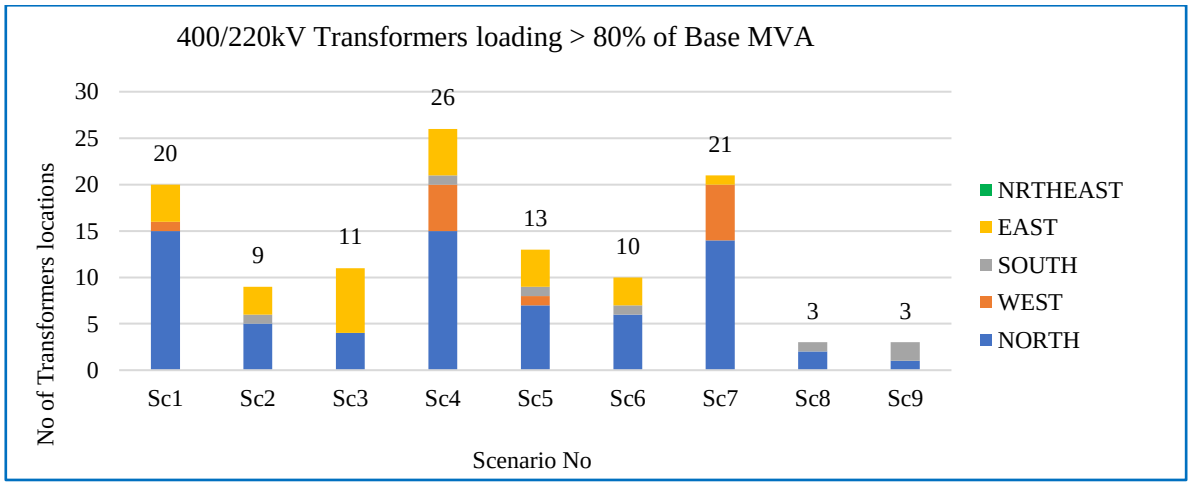
Figure 3-13:765/400kV ICT Loading under base case



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 1513 nos. of transformers located at about 579 nos. of 400/220 kV stations.

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



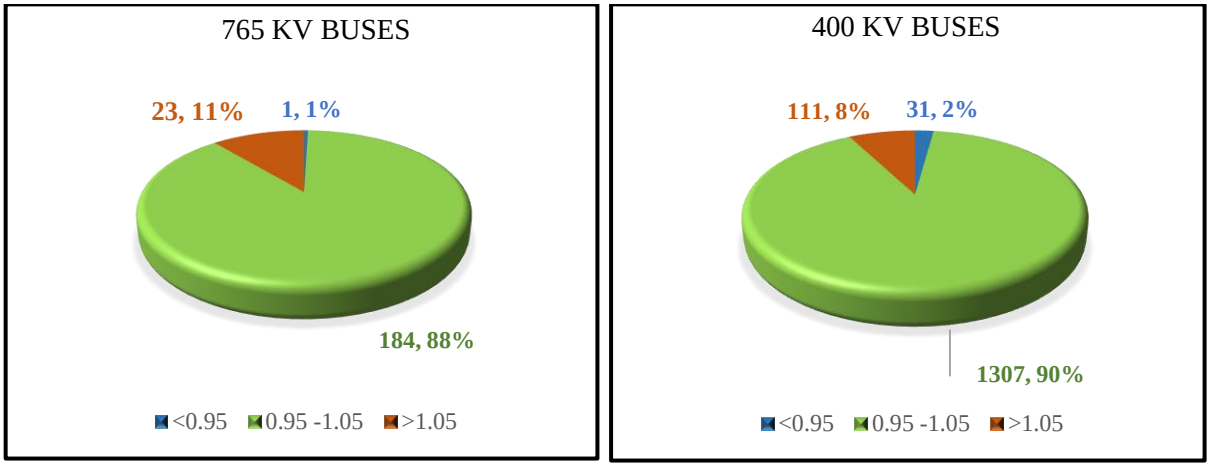
Under solar max scenarios viz. Scenarios 1, 4 and 7 about 20, 26 and 21 substations located in different region, where ICTs are getting loaded above 80% of MVA rating. The need for augmentation would depend upon the number of transformers, parallel paths availability etc. Hence simulation with contingencies 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



From the above voltage plots it can be seen that around 88% of the buses at 765 kV level and 90% of the buses 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 23 nodes of 765 kV voltage and 111 Nodes at 400 kV voltage are having voltage beyond 1.05 pu in any one of the scenarios. Similarly, around 1 node at 765 kV and 31 nodes at 400 kV are facing low voltage in one of the scenarios.

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-11.6.** 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-11.7** and the same has been summarised below in Figure 3-16, Figure 3-17 & Figure 3-18.

Figure 3-16: 765kV Tr. line loadings>3000MW under N-1 Contingency

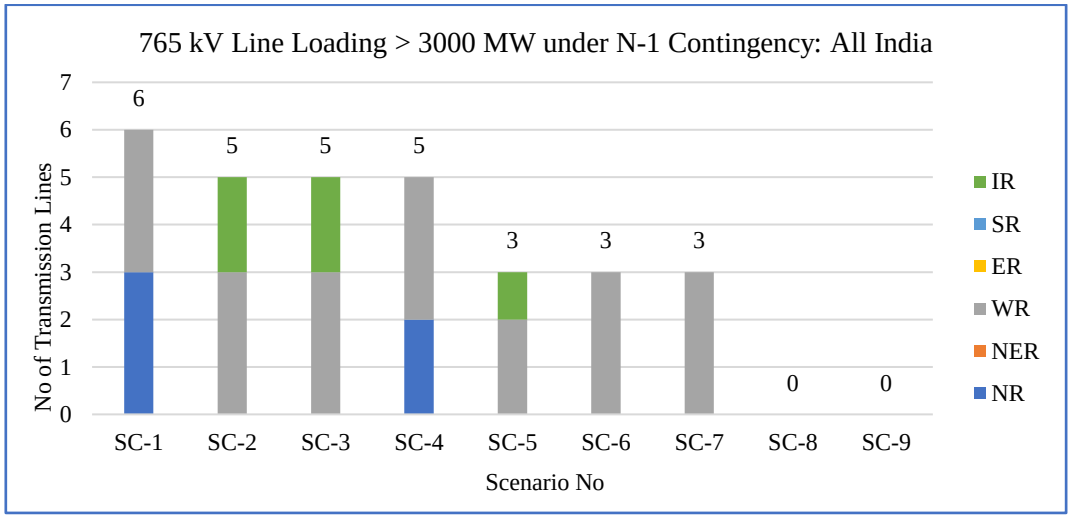


Figure 3-17:765kV line loading>3200 MW under N-1 Contingency

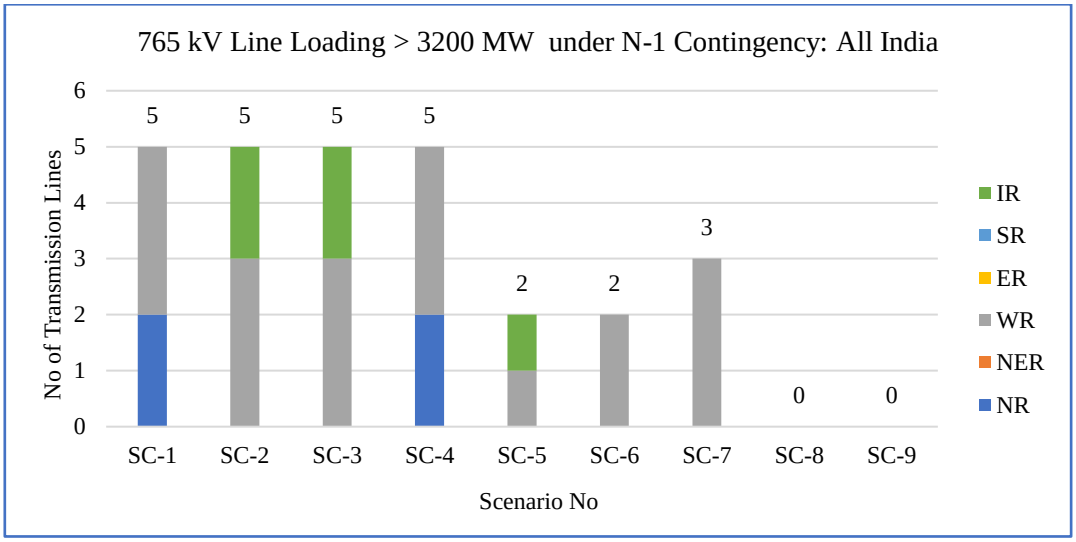
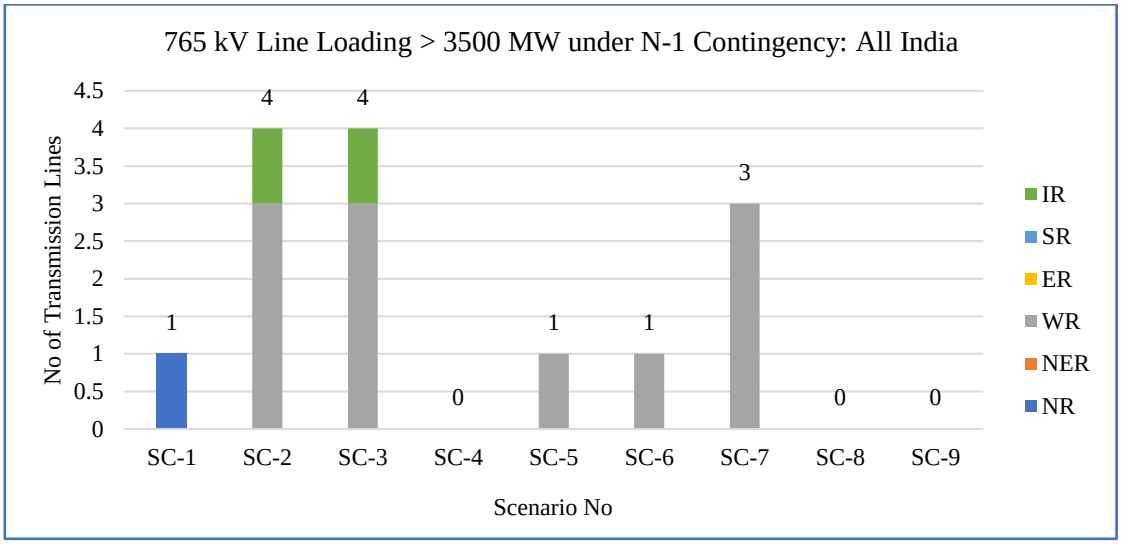


Figure 3-18:765kV line loading>3500 MW under N-1 Contingency



The most critical 765 kV lines are Tamnar-Dharamjaygarh, Vindhyachal Pool-Varanasi. 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-11.7.** The results are summarised below in Figure 3-19 & Figure 3-20.

Figure 3-19:400kV line loading>90% of thermal limit under N-1 Contingency

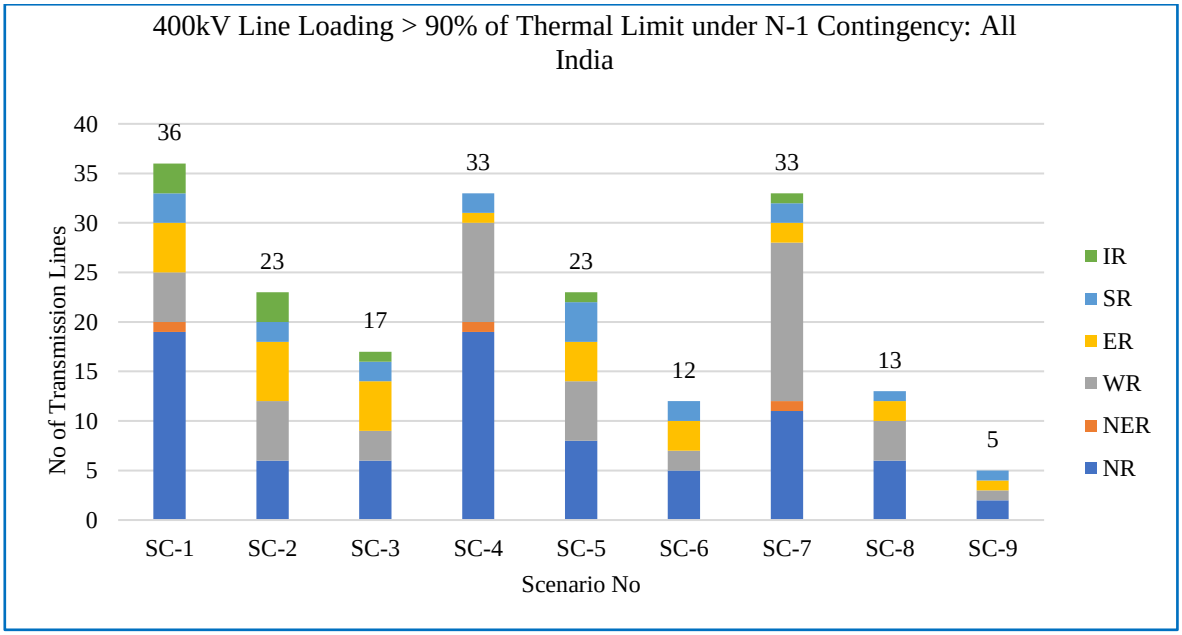
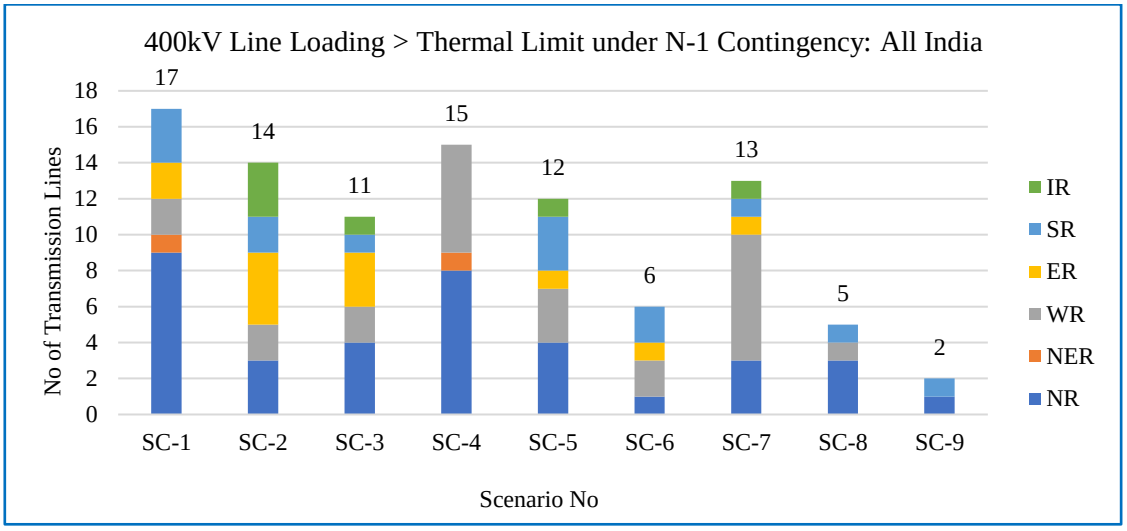


Figure 3-20:400kV line loading>thermal limit under N-1 Contingency



Max no. of 400kV lines on which loadings exceeds 90% and 100% of thermal limit are 37 and 17 respectively in Solar max scenarios i.e. Scenario-1. 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 3-21 & Figure 3-22 for 765/400 kV ICT and Figure 3-23 & Figure 3-24 for 400/220 kV ICT . Detailed results are attached at **Annex-11.8.**

Figure 3-21:765/400kV ICT loading≥90% of MVA rating under N-1 Contingency

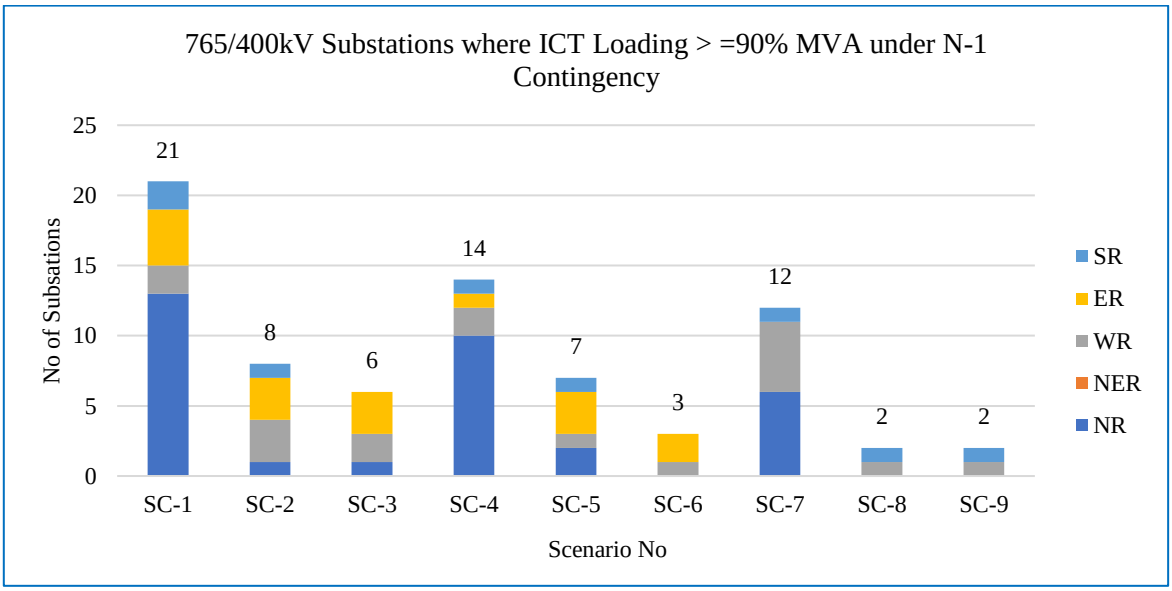
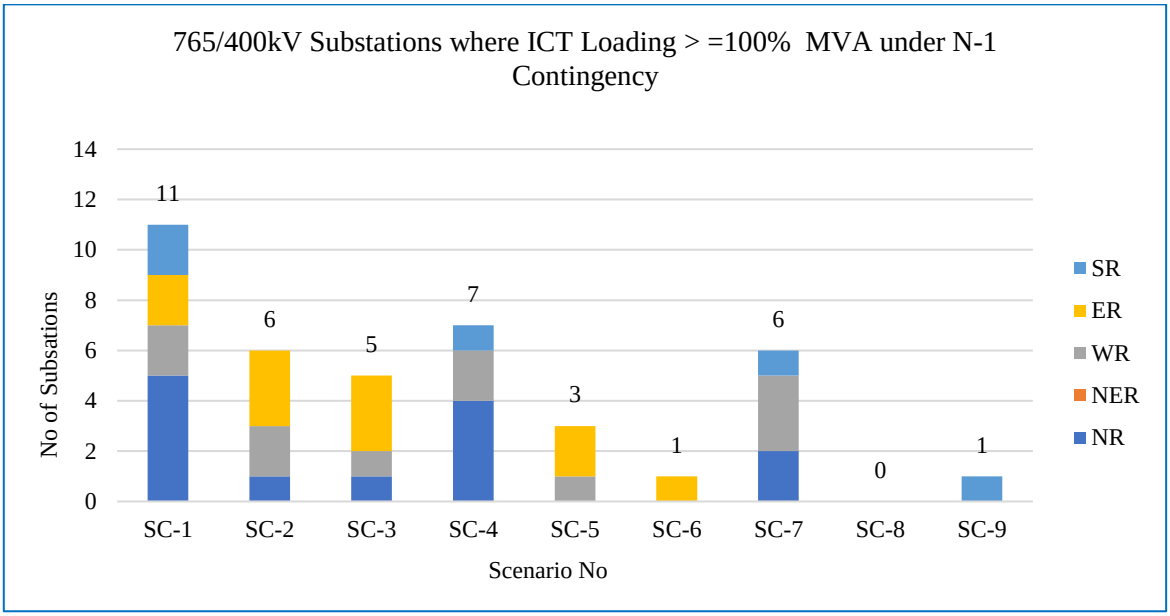


Figure 3-22:765/400kV ICT loading≥100% of MVA rating under N-1 Contingency



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 11 locations corresponding to Scenario-4 where ICT loading violations have been observed are Kurnool-3, Jharsuguda, Bhiwani (PG), Navsari(New), Varanasi, Maheshwaram, Fatehgarh-II, Bhadla-II, Jodhpur(Kankani) & Sipat. Thus, detailed studies are being carried out to plan for remedial measures.

Figure 3-23:400/220kV ICT loadings≥ 90% of MVA rating under N-1 Contingency

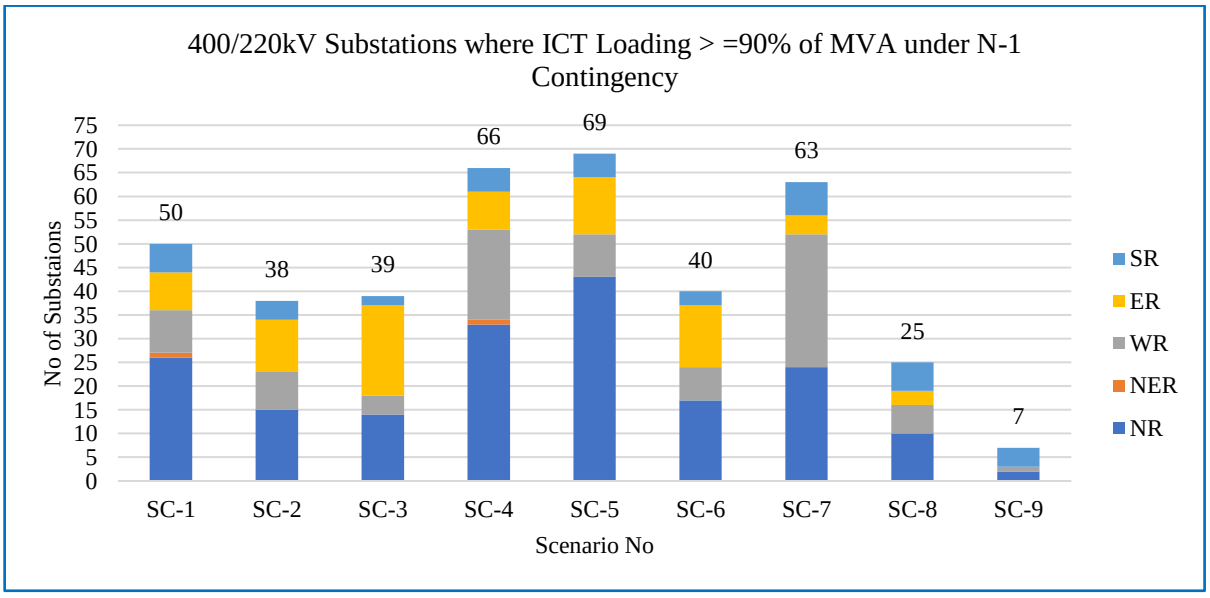
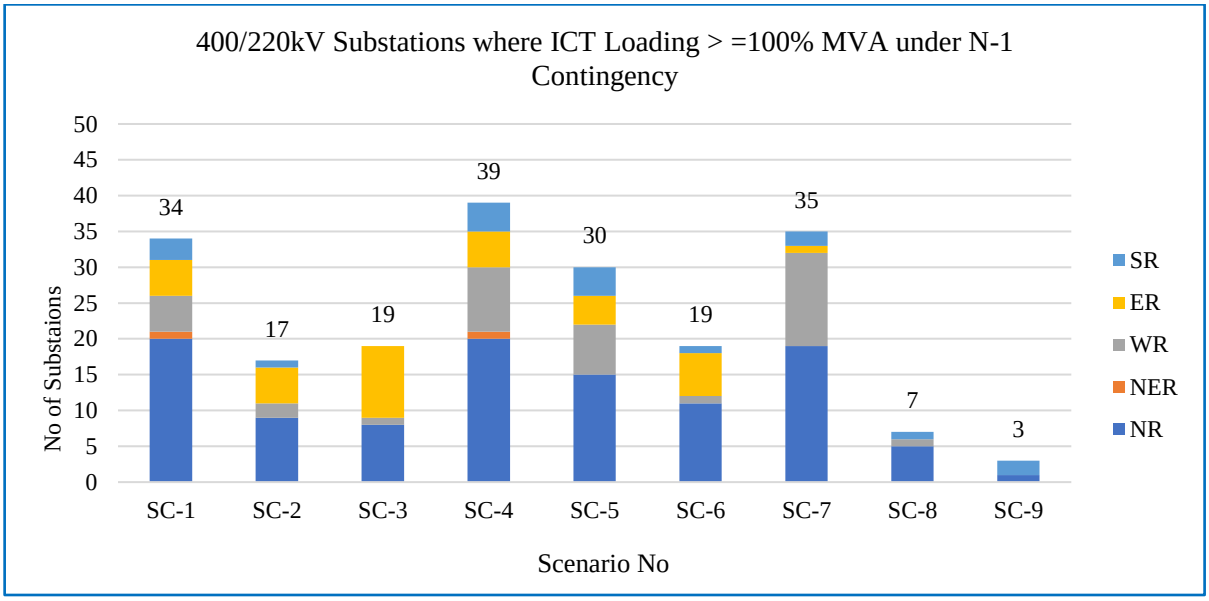


Figure 3-24:400/220kV ICT loadings≥ 100% of MVA rating under N-1 Contingency

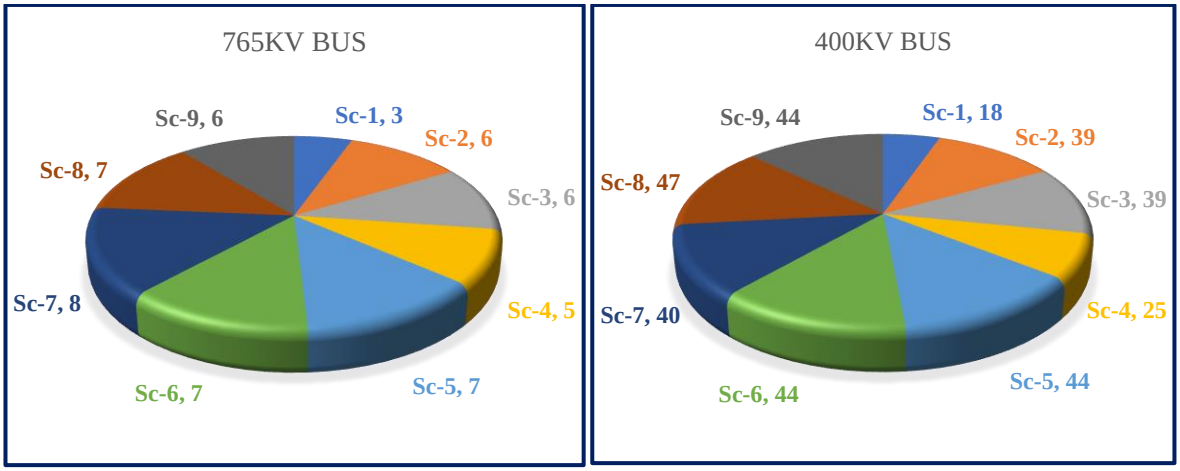


Maximum number of transformers exceeding the loading greater than MVA rating under N-1 contingency in each of the seasons are corresponding to Solar max scenarios viz. Scenarios-1, 4 and 7. Majority of these substations are RE pooling stations where ICTs have been planned considering N-0, as per Manual on Transmission Planning Criteria. Thus, some 39 no. of substations requires ICT augmentation, which are being studied in detail in respective regional chapters.

3.2.3 Short Circuit Analysis

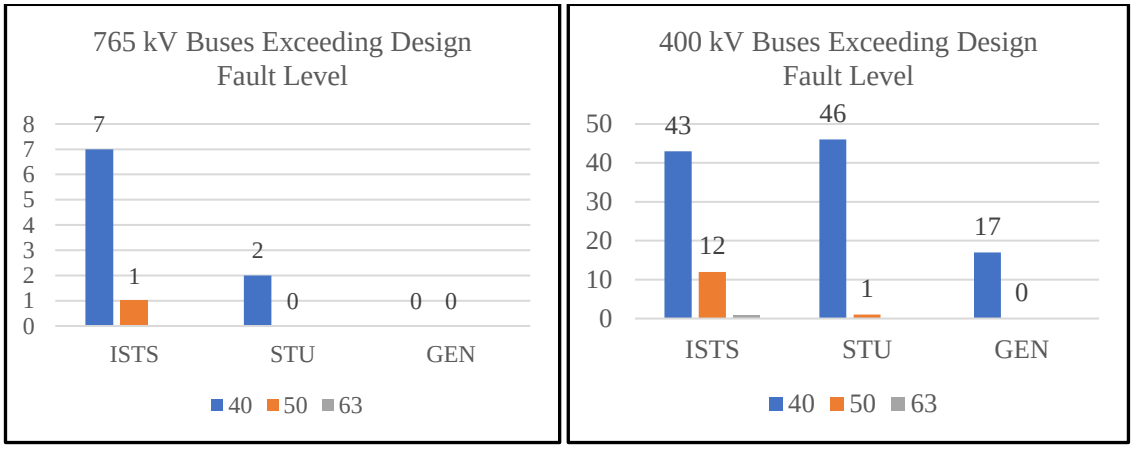
Short circuit level was calculated for all 765 and 400 kV buses on pan India basis. After finding the fault level for all buses exceeding the design fault level under any scenario were identified. Figure 3-25 shows the number of 765 kV and 400 kV buses exceeding the design fault current under different scenarios. About 8 and 47 no. of 765 and 400 kV buses respectively were observed to be crossing the design fault current limit in Scenario-7 and Scenario-8 respectively. Details about the buses exceeding design fault current limit are attached at **Annex-11.9** under various scenarios.

Figure 3-25: 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 in Figure 3-26.

Figure 3-26: 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 ▪ Raigarh Kotra (40kA): 48kA ▪ Jabalpur Pool (50kA): 53kA	➢ 400 kV ISTS ▪ Merrut(40kA): 65kA ▪ Kurl-new(50kA): 61kA
➢ 765 kV STU ▪ GNoidaUP (40kA): 43kA	➢ 400 kV STU ▪ Vemagiri(40kA): 57KA ▪ Maheshwaram-TS(50kA): 67kA

3.3 ISTS Expansion upto 2027-28

3.3.1 Summary of ISTS network

Region wise and year wise ISTS network expansion across the country upto FY 2027-28 is enclosed in **Annex-11.10**. Summary of ckm addition, MVA addition and the broad estimated cost of ISTS network ***under construction*** are tabulated below in Table 3-4, Table 3-5 & Table 3-6 respectively.

Table 3-4: ckm addition (Under Construction)

Sl. No.	FY	WR	SR	NR	ER	NER	Total
1	2022-23	1,800	1,470	1,910	50	809	**6,039**
2	2023-24	2,054	670	2,115	80	450	**5,369**
3	2024-25	239	-	405	185	-	**829**
4	2025-26	-	-	-	-	-	**-**
5	2026-27	-	-	-	-	-	**-**
6	2027-28	-	-	-	-	-	**-**
	Total	**4,093**	**2,140**	**4,430**	**315**	**1,259**	**12,237**

Table 3-5: MVA addition (Under Construction)

Sl. No.	FY	WR	SR	NR	ER	NER	Total
1	2022-23	6,500	8,500	15,265	500	200	**30,965**
2	2023-24	20,500	4,500	10,500	-	320	**35,820**
3	2024-25	2,500	-	-	-	-	**2,500**
4	2025-26	-	-	-	-	-	**-**
5	2026-27	-	-	-	-	-	**-**
6	2027-28	-	-	-	-	-	**-**
	Total	**29,500**	**13,000**	**25,765**	**500**	**520**	**69,285**

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

Sl. No.	FY	WR	SR	NR	ER	NER	Total
1	2022-23	5,792	6,117	4,997	54	1,601	**18,562**
2	2023-24	5,803	1,239	7,390	226	402	**15,060**
3	2024-25	243	-	1,077	458	-	**1,778**
4	2025-26	-	-	-	-	-	**-**
5	2026-27	-	-	-	-	-	
6	2027-28	-	-	-	-	-	**-**
	Total	**11,839**	**7,356**	**13,464**	**738**	**2,003**	**35,400**

Summary of ckm addition, MVA addition and the broad estimated cost of ISTS network ***under planning/bidding/approval*** are tabulated below in Table 3-7, Table 3-8 & Table 3-9 respectively.

Table 3-7: ckm addition (under planning/bidding/approval)

Sl. No.	FY	WR	SR	NR	ER	NER	Total
1	2022-23	-	-	-	-	-	**-**
2	2023-24	160	680	-	-	-	**840**
3	2024-25	2,490	1,960	5,590	-	-	**10,040**
4	2025-26	1,840	-	5,024	-	230	**7,094**
5	2026-27	-	-	2,808	-	-	**2,808**
6	2027-28	-	-	-	-	-	**-**
	Total	**4,490**	**2,640**	**13,422**	**-**	**230**	**20,782**

Table 3-8:MVA addition (under planning/bidding/approval)

Sl. No.	FY	WR	SR	NR	ER	NER	Total
1	2022-23	-	-	-	-	-	**-**
2	2023-24	2,500	3,000	1,000	-	-	**6,500**
3	2024-25	27,500	27,000	40,030	1,000	-	**95,530**
4	2025-26	9,500	18,000	34,830	-	1,720	**64,050**
5	2026-27	-	-	7,575	-	-	**7,575**
6	2027-28	-	-	-	-	-	**-**
	Total	**39,500**	**48,000**	**83,435**	**1,000**	**1,720**	**173,655**

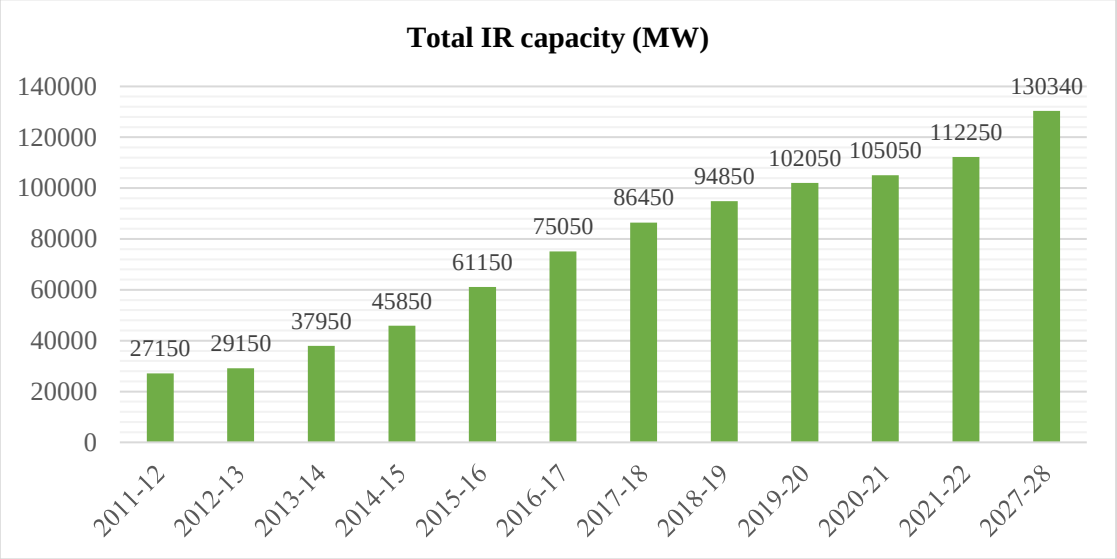
Table 3-9:Broad estimated cost (in ₹ Cr.) (under planning/bidding/approval)

Sl. No.	FY	WR	SR	NR	ER	NER	Total
1	2022-23	-	-	-	-	-	**-**
2	2023-24	2,978	453	175	59	16	**3,680**
3	2024-25	8,002	9,109	16,250	76	-	**33,437**
4	2025-26	5,527	3,907	27,942	422	430	**38,228**
5	2026-27	-	-	30,218	-	-	**30,218**
6	2027-28	-	-	-	-	-	**-**
	Total	**16,507**	**13,469**	**74,584**	**557**	**446**	**105,562**

3.3.2 Inter-Regional (IR) Capacity

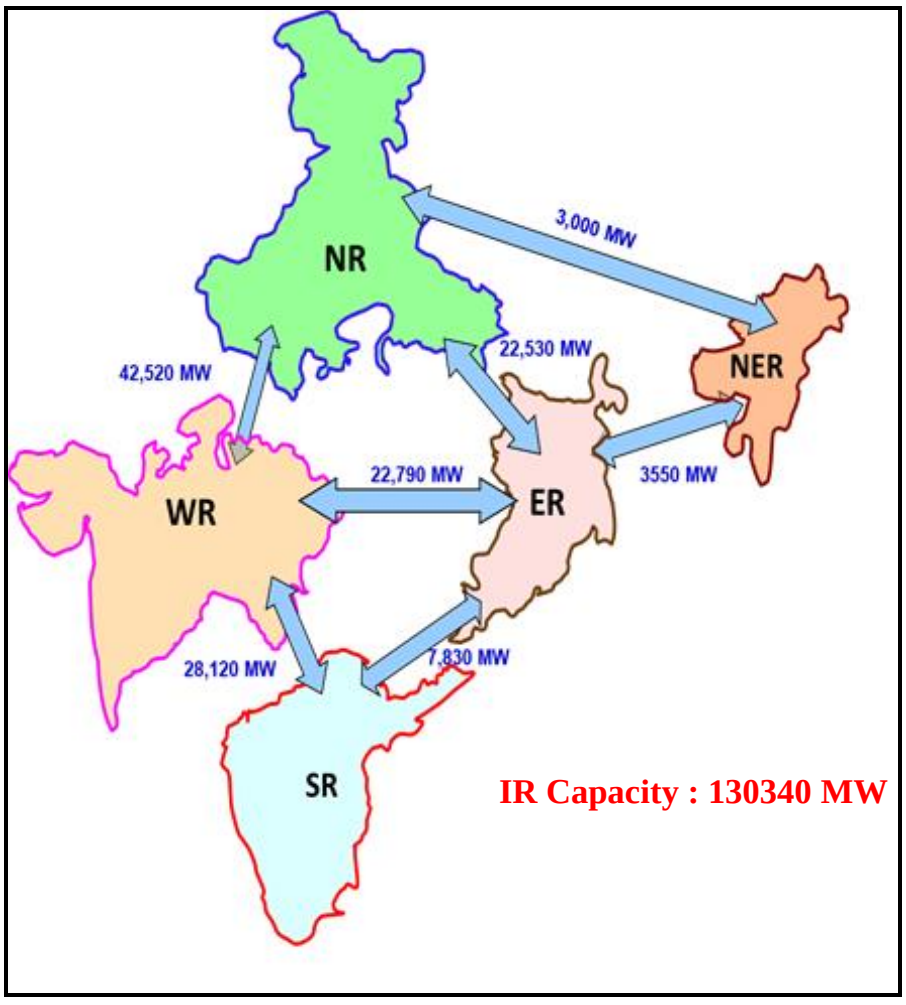
The progressive growth in Inter-Regional (IR) transmission capacity and till 2027-28 is given below in Figure 3-27:

Figure 3-27: Growth in IR Capacity (MW)



Details of approved Inter Regional corridor capacity are attached at **Annex-11.11** for 2027-28 and the schematic of the same is given below in Figure 3-28.

Figure 3-28: Inter-Regional Transmission Capacity in 2027-28



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 Mar'2022

As on Mar'2022, total Installed Capacity of Northern Region is about 112.8 GW and the peak demand met is about 72.9 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 Mar'22 (All Fig in GW)

State / UTs	Generation						Peak Demand Met
	Thermal	Nuclear	Renewable			Grand Total	
			Hydro	RES	Total		
Chandigarh	0.06	0.01	0.10	0.05	0.15	0.22	0.43
Delhi	6.52	0.10	0.73	0.27	1	7.62	7.32
Haryana	9.32	0.10	2.32	1.25	3.57	12.99	12.12
Himachal Pradesh	0.21	0.03	3.24	1.05	4.29	4.53	2.03
Jammu & Kashmir	0.88	0.07	2.32	0.24	2.56	3.51	2.82
Punjab	8.73	0.20	3.82	1.77	5.59	14.52	13.43
Rajasthan	14	0.56	1.94	17.04	18.98	33.54	15.78
UP	21.03	0.29	3.42	4.48	7.90	29.22	24.79
Uttarakhand	1.01	0.03	1.98	0.93	2.91	3.95	2.47
Central unallocated	1.72	0.24	0.75	0	0.75	2.71	0
Total	**63.48**	**1.63**	**20.62**	**27.08**	**47.70**	**112.82**	**72.93**

Source: CEA monthly report

4.2 Envisaged Power Supply Scenario

As per the 19th EPS, Northern Region demand for 2027-28 timeframe is expected to increase to about 102.7GW. As per the inputs received from various stakeholders, total installed capacity of Northern Region for 2027-28 is expected to be about 179.7 GW. The state wise bifurcation of generation capacity and peak demand by 2027-28 is summarized below at Table 4-2.

Table 4-2: Northern Region Installed Capacity and peak demand (2027-28)

(All Fig in GW)

State / UTs / Sector	Generation (GW)								Peak Demand (GW)
	Thermal	Hydro	Nuclear	Solar	Wind	Other RE	Gas	Total	
Chandigarh	-	-	-	-	-	-	-	-	0.62
Delhi	0.51	-	-	-	-	-	1.46	1.97	9.25
Haryana	3.83	0.06	-	0.91	-	-	-	4.80	17.40
Himachal Pradesh	-	0.31	-	-	-	-	-	0.31	2.46
Jammu & Kashmir	-	1.22	-	-	-	-	0.18	1.40	4.74
Punjab	4.84	1.37	-	1.60	-	-	-	7.81	19.89
Rajasthan	10.01	0.55	-	10.31	6.40	-	0.18	27.45	21.29
UP	21.82	1.30	-	4.19	-	-	-	27.30	32.85
Uttarakhand	-	2.16	-	-	-	-	-	2.16	4.80
Central	11.44	15.20	4.42	63.78	-	-	1.76	96.59	-
IPP	-	4.10	-	-	-	-	-	4.10	-
Rooftop / Other RE	-	-	-	4.50	-	1.36	-	5.86	
NR	**52.45**	**26.27**	**4.42**	**85.28**	**6.40**	**1.36**	**3.58**	**179.76**	**102.73**

There is a growth in peak demand of Northen Region from present time-frame (2021-22) to 2027-28 with a CAGR of 5.7%. 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 (MW)				
	2021-22	**2027-28 (19th EPS)**	**Increase in demand**	**CAGR**
Chandigarh	491	621	130	4.0%
Delhi	7471	9256	1785	3.6%
Haryana	12222	17400	5178	6.1%
Himachal Pradesh	1898	2465	567	4.5%
Jammu & Kashmir	3095	4741	1646	7.4%
Punjab	14886	19894	5008	5.0%
Rajasthan	14435	21292	6857	6.7%
UP	23664	32856	9192	5.6%
Uttarakhand	3180	4800	1620	7.1%
Total	**73770**	**102730**	**28960**	**5.7%**

From the above data it is observed that the CAGR growth of peak demand is maximum for Jammu & Kashmir (7.4%) and minimum for Delhi (3.6%).

4.3 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 Northern Region Load Generation Balance (LGB) for 2027-28 time-frame. For Northern Region also, three points on the daily load curve i.e. Solar max (afternoon), Peak load (evening) and Off-peak load (night) for three seasons viz. Monsoon (August), Summer (June) and Winter (February) have been considered.

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

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

Scenario No & Name	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%	105%
6-Jun Night Off Peak	70%	80%	0%	0%	60%	60%	86%
7-Feb Solar Max	30%	80%	90%	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 (46.8 GW) and highest demand (107.3 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'27			Jun'27			Feb'28		
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	391	434	264	392	477	267	300	328	150
Delhi	7489	6632	7310	7631	7621	8369	4725	3493	1829
Haryana	11945	10896	8283	12150	12541	7062	8562	6991	2873
Himachal Pradesh	1613	4902	1586	1531	1834	1543	1999	2101	1040
Jammu & Kashmir	2012	1872	1320	2230	2449	1549	3218	3039	2522

Drawal from ISTS	Aug'27			Jun'27			Feb'28		
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
Punjab	11877	10421	4376	13601	14076	6667	6179	5234	2174
Rajasthan	-465	2576	3410	1064	3462	5994	1563	5143	4939
UP	21517	16116	19292	22434	18673	15776	9963	11064	5231
Uttarakhand	1225	984	1183	1451	1558	1827	2131	1744	1241
Central (-)	-72890	-27732	-23581	-74464	-27732	-23493	-69111	-23874	-16886
IPP (-)	-2872	-3898	-2872	-2872	-3898	-2872	-1231	-2462	-1231
Total	-18160	23204	20571	-14853	31062	22690	-31702	12802	3881

Considering the above LGB for nine scenarios, load flow cases were prepared for 2027-28 timeframe.

4.4 ISTS Network

Various transmission schemes have been discussed/finalized in the Consultative Meeting for Evolution of Transmission System of Northern Region (CMETS-NR) from March 2022 to July 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.

4.4.1 WR-NR Inter-Regional (IR)

Scheme to relieve high loading of 400 kV Bhinmal -Zerda line

The Joint Study Meeting on Transmission Planning for Northern Region & Western Region was held on 21.03.2022, 28.03.22 & 29.03.22 amongst CEA, CTU, POSOCO, WR, and NR constituents was held to deliberate NR-WR Inter-regional (IR) transmission system requirement to relieve overloading of Bhinmal-Zerda line under various operating conditions. In the Joint Study meeting, the following scheme was proposed by CTU as per the immediate requirement (Phase-I: short term) to relieve 400kV WR-NR IR corridor loadings:

- Bypassing of 400 kV Kankroli - Bhinmal-Zerda lines at Bhinmal to form 400 kV Kankroli – Zerda (direct) line #
- Reconductoring of 400 kV Jodhpur(Surpura)(RVPN) – Kankroli S/c line with twin HTLS conductor*-188 km

 # with necessary arrangement for bypassing Kankroli- Zerda line at Bhinmal with suitable switching equipment inside the Bhinmal substation
**with minimum capacity of 2100 MVA/ckt at nominal voltage; Upgradation of existing 400kV bay equipment's each at Jodhpur (Surpura)(RVPN) and Kankroli S/s (3150 A)*

After deliberations in the meeting, it was decided that Ph-1 (short term) scheme may be implemented as inter regional system strengthening scheme (ISTS) on urgent basis. The matter was also discussed and agreed in the 5th CMETS NR held on 30.03.2022. Subsequently, POWERGRID provided inputs stating that with recent experience of Re-conductoring of various old lines based on HTLS conductor design principles for 400kV lines designed with ACSR Moose conductor for 85 Deg C, ampacity of around 1400 Amperes may be possible with GAP & Composite Core type HTLS Conductor. For

higher ampacity corresponding to 2100MVA capacity, GAP type HTLS Conductor may not be suitable and Composite Core type HTLS conductor may be the only option.

It was also mentioned that the Composite Core type HTLS conductors is very costly (around 3 times to that of equivalent ACSR), whereas, GAP is economical (around 1.5 times to that of equivalent ACSR). With ampacity requirement of 1400A, possibility of GAP & Composite core type HTLS conductor may facilitate larger vendor base leading to better competition & fair price discovery. In case of higher ampacity, limited vendors of Composite core conductor may lead to reduced competition

With 1400 Ampacity, 400kV line can be designed for about 1940 MVA. In the studies, it is observed from studies that line loading at 400 kV Jodhpur (Surpura)(RVPN) – Kankroli S/c (twin moose) line is about 1250 MW in Feb solar max scenario under worst case contingency. As the envisaged power flow is less than 1940MVA, therefore it is proposed that HTLS Conductor (Gap/Composite core) with 1400Amps(~1940MVA) may be utilized for reconductoring of 400kV Jodhpur (Surpura)(RVPN) – Kankroli S/c (twin moose) line

Based on above inputs, proposal was again deliberated in the 7th CMETS NR meeting held on 31.05.22. In the meeting, proposal for Reconductoring of 400 kV Jodhpur(Surpura)(RVPN) –Kankroli S/c line with twin HTLS conductor having minimum capacity of 1940MVA/ckt at nominal voltage was agreed

- Bypassing of 400 kV Kankroli - Bhinmal-Zerda line at Bhinmal to form 400 kV Kankroli – Zerda (direct) line #
- Reconductoring of 400 kV Jodhpur (Surpura)(RVPN) – Kankroli S/c (twin moose) line with twin HTLS conductor*-188 km

 # with necessary arrangement for bypassing Kankroli- Zerda line at Bhinmal with suitable switching equipment inside the Bhinmal substation

**with minimum capacity of* 1940MVA*/ckt at nominal voltage; Upgradation of existing 400kV bay equipment's each at Jodhpur (Surpura)(RVPN) and Kankroli S/s(3150 A)*

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

S, No	Scope of the Transmission Scheme	Implementation time-frame	Total Estimated Cost (Rs. Cr)
1	➢ Bypassing of 400 kV Kankroli - Bhinmal-Zerda line at Bhinmal to form 400 kV Kankroli – Zerda (direct) line # ➢ Reconductoring of 400 kV Jodhpur (Surpura)(RVPN) – Kankroli S/c (twin moose) line with twin HTLS conductor*-188 km *# with necessary arrangement for bypassing Kankroli- Zerda line at Bhinmal with suitable switching equipment inside the Bhinmal substation*	18 months from allocation of project	**279.5**

	**with minimum capacity of* 1940MVA*/ckt at nominal voltage; Upgradation of existing 400kV bay equipment's each at Jodhpur (Surpura)(RVPN) and Kankroli S/s(3150 A)*		

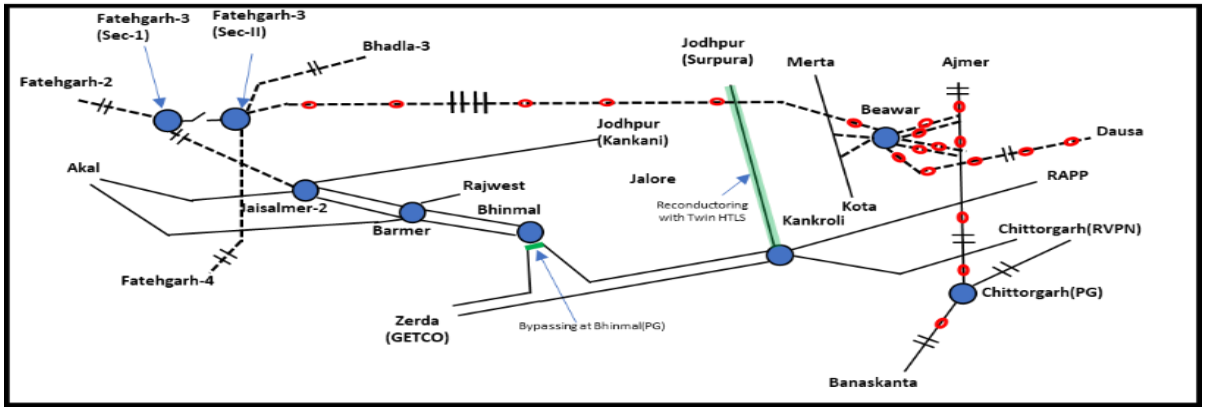


Figure 4-1:Tr. Scheme to relieve high loading of WR-NR IR Corridor

4.4.2 Rajasthan

(a) Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-1) (Bikaner Complex)

Transmission system for evacuation of power from Rajasthan Solar energy zones was evolved in various phases i.e Phase-I (8.9 GW), Phase-II (8.1 GW) & Phase-III (20 GW). The Ph-I transmission scheme is already commissioned whereas Ph-II is under various stages of implementation. The phase-III scheme is under tendering stage

Further, MNRE vide letter No. 367-13/1/2021-GEC dated 15.02.2022 addressed to Joint Secretary (Trans), MoP, had forwarded the Renewable Energy Zones (REZs) identified by MNRE/SECI with a total capacity of 181.5 GW for likely benefits by the year 2030. Transmission plan has to be prepared for the identified RE zones. These REZ's are located in eight states, out of which 75 GW REZs includes state of Rajasthan comprising of 15 GW Wind and 60 GW Solar potential.

District-wise breakup of identified RE Zones (potential) in NR is given below :

State	District	Potential (GW)		Evacuation capacity to be planned (GW)
		Wind	Solar	
Rajasthan (75 GW)	Sanchore, Sirohi, Jalor, Pali, Ajmer, Bikaner, Nagaur(non GIB Zone)		30	16
	Barmer, Jaisalmer, Jodhpur (GIB Zone)	15	30	32

Accordingly, a Comprehensive transmission scheme evolved for evacuation of 75GW RE from Rajasthan. Out of above comprehensive scheme, transmission scheme is evolved for about 8GW (Solar) in Bikaner complex (14 GW potential along with 6 GW BESS) in Rajasthan RE. At Bikaner-II PS, St-II Connectivity for 5.6 GW RE, against the potential of 1.9 GW (revised from 2.9GW identified under Ph-II), is already received. Accordingly, BESS may not be accounted for net dispatch at Bikaner-II PS while evolving the evacuation scheme and evacuation for additional 3.7 GW capacity is required from Bikaner-II PS. For 7GW additional solar potential at Bikaner-III along with 3GW BESS, evacuation system (4 GW) shall also be required. Further details of St-II connectivity and LTA received in Bikaner complex is as under:

Pooling Station	**St-II Connectivity received (MW)**	**LTA received (MW)**
Bikaner	3875	3275
Bikaner-II	5575	1500
Bikaner-III	1060	-

The evacuation system planned earlier in Ph-I, II, III from Bikaner complex was adequate for evacuation of about 4.8 GW RE potential from Bikaner complex. however, recently due to restrictions in GIB area, CTU has received more no. of connectivity applications in Bikaner complex. Stage-II connectivity received at Bikaner (PG) & Bikaner-II PS has already exceeded the envisaged potential in Bikaner complex as part of Ph-I (2.9 GW) and Ph-II (1.9 GW) potential.

Upon grant of about 5.575 GW St-II Connectivity, in the 5th & 6th Consultation Meeting for Evolving Transmission Schemes in Northern Region, no further grant for St-II connectivity at 400/220kV Bikaner-II was decided. However, to effect LTA of entire Stage-II grant at Bikaner-II, additional corridors shall need to be planned from Bikaner-II PS. Further, as Bikaner and Bikaner-II PS are interconnected, power flow on interconnection is influenced by RE generation dispatched at each Pooling station as cumulative St-II connectivity granted for about 10 GW (Incl. possible enhancement) on both the pooling stations. Considering space limitation of 400kV bays for additional corridors as well as 765/400kV ICTs at Bikaner PS, there is limitation on evacuation of power from Bikaner PS.

Accordingly, deliberations were held in 8th Consultative Meeting for Evolving Transmission Systems in Northern Region (CMETS-NR) held in 30.06.22. In the meeting, comments of stakeholders i.e. HVPN, PSTCL, POSOCO were discussed. Based on discussions, revised study files for February & June solar maximized scenario shared to all constituents. Additionally P-V, Q-V analysis for highly loaded 765kV lines also carried out to assess system stability under various contingencies.

Considering grant of connectivity to new RE generators in Bikaner complex (incl. Bikaner-III) as well as for evacuation of power beyond Bikaner complex (Bikaner/Bikaner-II/Bikaner-III PS), following transmission scheme was agreed for evacuation of power from Rajasthan REZ Ph-IV (Part-1) [Bikaner complex] in the 8th & 9th CMETS-NR meeting.

Scope of work along with tentative Cost and Implementation time-frame (Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-1)

Sl, No	Scope of the Transmission Scheme
1	Establishment of 6x1500 MVA (along with 1x500MVA spare unit), 765/400 kV & 5x500 MVA^ 400/220 kV Bikaner-III Pooling Station along with 2x330 MVAr (765kV) Bus Reactor (along with 110MVAr spare unit) & 2x125 MVAr (420kV) Bus Reactor at a suitable location near Bikaner (Assuming 2 GW injection at 220 kV level and 2 GW injection at 400 kV level) **Future provisions at Bikaner-III PS*:** **Space for** ➢ 765/400kV ICT along with bays- 1 no. ➢ 765 kV line bays along with switchable line reactors – 4 nos. ➢ 765kV Bus Reactor along with bay: 1 no. ➢ 400 kV line bays along with switchable line reactor –4 nos. ➢ 400 kV line bays–4 nos. ➢ 400/220kV ICT along with bays -5 nos. ➢ 400 kV Bus Reactor along with bay: 1 no. ➢ 400kV Sectionalization bay: 2 sets ➢ 220 kV line bays for connectivity of RE Applications -12 nos. ➢ 220kV Sectionalization bay: 3 sets ➢ STATCOM (2x±300MVAr) along with MSC (4x125 MVAr) & MSR (2x125 MVAr)
2	Augmentation with 400/220 kV, 5x500 MVA^ ICT at Bikaner-II PS
3	Augmentation with 765/400 kV, 1x1500MVA ICT (4^{th}) at Bikaner (PG)
4	LILO of both ckts of 400kV Bikaner (PG)-Bikaner-II D/c line at Bikaner-III PS (~20 km)
5	Bikaner-II PS – Bikaner-III PS 400 kV D/c line (Quad) (~30 km)
6	Establishment of 765/400 kV, 4x1500 MVA (along with 1x500MVA spare unit) Neemrana-II S/s along with 2x330 MVAr (765kV) Bus Reactor (along with 110MVAr spare unit) & 2x125 MVAr (420kV) Bus Reactor at a suitable location near Neemrana **Future provisions at Neemrana-II S/s:** **Space for** ➢ 765/400kV ICT along with bays- 2 ➢ 765 kV line bays along with switchable line reactors – 6 ➢ 765kV Bus Reactor along with bay: 1 nos. ➢ 400 kV line bays along with switchable line reactor –6 ➢ 400 kV Bus Reactor along with bays: 1 no. ➢ 400kV Sectionalization bay: 2 sets

Sl, No	Scope of the Transmission Scheme
7	Bikaner-III – Neemrana-II 765 kV 2xD/c line (~350 km) along with 330 MVAr switchable line reactor for each circuit at each end
8	Neemrana-II- Bareilly(PG) 765 kV D/c line (~350 km) along with 330 MVAr switchable line reactor for each circuit at each end
9	Neemrana-II -Kotputli 400 kV D/c line (Quad)(~70 km)
10	Augmentation by 400/220 kV, 1x500 MVA (3rd) ICT at Kotputli (PG)
11	LILO of both ckts of Sohna Road(GPTL)-Gurgaon(PG) D/c line at Neemrana-II S/s (~85 km)
12	220 kV line bays at Bikaner-III PS(6 no.) for interconnection of RE Projects

^incl 1x500MVA ICT to fulfill 'N-1' requirement

Implementation time-frame : 24 months from allocation of project

Estimated Cost (Rs. Cr) : 13,460

However, out of above agreed scheme, 765/400kV ICT (4th) at Bikaner (PG) S/s and 400/220 kV, 5x500 MVA ICT at Bikaner-II PS may be taken up based on evacuation requirement beyond Bikaner/Bikaner-II PS. The scheme is also agreed in 56th NRPC meeting recently.

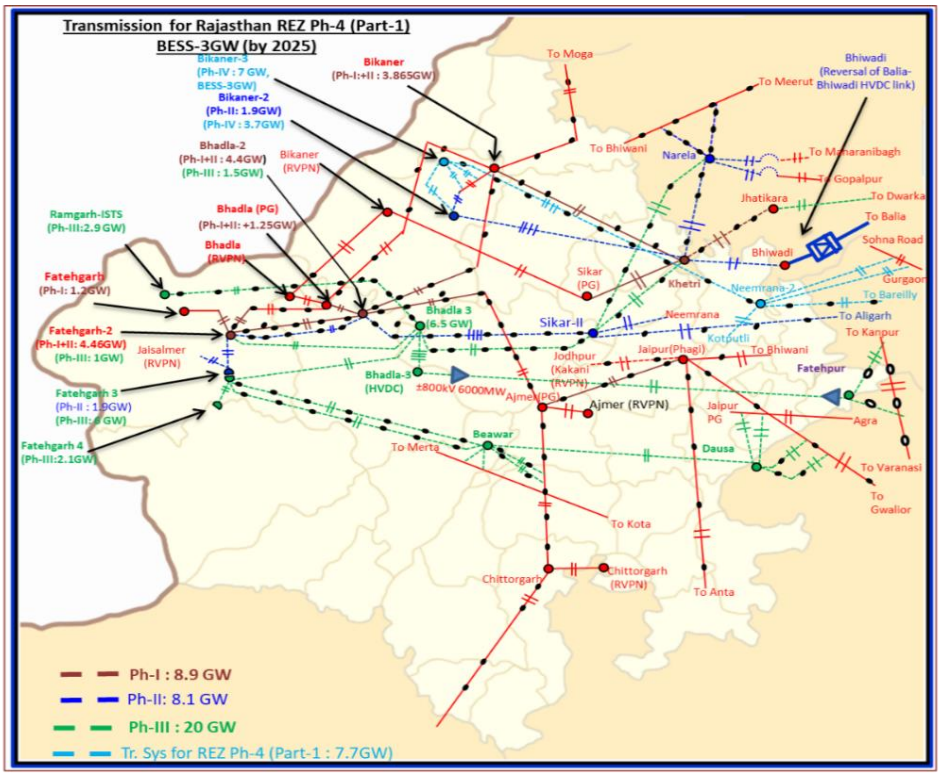


Figure 4-2:Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-1)

(b) Implementation of "N -1" contingency at RE pooling substations in NR

As per CEA transmission planning criteria, section 16.2 "The *'N-1' criteria may not be applied to the immediate connectivity of wind/solar farms with the ISTS/Intra-STS grid i.e. the line connecting the farm to the grid and the step-up transformers at the grid station."* The above criteria is also followed in planning of transmission system for integration of renewable energy zones in Rajasthan.

POWERGRID vide letters dated 17th May 2022 & 19th May 2022 informed that as per the current practice, N-1 criteria is not being implemented at planning stage of network with respect to step up transformers at RE pooling stations in Rajasthan (Bhadla-2, Fatehgarh-2 & Bikaner). Due to this, outage of any transformer in above stations will result into overloading of other transformers leading to cascaded tripping on overload/higher temperature and may adversely impact both RE generation as well as health of the transformers. In view of the above, POWERGRID requested CTU to implement additional 400/220kV ICTs at RE pooling stations to meet the N-1 criteria for smooth evacuation of power. POWERGRID also recommended that, N-1 criteria may be taken into consideration during planning stage for upcoming RE pooling stations.

POSOCO suggested that high RE capacity Substations must have N-1 compliance at 400/220 kV level i.e., Fatehgarh-II (both sections)/Fatehgarh-III PS, Bhadla-II PS etc. for which revised transmission planning criteria must have suitable provisions. NRPC agreed in the meeting that CTU may explore possibility of ensuring N-1 compliance at 400/220kV RE pooling stations with higher RE capacity on case-to-case basis and take up the ICT augmentation proposal for approval on priority.

In the Draft CEA Transmission planning criteria-2022, it is mentioned that *"N-1 reliability criteria may be considered for ICTs at the ISTS /STU pooling stations for renewable energy-based generation of more than 1000 MW after considering the capacity factor of renewable generating stations."*

POWERGRID vide mail dated 26.05.2022 confirmed the availability of space for implementation of additional ICTs at each 400/220 kV sections of Fatehgarh-2, Bhadla-2 & Bikaner PS along with Cable/GIS duct connection requirement.

Considering the security and reliability of the system, it was agreed in 8th & 9th CMETS-NR meeting to implement additional ICTs in each 400/220 kV sections of the RE pooling stations in order to meet the N-1 criteria as well as to meet the evacuation requirement. Scheme was agreed to be implemented in phases as under:

A) ICTs agreed to be taken up for implementation as system strengthening scheme on urgent basis

1. Augmentation with 400/220kV, 1x500MVA Transformer at Fatehgarh-2 PS (6th ICT at Section-1 with cable/GIS duct connection at 220kV side)
2. Augmentation with 400/220kV, 1x500MVA Transformer at Bikaner PS (3rd ICT)

B) ICTs agreed to be taken up for implementation on receipt of commensurate LTA quantum at RE pooling stations as shown below

1. Augmentation with 400/220kV, 1x500MVA Transformer at Bhadla-2 PS (4th ICT at Section-1A)
   Implementation Timeframe: *15 months from the date of allocation of project or evacuation requirement beyond 1000 MW at 220kV level of Bhadla-2(Section-1A) whichever is later.*

2. Augmentation with 400/220 kV 1x500 MVA (6th) ICT at Fatehgarh-2 PS (In Section-1A with cable/GIS duct connection at 220kV side)
   Implementation Timeframe: *15 months from the date of allocation of project or evacuation requirement beyond 2000 MW at 220kV level of Fatehgarh-2(Section-1A) or LTA grant schedule of M/s Eden RE Bercy (Mar'24) whichever is later.*

3. Augmentation with 400/220 kV 1x500 MVA(4th) ICT at Bikaner PS
   Implementation Timeframe: *15 months from the date of allocation of project or evacuation requirement beyond 1000 MW at 220kV level of Bikaner PS whichever is later.*

4. Augmentation with 400/220kV, 1x500MVA (6th) ICT at Bhadla-2 PS (In Section-1 with cable/GIS duct connection at 220kV side)
   Implementation Timeframe *15 months from the date of allocation of project or evacuation requirement beyond 2075 MW at 220kV level of Bhadla-II PS whichever is later.*

   For optimal utilization of ICTs, it is recommended that Schedule for Part-B for S.No. 1,3, and 4 ICTs to be matched with RE generation schedule. Part-A of above scheme was also agreed in 56th NRPC meeting

4.4.3 High voltages in the Northern Region Grid

Northern region experiences large variation in demand over various seasons and time of day. At present the demand varies from 74GW in Summer evening peak to about 28GW in winter off-peak time. Likewise, the demand in NR vary from 101GW in Summer evening peak to 44GW in Winter night off peak time in 2026-27 timeframe.

Additionally, NR has huge RE generation (mainly wind and solar) envisaged in western Rajasthan. At present NR has RE capacity of about 28GW which is envisaged to be increased to 67GW by 2026-27. Similarly, NR has 21GW of existing hydro capacity and more large scale hydro generation projects envisaged in J&K, Himachal Pradesh and Uttarakhand in next 4-5 years. As no solar generation available in evening and night time, whereas wind and hydro generation is also minimal in winter season, high voltage are observed in studies in various planning scenarios also by 2026-27-time frame.

In the 4th NRPC (TP) meeting held on 5.10.2021 and 12.10.2021, issue of high voltage and requirement of reactive compensation at the various substations in NR was discussed along with agenda of installation of line reactors as discussed in 3rd NRPC (TP) meeting. In above meeting, POSOCO also analyzed the issue of high voltages in Northern region and made a presentation highlighting the various nodes (44 nos.) in NR which are experiencing high voltages for which

POSOCO proposed bus reactors at 39 nos. of nodes. After deliberations in above meeting, following was agreed :

- 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 in meeting 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

As per POSOCO's operational feedback report of Quarter-4 (Jan'22-Mar'22), 43 nos. of substations experienced high voltage in the quarter. In the report, it is mentioned that there are 124 nos. of 400kV & above lines opened multiple times on High Voltage in last quarter in NR. Frequent switching of transmission lines to control system voltages has been observed in the NR grid during various seasonal scenarios. POWERGRID also mentioned that in Northern Region, 852 times of 400kV & above lines (91 nos. of lines) manually opened to control system voltage and 6 nos. of lines tripped on Over Voltage in Jan'22. POWERGRID informed that the frequent switching of transmission line reduces the life of transmission assets and its impact has been already highlighted to RPCs/RLDCs in various meetings.

Subsequently, issue of high voltages was deliberated in 8th Consultative Meeting for Evolving Transmission Systems in Northern Region (CMETS-NR). In the meeting it was analysed that percentage line compensation and total compensation (line+bus) in ISTS is about 61% and 105% respectively, whereas in STU system, the percentage line compensation and total compensation (line+bus) is about 39% and 89% respectively.

Further, 220 kV transmission lines of STU system as well Capacitor banks installed at downstream level also contributes significant MVARs in system especially during light load condition as However, very less compensation provided by STUs at 220kV level and below network, non-switched off Capacitor banks at downstream network adds significant reactive power flows into 400 kV network through 400/220 kV ICTs of ISTS and STU substations.

The graph depicts, the actual maximum MVAr injection on night off peak time of a typical day (06.12.21) from 220 kV to 400 kV network through 400/220 kV ICTs in NR states.

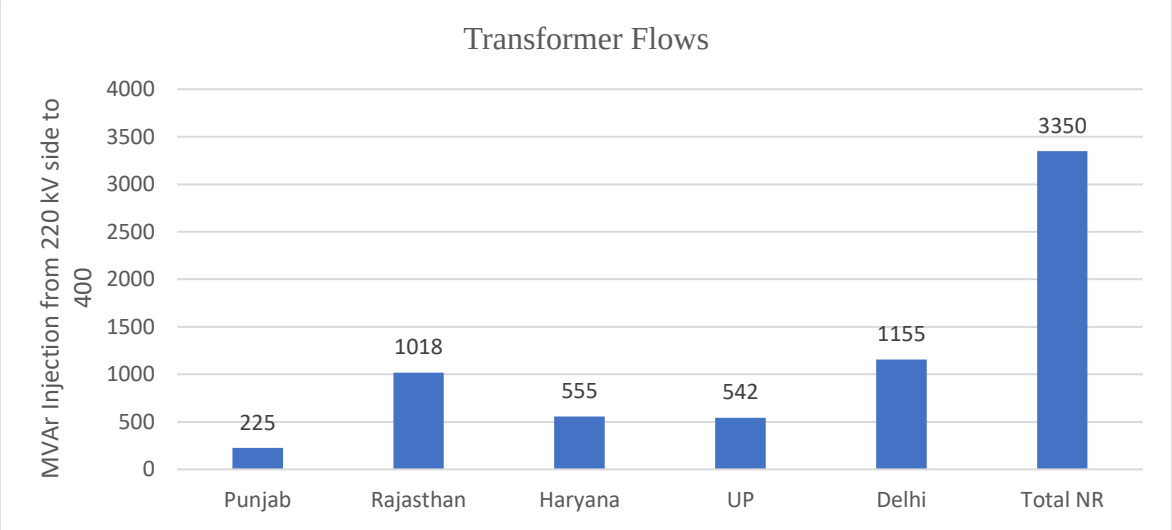


Figure 4-3:Maximum MVAr injection on a typical night (source: NTAMC, POWERGRID).

The graph in depicts total MVAr flows from 220 kV to 400 kV system through 400/220 kV ICTs in NR at different hours on the night of 06/12/21

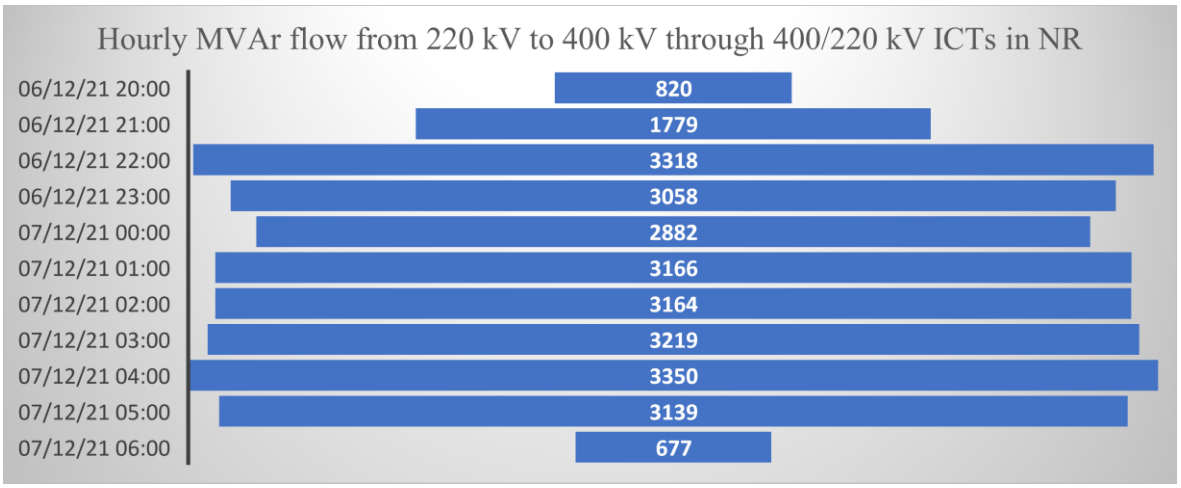


Figure 4-4:Total MVAr flow from 220 kV to 400 kV through 400/220 kV ICTs

From the analysis it was also emerged that in most of the substations reactive power is injected from 220 kV side through 400/220kV transformer due to inadequate reactive compensation in STU system.

Based on data received regarding existing/planned reactors and space availability at various substations, comprehensive reactive compensation studies were carried out for winter off-peak scenario of the year 2026-27. Based on the studies, following pockets were identified wherein reactive compensation measure is required to control high voltages and accordingly, new 420kv bus reactors are proposed to mitigate above high voltage issue. Details are as under

S,No.	Pocket/State	No of Substations on which HV observed in studies	HV observed in operational feedback report (POSOCO)	New 125MVAr (420kV) bus reactors proposed based on studies	Remarks
1	Punjab	15 nos. (all 400kV substations)	9 nos.	4 nos. (Makhu, Rajpura, Mukatsar/ Behman Singh (Malkana), and Dhanansu)	High voltage observed in night off peak scenario of Q1 (Apr-Jun), Q3(Sep-Dec) and Q4(Jan-Mar) (more prevailing in winters) due to large variation in demand from peak paddy season in monsoon (14GW) to winter night off (3.5GW)
2	Haryana	3 nos.	12 nos. (on most of 400kV substations)	4 nos. (Deepalpur, Nuhiyanwali, Kaboolpur and Nawada)	High voltage observed in night off peak scenario of Q1 (Apr-Jun), Q3(Sep-Dec) and Q4(Jan-Mar) (more prevailing in winters) due to large variation in demand from evening peak demand in summers (12GW) to winter night off (3.8GW)
3	Delhi	-	5 nos.	-	High voltage observed in night off peak scenario of Q1 (Apr-Jun), Q3(Sep-Dec) and Q4(Jan-Mar) (more prevailing in winters) due to large variation in demand from evening peak demand in summers (7.5GW) to winter night off (1.5GW) over the year
4	Uttar Pradesh	3 nos	3 nos.	2 nos. (Badaun and Maheba)	

S,No.	Pocket/State	No of Substations on which HV observed in studies	HV observed in operational feedback report (POSOCO)	New 125MVAr (420kV) bus reactors proposed based on studies	Remarks
5	Rajasthan	-	3 nos.	-	
6	Himachal Pradesh	8 nos.	4 nos.	-	In winter season (Q3 and Q4) due to less availability of water as well as less demand in Northern region, hydro generation is minimally dispatched and few are operated in synchronous condenser mode. At present, high voltages are observed in some of substations of J&K/HP/Uttarakhand. However, with envisaged hydro generation in next 4-5 years i.e. Pakaldul, Kiru, Kwar, Ratle, Shangtong, Tapovan Vishnugarh, Vishnugad Pipalkoti, Tehri PSP, Luhri St-I, II, Sunni Dam etc., critical high voltages are observed in studies.
7	Uttarakhand	10 nos.	-	-	
8	J&K	1 no.	-	1 no. (Pipalkoti)	

With above proposed reactive compensation, it was observed that, voltages on all EHVAC substations of High voltage pockets is within limit (≤1.03 pu).

Observations were received with POSOCO, CEA, PSTCL and HVPN and discussed in 8th CMETS-NR meeting. It was decided that stakeholders' comments on studies and on proposed bus reactors at various STU substations will be incorporated suitably and revised proposal along with reply of above observations will be shared shortly for finalization of proposal for installation of bus reactors to control high voltage in NR grid.

In line with discussion held in the 3rd & 4th NRPC (TP) meeting, proposal for line reactive compensation on 400kV transmission lines (ISTS) was also discussed. It was deliberated that 400kV D/c (Twin moose) line of 200-240km line length typically has a line rise (Ferranti rise) of 10-14kV (without reactors) at open end during line charging. In addition, source rise will be added in total rise.

In above scenario, during line charging of transmission lines of 200-240km length, voltage may breach permissible steady stage voltage limit of 420kV due to consistently higher bus voltage (>410kV). Further, due to such high voltage during charging events, issues are also observed in line equipment healthiness.

In Northern region, ISTS lines of more than 200 km line length but without any line reactive compensation have been analyzed. As informed by POWERGRID, space was not available for placement of line reactive compensation in substations for some of the lines. In above meeting, it was deliberated that based on information on availability of space in substation for placement of line reactive compensation, analysis has been carried out for following lines:

- 400kV Mainpuri- Ballabgarh D/c line (236 km)
- 400kV Kanpur- Allahabad S/c line (225 km)
- 400kV Agra- Bhiwadi ckt -2 (209 km)

After deliberations, it was decided and agreed in 8th CMETS-NR meeting that above proposed scheme (bus+line reactors) may be segregated in two phases. In Phase-I, being an urgent requirement, line reactor proposal was agreed . Details of the scheme is as under:

I. Installation of 50 MVAR switchable line reactor at Mainpuri end and fixed 50MVAR line reactor at Ballabgarh end on 400 kV Mainpuri- Ballabgarh D/c line - 236 km
II. Installation of 50 MVAR switchable line reactor at Allahabad end on 400 kV Kanpur-Allahabad S/c line - 225 km
III. Installation of 50 MVAR line reactor at Bhiwadi end for uncompensated circuit of 400kV Agra- Bhiwadi D/c line - 209 km

Perspective transmission schemes under planning

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

Northern region experiences large variation in demand over various seasons and time of day. At present the demand varies from 74GW in Summer evening peak to about 28GW in winter off-peak time. Likewise, the demand in NR vary from 101GW in Summer evening peak to 44GW in Winter night off peak time in 2026-27 timeframe.

Additionally, NR has huge RE generation (mainly wind and solar) envisaged in western Rajasthan. At present NR has RE capacity of about 28GW which is envisaged to be increased to 67GW by 2026-27. Similarly, NR has 21GW of existing hydro capacity and more large scale hydro generation projects envisaged in J&K, Himachal Pradesh and Uttarakhand in next 4-5 years. As no solar generation available in evening and night time, whereas wind and hydro generation is also minimal in winter season, high voltage are observed in studies in various planning scenarios also by 2026-27-time frame.

In the 4th NRPC (TP) meeting held on 5.10.2021 and 12.10.2021, issue of high voltage and requirement of reactive compensation at the various substations in NR was discussed along with agenda of installation of line reactors as discussed in 3rd NRPC (TP) meeting. In above meeting, POSOCO also analyzed the issue of high voltages in Northern region and made a presentation

highlighting the various nodes (44 nos.) in NR which are experiencing high voltages for which POSOCO proposed bus reactors at 39 nos. of nodes. After deliberations in above meeting, following was agreed :

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 in meeting 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

As per POSOCO's operational feedback report of Quarter-4 (Jan'22-Mar'22), 43 nos. of substations experienced high voltage in the quarter. In the report, it is mentioned that there are 124 nos. of 400kV & above lines opened multiple times on High Voltage in last quarter in NR. Frequent switching of transmission lines to control system voltages has been observed in the NR grid during various seasonal scenarios. POWERGRID also mentioned that in Northern Region, 852 times of 400kV & above lines (91 nos. of lines) manually opened to control system voltage and 6 nos. of lines tripped on Over Voltage in Jan'22. POWERGRID informed that the frequent switching of transmission line reduces the life of transmission assets and its impact has been already highlighted to RPCs/RLDCs in various meetings.

From the analysis it emerged that line compensation for transmission network (400kV and above) by 2025-26 in Northern region, percentage line compensation and total compensation (line+bus) in ISTS is about 61% and 105% respectively, whereas in STU system, the percentage line compensation and total compensation (line+bus) is about 39% and 89% respectively.

Further, it was stated that 220 kV transmission lines of STU system as well Capacitor banks installed at downstream level also contributes significant MVARs in system especially during light load condition as However, very less compensation provided by STUs at 220kV level and below network, non-switched off Capacitor banks at downstream network adds significant reactive power flows into 400 kV network through 400/220 kV ICTs of ISTS and STU substations.

From the Studies it was also emerged that in most of the substations reactive power is injected from 220 kV side through 400/220kV transformer due to inadequate reactive compensation in STU system.

Based on data received regarding existing/planned reactors and space availability at various substations, CTU carried out the comprehensive reactive compensation studies for winter off-peak scenario of the year 2026-27. Based on the studies, following pockets were identified wherein reactive compensation measure is required to control high voltages and accordingly, new 420kv bus reactors are proposed to mitigate above high voltage issue. Details are as under

S,No.	Pocket/State	No of Substations on which HV observed in studies	HV observed in operational feedback report (POSOCO)	New 125MVAr (420kV) bus reactors proposed based on studies	Remarks
1	Punjab	15 nos. (all 400kV substations)	9 nos.	4 nos. (Makhu, Rajpura, Mukatsar/ Behman Singh (Malkana), and Dhanansu)	High voltage observed in night off peak scenario of Q1 (Apr-Jun), Q3(Sep-Dec) and Q4(Jan-Mar) (more prevailing in winters) due to large variation in demand from peak paddy season in monsoon (14GW) to winter night off (3.5GW)
2	Haryana	3 nos.	12 nos. (on most of 400kV substations)	4 nos. (Deepalpur, Nuhiyanwali, Kaboolpur and Nawada)	High voltage observed in night off peak scenario of Q1 (Apr-Jun), Q3(Sep-Dec) and Q4(Jan-Mar) (more prevailing in winters) due to large variation in demand from evening peak demand in summers (12GW) to winter night off (3.8GW)
3	Delhi	-	5 nos.	-	High voltage observed in night off peak scenario of Q1 (Apr-Jun), Q3(Sep-Dec) and Q4(Jan-Mar) (more prevailing in winters) due to large variation in demand from evening peak demand in summers (7.5GW) to winter night off (1.5GW) over the year
4	Uttar Pradesh	3 nos	3 nos.	2 nos. (Badaun and Maheba)	
5	Rajasthan	-	3 nos.	-	
6	Himachal Pradesh	8 nos.	4 nos.	-	In winter season (Q3 and Q4) due to less availability of water as well as less demand in Northern region, hydro
7	Uttarakhand	10 nos.	-	-	

S,No.	Pocket/State	No of Substations on which HV observed in studies	HV observed in operational feedback report (POSOCO)	New 125MVAr (420kV) bus reactors proposed based on studies	Remarks
8	J&K	1 no.	-	1 no. (Pipalkoti)	generation is minimally dispatched and few are operated in synchronous condenser mode. At present, high voltages are observed in some of substations of J&K/HP/Uttarakhand. However, with envisaged hydro generation in next 4-5 years i.e. Pakaldul, Kiru, Kwar, Ratle, Shangtong, Tapovan Vishnugarh, Vishnugad Pipalkoti, Tehri PSP, Luhri St-I, II, Sunni Dam etc., critical high voltages are observed in studies

With above proposed reactive compensation, it may be observed from table that, voltages on all EHVAC substations of High voltage pockets is within limit (≤1.03 pu).

As per the deliberations in 8th CMETS-NR meeting, it was decided and agreed that scheme may be segregated in two phases. In Phase-I, being an urgent requirement, line reactor proposal was agreed to be taken up for implementation. Details of the scheme is as under:

In Phase-II, bus reactive compensation will be reviewed based on study file after incorporating POSOCO and STUs observations.

Transmission system for evacuation of RE power from Rajasthan Ph-IV (75GW)

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. 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).

As part of above comprehensive plan, a transmission scheme is already evolved for about 8GW (Solar) in Bikaner complex (14 GW potential along with 6 GW BESS) in Rajasthan RE.

4.5 Measures taken for mitigation of the issues of 2026-27 Rolling plan

4.5.1 Measures for controlling over-voltage

As per the voltage analysis carried out in Rolling Plan published for 2026-27 timeframe, 28 nos. of 765 kV (1 no.) and 400 kV (27 no.) buses were having issue of high voltage (voltage more than 1.05 pu)

For above, Comprehensive studies for high voltage and requirement of reactive compensation at the various substations in NR was deliberated in 8th CMETS-NR meeting and it was decided and agreed that scheme to control overvoltages may be segregated in two phases. In Phase-I, being an urgent requirement, line reactor proposal was agreed to be taken up for implementation. In Phase-II, Eleven nos. of bus reactors were proposed on ISTS/STU substations, however bus reactive compensation (Bus reactors) will be reviewed after incorporating POSOCO and STUs observations on studies and taken up in next rolling plan.

4.5.2 Measures for controlling short circuit

As per the short circuit analysis carried out in Rolling Plan published for 2026-27 timeframe, Short circuit level was calculated for all 765kV and 400 kV buses of Northern Region amd it was noted that 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.

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.

4.5.3 Measures for controlling loading of transformers and Transmisison lines

As per the analysis carried out in Rolling Plan published for 2026-27, transformers at 2 nos. of 765/400 kV substations and 6 nos. of 400/220kV substations were having critical loading. Transformer loading on ISTS substations at Orai, Allahabad and Agra substation is higher at few instances in 2026-27 timeframe. Augmentation/Replacement of ICT may be required w.r.t future load growth of UP and real tome operational data. High loading at Bhiwani ICT observed in Solar maximized scenario. Augmentation/Replacement of ICT may be required in future in 2026-27 timeframe with development of solar generation in Rajasthan . STU may take necessary action for ICTs at STU S/s by load diversion or augmentations.

In the analysis carried out in Rolling Plan 2026-27, 11 nos. of 400 kV lines are observed to be having critical loading in base case as well as Contingency scenario. To relive overloading of 400kV Barmer - Bhinmal line and 400kV Kankroli - Jodhpur(Surpura) line, Inter regional (WR-NR) scheme is already planned and approved in current rolling plan. RVPN also planned a comprensive

transmission scheme for RE projects envisaged at intra state level. The scheme is under approval. The proposed intra state scheme would relieve the loading of 400kV Jaisamer-2 -Barmer D/c line and 400kV Merta – Jodhpur (Kankani) line . For balance transmission lines in other states (ISTS/STUs), suitable strengthing scheme will be indetified in next rolling plan.

4.6 System study analysis and results for 2027-28 timeframe

4.6.1 Load Flow Studies

The base case file was prepared for 2027-28 timeframe. The study results are detailed in subsequent sections.

4.6.2 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 (2027-28)

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	1.07	8,9
3	Hamirpur	400.00	ISTS	1.07	8,9
4	Dhanasanu	400.00	STU	1.09	7,9
5	Behmnjsingh (Malkana)	400.00	STU	1.1	7,9
6	Talwandi Saboo	400.00	STU	1.09	7,9
7	Dhuri	400.00	STU	1.09	7,9
8	Makhu	400.00	STU	1.09	7,9
9	Mukatasar	400.00	STU	1.1	7,8,9
10	Nakodar	400.00	STU	1.08	7,9
11	Amritsar	400.00	ISTS	1.1	7,8,9
12	Moga (split section)	400.00	ISTS	1.06	7,8,9
13	Kankroli	400.00	ISTS	1.06	1,9
14	Jallandar	400.00	ISTS	1.08	7,9
15	Ratangarh	400.00	STU	1.07	2,9
16	Hindaun	400.00	STU	1.07	2,9
17	Bhilwara	400.00	STU	1.07	2,9
18	Merta	400.00	STU	1.07	2,9
19	Heerapura	400.00	STU	1.05	2,9
20	Bikaner	400.00	STU	1.0	2,9
21	Deedwana	400.00	STU	1.06	2,9
22	Ajmer	400.00	STU	1.08	2,8,9
23	Ajmer (New)	400.00	STU	1.08	2,8,9
24	Sikar	400.00	ISTS	1.07	1,9
24	Jodhpur (Surpura)	400.00	STU	1.06	2,3,8,9

Sl. No.	Bus Name	Voltage Level(kV)	Owner	Max(pu)	Scenario
25	Jodhpur (Kankani)	400.00	STU	1.06	2,3,8,9
26	Hanumangarh	400.00	STU	1.07	2,3,8,9

In addition to above, some additional buses also observed high voltages more than 1.05 pu (in minimum two scenarios) is depicted in Table 4-7:

Table 4-7:Additional Substations having high voltage in NR (2027-28)

Sl. No.	Bus Name	Voltage Level(kV)	Owner	Max(pu)	Scenario
1	Neemrana-2	400.00	ISTS	1.09	8.9
2	Neemrana-2	765.00	ISTS	1.12	2,3,8.9
3	Bikaner-3	400.00	ISTS	1.11	2,8.9
4	Bikaner-3	765.00	ISTS	1.12	2,3,8.9
5	Dausa	765.00	ISTS	1.06	2,9
6	Jaipur	765.00	ISTS	1.07	2,8,9
7	Chittorgarh	765.00	ISTS	1.07	2,8,9

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, Jallandar, Jodhpur (Surpura), Jodhpur (Kankani), Hanumangarh, having high voltage in off peak scenarios and in winter season due to low demand in NR.

Comprehensive studies for high voltage and requirement of reactive compensation at the various substations in NR was deliberated in 8th CMETS-NR meeting and it was decided and agreed that scheme to control overvoltages may be segregated in two phases. In Phase-I, being an urgent requirement, line reactor proposal was agreed to be taken up for implementation.

In Phase-II, bus reactive compensation will be reviewed based on study file after incorporating POSOCO and STUs observations.

4.6.3 Contingency Analysis

a) Transmission Lines

In the base case file prepared for 2027-28 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 4-8):

Table 4-8: Major transmission lines having critical loading in NR (2027-28)

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-4,7), Contingency (Sc 1,4,5,7)	ISTS	938 (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	8	Contingency	STU	896(under n-1)	857 (Twin Moose)	The line loading is marginally higher as per dispatch of Rajpura TPS.
3	400kV Merta - Jodhpur(Kankani) line	1,4	Contingency	STU	897(under n-1)	857 (Twin Moose)	The line loading is marginally higher in Solar maximized scenario. With new proposed RVPN schemes loading may be relieved.
4	400kV Meja-Allahabad D/c line	2,3,5, 6.7.8	Contingency	ISTS	1120(under n-1)	857 (Twin Moose)	The line loading is higher in evening peak and night off peak scenario. Action may required
5	400kV Agra-Agra(UP) line	1,2,3,5,6	Base	ISTS	1117(under n-1:1398MW)	857 (Twin Moose)	The line loading is higher in evening peak and night off peak scenario. Action may required.
6	400kV Agra-Agra(Fatehbad) line	2,3,5	Contingency	ISTS	991 (under n-1)	857 (Twin Moose)	The line loading is higher in evening peak and night off peak scenario. Action may required.
7	400kV Roorkee-Rishikesh line	1,4	Contingency	ISTS	936 (under n-1)	857 (Twin Moose)	The line loading is marginally higher in noon scenario. Monitoring required
8	400kV Lucknow (PG) -Lucknow (765) D/c line	1,4,7	Contingency	ISTS	2265(under n-1)	1714	The line loading is marginally higher in noon scenario. Monitoring required
9	400kV Bhiwani(PG)-Bhiwani(BBMB) line	1,4	Contingency	ISTS	956(under N-1)	857	The line loading is marginally higher in noon scenario. Monitoring required

Sl. No.	Name of the Line	Scenario No.	Case	Owner	Max Loading	Rating	Remark
10	400kV Bhiwani(PG)-Jind (PG D/c line	1,4	Contingency	ISTS	923(under N-1)	857	The line loading is marginally higher in noon scenario. Monitoring required
11	400 kV Bareilly(765) - Bareilly(PG)	1,4	Contingency	ISTS	1992(undue N-1	1714	The line loading is marginally higher in noon scenario. Monitoring required
12	400 kV Bareilly(PG) - Bareilly(UP)	1	Contingency	ISTS	1080(undue N-1	857	The line loading is marginally higher in noon scenario. Monitoring required

Additional system strengthening may be planned by respective STU's to feed the growing demand and increase in drawal from ISTS.

b) Transformers

In the base case file prepared for 2027-28 timeframe, transformers at 3 nos. of 765/400 kV substations and 12 nos. of 400/220kV substations are having critical loading. Details of transformers is as under (Table 4-9)

Table 4-9: Major transformers having critical loading in NR

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	2,3,7	ISTS	N-1 Contingency	851(1218 in case of N-1)	loading is higher in future due to load growth of UP. Augmentation/Replacement of ICT may be required
3	765/400/kV, 2X1500 MVA Varanasi ICTs	1	ISTS	N-1 Contingency	1617	loading is marginally higher at few instances. Augmentation/Replacement of ICT may be required
4	400/220kV, 3X315 MVA Kishenpur ICTs	1,2,4,5,7	ISTS	Base Case	449(561 in case of N-1)	High Loading observed with upcoming HEPs integrated at Kishtiwar/Kishenpur. Augmentation of ICT shall be required

Sl. No.	Name of the Element	Scenario No.	Owner	Case	Maximum Loading/ICT	Remark
5	400/220kV, 2X315 MVA Hindaun ICTs	1,2,3,4.5,6,7	STU	N-1 Contingency	419(on 315MVA ICT)	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	341	loading is marginally higher at few instances. Augmentation/Replacement of ICT may be required
8	400/220kV, 2X315 MVA Agra ICTs	2,3,5,6	ISTS	N-1 Contingency	377	loading is higher in future due to load growth of UP. Augmentation/Replacement of ICT may be required
9	400/220 kV 2x500 MVA Ropar S/s	5	STU	N-1 Contingency	528	loading is higher in future due to load growth of Rajasthan. Augmentation/ Replacement of ICT may be required
10	400/220 kV 2x315 MVA Merta S/s	6	STU	N-1 Contingency	343	loading is higher in future due to load growth of Rajasthan. Augmentation/ Replacement of ICT may be required
11	400/220 kV 2x315 MVA Ajmer S/s	5,6	STU	N-1 Contingency	387(on 315 MVA ICT)	loading is higher in future due to load growth of Rajasthan. Augmentation/ Replacement of ICT may be required
12	400/220 kV 2x315 MVA Chittorgarh S/s	6	STU	N-1 Contingency	326(on 315 MVA ICT)	loading is higher in future due to load growth of Rajasthan. Augmentation/ Replacement of ICT may be required
13	400/220 kV 2x315 MVA Kota S/s	6,7	ISTS	N-1 Contingency	340(on 315 MVA ICT)	loading is higher in future due to load growth of Rajasthan. Augmentation/ Replacement of ICT may be required
14	400/220kV, 3X315 MVA Kanpur ICTs	1,4	ISTS	N-1 Contingency	364	loading is marginally higher at few instances. Augmentation/Replacement of ICT may be required

Sl. No.	Name of the Element	Scenario No.	Owner	Case	Maximum Loading/ICT	Remark
15	400/220kV, 2X500 MVA Aligarh ICTs	3	ISTS	N-1 Contingency	527	loading is marginally higher at few instances. Augmentation/Replacement of ICT may be required

Respective STUs/Owners are required to take advance action 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.

4.6.4 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 50 nos. of substations (765kV-1 no., 400kV- 49 nos)in NR having fault level more than designed capacity

Out of above,5 nos. of ISTS substations and 11 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 4-10 & Table 4-11:

ISTS Substations

Table 4-10: 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 4-11: 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

Sl. No.	Substation Name	Owner State	Scenario No.	Highest Fault level (kA)	Design Rating(kA)
5	400kV Meja	UP	All	49	40
6	400kV Greater Noida (2 S/s)	UP	All	54	40
7	400kv Agea	UP	All	51	40
8	400kV Dadri	Gen (NTPC)	All	53	40
9	400kV Anpara	Gen (IPP)	All	52	40
10	400kV Anpara C	Gen (IPP)	All	51	40
11	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.

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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 Mar'2022

As on Mar'2022, total Installed Capacity (IC) of Western Region was about 129 GW and the peak demand was about 65 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:Western Region Installed Capacity and Demand met as on Mar'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	16.6	17.4	42.2	19.4
MP	16.4	0.3	3.2	5.5	8.7	25.4	15.9
Maharashtra	28.8	0.7	3.3	10.7	14.0	43.4	28.0
Chhattisgarh	12.2	0.0	0.2	0.9	1.1	13.4	5.0
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	0.7
Central unallocated	3.0	0.2	0.0	0.0	0.0	3.2	
Total	**85.9**	**1.8**	**7.6**	**33.6**	**41.2**	**129**	**65.2**

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 2027-28 timeframe is expected to increase to about 100 GW. The Installed capacity of Western Region is expected to be about 185GW. The state wise bifurcation of the same is given at Table 5-2.

Table 5-2 Western Region Installed Capacity and Peak Demand (2027-28)

(All Fig in GW)

State	Thermal	Hydro	Nuclear	Solar	Wind	Gas	Total	Peak Demand
Gujarat	7.9	0.6	0	7.6	8.3	2.8	27.2	30.1
MP	4.7	3.1	0	1.5	2.4	0.0	11.7	20.8
Maharashtra	20.4	2.9	0	3.8	5.7	1.2	34.1	42.2
Chhattisgarh	1.6	0.1	0	0.2	0	0	1.9	9
DD	0	0	0	0	0	0	0	0.6
DNH	0	0	0	0	0	0	0	1.9
Goa	0	0	0	0	0	0	0	1.2
Central	19	1.5	3.2	31.9	13.4	3.3	72.2	-
IPP	35.6	0	0	0	0	2.8	38.4	-
Rooftop	-	-	-	4.5	-	-	4.5	-
Total	**89.2**	**8.2**	**3.2**	**49.5**	**29.8**	**10.1**	**190**	**100.4**

There is a growth in peak demand of Western Region from present time-frame (2021-22) to 2027-28 with a CAGR of 7.5%.. The state wise growth in demand for 2027-28 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)

State	Peak Demand			
	Present	**19th EPS**	**Increase in demand**	***CAGR***
	2021-22	***2027-28***		
Gujarat	19431	30067	10636	7.5%
MP	15917	20847	4930	4.6%
Maharashtra	28016	42185	14169	7.1%
Chhattisgarh	5014	9022	4008	10.3%
DD	369	586	217	8.0%
DNH	888	1904	1016	13.6%
Goa	701	1161	460	8.8%
Total	**65205**	**100436**	**35231**	**7.5%**

From the above data it is observed that the CAGR growth of peak demand is maximum for DNH (13.6%) and minimum for Madhya Pradesh (4.6%).

5.3 Load Generation Balance for 2027-28 timeframe

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 Western Region Load Generation Balance (LGB) for 2027-28 time-frame. For Western Region also, three points on the daily load curve i.e. Solar max (afternoon), Peak load (evening) and Off-peak load (night) for three seasons viz. Monsoon (August), Summer (June) and Winter (February) have been considered.

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

Table 5-4: Western Region Installed Capacity and Peak Demand (2027-28)

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%	90%
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. Based on the LGB, state wise drawl from ISTS under these scenarios is summarised in Table 5-5. Further, both maximum and minimum import of each state is also 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	1	2	3	4	5	6	7	8	9
State	Solar Max	Peak Load	Off Peak	Solar Max	Peak Load	Off Peak	Solar Max	Peak Load	Off Peak
Gujarat	10673	9221	5211	16452	13247	12073	16957	12253	11919
MP	9313	6161	6536	11445	7882	8148	19074	15142	8972
Maharashtra	23071	17643	18820	27394	19258	19575	28436	20577	16947
Chhattisgarh	5362	5104	4919	4775	4519	4451	4575	3857	2829
DD	526	565	456	534	551	415	518	466	315
DNH	1222	1313	1058	1257	1297	977	1250	1125	761
Goa	843	906	730	949	979	738	929	836	566

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
Central	-41998	-29520	-27087	-43731	-29520	-26923	-41338	-24796	-21609
IPP	-9022	-28969	-30476	-10852	-32623	-31569	-19581	-32623	-30735
Total	-11	-17576	-19834	8222	-14411	-12115	10821	-3163	-10035

Out of these nine scenarios, Scenario-7 and Scenario-3 corresponds to two extreme cases with import / export requirement of Western Region i.e. Maximum import (10.8 GW) and maximum export (19.8GW) scenarios respectively. In all other scenarios, the import / export of Western Region varies between these two extremes.

Considering the above LGB for nine scenarios, load flow cases were prepared for 2027-28 timeframe. Detailed system studies have been carried out on the finalized load flow cases. The study results are discussed in subsequent sections.

5.4 ISTS Network

Various transmission systems have been planned for implementation in the Consultative Meeting for Evolution of Transmission System of WR (CMETS-WR) and joint study meetings from March 2022 to July 2022. These schemes have either been approved or under various stages of approval. The details of the schemes have been summarized below:

5.4.1 Chhattisgarh:

a) Augmentation of Transformation Capacity by 1x500 MVA, 400/220kV ICT (3rd) at Raigarh (PG) S/s

The scheme involves augmentation of transformation capacity at Raigarh(PG) S/s by 1x 500 MVA, 400/220kV ICT to resolve the overloading issues at Raigarh(PG) 400/220kV ICTs in present time frame as well as in future till further network augmentation in form of Pithora 400/220kV S/s is implemented by CSPTCL. Studies were carried out for 2023-24 Time frame without closing JPL – Raigarh & JPL – Gerwani 220kV lines and without considering Pithora 400/220kV S/s and loading on Raigarh 2x315MVA, 400/220kV ICTs was seen to be N-1 non-compliant (~400MW on one ICT after considering Raigarh – Malda 220kV D/c line in Mar'24).

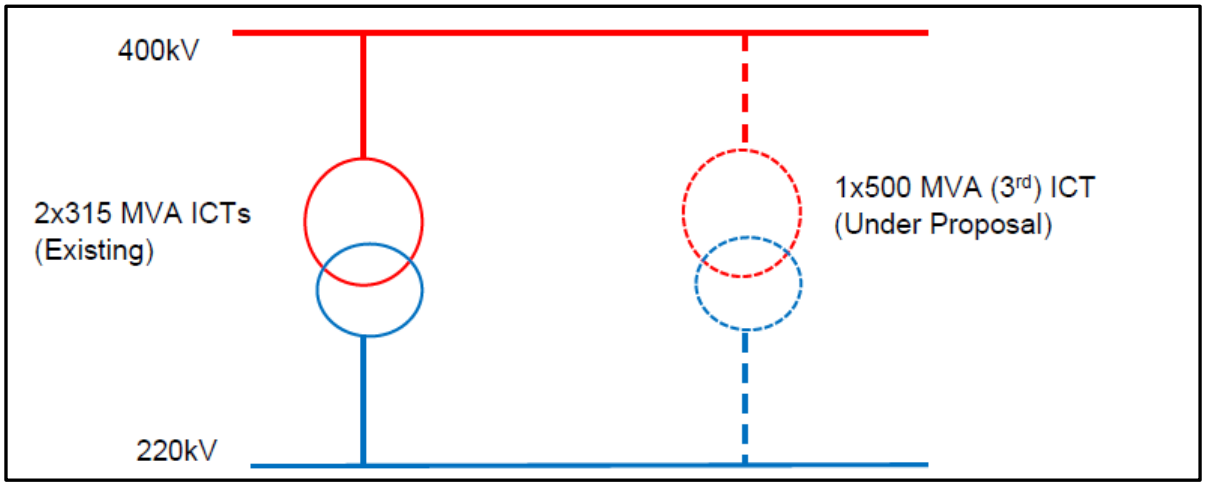
The proposal was discussed in 8th CMETS-WR meeting held on 30.06.2022 wherein it was acknowledged that in the absence of Pithora 400/220kV S/s (planned after Mar'26), the overloading issues at Raigarh 400/220kV ICTs shall persist as can be seen from study results and the 3rd ICT was agreed accordingly.

Detailed scope of the scheme is as mentioned below:

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

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Implementation timeframe
1.	Augmentation of 1x500 MVA, 400/220 kV ICT (3rd) at Raigarh(PG) S/s along with associated ICT bays	500MVA, 400/220kV ICT: 1 no. 400kV ICT bays: 1 no. 220kV ICT bays: 1 no.	15 months from the issue of OM by CTUIL
	Total Estimated Cost (Rs. Cr)	**45.52 Cr. (approx.)**	

Figure 5-1:Aug. of Trans. Capacity by 1x500 MVA, 400/220kV ICT (3rd) at Raigarh (PG) S/s



The scheme was allotted to POWERGRID vide CTU OM dated 25.08.2022 with implementation timeframe as given above.

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

The scheme involves Conversion of 2x240MVAr Non-switchable line reactors at Raipur PS (associated with Raipur PS – Champa PS 765kV circuits 1 & 2) into Switchable line reactors along with NGR bypass arrangement. The scheme shall facilitate flexibility in system operation so that the 2x240MVAr line reactors at Raipur PS (associated with Raipur PS – Champa PS 765kV circuits 1 & 2) may be utilized as bus reactors for voltage control at Raipur PS after line opening.

The scheme was discussed and agreed in 3rd Consultation Meeting for Evolving Transmission Schemes in Western Region (CMETS-WR) held on 31.01.2022. The utilization of each 240MVAr line reactor as a bus reactor at Raipur Pool (after line opening) leads to a drop in voltage to the tune of 2.2kV at Raipur PS (Durg). Detailed scope of the scheme is as mentioned below:

Sl. No.	Scope of the Transmission Scheme	Capacity/km	Implementation timeframe
1.	Conversion of 2x240MVAr non-switchable line reactors at Raipur PS (associated with Raipur PS – Champa PS 765kV circuits 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:			**INR 10.2 Crore**

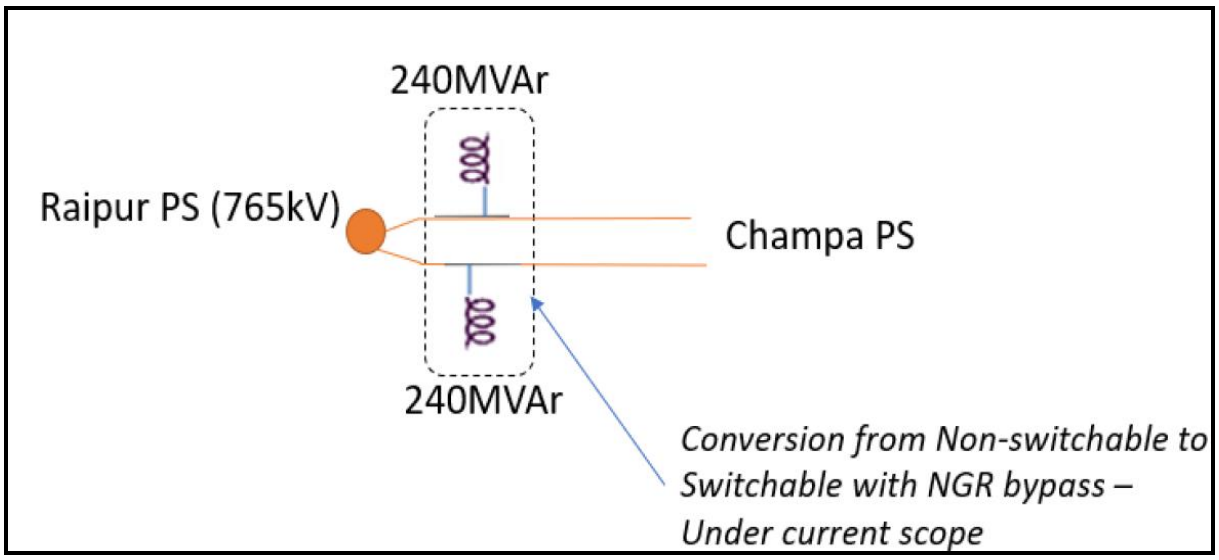


Figure 5-2:Western Region Expansion Scheme-XXIV (WRES-XXIV)

The scheme was allotted to POWERGRID vide CTU OM dated 24.06.2022 with implementation timeframe of Jun'23.

5.4.2 Maharashtra

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

The scheme involves Bypassing of Parli(PG) – Parli(M) 400kV D/c line (~5km.) and Parli(PG) – Parli(New) 400kV D/c (quad) line (~18km.) at Parli(PG) S/s at outskirts of the Parli(PG) S/s so as to form Parli(M) – Parli(New) 400kV D/c direct line. The scheme has been evolved to resolve the issue of overloading of Parli (M) - Parli (PG) 400 kV D/c line & control high fault level at Parli(PG) / Parli(M) 400kV buses. Studies were carried out in Scenario-7 (Feb Solar Max) & Scenario-8 (Feb Peak Load) 2026-27 time-frame and overloading was observed on Parli(PG) – Parli(M) 400kV D/c line (N-1 non compliant) and the fault levels at Parli(PG) and Parli(M) S/s were observed to be beyond design limit of 40kA.

The Short circuit levels observed before and after proposed scheme are tabulated below:

	3 phase fault level before bypassing	**3 phase fault level after bypassing**
Scenario-8		
Parli(M)	43	31
Parli(PG)	45	25
Scenario-7		
Parli(M)	35	30
Parli(PG)	36	24

Further, the loading on Parli (M) - Parli (PG) 400 kV D/c remains about 2x743MW in Scenario 7 case and the line remains N-1 non compliant. Hence, reconductoring of the line twin HTLS conductor has also been proposed as part of the scheme.

The scheme was deliberated in the 8th CMETS meeting of WR held on 30.06.2022. Detailed scope of the scheme is as mentioned below:

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

Sl. No.	**Scope of the Transmission Scheme**	**Capacity /km**	**Implementation timeframe**
1.	Bypassing of Parli(PG) – Parli(M) 400kV D/c line (~5km.) and Parli(PG) – Parli(New) 400kV D/c (quad) line (~18km.) at Parli(PG) S/s at outskirts of the Parli(PG) S/s so as to form Parli(M) – Parli(New) 400kV D/c direct line *(refer to note a)*	Line Bypassing work	12 months from the issue of OM by CTUIL.
2.	Reconductoring of Parli(PG) – Parli(M) 400kV D/c line section of above line (at Sl. 1) with twin HTLS conductor with a minimum capacity of 1940MVA per circuit at a nominal voltage *(refer to note b)*	Reconductoring length: About 5 km.	
3.	400kV Bay Upgradation work at Parli(M) S/s (Parli(M) S/s has a DMT scheme. The current rating of existing bays is 2000A which would be upgraded to 3150A to suit the reconductoring with Twin HTLS conductor)	400 kV line bays (Bay Upgradation) – 2 nos.	
Total Estimated Cost:			**INR 26.64 Crore**

Note:

a. As per GA of Parli(PG) S/s, Parli(M) & Parli(New) 400kV D/c lines are getting terminated in adjacent bays on the same side of Parli(PG) S/s. Hence, the above would facilitate their interconnection and bypassing at Parli(PG) S/s.

b. As informed by POWERGRID in the 8th CMETS-WR meeting, existing towers have been designed for sag corresponding to twin moose conductor at 85C design temperature. Hence, Reconductoring shall be possible on existing towers with GAP conductor to achieve 1400A per sub conductor or 1940MVA per ckt.

c. Balance works at Parli(M) S/s end such as Bus coupler/Transfer Bus Coupler/Bus Upgradation to 3150A, as required, shall be taken up by MSETCL in matching time-frame of the reconductoring scheme (WRES-XXX).

d. Due to the volatility in the metal market scrap value of aluminum conductors may be highly variable at this time. Considering this, the scrap value of the existing ACSR Moose conductor shall be deducted as per the prevailing scrap value to arrive at the final cost of the project.

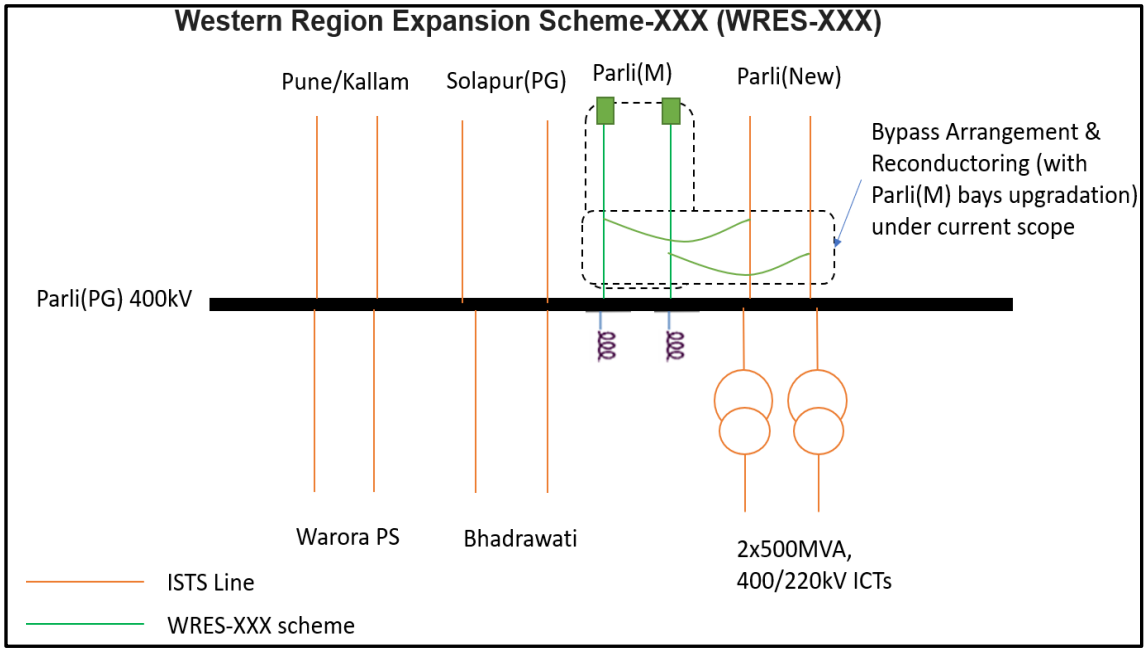


Figure 5-3:Western Region Expansion Scheme-XXX (WRES-XXX)

The scheme was allotted to POWERGRID vide CTU OM dated 25.08.2022 with implementation timeframe as given above.

b) Western Region Expansion Scheme XXXI (WRES-XXXI): Part A to C

The need for holistic ISTS & Intra-state transmission system planning for Maharashtra was deliberated in various CMETS-WR meetings (4th & 6th Meetings) and well as in meeting with MSETCL (for Wardha fault level control scheme) on 23.06.2022 from load flow as well as short circuit point of view. In this respect, the proposals of MSETCL received regarding 400kV D/c Interconnection between Padghe (PG)(GIS) and Padghe(M), splitting of Padghe(M) S/s for fault level control and Boisar – Manor 220kV D/c line were decided to be finalized in the course of joint study meeting with MSETCL.

In this regard, 3rd Joint Study Meeting on Transmission Planning for Western Region was held on 27.07.2022 amongst CTU, POSOCO and MSETCL to discuss transmission network augmentation w.r.t. Maharashtra. The following Network expansion schemes in Maharashtra under ISTS (with their tentative time-frame) were agreed:

- To meet the ATC requirement of ~24600MW of Maharashtra in 2026-27 time-frame

- To cater to fault level control at various substations (both ISTS & Intra-state) in Maharashtra

➢ **Western Region Expansion Scheme XXXI (WRES-XXXI): Part A**

(i) LILO of Tarapur/Velgaon – Padghe (M) 400kV D/c line at Kudus(M) S/s in following manner so as to form Padghe(PG)(GIS) – Padghe(M) 400kV D/c line and Tarapur/Velgaon - Kudus(M) 400kV D/c line:

1. Line-out portion for interconnection of Padghe(M) with Kudus(M) S/s to be constructed with HTLS conductor with minimum capacity of 2100MVA per ckt at nominal voltage and terminated directly into Padghe(PG)(GIS) – Kudus(M) 400kV D/c (quad) line at outskirts of Kudus(M) S/s so as to form Padghe(PG)(GIS) – Padghe(M) 400kV D/c line. 2 nos. 400kV bays shall get vacated with above arrangement.
2. Reconductoring of Padghe(M) - Kudus D/c balance line section (i.e. of existing line portion upto the proposed LILO point) with HTLS conductor with minimum capacity of 2100MVA per ckt at nominal voltage
3. Line-in portion for interconnection of Tarapur/Velgaon with Kudus(M) S/s to be terminated into 2 nos. bays vacated at Kudus (M) S/s (at Sl. 1 above)

(ii) Shifting of Padghe(PG)(GIS) – Padghe(M) 400kV D/c line from 400kV Section A to Section B

Note:

- *MSETCL shall implement splitting arrangement at 400/220kV Padghe(M) as per arrangement given below.*
- *Implementation Time-frame shall be 18 months from allocation to implementing agency or matching with Bableswar – Kudus 400kV D/c line of MSETCL (presently expected by Dec'23), whichever is later*

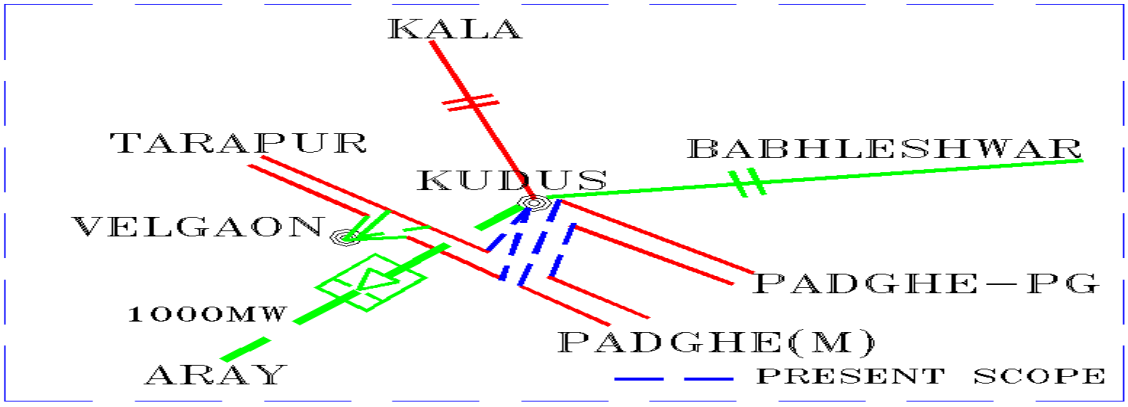


Figure 5-4:Western Region Expansion Scheme XXXI (WRES-XXXI): Part A

➢ **Western Region Expansion Scheme XXXI (WRES-XXXI): Part B**

(i) Augmentation of transformation capacity at Padghe (GIS) 765/400 kV substation by 1x1500 MVA ICT (4^{th})

Note:

- Space availability at Padghe(PG)(GIS) S/s has been confirmed by POWERGRID.
- Implementation Time-frame shall be 18 months from allocation to implementing agency

➢ **Western Region Expansion Scheme XXXI (WRES-XXXI): Part C**

(i) Augmentation of transformation capacity at Pune (GIS) 765/400 kV substation by 1x1500 MVA ICT (3rd)

Note:

- Space availability at Padghe(PG)(GIS) S/s has been confirmed by POWERGRID.
- Implementation Time-frame shall be 18 months from allocation to implementing agency

To supplement above schemes, Intra-state schemes including Splitting of 400/220kV Kalwa S/s was also agreed to be implemented by MSETCL.

The "Western Region Expansion Scheme XXXI (WRES-XXXI): Part C" scheme has been agreed in the 10th CMETS-WR meeting held on 30.08.2022. The rest of the schemes would be deliberated in the forthcoming CMETS-WR / NCT meetings based on feedback from MSTECL w.r.t. WRES-XXXI Part A scheme and based on loading on Padghe (GIS) 765/400 kV ICTs w.r.t. WRES-XXXI Part B scheme.

5.4.3 Transmission System in WR for Prioritized RE Potential under 181.5GW REZ plan:

In order to achieve the commitment made in terms of Nationally Determined Contributions (NDCs), as one of the significant steps, India has pledged to increase the non-fossil fuel energy capacity to 500 GW by 2030. This is a national mission as a part of the country's energy transition goal.

MNRE vide letter No. 367-13/1/2021-GEC dated 15.02.2022 addressed to Joint Secretary (Trans), MoP, had forwarded the Renewable Energy Zones (REZs) identified by MNRE/SECI with a total capacity of 181.5 GW for likely benefits by the year 2030. These REZ's are located in eight states as detailed below:

Sl. No.	State	Wind (GW)	Solar (GW)	Total (GW)	Remarks
1	Rajasthan	15	60	75	45 GW in GIB Zone
2	Andhra Pradesh	18	33	51	
3	Karnataka	8	9	17	
4	Tamil Nadu	5		5	Offshore wind
5	Telangana	3	10	13	
6	Madhya Pradesh	2	6	8	
7	Gujarat	5		5	Offshore wind
8	Maharashtra	2	5.5	7.5	
	Total	**58**	**124**	**181.5**	

In this regard, Ministry of Power vide letter No. 15-3/2017-Trans (part 1) dated 7th December, 2021, had constituted a Committee on Transmission Planning for RE under the Chairmanship of Chairperson, CEA, for planning of the requisite Inter- State Transmission System required for the targeted RE capacity by 2030. The committee had submitted its report in this regard to MoP.

Further, out of 181.5GW REZ, SECI vide letter dated 23.06.2022 has informed that as a first step to provide RTC Power (with wind, solar & storage components), they have identified certain locations with high solar & wind potential where work on RE evacuation system may be taken up immediately. The details of envisaged transmission system for integration and evacuation of RE potential from Neemuch, Solapur, Dhule and Kallam/Parli as deliberated in 9th CMETS in Western Region held on 28.07.2022 are given below:

Proposed location of ISTS Pooling Station	**RE development proposed under 181.5 GW plan & to be taken up on priority**	**Transmission System & deliberations in 9th CMETS-WR meeting**
Neemuch, MP	**2GW (Wind)**	• Broad scheme was identified as part of 181.5GW committee report. However, the scheme was evolved to cater to several RE pockets in NR which are yet to be prioritised. Hence, the scheme for evacuation of power from Neemuch WEZ (2GW) needs to be reviewed on a stand-alone basis. • It was informed that the existing Neemuch PS may be upgraded to 765kV level and the same may further be connected to Indore S/s through 765kV D/c line. Further, Neemuch PS may be interconnected to Chittorgarh S/s in future so as to establish Indore – Neemuch – Chittorgarh 765kV D/c corridor. Same is proposed to replace the planned Indore – Chittorgarh 765kV D/c line. • In this respect, M/s RUMSL stated that space may not be available adjacent to Neemuch PS plot (allotted by RUMSL) for the proposed upgradation. Hence, a new 765/400kV Neemuch-II PS may be required to be setup. • After deliberations, it was decided that the scheme shall be finalized in consultation with CEA, POSOCO, GETCO & MPPTCL.
Solapur, MH	**1 GW (Solar)**	• MSETCL stated that STU has already approved/received grid connectivity applications for Solar, Wind & Hybrid projects in Solapur region to the tune of 1553MW. Hence, implementation of any new scheme under ISTS may not be taken up without concurrence of STU as it may lead to sub-optimal utilization of transmission system if both STU & CTU implement RE linked schemes in the area. • It was informed that no additional scheme is envisaged for evacuation of power of power from 1GW addl. SEZ in Solapur as the same may be accommodated at Solapur(PG) S/s at 400kV level (at 1 no. 400kV bay already earmarked at the S/s for evacuation of 1GW capacity under 66.5GW REZ scheme, which is currently on hold due to non-identification of any RE project). With this 1GW addl. Potential, the 400kV bay shall now cater to 2GW injection directly at Solapur (PG) S/s. After deliberations, the above proposal was agreed.
Dhule, MH	**2 GW (Wind+Solar)**	Following scheme was proposed for Dhule 2GW REZ:

<table>
<tr><th>Proposed location of ISTS Pooling Station</th><th>RE development proposed under 181.5 GW plan & to be taken up on priority</th><th>Transmission System & deliberations in 9th CMETS-WR meeting</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><th>Sl.</th><th>Scope of the Transmission Scheme</th><th>Capacity /km</th></tr>
<tr><td>1.</td><td>Establishment of 4x500 MVA, 400/220 kV Pooling Station near Dhule along with 2x125 MVAr (420kV) Bus Reactor</td><td>400/220 kV, 500 MVA ICT – 4 nos.
400 kV ICT bays – 4 nos.
220 kV ICT bays – 4 nos.
400 kV Line bays – 2 nos.
125 MVAr, 420 kV Bus reactor – 2 no.
Bus reactor bay: 2 no.
220kV Bus coupler bay- 1 no.
220kV Transfer Bus Coupler (TBC) bay - 1 no.
220 kV line bays – 7nos.
(for RE interconnection)</td></tr>
<tr><td>2.</td><td>Dhule PS – Dhule (BDTCL) 400 kV D/c Line (Quad Moose) (60 km)</td><td>60km.</td></tr>
<tr><td>3.</td><td>2 nos. 400kV line bays at Dhule(BDTCL) for Dhule PS – Dhule (BDTCL) 400 kV D/c Line (Quad Moose)</td><td>400 kV Line bays – 2 nos.</td></tr>
</table>
MSETCL stated that STU has already approved/received grid connectivity applications for Solar, Wind & Hybrid projects in Dhule region to the tune of 3308MW and is also implementing 400kV Balsane S/s for the same. Hence, implementation of above scheme may not be taken up without concurrence of STU as it may lead to sub-optimal utilization of transmission system if both STU & CTU implement RE linked schemes in the area.
</td></tr>
</table>

Proposed location of ISTS Pooling Station	RE development proposed under 181.5 GW plan & to be taken up on priority	Transmission System & deliberations in 9th CMETS-WR meeting
		It was decided that the above scheme shall be taken up again after further discussions amongst CEA, CTU, SECI & MSETCL on the matter.
Kallam / Parli, MH	**2 GW** **(Wind+Solar)**	Following scheme was proposed for Parli/Kallam 2GW REZ: **<u>1 GW at Parli*:</u>** **a) <u>300MW at Parli(PG) 400/220kV S/s:</u>** • Direct interconnection at 220kV level of 400/220 kV Parli (PG) S/s [through 1 no. 220kV line bay] **b) <u>700MW at Parli(New) 765/400kV S/s:</u>** • Direct interconnection at 400kV level of 765/400 kV Parli (New) S/s [through 1 no. 400kV line bay] **<u>1 GW at Kallam*:</u>** • Augmentation of Kallam Pooling Station by 2x500 MVA, 400/220kV ICTs • 2 nos. 220kV line bays at Kallam PS for RE interconnection • 1x125 MVAr bus reactor (2nd) at Kallam PS **WRES XXX scheme evolved in the last CMETS-WR meeting shall be required to facilitate above evacuation of power.* MSETCL stated that STU has already approved/received grid connectivity applications for Solar, Wind & Hybrid projects in Beed/Latur/Osmanabad region to the tune of 7455MW. Hence, implementation of above scheme may not be taken up without concurrence of STU as it may lead to sub-optimal utilization of transmission system if both STU & CTU implement RE linked schemes in the area. CTU stated that the Stage-II connectivity at Kallam PS has already crossed 1GW. Hence, scheme for Kallam PS (1GW) may be taken up considering the 1GW addl. potential under 181.5GW as well as rapid pace of Stage-II connectivity applications being received by CTU. It was decided that the scheme for evacuation of power from Kallam PS shall be taken up in the ensuing NCT meeting for deliberations. Regarding scheme for evacuation of power from Parli (1GW), it was deliberated that same only involved implementation of bays at Parli(PG) / Parli(new) S/s and shall be taken up for further approval by CTU based on visibility of RE in the area.

5.5 Measures taken for mitigation of the issues of 2026-27 Rolling plan

Various augmentation works have been discussed with the STUs in the Joint Study /CMETS-WR meetings and the steps taken to mitigate the constraints in WR for 2026-27 timeframe has been described below:

5.5.1 Maharashtra

3rd Joint Study Meeting on Transmission Planning for Western Region was held on 27.07.2022 amongst CTU, POSOCO and MSETCL to discuss transmission network augmentation w.r.t. Maharashtra. The details of deliberations in the meeting are given below.

Sl.	Constraints	Deliberations / Outcomes based on studies
Short Circuit Violations (Primarily in Scenario-8)		
1	After considering proposed LILO of both ckts of Tarapur – Padghe 400kV D/c line first at Velgaon & then at Kudus by MSETCL, the 3phase fault levels are observed as follows: • Padghe(M): 52kA (Design limit: 40kA) • Padghe(PG)(GIS): 61kA (Design limit: 50kA) • Kudus(M): 62kA (Design limit: 40kA) The above fault levels are without considering split bus arrangement at Padghe(M) and without Padghe(PG)(GIS) – Padghe(M) 400kV D/c (New) line. It was deliberated that even after considering the above elements, fault levels at 400kV level of Kudus(M) as well as Padghe(M) will remain above design rating of 40kA & at Padghe(PG) above design rating of 50kA as discussed in 6th CMETS-WR meeting. Hence, a solution for the fault level control at above substations needs to be identified.	Various alternatives were discussed & Padghe(M) was considered split into 2 sections as proposed by MSETCL in 6th CMETS-WR meeting. Only the Padghe (PG)-Padghe (Sec-B) 400 kV D/c Line was modified in various alternatives as per requirement. The details of alternatives are given below: **Alt-1:** Dropping the proposal of LILO of both circuits of Tarapur/Velgaon – Padghe 400kV D/c line at Kudus and establishing Padghe(PG)(GIS) – Padghe(M) 400kV D/c (New) line In Alt-1, the fault levels at 400kV level of Kudus(M) as well as Padghe(M) remained above design rating of 40kA & at Padghe(PG) above design rating of 50kA. Hence, **this was not found to be suitable.** **Alt-2:** • Using the Velgaon - Kudus D/c line section (formed after LILO of both circuits of Tarapur/Velgaon – Padghe 400kV D/c line at Kudus) and interconnecting it with Padghe(PG)(GIS) – Kudus 400kV D/c line at outskirts of the substation so as to form Padghe(PG)(GIS) – Velgaon(M) 400kV D/c direct line. • Shifting of Padghe(M) – Kudus(M) 400kV D/c line section to Padghe(M) split bus (which is connected further to Kalwa through 2nd 400kV D/c line). In this alternative, Padghe(PG)(GIS) & Kudus S/s, which contribute heavily to each other, shall get disconnected and fault levels at 400kV Padghe(PG)(GIS), Kudus(M) & Padghe(M) (split buses A & B) remain within design limits. However, a very low power flow was observed on Padghe(PG)(GIS) – Velgaon(M) 400kV D/c direct line as majority of feed to

Sl.	Constraints	Deliberations / Outcomes based on studies
		Velgaon S/s was from Tarapur side. Hence, **the alternative was not found suitable from load flow point of view**. **<u>Alt-3:</u>** **(i) LILO of Tarapur/Velgaon – Padghe (M) 400kV D/c line at Kudus(M) S/s in following manner so as to form Padghe(PG)(GIS) – Padghe(M) 400kV D/c line and Tarapur/Velgaon - Kudus(M) 400kV D/c line:** 1. Line-out portion for interconnection of Padghe(M) with Kudus(M) S/s to be constructed with HTLS conductor with minimum capacity of 2100MVA per ckt at nominal voltage and terminated directly into Padghe(PG)(GIS) – Kudus(M) 400kV D/c (quad) line at outskirts of Kudus(M) S/s so as to form Padghe(PG)(GIS) – Padghe(M) 400kV D/c line. 2 nos. 400kV bays shall get vacated with above arrangement. 2. Reconductoring of Padghe(M) - Kudus D/c balance line section (i.e. of existing line portion upto the proposed LILO point) with HTLS conductor with minimum capacity of 2100MVA per ckt at nominal voltage 3. Line-in portion for interconnection of Tarapur/Velgaon with Kudus(M) S/s to be terminated into 2 nos. bays vacated at Kudus (M) S/s (at Sl. 1 above) **(ii) Shifting of Padghe(PG)(GIS) – Padghe(M) 400kV D/c line from 400kV Section A to Section B** In this alternative, Padghe(PG)(GIS) & Kudus S/s, which contribute heavily to each other, shall get disconnected and fault levels at 400kV Padghe(PG)(GIS), Kudus(M) & Padghe(M) (split buses A & B) remain within design limits. Fault level at Padghe(PG)(GIS) is observed as ~49kA (after considering 4x1500MVA, 765/400kV ICTs). The Padghe(PG)(GIS) – Padghe(M) 400kV D/c line is seen to be fairly loaded (~2x700MW, N-1: 1150MW) in Scenario-7. The above alternative was agreed from load flow as well as short circuit point of view. It was noted that with above bypassing at Kudus S/s, the in-feeds at Kudus S/s will reduce. Hence, above arrangement may only be operationalized after commissioning of Bableswar – Kudus 400kV D/c line which is currently under implementation by MSETCL and expected by Dec'23. Also, since the above requires re-arrangement of ISTS lines only, the same may be taken up under ISTS.
2	3 phase Fault level at Kalwa 400/220kV S/s was observed to cross 40kA after considering addl. 400kV D/c line from Padghe(M) split bus.	MSETCL informed that they have proposed to split the Kalwa 400kV & 220kV buses: Kalwa (400kV Sec-A): • Khargar 400kV line • Padghe (A) 400kV D/c line

Sl.	Constraints	Deliberations / Outcomes based on studies
		• 3x500MVA+1x600MVA, 400/220kV ICTs Kalwa (400kV Sec-B): • Vikroli/Pune 400kV line • Padghe (B) 400kV D/c line (New) • 2x500MVA, 400/220kV ICTs (New) TFIPL, Salset & Siemens 220kV lines are proposed to be shifted from Kalwa 220kV Sec A to Sec B. With above arrangement, fault level at Kalwa S/s (split sections A & B) are seen to be about 30kA on each bus.
3	3 phase Fault level at Lonikand-I / Lonikand-II (44kA) was observed to cross 40kA after considering planned Pune(PG)(GIS) – Lonikand-II 400kV D/c line of MSETCL	The fault level was brought to about 35kA (within limits) after dropping the Pune(PG)(GIS) – Lonikand-II 400kV D/c line and instead constructing Pune(PG)(GIS) – Jejuri 400kV D/c (quad) line as proposed under Sl. 7.
4	Other fault level violations were observed at below substations of MSETCL: • C'pur-I / C'pur-II (46kA) • A'bad-I / A'bad-II / Aibad-III (43-45kA)	It was deliberated that high fault levels are seen at the given substations primarily because of very short lines between C'pur-I & C'pur-II and between A'bad-I, A'bad-II & A'bad-III. It was deliberated that MSETCL shall check ratings of breakers at above substations and possibility of upgradation of equipments from 40kA to 50kA (in case several old equipments are already found to be rated to 50kA). Otherwise, MSETCL may explore possibility of reducing fault levels at above substations through suitable splitting / bypassing arrangement with or without series bus / line reactors.
Power Flow Violations (Primarily in Scenario-7)		
4	Overloading on 2x500MVA, 400/220kV Koradi-II ICTs (~2x414MW)	MSETCL stated that 3rd 1x500MVA, 400/220kV ICT is already planned at Koradi-II and the same shall take care of above overloadings.
5	Overloading on 3x1500MVA, 765/400kV Padghe(PG)(GIS) ICTs (~3x1277MW)	It was deliberated that 4th 1x1500MVA, 765/400kV ICT shall be required at Padghe(PG)(GIS) & POWERGRID shall be requested for space availability of the same.
6	Overloading on 2x1500MVA, 765/400kV Pune(PG)(GIS) ICTs (~2x1306MW)	It was deliberated that 3rd 1x1500MVA, 765/400kV ICT shall be required at Pune(PG)(GIS) & POWERGRID shall be requested for space availability of the same.
7	High loadings observed on Pune(PG)(GIS) – Lonikand-II 400kV D/c line (2x986MW & 1436MW under N-1) and	It was deliberated that the Pune(PG)(GIS) – Lonikand-II 400kV D/c line planned by MSETCL leads to heavy power flow on Pune(PG)(GIS) - Lonikand-II – Lonikand-I 400kV D/c corridor as well as high fault levels at Lonikand-I & Lonikand-II (44kA).

Sl.	Constraints	Deliberations / Outcomes based on studies
	Lonikand-II – Lonikand-I 400kV D/c line (2x798 & 1580MW under N-1)	Also, the issue of low voltages observed at Jejuri as well as provision of additional ISTS feed to Jejuri S/s was also required to be addressed. Hence, it was deliberated that the Pune(PG)(GIS) – Lonikand-II 400kV D/c line needs to be reviewed. MSETCL stated that they are yet to take up implementation of Pune(PG)(GIS) – Lonikand-II 400kV D/c line and hence, if required, the same may still be reviewed. In view of the above, it was decided that the instead of Pune(PG)(GIS) – Lonikand-II 400kV D/c line, Pune(PG)(GIS) – Jejuri 400kV D/c (quad) line may be constructed by MSETCL which leads to normalization of loadings on Lonikand-II – Lonikand-I 400kV D/c line and also helps reduce high fault levels at Lonikand-I & Lonikand-II from 44kA to 35kA. Fault level at Pune(PG)(GIS) also reduces marginally from 51kA to 50kA.
8	High loadings on Malegaon 400/220kV ICTs (2x393MW)	MSETCL stated that the Malegaon S/s and its interconnection with Dhule(BDTCL) S/s is still in nascent stage and hence the issue may be ignored for the time-being. Another issue which was observed was high loading on Dhule – Babhleswar 400kV D/c line (N-1 of more than 900MW) in case Malegaon S/s was not considered. The same needs to be looked into by MSETCL.

Splitting arrangement at 400/220kV Padghe(M) S/s

Split-A	Split-B
i. 400 kV Padghe-Nagothane D/c Line. ii. 400 kV Padghe-Babhleshwar D/c Line. iii. 400 kV Padghe-Kala D/c Line. iv. C'pur-Padghe HVDC Link v. 400/220 kV, 3x315+1x500+1x600 MVA ICTs vi. 220kV Padghe-Kamba D/c Line. vii. 220kV Padghe-Pal S/c Line viii. 220kV Padghe-Jambhul S/c Line ix. 220kV Padghe-Wada S/c Line x. 220kV Padghe-Nalasopara S/c Line	*i.* 400/220 kV, 2x500 MVA ICTs *(New 400/220kV ICTs Proposed)* ii. 400 kV Padghe (PG)-Padghe D/c Line. iii. 400 kV Boisar (PG)-Padghe S/c Line. *iv.* 400 kV Padghe -Kalwa D/c Line *(New 400kV D/c line Proposed).* v. 220kV Padghe-Temghar D/c Line. vi. 220kV Nashik-Padghe Line. vii. 220kV Jindal-Padghe Line.

5.5.2 Madhya Pradesh

A joint study meeting was held on 02.06.2022 & 12.09.2022 amongst CEA, CTUIL, MPPTCL and WRLDC to deliberate on ISTS / Intra-state transmission system augmentation in the state of MP to identify constraint points in the state of MP (from load flow as well as short circuit point of view). The details of deliberations in the meeting are given below:

Sl.	Constraints	Deliberations / Outcomes based on studies
1	Mandsaur - Nagda 400kV D/c line (N-1) 400/220kV 2X315 MVA Mandsaur ICTs (N-1)	Overloading of Mandsaur ICTs under N-1 was observed even when 500MW RE Generation at Neemuch was considered. Following alternatives were studied to resolve the overloading issues: **Alt-1:** • Installation of 2X500MVA, 400/220kV ICTs at Neemuch PS which is under implementation • Neemuch - Ratangarh 220kV D/c line with minimum capacity of 500MVA per ckt at nominal voltage • 1X500MVA,400/2202kV ICT at Mandsaur S/s In this alternative, it was deliberated that sectionalization of the 2X500MVA, 400/220kV ICTs at 220kV is required so that injection from 1000MW Neemuch Solar Park is at 400kV to ensure balanced power flows on Neemuch - Ratangarh 220kV D/c line. Hence, **this was not found to be suitable.** **Alt-2:** • Upgradation of existing 220kV Ratangarh S/s by installation of 2X500MVA, 400/220kV ICTs at Ratangarh • Neemuch - Ratangarh 400kV D/c (Twin AL59) line • 1X500MVA,400/2202kV ICT at Mandsaur S/s With this alternative, loading on Neemuch-Mandsaur 400kV D/c line and Mandsaur-Nagda 400kV D/c line reduces and Mandsaur 400/220kV ICTs are N-1 compliant with additional 1X500 MVA, 400/220kV ICT. It was also informed that M/s Greenko Energies Private Limited has been granted Connectivity at Neemuch PS for their 1200 MW Hydro Power Project and the above scheme would also cater to the injection from above PSP. With injection from the PSP, overloadings were observed on 220kV Ratangarh downstream network of MPPTCL. After deliberations, it was decided that the system augmentation ISTS/Intra-State (if any) would be finalized after receipt of LTA application from the PSP. Also, since the above arrangement is directly providing feed to Ratangarh i.e. MPPTCL S/s, the scheme may be taken up under Intra-State and shall be implemented by 2026-27 timeframe.
2	Malwa-Chegaon 400kV D/c line (N-1)	CTU stated that Malwa-I & Malwa-II can be opened in case of high loading at Malwa-Chegaon 400kV D/c line. MPPTCL informed that from reliability point of view it is preferable that Malwa-I & Malwa-II remains interconnected. WRLDC also informed that Julwania 400/220kV ICTs are currently overloaded. It was deliberated that Chegaon is connected to Julwania through 400kV D/c line and feed from ISTS can be provided to

Sl.	Constraints	Deliberations / Outcomes based on studies
		Julwania which would resolve the above issues. Keeping above in view, following alternative was agreed: • Julwania 400kV - Khandwa PS New 400kV D/C line (triple Snowbird equivalent) alongwith suitable downstream augmentation by 2026-27 timeframe (Intra-State) MPPTCL was requested to identify suitable downstream network augmentation on Julwania ICTs.
3	400/220kV, (2X315)+ (1X500) MVA Shujalpur ICTs (N-1)	It was informed that due to high RE injection in Rajasthan and proposed interconnection of Pachora -Shujalpur 400kV D/c line for evacuation of power from RE Projects in Rajgarh (2500 MW) SEZ in Madhya Pradesh, RAPP-Shujalpur 400kV D/c line alongwith Shulapur ICTs & downstream network were found to be overloaded. To resolve the overloadings, following alternatives were studied: **Alt-1:** • Establishment of 400/220kV, 3X500MVA ICTS at Pachora PS alongwith Pachora - Shujalpur 220kV D/c line & Pachora - Rajgarh 220kV D/c line • Bypassing of Shujalpur(PG)-Shujalpur (MP) 220kV D/c line & Shujalpur (MP)- Bhopal 220kV D/c line at Shujalpur(MP) to form Shujalpur (PG)- Bhopal 220kV D/c line **Alt-2:** • 400kV Pachora SP - Ujjain 400kV D/C line • Establishment of 400/220kV, 2X500MVA ICTs at Kurawar (New) alongwith 3x200MVA, 220/132kV, 2x50MVA, 132/33kV • LILO of both circuit of Bina - Shujalpur 400kV D/c line at Kurawar (New) • LILO of both circuit of Bhopal - Shujalpur 220kV D/c line at Kurawar 400kV S/s • LILO of Kurawar - Shujalpur 132kV line at Kurawar 400kV and LILO of Kurawar - Bairagarh 132kV line at Kurawar 400kV S/s • 132kV Kurawar 400kV - Peelukhedi D/C line • 132kV Kurawar 400kV - Runaha D/C line • 132kV Runaha - Berasiya D/C line • Upgradation of Narsinghgarh 132kV on 220kV • Charging of existing Shujalpur 220kV - Narsinghgarh 220kV line on 220kV level and LILO at Shujalpur 400kV S/s • 2nd Circuiting of Shujalpur 220kV - Narsinghgarh 220kV(U/G) D/C line • 132kV Narsinghgarh 220kV - Biora D/C line(High Capacity Conductor) • LILO of Biora - Maqsudangarh line at Suthaliya 132kV S/s **Alt-3:** • 400kV Pachora SP - Ujjain 400kV D/C line

Sl.	Constraints	Deliberations / Outcomes based on studies
		• 400kV Shujalpur 400kV - Astha 400kV D/C line • Upgradation of Narsinghgarh 132kV on 220kV • Charging of existing Shujalpur 220kV - Narsinghgarh 220kV line • 2nd Circuiting of existing Shujalpur 220kV - Narsinghgarh 220kV line and LILO of same at Shujalpur 400kV S/s • 132kV Narsinghgarh 220kV - Biora D/C line • LILO of Biora - Maqsudangarh line at Suthaliya 132kV S/s With respect to alternative-1, MPPTCL stated that Shujalpur MP will get disconnected from Shujalpur (PG) at 220kV level and thus would reduce the reliability of Shujalpur(MP) S/s. With respect to alternative-2 & 3, it was informed that RAPP-Shujalpur overloading increases further and ICTs were also observed to be N-1 non compliant at Shujalpur(PG). It was informed that for integration of Ajmer (2GW) & Nagaur (2GW) REZ potential in Rajasthan under 181.5GW RE potential, 765/400 kV, 2x1500 MVA Kota (New) & Shujalpur (New) Pooling Station alongwith Kota (New) — Shujalpur(New) 765 kV D/c line, Shujalpur (New) – Shujalpur 400 kV (QM equivalent) D/c line & LILO of 765 kV Bina-Indore S/c line at Shujalpur (new) S/s has been planned. The above schemes can be taken up earlier to resolve the overloading issues at Shujalpur. Accordingly, it was decided that the above proposals would be reviewed in Joint study meeting with CEA, POSOCO, NR and WR constituents to control the overloadings at Shujalpur S/s.
4.	400/220kV, 2X315 MVA Jabalpur ICTs (N-1)	It was informed that 400/220kV, 2X315 MVA ICTs at Jabalpur were found to be N-1 non compliant. To resolve the overloadings, following alternative was evolved and agreed: • Creation of 220 kV level at 765/400 kV Jabalpur PS with Installation of 2x500 MVA, 400/220 kV ICTs along with associated ICT bays and 4 No. of 220kV line bays **(Under ISTS)** • LILO of Narsinghpur - Jabalpur (MP) 220kV D/c line at Jabalpur Pool **(Under Intra-State by MPPTCL)**
5.	400/220kV, 3X315 MVA Gwalior ICTs	It was informed that 400/220kV, 3X315 MVA ICTs at Gwalior were found to be N-1 non compliant. MPPTCL informed that there is a requirement of a new Substation in South of Gwalior to cater to the increased demand in that area. CTU stated that M/s Greenko Energies Private Limited has been granted Stage-I Connectivity at South of Gwalior S/s for their 2520 MW Hydro Power Project and the above scheme would also cater to the injection from above PSP. However, the evacuation system would be finalized after receipt of LTA application. Keeping above in view, following alternative was evolved:

Sl.	Constraints	Deliberations / Outcomes based on studies
		• Establishment of 765/400kV, 2X1500MVA (with 4x500MVA including one spare unit) ICTS & 400/220kV, 2X500MVA ICTs at Karera (Near Datiya) • LILO of Bina - Gwalior 765kV S/c line at Karera • LILO of both circuit Bina - Datiya 220kV line at Karera • Extention of LILO portion of Datiya 220kV- Bina 400kV line for Pichhore 220kV upto Karera • Upgradation 132kV Seondha on 220kV with 2x200MVA,220/132kV ICT • Karera 765kV S/s - Seondha 220kV(U/G) D/C 220kV line • 132kV Seondha 220kV - Indergarh DCSS line It was deliberated that with LILO of Bina - Gwalior 765kV S/c line at Datiya (New), fault level at Bina 765kV is crossing the design limit (40kA) and the same is not feasible from short circuit point of view. It was also deliberated that presently only one 765/400kV, 1X1500MVA ICT is required and with the proposed PSP interconnection & increased drawal requirement in future, augmentation of the ICTs may be taken up and the location of the proposed substation can be kept between Karera & Datiya to cater to the requirement of both PSPs & MPPTCL. Accordingly, it was decided that LILO of Satna-Gwalior 765kV S/c line at Datiya (New) is technically feasible from load flow as well as short circuit point of view. The details of the finalized scheme are given below: **Under ISTS** • Establishment of 765/400kV, 2X1500MVA (with 4x500MVA including one spare unit) ICTS & 400/220kV, 2X500MVA ICTs at Karera (near Datiya) along with 1x330 MVAr (765kV) Bus Reactor • LILO of Satna-Gwalior 765kV S/c line at Karera **Under Intra-State** • LILO of both circuit Bina - Datiya 220kV line at Karera • Extention of LILO portion of Datiya 220kV- Bina 400kV line for Pichhore 220kV upto Karera • Upgradation 132kV Seondha on 220kV with 2x200MVA,220/132kV ICT • Karera 765kV S/s - Seondha 220kV(U/G) D/C 220kV line • 132kV Seondha 220kV - Indergarh DCSS line
6.	400/220kV 2X315 MVA Sagar ICTs (N-1)	It was pointed out that additional ICT is not required after LILO of Damoh - Bhopal S/c line at Sagar S/s and the same was agreed.
7.	400/220kV, (2X315)+ (1X500) MVA Satna(PG)ICTs (N-1)	It was informed that 400/220kV, (2X315)+ (1X500) ICTs at Satna (PG) alongwith downstream network i.e. Satna (PG)-Satna(MP) 220kV 3XS/c lines were found to be heavily loaded and N-1 non compliant. To resolve the overloadings following alternatives were studied:

Sl.	Constraints	Deliberations / Outcomes based on studies
		Alt-1: • Upgradation of existing 220kV Satna S/s by installation of 400/220kV, 2X500MVA ICTS at Satna (MP) • LILO of Satna (PG) - Vindhyachal 400kV 1st D/c line at Satna (MP) **Alt-2:** • Additional 400/220kV, 500MVA ICT(4th) at Satna(PG) S/s • LILO of Satna 220kV - Katni 400kV line at Maihar 220kV S/s • LILO of Satna 220kV - Maihar 220kV line at Satna (PG) S/s With above proposal there will be 4 circuits between Satna PG - Satna 220kV. **Alt-3:** • Upgradation of existing 220kV Kotar S/s by installation of 400/220kV, 2X500MVA ICTS at Kotar (MP) • LILO of Satna (PG) - Vindhyachal 400kV 1st D/c line at Satna (MP) or Satna(PG)-Kotar 400kV D/c line • Downstream network to be informed by MPPTCL With respect to alternative-1, MPPTCL informed that adequate space is not available at existing Satna 220kV MP S/s for upgradation to 400/220kV level by installation of 2X500MVA, 400/220kV ICTs. With respect to alternative-2, it was deliberated that availability of space of ICT bay along with 220kV line bays needs to be confirmed by POWERGRID. However, if space is not available, then upgradation of existing 220kV Kotar (MP) S/s by installation of 400/220kV, 2X500MVA ICTS at Kotar (MP) alongwith LILO of Satna (PG) - Vindhyachal 400kV 1st D/c line at Kotar(MP)/Satna(PG)-Kotar 400kV D/c line may be done to resolve above overloading issues at Satna S/s.

Sl.	Constraints	Deliberations / Outcomes based on studies
8.	Requirement of additional ISTS feed near Chhatarpur/Tikamgarh area	It was informed that 1.5 GW solar generation capacity has been identified in Chhatarpur area in Madhya Pradesh. Transmission System for evacuation of power from Chhatarpur SEZ (1500MW) will enable integration of 1.5 GW SEZ in Chhatarpur area with the ISTS grid. Chhatarpur SEZ (1500MW) includes setting up of two solar parks, namely, 550MW at Barethi by NTPC and 950MW at Bijawar by M/s RUMSL. The scheme involves establishment of 3x500MVA, 400/220 kV Pooling Station at Chhatarpur alongwith LILO of Satna – Bina 400kV (1st) D/c line at Chhatarpur PS. Accordingly, MPPTCL can take ISTS feed from the proposed Chhatarpur PS. MPPTCL stated that M/s RUMSL is in the process of establishing 950MW solar project in Bijawar area whereas M/s NTPC is in the process of establishing 550MW solar project in Barethi/Chhatarpur area which includes forest stretch between Bijawar and Chhatarpur (refer schematic below). Chhatarpur PS is proposed to be established in Bijawar area near to RUMSL solar site as land for the ISTS pooling station may also be provided by them adjacent to their solar project. Considering the above, MPPTCL would not be able to draw any outlets from existing 220kV Tikamgarh and Chhatarpur substations as it would lead to increase in length / forest area involvement in the interconnection with the proposed ISTS pooling station and accordingly new substation near Ishanagar/Jatara may be planned. Keeping above in view, following alternatives were evolved: **Alt-1:** • Establishment of 400/220kV, 2X500MVA ICTS at Jatara (New) • Datiya (New) - Jatara (New) 400kV D/c line • LILO of Tikamagarh - Chattarpur 220kV D/c line at Jatara (New) **Alt-2:** **Under ISTS:** • Establishment of 765/400kV, 2X1500MVA ICT (1X500MVA spare unit) and 400/220 kV, 2X500MVA ICTs at Ishanagar (New) along with 1x330 MVAr (765kV) (110MVAr spare unit) & 1X125MVAr, 420kV bus reactor • LILO of Jabalpur - Orai 765kV S/c line at Ishanagar 765kV S/s (New) **Under Intra-State:** • Establishment of 220/132kV, 2x200MVA ICT & 132/33kV 2x50MVA ICT at Jatara 220kV S/s • 220kV Ishanagar 765/400/220kV - Jatara 220kV D/C line • 132kV Jatara 220kV - Jatara 132kV D/C line (With High Capacity Conductor) • 132kV Jatara 220kV - Nowgaon 132kV D/C line

Sl.	Constraints	Deliberations / Outcomes based on studies
		• 2nd circuiting of Jatara 132kV - Prithvipur DCSS line • 2nd circuiting of Jatara 132kV - Tikamgarh DCSS line It was deliberated that Alternative-2 would be more economical than Alternative-1 owing to long length of Datiya (New) - Jatara (New) 400kV D/c line (– 150km) and it may also involve ROW issues, whereas, MPPTCL informed that Jabalpur - Orai 765kV line passes near Ishanagar area, so LILO of the above line would be more optimal. Accordingly, Alternative-2 was agreed from techno economic point of view. Further, MPPTCL informed that Green hydrogen plant in nearby area is also proposed to be established and loads in Chhatarpur, Tikamgarh & Jatara area alongwith 550MW NTPC Barethi Solar Plant may be interconnected at Ishanagar (New) S/s in future. It was also deliberated that presently only one 765/400kV, 1X1500MVA ICT is required and with the proposed PSP interconnection & increased drawal requirement in future, augmentation may be carried out.

5.6 System study analysis and results for 2027-28 timeframe

Based on the load-generation scenarios as elaborated in section **1.3**, various system studies have been carried out in PSSE. Planned/ Under implementation Transmission system that are expected to be commissioned in 2027-28 timeframe are considered for conducting these studies. Results of these studies were analysed and the same are deliberated below-

5.6.1 Load Flow Studies

The base case file was prepared for 2027-28 timeframe. The study results are detailed in subsequent sections.

5.6.2 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 5-6:

Table 5-6: Buses having beyond 1.05 pu & 0.95pu Voltage in WR

Sl. No.	Bus Name	Voltage Level	Owner	Max/Min	Scenario
Overvoltage					
1	Shivlakha PS	400	STU	1.08	1,2,3,4,6,8,9
2	Jaigad II	400	STU	1.10	1,4
3	Dolvi	400	STU	1.09	1,4
4	Wardha	765	ISTS	1.05	3

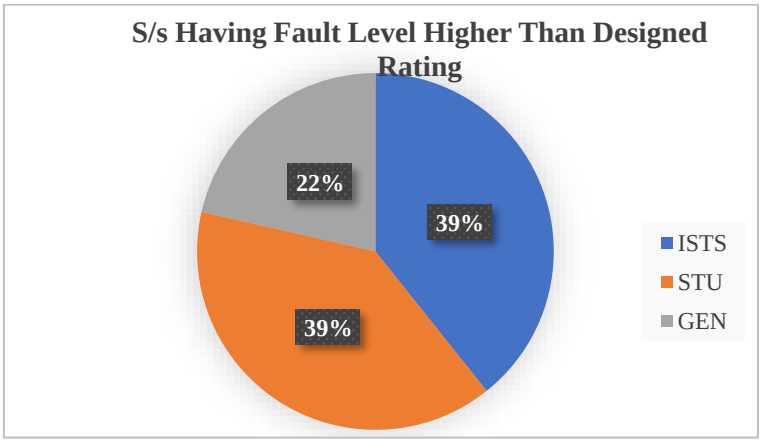
Sl. No.	Bus Name	Voltage Level	Owner	Max/Min	Scenario
Undervoltage					
5	Jaigad II	400	STU	0.97	2,3,5,6,7,8,9
6	Dolvi	400	STU	0.95	2,3,5,6,7,8,9
7	Kalwa	400	STU	0.94	7
8	Kalwa-Split	400	STU	0.93	7
9	Khargar	400	STU	0.94	7
10	Chakan	400	STU	0.95	7
11	Hinjewadi	400	STU	0.95	7
12	Vikroli	400	STU	0.93	7
13	Navi Mumbai	400	ISTS	0.94	7
14	Padghe	400	STU	0.94	7

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, Padghe, Chakan 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.

5.6.3 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 4 nos. of 765kV substations and 24 nos of 400kV substations in WR 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 below:



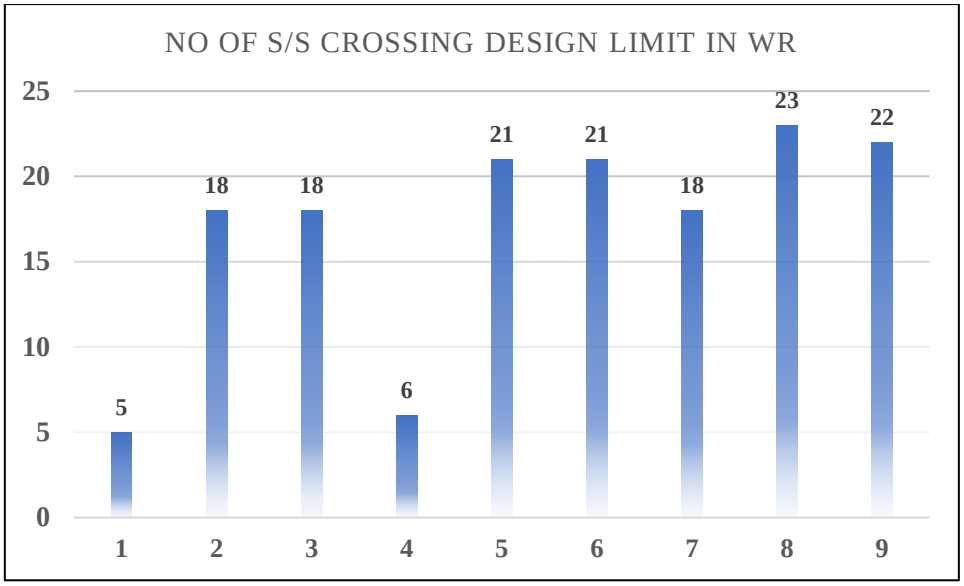


Figure 5-5:Substations crossing the design limit in WR at 400kV buses

Details of the ISTS buses exceeding design fault level by more than 5% are tabulated below at Table 5-7:

Table 5-7: 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	2,3,4,5,6,7,8,9	47	40
2	765kV Bilaspur Pool	2,3,4,5,6,7,8,9	44	40
3	765kV Jabalpur Pool	2,3,5,6,7,8,9	53	50
4	765kV Bina	2,3,5,6,7,8,9	42	40
5	400kV Bina	2,3,5,6,7,8,9	42	40
6	400kV Jabalpur	2,3,5,6,7,8,9	43	40
7	765kV Wardha	2,3,5,6,7,8,9	42	40
8	400kV Solapur PG	7,8,9	42	40

From the above, it can be seen that 8 nos. of buses i.e. 400kV & 765kV Bilaspur PS, 765kV Jabalpur PS, 400kV & 765kV Bina, 400kV Jabalpur, 765kV Wardha, 400kV Solapur violates the design fault level by more than 5%. Studies shall be carried out to mitigate the same in consultation with various stakeholders of WR.

Further, following STU buses exceed the substation design fault level by more than 5% under different scenario are mentioned at Table 5-8:

Table 5-8: 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	45	40
3	400kV Nagda	MP	All	42	40
4	400kV Bina	MP	2,3,5,6,7,8,9	42	40
5	400kV Aurangabad-I	Maharashtra	All	46	40
6	400kV Aurangabad-II	Maharashtra	2,3,5,6,7,8,9	45	40
7	400kV Aurangabad-III	Maharashtra	2,3,5,6,7,8,9	44	40

Following Generator buses exceed the substation design fault level by more than 5% under different scenario are mentioned at Table 5-9 below:

Table 5-9: 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	45	40
2	400kV CGPL	Gujarat	All	45	40
3	400kV Chandrapur-I	Maharashtra	2,3,5,6,7,8,9	45	40
4	400kV Chandrapur-II	Maharashtra	2,3,5,6,7,8,9	45	40
5	400kV Chandrapur SW	Maharashtra	2,3,5,6,7,8,9	43	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.

With respect to high fault levels at C'pur-I/C'pur-II/A'bad-I/A'bad-II/A'bad-III, as discussed in the 10th CMETS-WR meeting held on 30.08.2022, MSETCL shall check ratings of breakers at above substations and possibility of upgradation of equipments from 40kA to 50kA (in earlier cases, several old equipments were already found to be rated to 50kA). Otherwise, MSETCL may explore possibility of reducing fault levels at above substations through suitable splitting / bypassing arrangement with or without series bus / line reactors.

5.6.4 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:

a) Transmission Lines

List of 765kV ISTS lines loaded beyond 3500MW under N-1 contingency are summarized below at Table 5-10:

Table 5-10: 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	Tamnar – Dharamjaigarh 765kV one line	Tamnar – Dharamjaigarh 765kV other line	2,3,5,6	ISTS	2674	4524	3500	129%
2	Sasan – Vindhyachal Pool 765kV one line	Sasan – Vindhyachal Pool 765kV other line	2,3	ISTS	2119	3621	3500	103%
3	Navsari (New)-Padghe 765kV one line	Navsari (New)-Padghe 765kV other line	7	ISTS	2611	3750	3500	107%
4	Navsari (New)-Vataman765kV one line	Navsari (New)-Vataman765kV other line	7	ISTS	2655	3596	3500	103%
5	Khavda-Bhuj765kV one line	Khavda-Bhuj765kV other line	7	ISTS	2225	3836	3500	110%

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 STUs. Sasan- Vindhyachal Pool 765kV D/c line length is only about 5km and with 3500MW loading no issues are envisaged. In Gujarat, high loadings on Vataman - Navsari (New) - Padghe 765kV D/c line corridor & Khavda-Bhuj 765 kV D/c line on account of high NR export, high RE generation in Khavda, Bhuj, Jam-Khambhaliya area of Gujarat coupled with high demand and low self-generation in Gujarat. Further, connectivity applications from MUL (4000 MW) in Navinal area and RIL (860 MW) in Hazira/ Dahej/Surat areas as bulk consumers/distribution licensees have been received which would reduce the overloadings on the above lines after interconnection in future.

Further, 400kV ISTS lines loaded beyond 100% of thermal rating under N-1 contingency are summarized below at Table 5-11:

Table 5-11: 400kV ISTS Transmission lines not meeting N-1 Criteria in Western Region

Sl. No.	Name of the Line	Contigency	Scenario No.	Owner	Base case Loading	Loading under N-1	Rating	% Loading
1	Khargar - Navi Mumbai 400kV line	Khargar - Padghe 400kV line one ckt	1,4,5,67	ISTS	473	1268	850 (Twin Moose)	147%
2	Gandhar -Dehgam 400kV D/c line (Twin Moose)	Gandhar-Dehgam 400kV line one ckt	7	ISTS	704	891	850 (Twin Moose)	104%
3	Solapur-Alkud 400kV S/c line	Kolhapur-Solapur 400kV S/c line	7	ISTS/ MSETCL	738	864	850 (Twin Moose)	101%

Due to less availability of gas based generations at Sugen, Gandhar, DGEN etc and high demand in Gujarat (Pirana, Dehgam, Kasor 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. Due to high RE and thermal generation in Solapur area, critical loading is observed on Solapur-Alkud 400kV S/c line.

400kV STU lines loaded beyond 100% of thermal rating under N-1 contingency are summarized below at Table 5-12:

Table 5-12: 400kV STU Transmission lines not meeting N-1 Criteria in Western Region

Sl. No.	Name of the Line	Contigency	Scenario No.	Owner	Base case Loading	Loading under N-1	Rating	% Loading
1	TAPS-Velgaon 400kV D/c line	TAPS-Velgaon 400kV one ckt	1 to 8	MSETCL	614	1063	850 (Twin Moose)	124%
2	RGPPL to Nagothane 400kV D/c line	RGPPL to Nagothane 400kV one ckt	2,5	MSETCL	645	951	850 (Twin Moose	111%
3	Dhamtari to Jagdalpur 400kV D/c line	Dhamtari to Jagdalpur 400kV one ckt	3	CSPTCL	633	868	850 (Twin Moose	101%
4	GPEC - Gandhar 400kV S/c line	Gandhar-Dehgam 400kV line one ckt	4,7	GETCO	798	887	850 (Twin Moose)	104%
5	GPEC - Kasor 400kV S/c line	Gandhar-Dehgam 400kV line one ckt	4,7	GETCO	798	887	850 (Twin Moose)	104%

Additional system strengthening may be planned by respective STU's to feed the growing demand and increase in drawal from ISTS.

b) Transformers

List of ISTS ICTs loaded beyond MVA rating under N-1 contingency are summarized below at Table 5-13:

Table 5-13: 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 o ICT	% Loading	Rating
1	400/220kV, 2X315 MVA Magarwada DD ICTs	1,2,3,4, 5,6,7,8	ISTS	235	483	153%	315

Sl. No.	Name of the Element	Scenario No.	Owner	Maximum Base Case Flow	Maximum Loading under N-1 o ICT	% Loading	Rating
2	765/400kV, 2X1500 MVA Indore ICTs	7	ISTS	1609	1950	130%	1500
3	765/400kV, 3X1500 MVA Navsari New ICTs	1,4,7	ISTS	1423	1894	126%	1500
4	400/220kV, 3X500 MVA Navsari New ICTs	4	ISTS	443	542	108%	500
5	400/220kV, 2X315MVA Navi Mumbai ICTs	7	ISTS	274	325	103%	315
6	400/220kV, (2X315)+ (1X500) MVA Wardha ICTs	1,4	ISTS	282	397	126%	315
7	400/220kV, 2X500 MVA Vadodara ICTs	4,7	ISTS	474	648	130%	500
8	400/220kV, 2X500 MVA Aurangabad ICTs	7	ISTS	239	332	105%	315
9	400/220kV, 2X500 MVA Parli ICTs	5	ISTS	362	521	104%	500
10	400/220kV, (2X315)+ (2X500) MVA Boisar ICTs	7	ISTS	278	327	104%	315
11	400/220kV, 3X315 MVA Sugen ICTs	4,7	TPL	289	358	114%	315
12	400/220kV, 2X315 MVA Bhachau ICTs	7	ISTS	222	318	101%	315
13	765/400kV, 2X1500 MVA Lakadiya ICTs	2,3,5	ISTS	1058	1678	112%	1500

In Gujarat, high loading of ICTs at Navsari (New), Lakadiya, Bhachau, Vadodara and Sugen are observed on account of high NR export (in scenario 7), high RE integration in Khavda, Bhuj, Jam-Khambhaliya 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.

In MP, high loading of ICTs at Indore(PG) is observed due to high RE injection from Neemuch PS. System strengthening at Neemuch PS in the form of establishment of 2x1500 MVA, 765/400kV Santrampur S/s alongwith Neemuch- Santrampur 765 kV D/c line & Santrampur-Dhule 765 kV D/c line has been planned under integration of 181.5GW REZ.

In Maharashtra, high loading of ICTs at Wardha is observed due to high RE injection from proposed Wardha (2500MW) Solar park which has not been taken up as per inputs of SECI/MNRE. Further, Navi Mumbai, Parli and Boisar ICTs are also observed to be overloaded due to high demand in western part of Maharashtra and low self-generation. 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 5-14:

Table 5-14: 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	4	MSETCL	256	400	126%	315
2	400/220kV, 2X500 MVA Dolvi ICTs	7	MSETCL	260	559	112%	500
3	400/220kV 2X500 MVA Malegaon ICTs	1,4,7	MSETCL	463	692	138%	500
4	400/220kV (2X315) + (1X500) MVA Dhule ICTs	7	MSETCL	278	390	124%	315
5	400/220kV 2X500 MVA Jejuri ICTs	7	MSETCL	399	504	101%	500
6	400/220kV (3X315 +1x500+1x600) MVA Padghe ICTs	5	MSETCL	261	330	105%	315
7	400/220kV, 2X315 MVA Mundra APL ICTs	5	APL	241	332	105%	315
8	765/400kV, 2X1000 MVA Sipat ICTs	1,2	NTPC	722	1090	109%	1000

From above, it is observed that ICT loadings i.r.o 6 nos. of substations in Maharashtra, 1 no. in Gujarat, and 1 no. in Chhattisgarh are not complying with N-1 criteria in 2027-28 timeframe. Therefore, respective STUs/Owners are required to take advance action 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.

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Chapter 6: Southern Region

Southern Region has a typical load-generation scenario wherein every year the Region experiences large import of power requirements from NEW-Grid during peak demand conditions. On the other hand the Region experiences large export of power requirements during peak RE conditions. In view there requirements the Region has been inter-connected with Western and Eastern Regions through high capacity 765kV AC links, Back-to-Back HVDC and Bi-pole HVDC links. Further, the Region has renewable energy penetration level of as high as 40% of total installed capacity nad huge RE potential including offshore wind which are being harnessed. With this large quantum of RE including offshore wind, the export requirements of the Region would further enhance and may require augmentation of High Capapcity corridors in future.

6.1 Power Supply Scenario as on Mar'2022

As on Mar'2022, total Installed Capacity (IC) of Southern Region was about 118 GW and the peak demand met was about 60 GW. Southern Region has touched the maximum export of about 6.4 GW and maximum import of about 16 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 Mar'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	12.0
Telangana	9.4	0.2	0.8	0.0	10.5	0.1	2.5	5.0	7.4	18.1	14.2
Karnataka	9.8	0.5	0.0	0.0	10.3	0.7	3.6	15.9	19.5	30.6	14.8
Kerala	2.1	0.3	0.5	0.2	3.1	0.4	1.9	0.7	2.5	6.0	4.4
Tamil Nadu	12.4	1.8	1.0	0.2	15.4	1.4	2.2	16.1	18.3	35.1	17.2
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**	**46.9**	**58.7**	**118.3**	**59.8**

Source: CEA monthly report

6.2 Envisaged Power Supply Scenario

As per the 19th EPS, Southern Region demand for 2027-28 timeframe is expected to increase to about 89 GW. As per the inputs received from various stakeholders, total installed capacity of Southern Region for 2027-28 is expected to be about 159 GW. The state wise bifurcation of installed capacity and peak demand is summarized at Table 6-2 below.

Table 6-2: Southern Region Installed Capacity and peak demand (2027-28)

(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	-	1.07	19.6	17.8
Telangana	10.8	2.5	-	2.6	0.1	-	-	16.0	19.8
Karnataka	7.7	4.9	-	6.9	5.7	-	0.4	25.5	19.6
Kerala	-	2.4	-	0.1	.07	-	.4	2.9	7.0
Tamil Nadu	11.7	2.8	-	5.5	10.7	-	0.6	31.3	29.0
Pudducherry	-	-	-	-	-	-	-	-	.75
Central	12.9	-	3.8	19.1	15	-	-	50.7	-
IPP	4.6	1.5	-	-	-	-	-	6.1	-
Rooftop /Other RE	-	-	-	4.5	-	2.4	-	6.9	-
SR	**54.1**	**18.5**	**3.8**	**42.1**	**35.8**	**2.4**	**2.4**	**159.1**	**88.7**

There is a growth in peak demand of Southern Region from present time-frame (2021-22) to 2027-28 with a CAGR of 6.8%. The state wise peak demand growth is given at Table 6-3.

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

(All Fig in MW)

Peak Demand (MW)				
State	**2021-22**	**2027-28**	**Difference**	**CAGR**
Andhra Pradesh	12032	17829	5797	6.8%
Telangana	14160	19772	5612	5.7%
Karnataka	14818	19590	4772	4.8%
Kerala	4380	6999	2619	8.1%
Tamil Nadu	17196	29036	11840	9.1%
Puducherry	458	750	292	8.6%
Total	59718	88671	28953	6.8%

From the above data it is observed that the CAGR growth of peak demand is maximum for TamilNadu (9.1%) and minimum for Karnataka (4.8%).

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 2027-28 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 (55.9 GW) and highest demand (80.9 GW) scenarios respectively. In all other scenarios, Southern Region demand is varying between these two demands as per demand factors.

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'27 Time Frame			Jun'27 Time Frame			Feb'28 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	4716	518	1500	6109	2498	2087	7605	4687	5445
Telangana	10487	6647	5239	6150	3294	4216	10705	7886	4670
Karnataka	2635	1060	1057	4217	2643	2072	7695	7947	7661

State / UTs	Drawl From ISTS								
Scenario No	Aug'27 Time Frame			Jun'27 Time Frame			Feb'28 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)
Kerala	3504	2857	2681	4429	4088	3621	5205	4183	3939
Tamil Nadu	7467	2311	3154	9591	4180	4499	11408	6451	6763
Puducherry	547	584	495	622	691	612	568	536	434
Central	-27377	-19202	-17857	-30570	-23378	-20002	-24512	-16986	-10245
IPP	-1549	-3974	-3731	-2038	-4370	-3575	-2277	-4530	-3241
Total	430	-9200	-7462	-1490	-10355	-6469	16398	10176	15426

Out of these nine scenarios, Scenario-5 and Scenario-7 corresponds to two extreme cases with respect to import/export i.e. highest export (10.4 GW) and highest import (16.4 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 2027-28 timeframe. Detailed system studies have been carried out on the finalized load flow cases. The study results are discussed in subsequent chapters.

6.4 ISTS Network Expansion Scheme in Southern Region

Various transmission schemes have been discussed/finalized in the Consultative Meeting for Evolution of Transmission System of Southern Region (CMETS-SR) from March 2022 to July 2022. The details of the schemes are summarized below:

6.4.1 Karnataka

a) Proposal for Augmentation of 1x500 MVA, 400/220kV ICT (6th) and common facility works at Pavagada (Tumkur) PS

Pavagada (Tumkur) PS was established with 5x500MVA, 400/220 kV ICTs as part of transmission scheme for Pavagada Ultra Mega Solar power park (2000 MW) in Tumkur, Karnataka. Presently, Connectivity / LTA of 2050 MW is under operation for Solar Power Park. Further additional Stage-II Connectivity for 1000 MW has been granted at Pavagada PS.

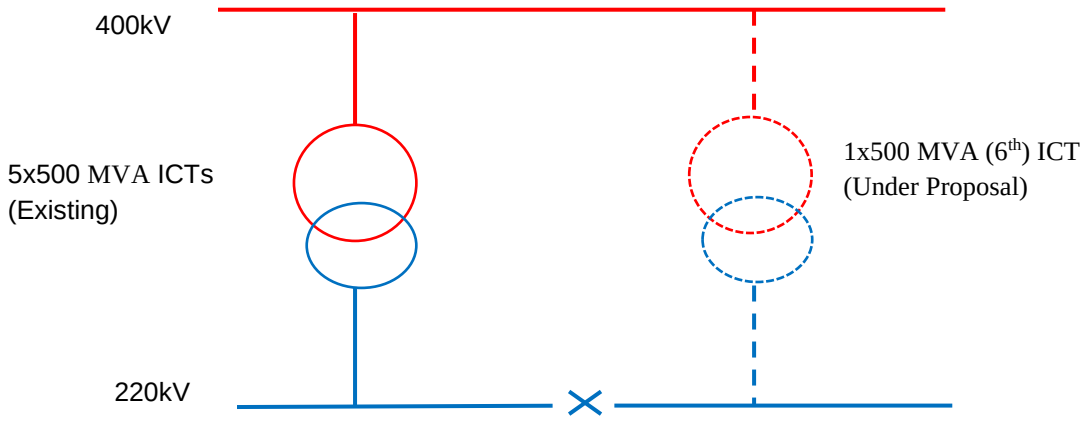
As per prevailing CEA's Manual on Transmission Planning Criteria, N-1 Contingency Criteria is not applicable for immediate connectivity of RE at ISTS/ Intra-STS grid i.e. dedicated line and immediate ICTs at grid station. To facilitate the integration of proposed RE projects at Pavagada PS, implementation of 220kV bus sectionalizer along with bus coupler & transfer bus coupler are required in line with CEA Transmission Planning Criteria and Technical Standards for Construction. Further, for evacuation of additional power from proposed RE based generation project, augmentation of transformation capacity by 1x500 MVA, 400/220 kV ICT (6th) is required.

Accordingly, proposal of augmentation of 1X500 MVA, 400/220kV ICT (6th) and common facility works at Pavagada (Tumkur) PS was discussed and agreed for implementation in the 5th Consultative

Meeting for Evolution of Transmission System of Southern Region (CMETS-SR) held on 25.03.2022. Detailed scope of the scheme is as mentioned below:

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

SI. No	Scope of the Transmission Scheme	Capacity	Implementation Timeframe
1.	Augmentation of transformation capacity by 1X500 MVA, 400/220kV ICT (6th) at Pavagada	a) 1x500 MVA, 400/220 kV ICT b) 400kV ICT bay – 1 no c) 220kV ICT bay – 1 no	Dec'23
2.	Implementation of 220kV bus sectionalizer along with bus coupler & transfer bus coupler at Pavagada PS	a) 220kV Bus Sectionalizer Bay – 1 Set b) 220kV Bus Coupler Bay – 1 no c) 220kV TBC bay – 1 no	Dec'23
Total Estimated Cost			**62.52 Crore**



b) Transmission Scheme for integration of additional RE potential in Gadag, Koppal, Davangere, Bijapur and Bellary Area of Karnataka

As part of transmission system planning for 18.5 GW in Southern Region, CTU has planned the Koppal PS and Gadag PS in the state of Karnataka with 5x500 MVA, 400/220 kV ICTs. The Transmission System associated with Koppal PS and Gadag PS are under advance stage of implementation. Accordingly, Koppal PS and Gadag PS have been closed for further grant of Connectivity through allocation of new bay(s). However, margins available in the allocated bay(s) shall be utilized for Connectivity through enhancement in Connectivity quantum or sharing of dedicated transmission line.

Further, Govt. of India has set a target of 500 GW addition capacity from non-fossil fuel based generation capacity by 2030. In this direction, MNRE has identified the 181.5 GW of RE Potential in the states of Andhra Pradesh, Telangana, Karnataka, Rajasthan, Madhya Pradesh and Tamil Nadu (Offshore). Out of the identified 181.5 GW Potential, 86 GW RE Potential is identified in the State of Andhra Pradesh, Telangana Karnataka and Tamil Nadu (Offshore) in Southern Region. The transmission system for integration of the RE Potential is under advanced stage of identification.

Out of this 86 GW RE Potential in Southern Region, 17 GW has been identified in the State of Karnataka. MNRE have indicated that out of the 17 GW REZ potential in Karnataka, transmission system for evacuation capacity of 10.5 GW may be identified considering the Energy Storage System. The details of district wise RE potential and evacuation capacity to be planned considering Wind & Solar dispatch are given below:

District	Potential (GW)		Total (GW)	Dispatch (90% S+55% W)	BESS	Evacuation capacity to be planned (GW)
	Wind	Solar				
Koppal	2	2	4	2.9	1	2
Gadag	2	2	4	2.9	1	2
Davangere / Chitradurga	2	2	4	2.9	1	2
Bijapur	2		2	1.1		2
Bellary		1.5	1.5	1.35		1.5
Tumkur		1.5	1.5	1.35		1.5
Total	**8**	**9**	**17**	**12.5**	**3**	**11**

Further, it was informed that SECI vide email dated 08.05.2022 has informed that SECI have floated tenders for selection of RE developer and it is likely that developer would opt for setting up of these RE projects in Koppal and Gadag area of Karnataka. Accordingly, SECI has requested to prioritize the development of associated transmission system for integration of additional potential at Koppal and Gadag.

Also, CTU is continuously receiving Connectivity applications and representations from RE developers for further augmentation of capacity at under implementation Koppal PS and Gadag PS so that they may further integrate the proposed RE generation projects in the area. CTU is already in receipt of Stage-II Connectivity applications of about 900 MW at Koppal-II / Gadag-II area (Koppal-II – 400 MW & Gadag-II – 500 MW).

The 765/400/220kV Koppal-II PS is being envisaged for final capacity of about 9 GW considering the integration of above pooling stations. Accordingly, CTU has carried out detailed system studies for the 2025-2026 timeframe and identified the additional transmission system as advanced action for integration and immediate evacuation of additional RE potential of 2 GW at Koppal and Gadag each as well as integration of RE potential at Gadag, Davangere, Bijapur and Bellary through 400kV transmission lines with Koppal-II PS 765/400/220kV.

The scheme was discussed and agreed in the Joint Study meeting of Southern Region Constituents held on 30th June – 2nd July, 2022 at SRPC, Bengaluru. The scheme was also agreed in the 9th CMETS(SR) held on 29.07.2022.The details of envisaged transmission system for integration and

evacuation of RE potential from Koppal-II and Gadag-II and Common Transmission Scheme for integration of additional RE potential in Gadag, Davangere, Bijapur and Bellary are as given below:

District	Potential (GW)		Total (GW)	Dispatch (90% S+55% W)	BESS	Evacuation capacity to be planned (GW)
	Wind	Solar				
Koppal	2	2	4	2.9	1	2
Gadag	2	2	4	2.9	1	2
Total	**4**	**4**	**8**	**5.8**	**2**	**4**

(i) Transmission Scheme for Renewable Energy Zone (Phase-II) in Koppal-II in Karnataka and Common Transmission Scheme for integration of additional RE potential in Gadag, Davangere, Bijapur and Bellary.

a. Phase-A

- Establishment of 765/400kV 2x1500 MVA, 400/200kV 2x500 MVA Koppal-II Pooling Station with provision of two (2) sections of 4500 MVA each at 765/400kV level and provision of four (4) sections of 2500 MVA each at 400/220kV level
- Koppal-II PS – Narendra New 765kV D/c line with 240 MVAr SLR at Koppal-II PS end (~150 km)
- 2x330 MVAr (765kV) & 2x125MVAr (400kV) bus reactors at Koppal-II PS
- Provision for 25 acres of land for establishment of BESS at Koppal-II PS

b. Phase-B

- Koppal-II PS – Raichur 765kV D/c line with 330 MVAr SLR at Koppal-II PS end (~190 km)
- Augmentation of 2x1500, 765/400kV, ICTs at Koppal-II PS.
- Augmentation of 2x500, 400/220kV, ICTs at Koppal-II PS.

Future Provisions

- Space provision for 8 nos. of 400/220kV, 500 MVA ICTs at Koppal-II PS
- Space for 4 nos. of 765/400kV, 1500 MVA ICTs at Koppal-II PS

(ii) Transmission Scheme for Renewable Energy Zone (Phase-II) in Gadag-II in Karnataka

- Establishment of 400/220kV, 2x500 MVA Gadag-II Pooling Station
- Gadag-II PS – Koppal-II PS 400kV (Quad Moose) D/c line (~100 km)
- 2x125MVAr 420kV bus reactors at Gadag-II PS
- Provision for 25 acres of land for establishment of BESS at Gadag-II PS

Future Provisions

- Space provision for 10 nos. of 400/220kV, 500 MVA ICTs at Gadag-II PS

Figure: Tr. Scheme for integration of additional RE potential in Koppal-II (Phase-A) and Gadag-II

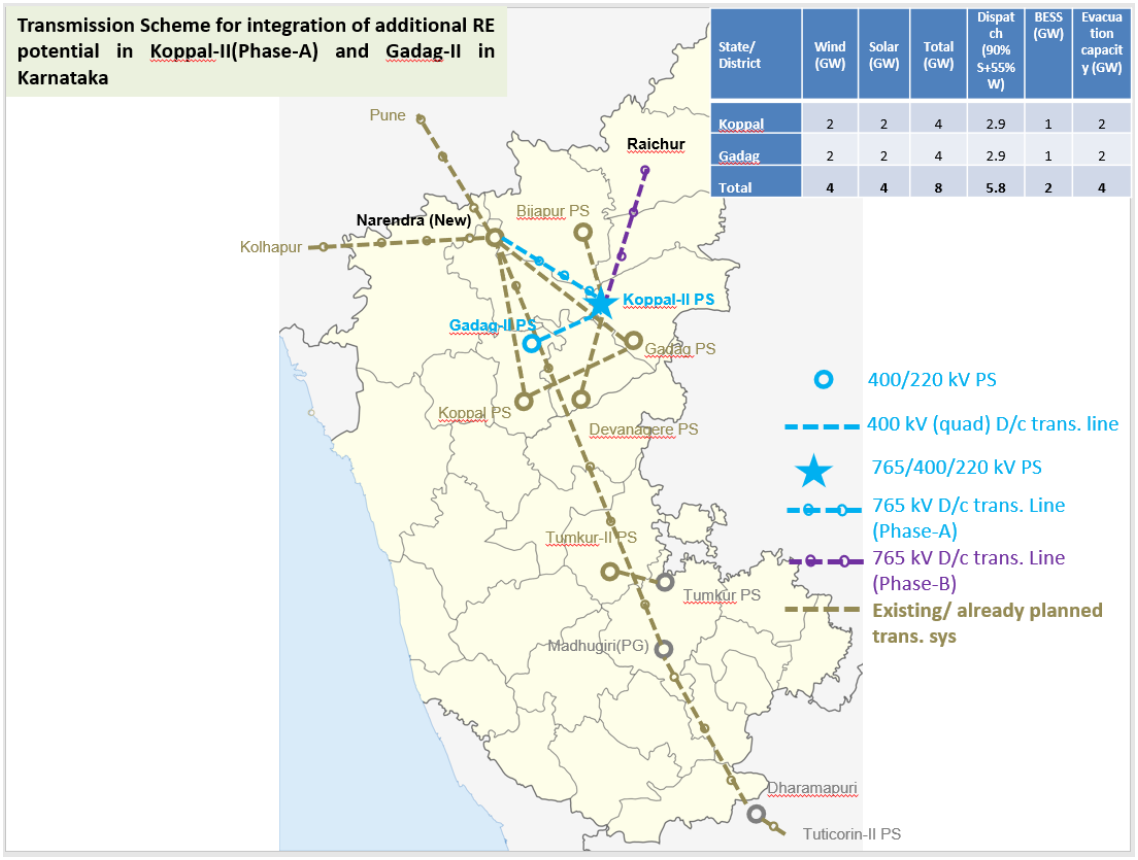
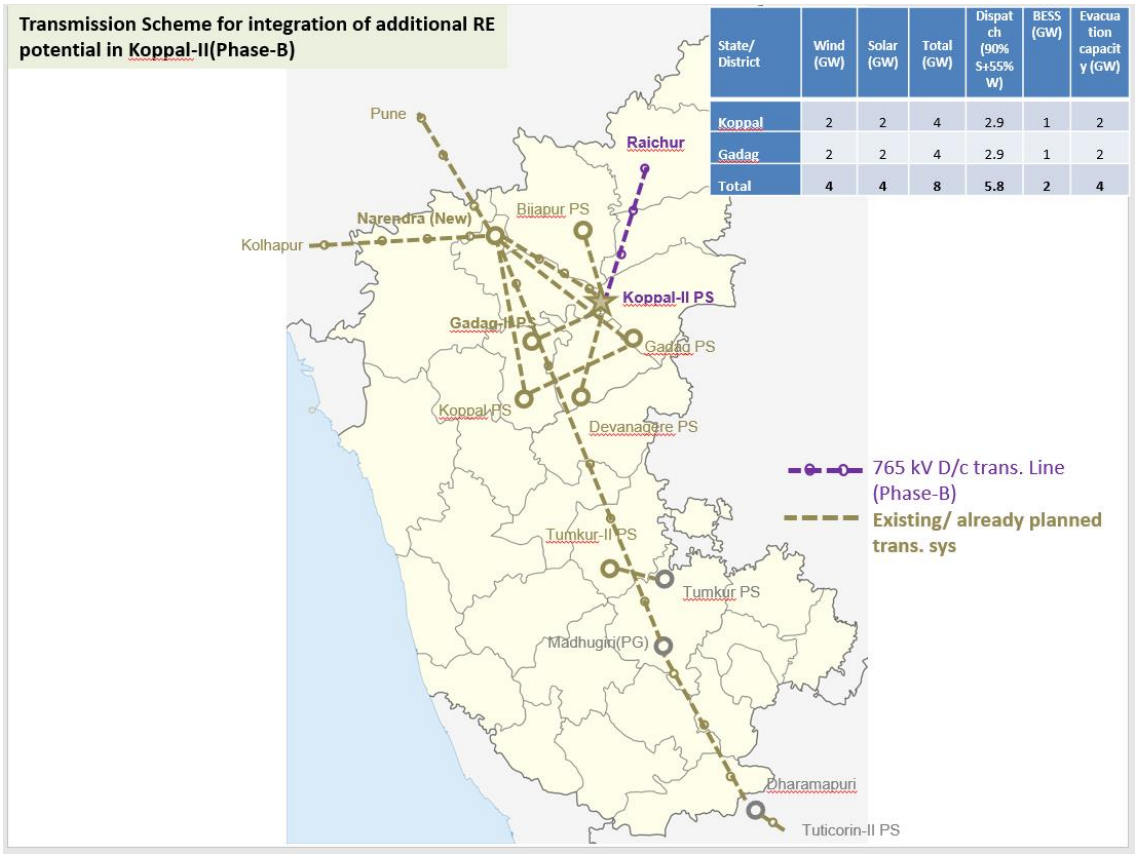


Figure: Tr. Scheme for integration of additional RE potential in Koppal-II (Phase-B)



Implementation of transmission system shall be taken up in phased manner subject to materialization of RE projects as decided in the joint study meeting of SR Constituents, CTU, CEA & POSOCO. Phase-B transmission system of Koppal-II shall be implemented after cumulative grant of Connectivity / LTA beyond 2500 MW at Koppal-II and Gadag-II REZs.

6.4.2 Tamil Nadu

a) Augmentation of Transformation Capacity at Arasur S/s:

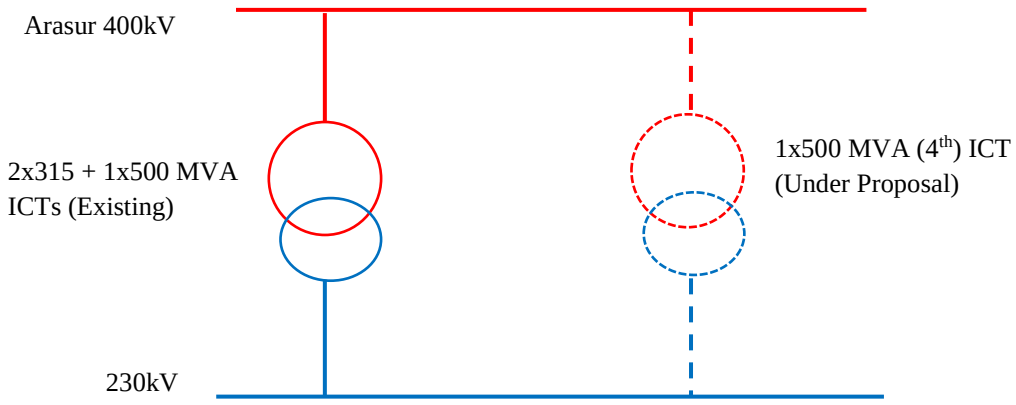
SRLDC vide letter dated 05.05.2022 has communicated that Southern Region has met a record maximum demand of 60,876 MW on 1st April, 2022 during this peak demand season. Similarly, Tamil Nadu has met an all-time maximum demand of 17,196 MW on 29th March, 2022. It was also informed that the transmission system in Tamil Nadu experiences severe loading on 400/230kV ICTs and intra-state transmission lines every year during the peak demand season. Further, Tamil Nadu may experience a peak demand of about 27000 MW in 2026-27 as per the 19th EPS and may have an import requirement of approx. 18000 MW. With future LTA/MTOA being contracted to Tamil Nadu the violation in ATC would increase, therefore augmentation of ICTs & Intra-State Transmission System is required on urgent basis.

The 400/230kV ICTs at most of the stations are operated without meeting N-1 contingency criteria and tripping of one these ICTs during such high loading may leads to cascade tripping and may result in loss of large quantum of load / generations. Further, the augmentation of transformation capacity at Hosur with 1x500 MVA was deliberated in the 3rd SRPC(TP) meeting held on 24.08.2021. The transmission constraints in Tamil Nadu were also discussed in the special meeting of SRPC held on 17.05.2022. During the meeting, it was decided that suitable ICT augmentations at specified locations may be taken up by TANTRANSCO and CTU. Accordingly, augmentation of 1x500 MVA, 400/230kV transformation capacity at Arasur substation for improving the reliability and meeting the contingency criteria in meeting the peak demand of Tamil Nadu was discussed and agreed in the 7th CMETS(SR) held on 31.05.2022. Detailed scope of the scheme is as mentioned below:

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

SI. No.	Scope of the Transmission Scheme	Capacity/km	Total Estimated Cost	Implementation timeframe
1.	Augmentation of transformer capacity by 1x500 MVA, 400/230kV ICT (4th) at Arasur S/s along with associated ICT bays	• 1x500 MVA, 400/230 kV ICT • 400kV ICT bay – 1 No. • 230kV ICT bay – 1 No. (For ICT interconnection to 230kV Switchyard, 245kV Cable / GIB shall be required)	61 Crore	18 months from date of CTU OM

Figure: Augmentation of 1x500 MVA, 400/230kV transformation capacity at Arasur S/s



b) Augmentation of Transformation Capacity at Hosur S/s:

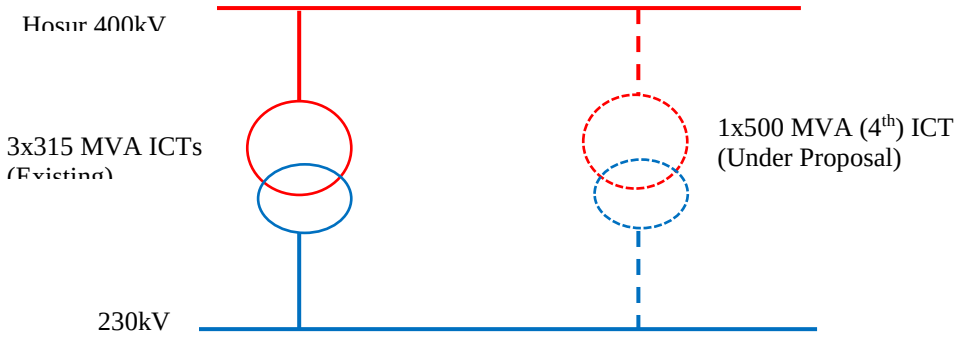
SRLDC vide letter dated 05.05.2022 has communicated that Southern Region has met a record maximum demand of 60,876 MW on 1st April, 2022 during this peak demand season. Similarly, Tamil Nadu has met an all-time maximum demand of 17,196 MW on 29th March, 2022. It was also informed that the transmission system in Tamil Nadu experiences severe loading on 400/230kV ICTs and intra-state transmission lines every year during the peak demand season. Further, Tamil Nadu may experience a peak demand of about 27000 MW in 2026-27 as per the 19th EPS and may have an import requirement of approx. 18000 MW. With future LTA/MTOA being contracted to Tamil Nadu the violation in ATC would increase, therefore augmentation of ICTs & Intra-State Transmission System is required on urgent basis.

The 400/230kV ICTs at most of the stations are operated without meeting N-1 contingency criteria and tripping of one these ICTs during such high loading may leads to cascade tripping and may result in loss of large quantum of load / generations. Further, the augmentation of transformation capacity at Hosur with 1x500 MVA was deliberated in the 3rd SRPC(TP) meeting held on 24.08.2021. The transmission constraints in Tamil Nadu were also discussed in the special meeting of SRPC held on 17.05.2022. During the meeting, it was decided that suitable ICT augmentations at specified locations may be taken up by TANTRANSCO and CTU. Accordingly, augmentation of 1x500 MVA, 400/230kV transformation capacity at Hosur substation for improving the reliability and meeting the contingency criteria in meeting the peak demand of Tamil Nadu was discussed and agreed in the 8th CMETS(SR) held on 28.06.2022 respectively. Detailed scope of the scheme is as mentioned below:

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

SI. No.	Scope of the Transmission Scheme	Capacity/km	Total Estimated Cost	Implementation timeframe
2.	Augmentation of transformer capacity by 1x500 MVA, 400/230kV ICT (4th) at Hosur S/s along with associated ICT bays	• 1x500 MVA, 400/230 kV ICT • 400kV ICT bay – 1 No. 230kV ICT bay – 1 No.	46 Crore	15 months from date of CTU OM

Figure: Augmentation of 1x500 MVA, 400/230kV transformation capacity at Hosur S/s



6.5 Measures taken for mitigation of the issues of 2026-27 Rolling plan

6.5.1 Measures for controlling over-voltage

As per the voltage analysis carried out in Rolling Plan published for 2026-27 timeframe, following 765 kV and 400 kV buses were having issue of high voltage (voltage more than 1.05 pu):

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

Over-voltage studies have been carried out and it has been observed that bus voltages in the ISTS are within the limits with addition of one 1x330 MVAR Bus Reactor at 765kV Nizamabad.

6.5.2 Measures for controlling fault levels of Substation

As per the short circuit analysis carried out in Rolling Plan published for 2026-27 timeframe, 11 nos. of ISTS substations (2 nos. of 765kV substations and 9 nos of 400kV substations) are having fault level more than designed capacity in the Region. However, 4 nos. of substations 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%. Details of substations having high fault level is given below:

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

Sl. No.	Substation Name	Owner	Scenario No.	Highest Fault level	Designed Rating
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-I	NTPC	9	41	40
11	400kV Simhadri-II	NTPC	9	41	40

TSTRANSCO is planning the scheme to control fault level of Maheshwaram TS substation. The scheme is under review and it is expected that bus splitting of Maheshwaram TS substation would resolve the short circuit issue of Maheshwaram (PG) & Kurnool substations. CTU is carrying out detailed system studies for controlling the short circuit level of ISTS buses. After finalization, the schemes would be included in the final report of Annual Rolling Plan for 2027-28 timeframe.

6.5.3 Measures for controlling overloading of Transmission lines

Following ISTS lines were observed to be loaded beyond 90% of thermal rating under N-1 contingency as per the analysis carried out in the Rolling Plan published for 2026-27 timeframe:

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 400kV D/c line	Malekottaiyur – Thiruvalam 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. In this case, entire potential has been considered at Karur PS. However, CTU has received stage-II/LTA application for 420 MW in Karur area. Therefore, measures to control overloading of the line would be planned upon realization of the entire RE potential at Karur PS.

With regard to overloading of Kolar – Dommasandra 400kV line, reconductoring of the transmission line with HTLS conductor would relieve the loading of the line. Reconductoring proposal of Kolar – Dommasandra 400kV line would be discussed in the joint study meeting with the KPTCL.

Further, Malekottaiyur – Thiruvalam 400kV D/c line is twin moose line designed with 45 (ambient) / 85 (conductor) temperature and having the rating of 1100 MVA. Therefore, it can comply N-1 criteria.

In addition, following STU lines were observed to be loaded beyond 90% of thermal rating under N-1 contingency in the in the Rolling Plan published for 2026-27 timeframe:

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 (Quad Moose)	105%

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 the scheme to control fault level of Maheshwaram TS substation in which they are also proposing the fault limiting reactors in the Maheshwaram – Maheshwaram TS 400kV (Quad) D/c line. The scheme is under review and it is expected that this would relieve the overloading issue of Maheshwaram – Maheshwaram TS 400kV (Quad) D/c line.

6.5.4 Measures for controlling overloading of ICTs

12 nos. of ICTs in ISTS were observed to be loaded beyond 90% of rating under N-1 contingency as per the analysis carried out in the Rolling Plan published for 2026-27 timeframe. Actions taken for mitigating the overloading of ICTs/ suggested measures are mentioned below:

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. The same would be plaaned upon materialization of the RE potential.
2	765/400kV, 2x1500 MVA Maheshwaram ICTs	1 & 7	ISTS	1273	1711	114 %	1500	765/400kV, 1x1500 MVA (3rd) ICT at Maheshwaram is required to control the high transformation loading. The proposal would be taken up in the forthcoming CMETS meeting of SR.

Sl. No.	Name of the Element	Scenario No.	Owner	Base Case Flow	Loading of ICT under N-1	% Loading	Rating (MVA)	Remark
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	4th 1X500 MVA 400/220kV ICT has been agreed for implementation with implementation schedule of 15 months.
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, TSTRANSCO 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, 1x200 MVA Ramagundam NTPC ICTs	5, 7, 8	ISTS	264	286	142%	200	
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, 2013.
9	400/220kV, 2x315 MVA Cuddapah ICTs	4 & 7	ISTS	236	325	103%	315	High RE generation at Anantapur is causing overloading of ICTs. ICT augmentation would be planned upon materialization of the RE potential.
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 + 1x500 MVA Trichy ICTs	3, 5, 6, 7, 8	ISTS	227	321	102%	315	Transformation capacity augmentation would be planned in consultation with STU.

6.6 System Study Analysis and Results

Based on the load-generation scenarios as elaborated in section 6.3, various system studies have been carried out in PSSE. Planned/ Under implementation Transmission system that are expected to be

commissioned in 2027-28 timeframe are considered for conducting these studies. Results of these studies were analysed and the same are deliberated below-

6.6.1 Load Flow Studies

a) Transmission Lines

In the base case file prepared for 2027-28 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 at Table 6-6 below.

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

(All Fig in MW)

Sl. No.	Name of the Element	Scenario No.	Owner	Maximum Loading	Rating (MVA)
1	Cuddapah – Chittoor 400kV S/c line	4	ISTS & STU (AP)	723	850 (Twin Moose)
2	Kolar – Dommasandra 400kV S/c line	7 & 9	ISTS & STU (KPTCL)	705	850 (Twin Moose)
3	Raichur – Veltoor 400kV S/c line	1	ISTS	806	850 (Twin Moose)
4	Kurnool-Srisailam lower bank 400kV S/c line	1	ISTS	660	850 (Twin Moose)

Sl. No.	Name of the Line	Scenario No.	Owner	Maximum Loading	Rating
1	Cuddapah – Chittoor 400kV S/c line	4	ISTS & STU (AP)	723	850 (Twin Moose)
2	Kolar – Dommasandra 400kV S/c line	7 & 9	ISTS & STU (KPTCL)	705	850 (Twin Moose)
3	Raichur – Veltoor 400kV S/c line	1	ISTS	806	850 (Twin Moose)
4	Kurnool-Srisailam lower bank 400kV S/c line	1	ISTS	660	850 (Twin Moose)

b) Transformers

In the base case file prepared for 2027-28 timeframe, transformers at 2 nos. of 765/400 kV substations and 4 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 at Table 6-7

Table 6-7: Transformers Loading in the Base Cases

(Max Loading in MW)

Sl. No.	Name of the Element	Scenario No.	Owner	Maximum Loading	Rating (MVA)
1	765/400kV, 3x1500 MVA Kurnool-III ICTs	1 & 4	ISTS	1326	1500
2	765/400kV, 2x1500 MVA Maheshwaram ICTs	7	ISTS	1297	1500
3	400/230kV, 2x250 MVA Neyveli TS-II ICTs	2, 4, 5, 6, 8	ISTS	252	250
4	400/132kV, 1x200 MVA Ramagundam NTPC ICT	2	ISTS	163	200
5	400/220kV, 4x500 MVA Koppal-II	9	ISTS	430	500
6	400/220kV, 4x500 MVA Gadag-II	9	ISTS	405	500

6.6.2 Voltage Analysis

PU voltages of all 765 kV and 400 kV buses were observed in all the nine scenarios prepared for 2027-28 timeframe. 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 6-8 below.

Table 6-8: Buses having more than 1.05 pu Voltage in SR

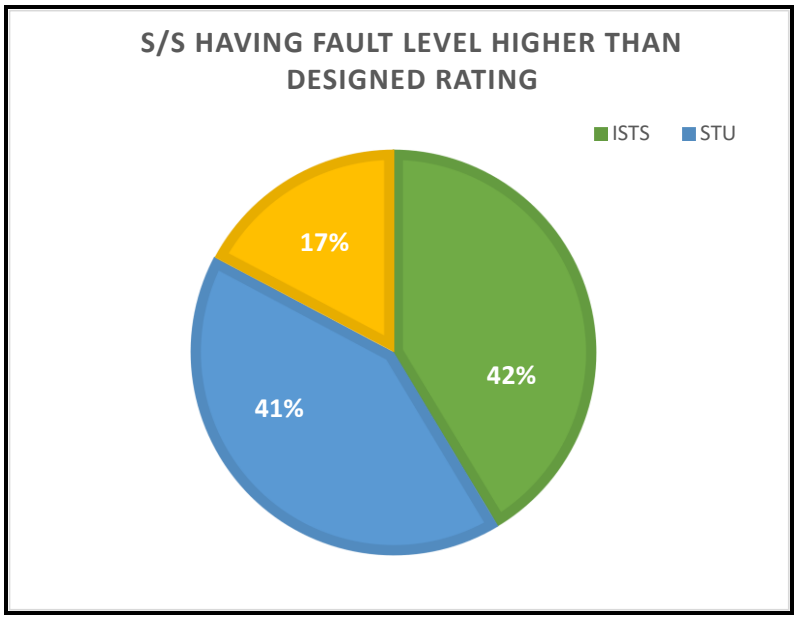
Sl. No.	Bus Name	Voltage Level (kV)	Owner	Max (pu)	Scenario
1.	Maheshwaram	765	ISTS	1.06	3
2.	Bidar	765	ISTS	1.05	3, 6, 9
3.	Nizamabad	765	ISTS	1.05	3
4.	Cudappah	765	ISTS	1.05	3
5.	C Peta	765	ISTS	1.05	3
6.	Srikakulam	765	ISTS	1.05	7
7.	Cuddapah	400	ISTS	1.05	3
8.	Bidar	400	ISTS	1.05	3
9.	Suryapet	400	STU	1.06	4
10.	Konasema Vemagiri	400	STU	1.06	9
11.	Raidurg	400	STU	1.06	3, 4, 6
12.	Kethireddypally	400	STU	1.06	3, 4, 6
13.	Muddunur	400	STU	1.05	1, 4

Sl. No.	Bus Name	Voltage Level (kV)	Owner	Max (pu)	Scenario
14.	Malkaram	400	STU	1.05	4
15.	Chouttuppal	400	STU	1.05	4
16.	Shankarpally	400	STU	1.05	4
17.	Julurupadu	400	STU	1.05	4
18.	Ainavilli	400	STU	1.05	9
19.	Kothagudem-VI	400	STU	1.05	4
20.	Kothagudem-VII	400	STU	1.05	4

High voltages have been observed during night off-peak hours due to less loading in 765kV & 400kV lines emanating from these substations and during solar max scenarios due to non-availablity of thermal generation. Further, few substations of Telangana are facing issue of over voltage during the period when Lift Irrigation loads are not in operation. Requirement of adequate reactive compensation at above buses would be worked out in consultation with the respective STUs.

6.6.3 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 29 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 6-1.



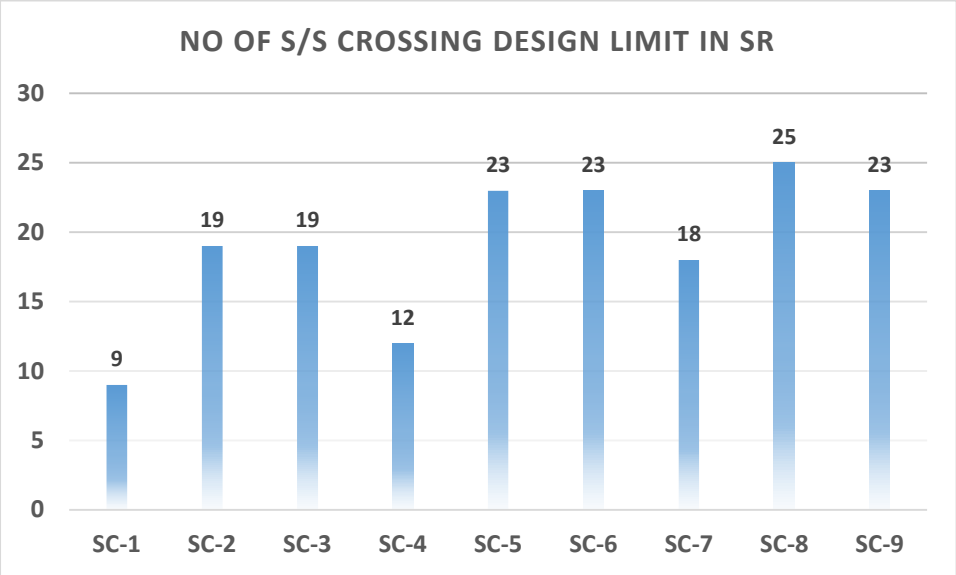


Figure 6-1: Substations crossing the design limit in SR

Details of the ISTS buses exceeding design fault level under any scenario are tabulated below at Table 6-9**.**

Table 6-9: 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	46	40
2.	765kV Maheshwaram	POWERGRID	4, 5, 6, 7, 8	41	40
3.	400kV Maheshwaram	POWERGRID	2, 3, 5, 6, 7, 8, 9	67	63
4.	400kV Kurnool New	POWERGRID	All	61	50
5.	400kV Narendra New	POWERGRID	5, 6, 8	53	50
6.	400kV Dharmapuri	POWERGRID	All	53	50
7.	400kV Madhugiri	POWERGRID	4, 7	52	50
8.	400kV Kudgi	NTPC	5, 6, 8	50	50
9.	400kV Tirunelveli	POWERGRID	All	49	40
10.	400kV Udumalpet	POWERGRID	All	49	40
11.	400kV Khammam	POWERGRID	2, 3, 5, 6, 7, 8, 9	43	40
12.	400kV Pugalur	POWERGRID	2, 3 5, 6, 8	42	40
13.	400kV Ramagundam	NTPC	2, 3, 4, 5, 6, 7, 8, 9	42	40
14.	400kV Hyderabad	POWERGRID	2, 3, 5, 6, 7, 8, 9	41	40

Sl. No.	Substation Name	Owner	Scenario No.	Highest Fault level	Designed Rating
15.	400kV Salem	POWERGRID	5, 6, 8	41	40
16.	400kV Kudankulam	NPCIL	9	41	40
17.	400kV Simhadri-I	NTPC	9	41	40
18.	400kV Simhadri-II	NTPC	9	41	40
19.	400kV Bidadi	POWERGRID	7, 8	40	40

From the above, it can be seen that 765kV, Kurnool, 400kV Maheshwaram PG, 400kV Kurnool New, 400kV Tirunelveli, 400kV Udumalpet, 400kV Narendra New, 400kV Dharmapuri and 400kV Khammam violates the design fault level by more than 5%. Detailed studies are being carried out and suitable measures shall be included in the final report of Rolling Plan.

Further, STU buses exceeding the substation design fault level under different scenario are mentioned at Table 6-10

Table 6-10: 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 Vemagiri	AP	2, 3, 5, 6, 8, 9	57	40
2.	400kV Kurnool	AP	All	56	40
3.	400kV Vijaywada	AP	All	48	40
4.	400kV Guddigudem	AP	2, 3, 5, 6, 7, 8, 9	45	40
5.	400kV Kakinada SEZ	AP	2, 3, 5, 6, 8, 9	43	40
6.	400kV Vizag Pool	AP	2, 3, 5, 6, 7, 8, 9	42	40
7.	400kV Maheshwaram	TSTRANSCO	All	67	50
8.	400kV Mamidipally	TSTRANSCO	All	48	40
9.	400kV Gajwel	TSTRANSCO	7, 8, 9	43	40
10.	400kV Dichipally	TSTRANSCO	2, 3, 4, 5, 6, 7, 8, 9	43	40
11.	400kV Raichur	KPTCL	5, 6, 8, 9	44	40
12.	400kV Neelmangala	KPTCL	All	44	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.

6.6.4 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:

a) Transmission Lines

ISTS lines loaded beyond 90% of thermal rating under N-1 contingency are summarized below at Table 6-11.

Table 6-11: 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	1379	2369*	2186 (Quad Moose)	108
2.	Veltoor – Raichur 400kV S/c line	765/400kV Maheshwaram ICT 1	1	ISTS	816	884#	850 (Twin Moose)	104

**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.*

#High loading of Veltoor – Raichur 400kV S/c line is observed (under N-1) during peak RE scenario of Karnataka. Studies are being carried out to control the loading of Veltoor-Raichur 400kV S/c line.

Further, STU lines loaded beyond 90% of thermal rating under N-1 contingency are summarized below at Table 6-12.

Table 6-12: 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	5	APTRANSCO	453	**869***	850 (Twin Moose	**1.02**

Sl. No.	Name of the Line	Contingency	Scenario No.	Owner	Base case Loading	Loading under N-1	Rating	% Loading
2.	Maheshwaram – Maheshwaram TS 400kV D/c line	Maheshwaram – Maheshwaram TS 400kV one ckt	1, 7	TSTRA NSCO	1380	**2677#**	2186 (Quad Moose)	**1.22**
3.	Mamidipally – Maheshwaram TS 400kV D/c line	Mamidipally – Maheshwaram TS 400kV one ckt	1	TSTRA NSCO	582	**905#**	850 (Twin Moose)	**1.06**

**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 and Mamidipally – Maheshwaram TS 400kV D/c lines are observed (under N-1) during low internal generation of Telangana and high solar dispatch at Bidar. TSTRANSCO is planning the scheme to control fault level of Maheshwaram TS substation in which they are also proposing the fault limiting reactors in the Maheshwaram – Maheshwaram TS 400kV (Quad) D/c line. The scheme is under review and it is expected that this would relieve the overloading issue of Maheshwaram – Maheshwaram TS 400kV (Quad) D/c and Mamidipally – Maheshwaram 400kV D/c lines.

b) Transformers

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

Table 6-13: 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)
1.	765/400kV, 3X1500 MVA Kurnool-III ICTs	1 & 4	ISTS	1355	1927	128%	1500
2.	765/400kV, 2X1500 MVA Maheshwaram ICTs	1 & 7	ISTS	1200	1612	107 %	1500
3.	765/400kV, 2X1500 MVA Tuticorin PS ICTs	2 & 5	ISTS	881	1500	100 %	1500
4.	400/230kV, 2X250 MVA Neyveli TS-II ICTs	1, 2, 3, 4, 5, 6, 7, 8	ISTS	252	297	118%	250
5.	400/220kV, 5X500 MVA Koppal ICTs	2 & 5	ISTS	397	496	99%	500
6.	400/220kV, 2X315 + 1X500 MVA Cuddapah ICTs	7	ISTS	224	308	98%	315

Sl. No.	Name of the Element	Scenario No.	Owner	Base Case Flow	Loading of ICT under N-1	% Loading	Rating (MVA)
7.	400/220kV, 2X315 MVA Trichy ICTs	5, 6, 8	ISTS	226	320	102%	315
8.	400/220kV, 2X315 MVA + 1X500 MVA Hiriyur ICTs	1	ISTS	197	287	91%	315
9.	400/220kV, 4X500 MVA Koppal-II	8, 9	ISTS	433	580	116%	500
10.	400/220kV, 4X500 MVA Gadag-II	8, 9	ISTS	408	547	109%	500
11.	765/400kV, 3X1500 MVA Koppal-II	8, 9	ISTS	1148	1758	117%	1500

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

STU ICTs loaded beyond 90% of MVA rating under N-1 contingency are summarized below at Table 6-14.

Table 6-14: 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, 2X315 MVA Kottyam ICTs	7	KSEB	230	313	99%	315
2.	400/220kV, 2X500 MVA Gulbarga ICTs	2, 3, 5, 8, 9	KPTCL	377	604	120%	500
3.	400/220kV, 2X500 MVA Jagalur ICTs	1 & 4	KPTCL	337	515	101%	500
4.	400/220kV, 2X500 MVA Peenya ICTs	7	KPTCL	315	456	91%	500
5.	400/220kV, 2X500 MVA Dommasandra ICTs	7	KPTCL	313	454	91%	500
6.	400/110kV, 2X200MVA Cuddalore ICTs	All	TANTRANSCO	219	336	168%	200
7.	400/110kV, 2X200 MVA Thenampatty ICTs	1, 4, 7	TANTRANSCO	165	329	165%	200

Sl. No.	Name of the Element	Scenario No.	Owner	Base Case Flow	Loading of ICT under N-1	% Loading	Rating (MVA)
8.	400/110kV, 2X200 MVA Kayathar ICTs	1, 2, 3, 4, 5, 6	TANTRANSCO	152	305	153%	200
9.	400/110kV, 2X200 MVA Arni ICTs	All	TANTRANSCO	225	303	151%	200
10.	400/110kV, 2X200 MVA Edayarpalayam ICTs	7, 8, 9	TANTRANSCO	222	266	133%	200
11.	400/110kV, 3X200 MVA Kanarpatty ICTs	1, 2, 4, 5	TANTRANSCO	191	266	133%	200
12.	400/230kV, 2X315 MVA Kamuthi ICTs	1, 4, 7	TANTRANSCO	208	415	132%	315
13.	400/110kV, 2X200 MVA Kamuthi ICTs	1, 4, 7	TANTRANSCO	162	258	129%	200
14.	400/110kV, 2X200 MVA Alagarkoil ICTs	2, 3, 4, 5, 6, 7, 8, 9	TANTRANSCO	169	237	118%	200
15.	400/110kV, 3X100 MVA Rasipalayam ICTs	2, 3, 5	TANTRANSCO	84	113	113%	100
16.	400/110kV, 2X200 MVA Palavadi ICTs	1, 2, 4, 5, 6, 7, 8	TANTRANSCO	149	223	111%	200
17.	400/110kV, 2X200 MVA Velalavidu ICTs	1, 2, 4, 5, 6, 7, 8	TANTRANSCO	140	216	108%	200
18.	400/220kV, 2X315 MVA Kanarpatty ICTs	1 & 4	TANTRANSCO	167	334	106%	315
19.	400/110kV, 2X200 MVA Samugarangapur ICTs	2	TANTRANSCO	137	191	96%	200
20.	400/110kV, 2X200MVA Salem ICTs	4, 5, 6, 7	TANTRANSCO	148	187	93%	200

From above, it is observed that one ICT in Kerala, 4 nos. of ICT in Karnataka and 15 nos. of ICT in Tamil Nadu are not complying N-1 criteria in 2027-28 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. Therefore, STUs are required to take immediate measures to mitigate this issue of high transformer loading.

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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 Scenario as on Mar'2022

As on Mar'2022, total Installed Capacity (IC) of Eastern Region was about 34.28 GW and the peak demand met was about 26 GW. The state-wise breakup of installed capacity and peak demand is summarised at Table 7-1 below.

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

(All Fig in MW)

State	Thermal	Renewable			Grand Total	Peak Demand
	Coal	Hydro	RES	Total		
Bihar	6826	110	387	497	**7323**	**7154**
Jharkhand	2447	191	97	288	**2734**	**1887**
DVC	3247	186	0	186	**3343**	**3355**
Odisha	5027	2163	617	2780	**7807**	**5643**
West Bengal	8617	1396	587	1983	**10700**	**9089**
Sikkim	54	633	57	690	**743**	**133**
Central unallocated	1539	85	0	85	**1624**	-
Total	**27757**	**4764**	**1745**	**6509**	**34274**	**26019**

Source: CEA monthly report

7.2 Envisaged Power Supply Scenario

As per the 19th EPS, Eastern Region demand for 2027-28 timeframe is expected to increase to about 37.4 GW. As per the inputs received from various stakeholders, total installed capacity of Eastern Region for 2027-28 is expected to be about 60.22 GW. It is to mention that the hydro generations of Nepal and Bhutan has been considered in Eastern Region only for study purpose. The state wise bifurcation of installed capacity and peak demand is summarized below at Table 7-2**.**

Table 7-2: Eastern Region Installed Capacity and peak demand (2027-28)

(All Fig in MW)

State	Thermal	Hydro	Solar	Total	Peak Demand
Bihar	1820	45	1087	**2952**	**9757**
Jharkhand	2400	130	97	**2627**	**3036**
DVC	0	0	0	**0**	**5430**
Odisha	2490	2193	1020	**5703**	**6576**
West Bengal	6065	1474	587	**8126**	**14916**
Sikkim	0	14	57	**71**	**226**
Central	25760	5819	0	**31579**	-
IPP	4150	5012	0	**9162**	-
ER	**42685**	**14687**	**2848**	**60220**	**37396**

There is a growth in peak demand of Eastern Region from present time-frame (2021-22) to 2027-28 with a CAGR of 6.2%. The state wise peak demand growth is given at Table 7-3.

Table 7-3: Increase in Peak Demand of Various States of ER

(All Fig in MW)

State	2021-22	2027-28	Increase in demand	CAGR
Bihar	7154	9757	2603	5.3%
Jharkhand	1887	3036	1149	8.2%
DVC	3355	5430	2075	8.4%
Odisha	5643	6576	933	2.6%
West Bengal	9089	14916	5827	8.6%
Sikkim	133	226	93	9.2%
Total	**26019**	**37396**	**11377**	**6.2%**

From the above data it is observed that the CAGR growth of peak demand is maximum for Sikkim (9.2%) and minimum for Odisha (2.6%) which is less than the National CAGR of 7.7%. 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 for 2027-28 timeframe

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 Eastern Region Load Generation Balance (LGB) for 2027-28 time-frame. For Eastern Region also, three points on the daily load curve i.e. Solar max (afternoon), Peak load (evening) and Off-peak load (night) for three seasons viz. Monsoon (August), Summer (June) and Winter (February) have been considered.

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

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

Scenario No & Name	Generation Dispatch Factors			Demand Factors
	Hydro	Solar	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. Based on the LGB, state wise drawl from ISTS under these scenarios is summarised in Table 7-5. Further, both maximum and minimum import of each state is also highlighted in table below.

Table 7-5: 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)
Bihar	6820	7129	2259	6316	6657	3635	3984	5017	2372
Jharkhand	1537	-242	71	228	-211	-91	302	-147	-145
DVC	3874	4556	5821	4288	5092	5918	4213	5001	3968
Odisha	3721	4287	5912	3852	4540	3728	3479	3664	2390
West Bengal	10282	9931	10456	10110	10524	10315	6969	5143	4453
Sikkim	115	134	10	112	132	50	190	222	122
Central	-5690	-13619	-13049	-13291	-25274	-21409	-14528	-25388	-19082
IPP	-4916	-6687	-5684	-4916	-8038	-6559	-3786	-6535	-4554
Total	15744	5489	5796	6698	-6578	-4414	823	-13022	-10477

Out of these nine scenarios, Scenario-1 and Scenario-8 corresponds to two extreme cases with import / export requirement of Eastern Region i.e. Maximum import (15.7 GW) and maximum export (13GW) scenarios respectively. In all other scenarios, the import / export of Eastern Region varies between these two extremes.

Considering the above LGB for nine scenarios, load flow cases were prepared for 2027-28 timeframe. Detailed system studies have been carried out on the finalized load flow cases. The study results are discussed in subsequent sections.

7.4 ISTS Network Expansion Scheme in Eastern Region

Various transmission schemes have been discussed/finalized in the Consultative Meeting for Evolution of Transmission System of Eastern Region (CMETS-ER) from March 2022 to July 2022. The details of the schemes are summarized below:

7.4.1 Bihar

(a) Installation of 420kV, 1x125MVAr bus reactor along with associated bay at Biharsharif (POWERGRID) S/s in the bus section having 1x80MVAr existing bus reactor.
Note: ***Upon implementation of above reactor, split Section-A shall have 1x80MVAr + 1x125MVAr bus reactors and Section-B shall have 1x50MVAr + 2x125MVAr bus reactors.***

During winter season the bus voltage at Biharsharif S/s has reached upto 422kV as per data from ERLDC. Biharsharif substation is being operated in split mode from Mar 2021 onwards. Section-A comprises of 80MVAr bus reactor and Section-B comprises of 50MVAr+2x125MVAr bus reactors. As per the study, with switching of 125MVAr bus reactor at Biharsharif Section-A, the bus voltage changes by about 2kV. It is proposed to install new 420kV, 125MVAr bus reactor along with associated bay in the Section-A of Biharsharif substation in order to limit voltage rise and also to meet contingency of only one 80MVAr bus reactor in that section.

Accordingly, installation of 420kV, 1x125MVAr bus reactor along with associated bay at Biharsharif (POWERGRID) S/s in the bus section having 1x80MVAr existing bus reactor has been agreed for implemented under ISTS in the 6th CMETS-ER held on 29-04-2022. The implementation schedule of the scheme would be about 18 months. However, best efforts would be made to commission the reactor at the earliest.

7.4.2 West Bengal

(a) Installation of new 420kV, 1x63MVAr line reactor at Maithon-A end of Maithon-A – Kahalgaon-B ckt-1 400kV line along with new 700ohm NGR (with NGR bypass arrangement for operation of line reactor as a bus reactor)

Presently, 1x50MVAr line reactor at 400kV Maithon-A end of Maithon-A – Kahalgaon-B ckt-1 is in service. Based on the condition monitoring and residual life assessment by CPRI, this 50MVAr line reactor (commissioned in 1991) has completed their useful life. as per the studies, following was observed:

- On charging of Maithon-A – Kahalgaon-B ckt-1 from either end without line reactor, total voltage rise is about 11-12kV.

- In view of current network conditions, charging studies were done with 63MVAr line reactor in the subject line, the total rise is observed to be 1-2kV while charging from Kahalgaon-B end and 9-10kV while charging from Maithon-A end.

Accordingly, installation of new 420kV, 1x63MVAr line reactor at Maithon-A end of Maithon-A – Kahalgaon-B ckt-1 400kV line along with new 700ohm NGR (with NGR bypass arrangement for operation of line reactor as a bus reactor) was agreed in the 8th CMETS-ER held on 30-06-2022. The existing 50MVAr line reactor along with NGR in this line at Maithon-A end may be decommissioned prior to commissioning of above new 63MVAr line reactor and NGR.

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

7.4.3 Jharkhand

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

Under ERSS-IX scheme, addition of 2x125MVAr bus reactors in parallel with the existing 2x50MVAr bus reactor was approved at Jamshedpur S/s. In case of space constraint for parallel operation of reactors, the existing 50MVAr reactor may be replaced with the 125MVAr reactors and the released bus reactor would be utilised as a regional spare. Accordingly, Bus Reactor bank-1 comprising of 125MVAr + 50MVAr bus reactors and Bus reactor-2 comprising of 125MVAr only was commissioned. The released 50MVAr bus is presently kept as regional spare has been proposed for replacement.

As per the NLDC operational feedback, the voltage at Jamshedpur 400kV bus has crossed the IEGC band during winters for almost 35-40% of the time. Therefore, bus reactor is required at Jamshedpur S/s.

In the 8th CMETS-ER, POWERGRID proposed that the 50MVAr bus reactor (3x16.67MVAr single phase reactors) in parallel with 125MVAr bus reactor at Jamshedpur S/s may also be considered for decommissioning considering its age. Further, upon studies, it was observed that voltage change of about 2-3kV with switching of 125MVAr bus reactor is observed. Accordingly, in view of decommissioning of two 50MVAr reactors and over voltages observed at Jamshedpur S/s, installation of a new 125MVAr bus reactor along with associated bay at Jamshedpur S/s under ISTS was agreed in the 8th CMETS-ER.
The implementation schedule of the scheme would be about 18 months. However, best efforts would be made to commission the reactor at the earliest.

(b) Establishment of 400/220/132kV substations in DVC area

The peak load of DVC is expected to increase to about 5700MW by 2026-27 time-frame. Further, 4x210MW generation at Mejia and 1x210MW generation at Waria, which are connected at 220kV level are expected to be decommissioned in phased manner in next 4-5 years. To

compensate for the decommissioning of these generations and to feed the increasing load, DVC has planned for augmentation of 2x660MW generation capacity at Raghunathpur TPS. Since, old generation units of DVC were connected at 220kV and 132kV level, however, the new units at Bokaro, DSTPS, Mejia and Raghunathpur having unit sizes of 500MW and more capacity are connected at 400kV level.

Therefore, in the 6th CMETS-ER meeting it was agreed that DVC may established 2 nos. of new 400kV substations viz. Gola-B and Ramkanali-B for evacuation of power from new generation projects (connected at 400kV) to the load centres with the following scope of works (schematic at Figure 7-1):

(a) Establishment of Gola-B 400/220/132kV S/s:

(i) 400/220kV, 2x500MVA + 220/132kV, 2x200MVA

(ii) LILO of Raghunathpur TPS – Ranchi 400kV D/c line at Gola-B

(iii) LILO of Ramgarh-2B (newly proposed) – Ranchi 220kV S/c line (presently Ramgarh – Ranchi line) at Gola-B

(iv) LILO of Ramkanali-B (newly proposed) – Ramgarh-2B 220kV S/c line (presently MTPS – Ramgarh line) at Gola-B

(v) LILO of Ranchi – Ramkanali-B (newly proposed) 220kV S/c line (presently Ranchi – MTPS line) at Gola-B

(vi) LILO of CTPS – Gola 132kV D/c line at Gola-B

(vii) 420kV, 2x125MVAr bus reactor

(viii) Adequate space for future expansion at 400kV, 220kV and 132kV levels including space for installation of new ICTs, bus/line reactors, and lines.

(b) Establishment of Ramkanali-B 400/220/132kV S/s:

(i) 400/220kV, 2x315MVA (shifted from DSTPS) + 220/132kV, 3x200MVA (3rd 220/132kV ICT may be installed progressively with load growth)

(ii) LILO of Durgapur STPS – Raghunathpur TPS 400kV D/c line at Ramkanali-B

(iii) LILO of MTPS – Gola-B (newly proposed) 220kV S/c line (presently MTPS – Ranchi line) at Ramkanali-B

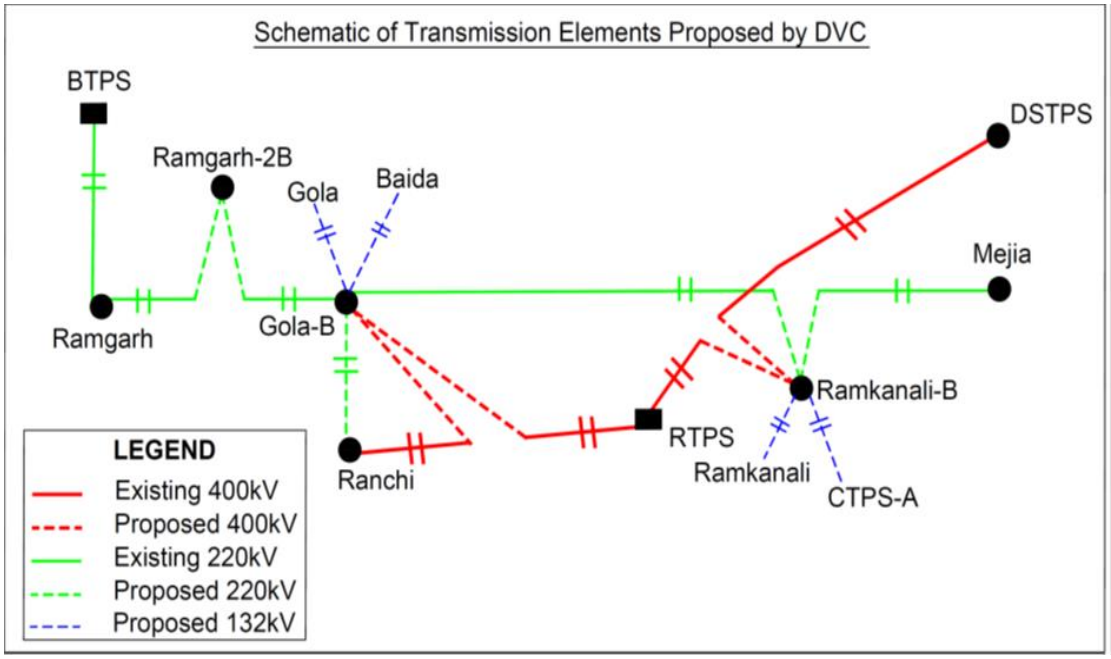
(iv) LILO of MTPS – Gola-B (newly proposed) 220kV S/c line (presently MTPS – Ramgarh line) at Ramkanali-B

(v) LILO of Ramkanali – CTPS 132kV D/c line at Ramkanali-B

(vi) 420kV, 2x125MVAr bus reactor

(vii) Adequate space for future expansion at 400kV, 220kV and 132kV levels including space for installation of new ICTs, bus/line reactors, and lines.

Figure 7-1:Proposed new 400kV S/s in DVC area



In addition to above, augmention of ICTs at following ISTS (DVC) S/s have also been discussed and agreed.

(i) Bokaro-A TPS, 400/220kV: 2x315MVA ICTs to be replaced with 2x500MW by DVC. Replaced ICTs would be shifted to Mejia (2nd ICT) and RTPS / Ramkanali-B (3rd ICT)

(ii) Durgapur TPS, 400/220kV: 2x315MVA ICTs to be replaced with 2x500MW by DVC. Replaced ICTs would be shifted to Ramkanali-B (1st and 2nd ICT) for its establishment

The implementation schedule of the scheme would be about 3-4 years.

7.4.4 Odisha

(a) Establishment of 400/220kV Joda Substation by OPTCL

(b) Reconductoring of Jharsuguda/Sundargarh (POWERGRID) – Rourkela (POWERGRID) 400kV 2xD/c Twin Moose line with Twin HTLS conductor (with ampacity Single HTLS as 1228A at nominal voltage) alongwith suitable modification in the bay equipment at Rourkela end.

OPTCL has large numbers of Industries which is expected to come up in and around areas of Joda. Accordingly, OPTCL has planned to establish a new 400/220kV S/s at Joda New to feed the load of about 480MW. OPTCL requested CTU for ISTS connectivity from Rourkela 400/220kV and Keonjhar 400/220kV S/s alongwith LILO of Tikarpada – Joda 220kV line and Keonjhar – Joda 220kV line at Joda New.

Considering 400/220kV Rourkela substation as a strong source, the ISTS connectivity to new 400/220kV Joda substation was provided through Rourkela substation through LILO of existing

ISTS Rourkela (POWERGRID) – Talcher (NTPC) 400kV D/c line at Joda New (to be implemented by OPTCL under intra-state scheme) with the following scope of works:

(a) Establishment of 400/220kV, 3x500MVA Joda New S/s (3rd ICT to be installed progressively with demand growth)

(b) LILO of existing ISTS Rourkela (POWERGRID) – Talcher (NTPC) 400kV D/c line at Joda New by OPTCL

(c) 400kV, 2x125MVAr bus reactor at Joda New

(d) Adequate space for future expansion at 400kV, 220kV and 132kV levels including space for installation of new ICTs, bus/line reactors, and lines.

(e) Reconductoring of Joda (OPTCL) – Jindal 220kV S/c line with Single HTLS of 1179A (at 120°C – ACCC Drake) along with necessary upgradation in bay equipment at both ends.

The above scheme was agreed in the 6th CMETS-ER meeting held on 29-04-2022.

With the integration of Joda New 400/220kV substation with the existing 220/132kV Joda (Barbil) substation, about 900MW power flows through the 400/220kV ICTs, most of the power flows from Jharsuguda – Rourkela – Joda 400kV corridor. Further, Rourkela substation also acts as a source of power to Jharkhand through Rourkela – Chaibasa and Rourkela – Ranchi 400kV D/c lines. Accordingly, reconductoring of 400kV Jharsuguda – Rourkela 2xD/c lines with HTLS conductor in similar timeframe of establishment of Joda New 400/220kV substation was agreed in the 7th CMETS-ER meeting held on 31-05-2022. Upgradation of bay equipment at Rourkela end to match with the rating of HTLS line was also agreed. However, no upgradation in line bays is envisaged at Jharsuguda/Sundargarh (POWERGRID) S/s as the existing line bays are rated for 3150A.

The implementation schedule of the scheme would be about 36 months.

7.4.5 Sikkim

(a) Reconductoring of Rangpo – Gangtok 132kV D/c line

Presently, Gangtok 132/66kV S/s is fed from only one 132kV D/c line viz. Rangpo – Gangtok 132kV D/c line which is not N-1 compliant. Therefore, in the 9th CMETS-ER Reconductoring of Rangpo – Gangtok 132kV D/c line with HTLS conductor of 800A (at nominal voltage level) with Upgradation of CTs at Gangtok end in both circuits of Rangpo – Gangtok 132kV D/c line from 600A to rating commensurate with rating of 800A HTLS conductor has been agreed in the 9th CMETS-ER held on 29-07-2022.

7.5 Measures taken for mitigation of the issues of 2026-27 Rolling plan

Various augmentation works have been discussed with the STUs in the CMETS-ER meetings and the steps taken to mitigate the constraints in ER for 2026-27 timeframe has been described below:

7.5.1 Measures for controlling transmission line overloading

As per the transmission line overloading report mentioned in the in Rolling Plan published for 2026-27 timeframe, 4 nos. of transmission lines viz. Ranchi - Sipat 400kV D/c, Jharsuguda – Rourkela 400kV 2xD/c, Rourkela – Chaibasa 400kV D/c and Kahalgaon – Farakka 400kV D/c lines were violating N-1 contingency crieteria. Out of these, following reconductoring works were discussed nd agreed in the CMETS-ER meeting:

(i) Reconductoring of Jharsuguda (POWERGRID) – Rourkela (POWERGRID) 400kV 2xD/c Twin Moose line with Twin HTLS conductor (with ampacity Single HTLS as 1228A at nominal voltage) alongwith necessary bay upgradation works ar Rourkela end.

These reconductoring works would relieve the overloading of Jharsuguda – Rourkela 400kV 2xD/c line for 2026-27 timeframe.

7.5.2 Measures for controlling ICT overloading

As per the ICT overloading report mentioned in the in Rolling Plan published for 2026-27 timeframe, ICTs at 7 nos. of ISTS S/s viz, Durgapur TPS, Bokaro-A TPS, Koderma TPS, Raghunathpur TPS, Rajarhat, Subhasgram and Jeerat New S/s were violating N-1 contingency crieteria. Out of these, following ICT augmentation was discussed in the CMETS-ER meeting:

(i) Bokaro-A TPS, 400/220kV: 2x315MVA ICTs to be replaced with 2x500MW by DVC. Replaced ICTs would be shifted to Mejia (2nd ICT) and RTPS / Ramkanali-B (3rd ICT)

(ii) Durgapur TPS, 400/220kV: 2x315MVA ICTs to be replaced with 2x500MW by DVC. Replaced ICTs would be shifted to Ramkanali-B (1st and 2nd ICT) for its establishment

(iii) Subhasgram 400/220kV: New 1x500MVA ICT to be installed by CESC as 6th ICT.

These augmentation works would relieve the overloading of Durgapur TPS, Bokaro-A TPS, Raghunathpur TPS and Subhasgram S/s for 2026-27 timeframe.

7.5.3 Measures for controlling fault levels of Substation

As per the fault level violation report mentioned in the in Rolling Plan published for 2026-27 timeframe, fault level at 5 nos. of ISTS S/s viz, Patna, Barh, Farakka, Siliguri, and Ranchi S/s were crossing its design limit. Out of these, following transmission scheme was discussed in the CMETS-ER meeting to control the fault level:

(i) Patna 400kV: Bypassing of Patna – Barh 400kV D/c (Quad) line (ckt-3 & 4) (68.9km) and Patna – Naubatpur 400kV D/c (Quad) line (25.45km) at Patna S/s so as to form Barh – Naubatpur 400kV D/c (Quad) line

This would relieve the fault level of Patna S/s as well as Barh generation switchyard. Detailed study for controlling the fault level of Patna, Barh and Ranchi S/s is under progress.

7.6 System study analysis and results for 2027-28 timeframe

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 2027-28 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

a) Transmission Lines

In the base case file prepared for 2027-28 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 7-6.

Table 7-6: Transmission Lines Loading in the Base Cases

(All Fig in MW)

Sl. No.	Name of the Line	Scenario No.	Owner	Maximum Loading	Rating (MW)	Remark
1.	Kahalgaon-B – Farakka 400kV D/c line	6,7	ISTS	717	850 (Twin Moose)	Due to merit order despatch, the generations of Sagardighi has been switched off. Increase in generation at Sagardighi can relieve this problem
2.	Farakka – Sagardighi 400kV D/c line	1,4	ISTS	841	1093 (Twin Moose)	
3.	Rourkela – Chaibasa 400kV D/c line	2	ISTS	811	1093 (Twin Moose)	Due to high generation in Chattisgarh, and low generation in West Bengal, this problem has arised. Additional corridor from Jharsuguda to Jharkhand may be planned to control this power flow.
4.	Sipat – Ranchi 400kV D/c line	1,2,3	ISTS	750	850 (Twin Moose)	

b) Transformers

In the base case file prepared for 2027-28 timeframe, transformers at 2 nos. of 765/400 kV substations and 6 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 7-7**.**

Table 7-7: 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, 2X1500 MVA Jharsuguda-A ICTs	2, 3	ISTS	1302	1500	After removal of 400kV LILOs at Angul, the major demand of Odisha is met from Jharsuguda S/s only. 765kV corridor from

Sl. No.	Name of the Element	Scenario No.	Owner	Maximum Loading	Rating (MVA)	Remark
2.	765/400kV, 2X1500 MVA Jharsuguda-B ICTs	3	ISTS	1269	1500	Angul to STU network by OPTCL (which was planned earlier and presently kept in abeyance) can relieve this problem
3.	400/220kV, 2x315MVA ICTs at Kolaghat TPS	1,4,5	STU (WBSETCL)	303	315	WBSETCL has proposed to shift 210MW units from 400kV level to 220kV level to reduce the loading of ICTs.
4.	400/220kV, 3x315MVA ICTs at Chanditala	1,2,3,4,5,6	STU (WBSETCL)	328	315	WBSETCL may take action regarding upgradation / replacement of ICT as discussed in the CMETS
5.	400/220kV, 3x315MVA ICTs at Kharagpur	2,3,5,6	STU (WBSETCL)	273	315	
6.	400/220kV, 4x315MVA ICTs at Jeerat	1,2,3,4,5,6	STU (WBSETCL)	299	315	
7.	400/220kV, 3x315MVA ICTs at Bidhannagar	1,4	STU (WBSETCL)	271	315	
8.	400/220kV, 2x315MVA ICTs at Bokaro TPS	4,7	ISTS (DVC)	460	500	Proper utilization of Dhanbad 400kV (ISTS) S/s may reduce the loading of Bokaro ICTs. DVC may plan 220kV outlets from Dhanbad (ISTS) to feed the loads at Bokaro.

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.

765kV & 400kV buses having voltage more than 1.05 pu are Tabulated at Table 7-8.

Table 7-8: Buses having more than 1.05 pu Voltage in ER

Sl. No.	Bus Name	Voltage Level (kV)	Owner	Max (pu)	Scenario
1.	Duburi	400	ISTS	1.05	9
2.	Paradeep	400	STU	1.06	9
3.	Meramundali-B	400	STU	1.06	9

765kV & 400kV buses having voltage more than 1.05 pu are Tabulated at Table 7-9**.**

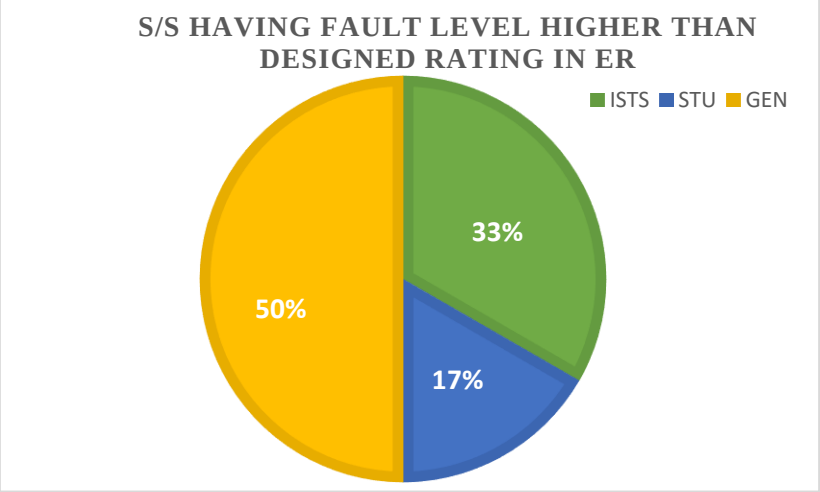
Table 7-9: Buses having more than 1.05 pu Voltage in ER

Sl. No.	Bus Name	Voltage Level (kV)	Owner	Max (pu)	Scenario
1.	Mendhasal	400	STU	0.94	2
2.	Pandiabili	400	ISTS	0.94	2
3.	Narendrapur	400	STU	0.95	2

Sl. No.	Bus Name	Voltage Level (kV)	Owner	Max (pu)	Scenario
4.	Rajarhat	400	ISTS	0.91	6
5.	Jeerat	400	ISTS	0.92	6
6.	Subhasgram	400	ISTS	0.91	6
7.	Kolaghat	400	STU	0.94	6
8.	Haldia-TPS	400	STU	0.94	6
9.	Chanditala_N	400	STU	0.94	6
10.	Bakraswar	400	STU	0.93	6
11.	Arambagh	400	STU	0.94	6
12.	New Laxmktnp	400	STU	0.92	6
13.	Jeerat-New	400	ISTS	0.92	6
14.	Jeerat7	765	ISTS	0.94	6

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 4 nos. of 400kV ISTS S/s and 2 nos STU S/s in ER have crossed their designed fault level rating. Owner wise distribution of these buses and scenarios in which these buses are crossing the design fault level are shown in Figure 7-2**.**



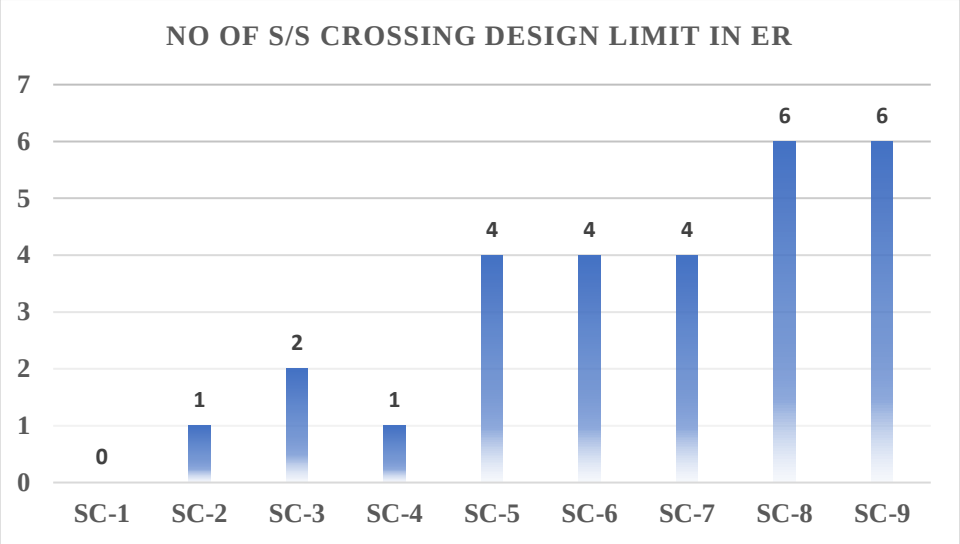


Figure 7-2: Substations crossing the design limit in ER

Details of the ISTS buses exceeding the designed fault level under any scenario are tabulated below at Table 7-10**.**

Table 7-10: ISTS Buses Exceeding Designed Fault Level in Eastern Region

(All Fig in kA)

Sl. No.	Substation Name	Owner	Scenario No.	Highest Fault level	Designed Rating
1.	400kV Barh	NTPC	5,6,7,8,9	43	40
2.	400kV Farakka	NTPC	5,6,7,8,9	46	40
3.	400kV Siliguri	POWERGRID	8,9	40	40
4.	400kV Ranchi	POWERGRID	All	51	40

From the above, it can be seen that 4 nos. of buses i.e. 400kV Barh, 400kV Farakka, 400kV Siliguri & 400kV Ranchi violates the design fault level. The fault level control measures for Farakka have been implemented. Detailed studies are being carried out for the balance 3 no. S/s and the same would be discussed in the upcoming CMETS meeting and the corrective measures shall be included in the next Rolling Plan.

Further, STU buses exceeding the designed fault level under different scenario are mentioned at Table 7-11**.**

Table 7-11: STU Buses Exceeding Designed Fault Level in Eastern Region

(All Fig in kA)

Sl. No.	Substation Name	Owner	Scenario No.	Highest Fault level	Designed Rating
1.	400kV Sagardighi	WBSEDCL	8,9	43	40
2.	400kV Patratu	JUSNL	5,6,7,8,9	41	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:

a) Transmission Lines

ISTS lines loaded beyond 90% of thermal rating under N-1 contingency are summarized below at Table 7-12**.**

Table 7-12: ISTS Transmission lines not meeting N-1 Criteria in Eastern 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.	Varanasi – Sasaram 400kV line-1	Fatehpur – Sasaram 765kV line-1	1	ISTS	497	787	850 (Twin Moose)	93%
2.	Ranchi New – Dharamjaygarh 765kV Line-1	Ranchi New – Dharamjaygarh 765kV Line-2	2,3	ISTS	2451	3474	3500 (Quad Bersemis)	99%
3.	Ranchi – Sipat 400kV line-1	Ranchi – Sipat 400kV line-2	1,2,3	ISTS	792	954	850 (Twin Moose)	112%
4.	Kahalgaon – Farakka 400kV line-1	Kahalgaon – Farakka 400kV line-2	5,6,7,8	ISTS	717	1033	850 (Twin Moose)	121%
5.	Rourkela – Chaibasa 400kV line-1	Rourkela – Chaibasa 400kV line-2	2,3	ISTS	811	1073	1093 (Twin Moose)	98%
6.	Sterlite – Lapanga 400kV line-1	Sterlite – Lapanga 400kV line-2	1,2,3,5	STU	745	1320	1093 (Twin Moose)	121%
7.	Farakka – Sagardighi 400kV Line-1	Farakka – Sagardighi 400kV Line-2	1,4	ISTS	842	1090	1093 (Twin Moose)	100%

Further, STU lines loaded beyond 90% of thermal rating under N-1 contingency are summarized below at Table 7-13**.**

Table 7-13: STU Transmission lines not meeting N-1 Criteria in Eastern Region

(All Fig in MW)

Sl. No.	Name of the Line	Contigency	Scenario No.	Owner	Base case Loading	Loading under N-1	Rating	% Loading
1.	Sterlite – Lapanga 400kV line-1	Sterlite – Lapanga 400kV line-2	1,2,3,5	OPTCL	745	1320	1093 (Twin Moose)	121%

b) Transformers

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

Table 7-14: ISTS ICTs not meeting N-1 Criteria in Eastern 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, 4X1500 MVA ICTs at Gaya	1	ISTS	1092	1383	92%	1500	High RE injection from NR
2.	765/400kV, 4X1500 MVA ICTs at Jharsuguda-A	1,2,3,5	ISTS	1328	2055	137%	1500	High RE injection from NR/WR. After removal of 400kV LILOs at Angul, the major demand of Odisha is met from Jharsuguda S/s only. 765kV corridor from Angul to STU network by OPTCL (which was planned earlier and presently kept in abeyance) can relieve this problem
3.	765/400kV, 4X1500 MVA ICTs at Jharsuguda-B	1,2,3,4, 5,6	ISTS	1271	2025	135%	1500	
4.	400/220kV, 2x500MVA ICTs at Rajarhat	2,3,5,6	ISTS	358	495	99%	500	Increasing demand of Kolkata and nearby areas with reduced / retired generations of WBSEDCL is leading to overloading of ICTs. CESC is augmenting 1x500MVA ICT at Subhasgram. Augmentation of ICTs at Rajarhat and Jeerat may be taken up to relieve the loading in this area.
5.	400/220kV, 4x315+1x500 MVA ICTs at Subhasgram	2,3,5,6	ISTS + CESC	243	303	96%	315	
6.	765/400kV, 2x1500MVA ICTs at Jeerat New	3,5,6	ISTS	1023	1685	112%	1500	
7.	400/220kV, 2x500MVA ICTs at Durgapur TPS	3	ISTS (DVC)	335	478	96%	500	DVC has planned to augment the transformation capacity at their 400/220kV S/s by replacing existing 315MVA ICTs of Bokaro with 500MVA ICTs. After the release of ICT from Bokaro TPS, the same would be shifted to Mejia-B (as 2nd ICT) and Raghunathpur TPS (as 3rd ICT), there resolving this overloading.
8.	400/220kV, 2x500MVA ICTs at Raghunathpur TPS	6	ISTS (DVC)	218	308	98%	315	
9.	400/220kV, 3x500MVA ICTs at Maithon-B	1,7	ISTS	233	286	91%	500	Under Boundary Condition. May be reviewed under next rolling plan
10.	400/220kV, 2x315MVA ICTs at Koderma TPS	2,3,4,5,6,8	ISTS (DVC)	268	422	134%	315	Suitable augmentation of ICTs may be taken up by DVC.
11.	400/220kV, 2x315MVA ICTs at Bokaro-A TPS	1,3,4,6, 7,8	ISTS (DVC)	462	709	142%	500	Proper utilization of Dhanbad 400kV (ISTS) S/s may reduce the loading of Bokaro ICTs. DVC may plan 220kV outlets from Dhanbad ISTS to feed the loads at Bokaro.

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 7-15**.**

Table 7-15: STU ICTs not meeting N-1 Criteria in Eastern 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, 2x500MVA ICTs at Buxar TPS	5,8	BSPTCL	296	477	95%	500
2.	400/220kV, 3x315MVA ICTs at Mendhasal	2,3,5	OPTCL	306	379	120%	315
3.	400/220kV, 2x315MVA ICTs at Meramunadli	2,3	OPTCL	260	328	104%	315
4.	400/220kV, 4x315MVA ICTs at Jeerat	1,2,3,4, 5,6	WBSETCL	304	358	114%	315
5.	400/220kV, 1x315MVA ICTs at Sagardidhi (Under outage of 1x315MVA ICT at Gokarna)	5,6	WBSEDCL	258	294	93%	315
6.	400/220kV, 2x315MVA ICTs at Kolaghat TPS	1,2,3,4, 5,6,7	WBSETCL	304	450	143%	315
7.	400/220kV, 3x315MVA ICTs at Chanditala	1,2,3,4, 5,6	WBSETCL	339	419	133%	315
8.	400/220kV, 3x315MVA ICTs at Kharagpur	1,2,3,4, 5,6	WBSETCL	275	381	121%	315
9.	400/220kV, 3x315MVA ICTs at Gokarna	1,2,3,4, 5,6	WBSETCL	253	316	100%	315
10.	400/132kV, 2x315MVA ICTs at New Laxmikantpur	2,3,5,6	WBSETCL	264	392	124%	315
11.	400/220kV, 2x500MVA ICTs at Satgachia	3,5,6	WBSETCL	300	466	93%	500
12.	400/220kV, 3x315MVA ICTs at Bidhannagar	4,6	WBSETCL	270	343	109%	315
13.	400/220kV, 2x315MVA ICTs at Tenughat TPS	2	JUSNL	201	298	95%	315
14.	400/220kV, 2x315MVA ICTs at Daltonganj	1,7	JUSNL	191	307	98%	315

From above, it is observed that 1 no. of S/s of BSPTCL, 2 nos. of S/s each of JUSNL & OPTCL and 9 nos. of S/s of WBSETCL/WBSEDCL are not complying N-1 criteria in 2027-28 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 WBSETCL are hitting more than 120% loading under N-1 Contingency. WBSETCL may take actions in a progressive manner for upgradation / replacement of ICT as discussed in the CMETS meeting.

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 Present Power Supply Scenario

8.1 Present Power Supply Scenario as on Mar'2022

As on Mar'2022, total Installed Capacity (IC) of North Eastern Region was about 4943MW and the peak demand met was about 3427MW. The state-wise breakup of installed capacity and peak demand is summarised at Table 8-1 below.

(All Fig in MW)

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

State	Thermal			Renewable			Grand Total	Peak Demand
	Coal	Gas	Total	Hydro	RES	Total		
Assam	402	765	1168	522	154	676	1843	2126
Arunachal Pradesh	37	47	84	545	142	687	771	197
Meghalaya	52	110	161	409	50	459	621	408
Tripura	56	519	575	68	31	99	674	328
Manipur	47	118	164	95	18	113	277	258
Nagaland	32	74	106	66	34	100	206	173
Mizoram	31	60	92	98	44	142	233	169
Central Unallocated	113	64	176	140	0	140	316	-
Total	**770**	**1757**	**2526**	**1943**	**473**	**2416**	**4941**	**3427**

Source: CEA monthly report

8.2 Envisaged Power Supply Scenario

As per the 19th EPS, North Eastern Region demand for 2027-28 timeframe is expected to increase to about 7221MW. As per the inputs received from various stakeholders, total installed capacity of North Eastern Region for 2027-28 is expected to be about 7534MW. The state wise bifurcation of installed capacity and peak demand is summarized below at Table 8-2**.**

Table 8-2: North Eastern Region Installed Capacity and peak demand (2027-28)

(All Fig in MW)

State / UTs / Sector	Thermal	Hydro	Solar	Gas	Total	Peak Demand
Assam	0	220	200	347	767	4483
Arunachal Pradesh	0	24	142	0	166	519
Meghalaya	0	490	50	0	540	651
Tripura	0	0	31	149	180	533
Manipur	0	0	18	0	18	718
Nagaland	0	24	34	0	58	347
Mizoram	0	28	44	0	72	271
Central	750	3630	0	1353	5733	
NER	**750**	**4416**	**519**	**1849**	**7534**	**7221**

There is a massaive growth in peak demand of North Eastern Region from present time-frame (2021-22) to 2027-28 with a CAGR of 13%. The state wise peak demand growth is given at Table 8-3.

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

(All Fig in MW)

State	2021-22	2027-28	Increase in demand	CAGR
Assam	2126	4483	2357	13.2%
Arunachal Pradesh	197	519	322	17.5%
Meghalaya	408	651	243	8.1%
Tripura	328	533	205	8.4%
Manipur	258	718	460	18.6%
Nagaland	173	347	174	12.3%
Mizoram	169	271	102	8.2%
Total	**3427**	**7221**	**3794**	**13.2%**

From the above data it is observed that the CAGR growth of peak demand is maximum for Manipur (18.6%) and minimum for Meghalaya (8.1%) which is higher than the National CAGR of 7.7%.

8.3 Load Generation Balance for 2027-28 timeframe

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 North Eastern Region Load Generation Balance (LGB) for 2027-28 time-frame. For North Eastern Region also, three points on the daily load curve i.e. Solar max (afternoon), Peak load (evening) and Off-peak load (night) for three seasons viz. Monsoon (August), Summer (June) and Winter (February) have been considered.

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

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

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

The despatch from thermal generations have been done considering merit order despatch. Based on the LGB, state wise drawl from ISTS under these scenarios is summarised in Table 8-5. Further, both maximum and minimum import of each state is also highlighted in table below.

Table 8-5: 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)
Arunachal Pradesh	207	390	297	179	334	227	146	337	180
Assam	2475	3067	2331	2273	2581	1741	2037	2607	1448
Manipur	421	570	434	389	492	337	337	486	259
Meghalaya	39	76	51	9	5	-38	158	147	88
Mizoram	139	190	144	127	161	108	119	167	89
Nagaland	186	254	193	171	216	146	155	220	118
Tripura	312	296	225	288	239	161	250	234	148
Central	-2954	-4830	-3833	-2954	-5055	-3765	-1502	-3966	-1907
Total	827	13	-159	483	-1026	-1084	1701	231	422

Out of these nine scenarios, Scenario-6 and Scenario-7 corresponds to two extreme cases with import / export requirement of North Eastern Region i.e. maximum export (1084MW) and Maximum import (1701MW) scenarios respectively. In all other scenarios, the import / export of North Eastern Region varies between these two extremes.

Considering the above LGB for nine scenarios, load flow cases were prepared for 2027-28 timeframe. Detailed system studies have been carried out on the finalized load flow cases. The study results are discussed in subsequent sections.

8.4 ISTS Network Expansion Scheme in North Eastern Region

Various transmission schemes have been discussed/finalized in the Consultative Meeting for Evolution of Transmission System of North Eastern Region (CMETS-NER) from March 2022 to July 2022. The details of the schemes are summarized below:

8.4.1 Mizoram

(a) North-Eastern Region Expansion Scheme-XVIII (NERES-XVIII)

i. Reconductoring of Melriat (POWERGRID) – Zuangtui (Mizoram) 132kV ACSR Panther S/c line with Single HTLS conductor of 900A (at nominal voltage level).

ii. One (1) new 132kV line bay at Melriat (POWERGRID) S/s (of rating commensurate with rating of HTLS viz. 900A) for termination of Melriat (POWERGRID) – Zuangtui (Mizoram) 132kV HTLS line.

iii. Replacement of existing CT of 600/1A at Zuangtui (Mizoram) end in Melriat (POWERGRID) – Zuangtui (Mizoram) 132kV S/c line with rating commensurate with ampacity (900A) of HTLS conductor.

iv. Reconductoring of Aizawl (POWERGRID) – Luangmual (Mizoram) 132kV ACSR Panther S/c line with Single HTLS rating of HTLS conductor of 800A (at nominal voltage level).

v. Replacement of existing CT of 600/1A at Luangmual (Mizoram) end in Aizawl (POWERGRID) – Luangmual (Mizoram) 132kV S/c line with rating commensurate with ampacity (800A) of HTLS conducto

vi. Installation of OPGW in Aizawl (POWERGRID) – Luangmual (Mizoram) 132kV S/c line.

- **Reconductoring of Melriat (POWERGRID) – Zuangtui (Mizoram) 132kV line**

  Presently, 132kV Melriat (POWERGRID) – Zuangtui (Mizoram) line carries about 70MW power. In future time frame of 2024-25, power demand of Mizoram is expected to grow to about 215MW from present level of about 160MW, and in such case the Melriat (POWERGRID) – Zuangtui 132kV line is found to be critically loaded in base case itself, about 88MW. Further, with N-1 of either Sihhmui – Zuangtui or Aizawl (POWERGRID) – Luangmual, the loading on Melriat (POWERGRID) – Zuangtui 132kV line increases to 112MW or 146MW respectively. N-1 of Melriat (POWERGRID) – Zuangtui results in overloading of Sihhmui – Zuangtui line. Accordingly, for reliable power supply to Mizoram from ISTS, reconductoring of Melriat (POWERGRID) – Zuangtui (Mizoram) 132kV S/c ISTS line and Sihhmui – Zuangtui 132kV S/c Intra-State line has been agreed in the 8th CMETS-NER held on 27-06-2022.

  Reconductoring of Melriat (POWERGRID) – Zuangtui (Mizoram) 132kV ACSR Panther S/c line with Single HTLS rating of 900A along with upgradation of line bay equipment at Melriat

(POWERGRID) and Zuangtui (Mizoram) ends commensurate with rating of HTLS, as required has been agreed in 8th CMETS-NER.

- **Reconductoring of Aizawl (POWERGRID) – Luangmual (Mizoram) 132kV line**

It has been observed that to meet the power supply requirement of central and southern part of Mizoram, with about 100MW of demand, there are only two 132kV lines viz. Aizawl (POWERGRID) – Luangmual and Zuangtui – Serchip. N-1 of any of these two lines, results in overloading of the other line. Moreover, N-1 of these lines, results in Luangmual or Serchip getting feed through about 250km long 132kV corridor, which results into critical voltage drop along the corridor necessitating requirement of capacitor banks at intermediate substations in southern part of Mizoram. In case of N-1 of Aizawl (POWERGRID) – Luangmual line, complete voltage collapse occurs in southern Mizoram grid without capacitive support, as the major part of Mizoram gets dependent for power from a single source viz. Zuangtui.

In view of the above, reconductoring of both Aizawl (POWERGRID) – Luangmual (Mizoram) 132kV S/c ISTS line and Zuangtui (Mizoram) – Serchip (Mizoram) 132kV S/c Intra-State line along with installation of capacitor banks in southern Mizoram grid (under intra-state) has been agreed in the 8th CMETS-NER. Reconductoring of Aizawl (POWERGRID) – Luangmual (Mizoram) 132kV ACSR Panther S/c line with Single HTLS rating of HTLS conductor of 900A along with upgradation of line bay equipment at Aizawl (POWERGRID) and Luangmual (Mizoram) ends commensurate with rating of HTLS, as required has been agreed in 8th CMETS-NER.

Along with reconductoring works, installation of OPGW in Aizawl (POWERGRID) – Luangmual (Mizoram) has also been agreed in the meeting as existing line is not having OPGW.

Implementation timeframe: Apr 2025

8.4.2 Manipur

(a) North-Eastern Region Expansion Scheme-XIX (NERES-XIX)

i. Reconductoring of Loktak (NHPC) – Imphal (POWERGRID) 132kV S/c line with HTLS conductor (with Ampacity of single HTLS as 800A at nominal voltage) along with strengthening of associated structure in NHPC switchyard, if necessary.

ii. Replacement of existing CT of 600-400-200/1A at Loktak HEP end in Loktak – Imphal 132kV S/c line with rating commensurate with ampacity (800A) of HTLS conductor.

Loktak (NHPC) – Imphal (POWERGRID) 132kV S/c line (36.6km) is very old (commissioned in June 1982). 132kV lines in this area are in difficult hilly terrain and prone to frequent outages, which affects reliability of power drawl requirement in the area. N-1-1 contingency near Loktak HEP (105MW) results in power evacuation constraints for Loktak HEP. Since Dimapur – Imphal and Loktak – Jiribam 132kV S/c lines are already agreed for reconductoring with HTLS conductor hence Loktak – Imphal becomes limiting constraint for power evacuation from Loktak HEP. In first week of May 2022 simultaneous outage of Jiribam (MSPCL) – Rengpang and Loktak – Ningthoukhong

occured, which resulted in limitation in power evacuation from Loktak HEP to 70MW. Thus, Loktak – Rengpang – Jiribam (MSPCL) does not offer reliable path for power evacuation. Accordingly, for reliable power evacuation, and reliable & secure power supply in the area including state capital of Imphal, reconductoring of Loktak (NHPC) – Imphal (POWERGRID) 132kV S/c line with HTLS conductor of 800A along with bay upgradation (change of CT) and strengthening of associated structure in NHPC switchyard, if required, was agreed in 8th CMETS-NER held on 27-06-2022.

Implementation timeframe:18 months from date of allocation.

8.5 Measures taken for mitigation of the issues of 2026-27 Rolling plan

Only two constraints at 400kV was reported under N-1 contingency in the last rolling plan of 2026-27. Misa – Balipara 400kV D/c line was under the boundary condition and 400/220kV, 2x500MVA ICT at Khumtai was under Intra state. In the CMETS-NER meeting, it was deliberated that transmission system requirement may be assessed for next 8-10 years' time horizon keeping in view the time taken for arrangement of funds and 6 months working season for implementation activities. Detailed study for the mitigation of the above constraints would be carried out in the 10 years' transmission system studies for NER.

8.6 System study analysis and results for 2027-28 timeframe

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 2027-28 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 2027-28 timeframe, 6 nos. of ISTS lines and 30 nos. of STU 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 8-6.

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

(All Fig in MW)

Sl. No.	Name of the Line	Scenario No.	Owner	Maximum Loading	Rating (MW)
1.	Silchar-PG - Srikona 132kV Line - 1	2	ISTS	61	84
2.	Silchar-PG - Srikona 132kV Line - 2	2	ISTS	61	84
3.	Misa-PG - Balipara-PG 400kV Line - 1	1	ISTS	603	850
4.	Misa-PG - Balipara-PG 400kV Line - 2	1	ISTS	603	850
5.	Dimapur-Naga - Dimapur-PG 132kV Line - 1	2,3,5,8	ISTS	79	84
6.	Dimapur-Naga - Dimapur-PG 132kV Line - 2	2,3,5,8	ISTS+ DoP, Nagaland	79	84
7.	BTPS - Kokrajhar 132kV Line - 1	2	AEGCL	59	84
8.	Gogamukh - Dhemaji 132kV Line - 2	2,3,5,8	AEGCL	80	84

Sl. No.	Name of the Line	Scenario No.	Owner	Maximum Loading	Rating (MW)
9.	LRPP-Lakwa - Ltps-Lakwa 132kV Line - 1	2,5,8	AEGCL	66	84
10.	Gohpur-Split - Gohpur 132kV Line - @1	1,4	AEGCL	63	84
11.	CTPS - Sonapur 132kV Line - 1	2	AEGCL	60	84
12.	Gossaigaon - Gossaigaon-N 132kV Line - 1	2,8	AEGCL	68	84
13.	Gossaigaon - Gossaigaon-N 132kV Line - 2	2,8	AEGCL	68	84
14.	Gossaigaon - Agamoni 132kV Line - 1	2	AEGCL	66	84
15.	Dhaligaon - Barpeta 132kV Line - 1	1,2,3,5, 6,7,8	AEGCL	100	84
16.	Dhaligaon - Bijni-Bypass 132kV Line - 1	2,8	AEGCL	60	84
17.	Bornagar - Barpeta 132kV Line - 1	2,8	AEGCL	63	84
18.	Bordubi - NTPS-Namrup 132kV Line - 1	2,3,5,8	AEGCL	85	84
19.	Kalain - Panchgram 132kV Line - 1	1,4,5,6	AEGCL	81	84
20.	Kalain - Lumshnong 132kV Line - 1	1,2,3,4, 5,6	AEGCL+ MePTCL	90	84
21.	Jorhat West - Khumtai 132kV Line - 1	1,2,4,7	AEGCL	68	80
22.	Khumtai - Golaghat 132kV Line - 1	1,2,4	AEGCL	66	80
23.	Bijni-Bypass - Nathkuchi 132kV Line - 1	2	AEGCL	59	84
24.	Chabua - Tinsukia 132kV Line - 1	1,2	AEGCL	60	84
25.	LTPS-Lakwa - Moran 132kV Line - 1	2,5,8	AEGCL	71	84
26.	LTPS-Lakwa - Nazira 132kV Line - 1	2,5	AEGCL	65	84
27.	LTPS-Lakwa - Nazira 132kV Line - 2	2	AEGCL	63	84
28.	Khumtai - Mariani-Assm 220kV Line - 1	1,4,7	AEGCL	239	200
29.	Khumtai - Mariani-Assm 220kV Line - 2	1,4,7	AEGCL	239	200
30.	Khupi - Kimi-Kameng 132kV Line - 1	1,2,3,4, 5,6,8	DoP,AP	98	84
31.	Mawlai - Mawngap 132kV Line - 1	8	MePTCL	59	84
32.	Khlieriat-Me - Lumshnong 132kV Line - 1	1,2,4	MePTCL	61	84
33.	Nw Kohima-St - Kohima 132kV Line - 1	2	DoP, Nagaland	65	84
34.	Ningthou - Churachandrp 132kV Line - 1	2	MSPCL	63	84
35.	Ningthou - Churachandrp 132kV Line - 2	2	MSPCL	63	84
36.	Pkbari - Kumarghat-PG 132kV Line - 1	2	TSECL	43	60

b) Transformers

In the base case file prepared for 2027-28 timeframe, transformers at 4 nos. of 220/132kV substations having loading more than 70% of the ICT rating. Scenarios where loading is more than 70% of rating and maximum loading hit by these transformers in the simulation studies are tabulated below at Table 8-7.

Table 8-7: Transformers Loading in the Base Cases

(Max Loading in MW)

Sl. No.	Name of the Element	Scenario No.	Owner	Maximum Loading	Rating (MVA)
1.	220/132kV, 2X100 MVA Rangia ICTs	2	AEGCL	71	100
2.	220/132kV, 2X100 MVA Mariani ICTs	2	AEGCL	73	100

Sl. No.	Name of the Element	Scenario No.	Owner	Maximum Loading	Rating (MVA)
3.	220/132kV, 2X160 MVA Amingaon ICTs	2	AEGCL	113	160
4.	220/132kV, 2X100 MVA Tinsukia ICTs	2	AEGCL	72	100

8.6.2 Voltage Analysis

PU voltages of all 132kV and above 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.

765kV & 400kV buses having voltage more than 1.05 pu are Tabulated at Table 8-8.

Table 8-8: Buses having more than 1.05 pu Voltage in NER

Sl. No.	Bus Name	Voltage Level (kV)	Owner	Max (pu)	Scenario
1.	Daporijo	132	DoP, AP	1.05	9
2.	Along	132	DoP, AP	1.06	9
3.	Passighat	132	DoP, AP	1.06	9
4.	Niglok	132	DoP, AP	1.05	9
5.	Pasighat-New	132	DoP, AP	1.06	9
6.	Basar	132	DoP, AP	1.06	9
7.	Saiha	132	P&E Dept, Mizoram	1.07	4,9
8.	Serchip-bukp	132	P&E Dept, Mizoram	1.05	9
9.	Kawmzawl	132	P&E Dept, Mizoram	1.06	9
10.	Lawngtlai	132	P&E Dept, Mizoram	1.07	9
11.	Lunglei-khaw	132	P&E Dept, Mizoram	1.06	9
12.	Lungsen	132	P&E Dept, Mizoram	1.06	9

765kV & 400kV buses having voltage less than 0.95 pu are Tabulated at Table 8-9**.**

Table 8-9: Buses having more than 0.95 pu Voltage in NER

Sl. No.	Bus Name	Voltage Level (kV)	Owner	Max (pu)	Scenario
1.	Moran	132	AEGCL	0.95	1
2.	Nazira	132	AEGCL	0.95	1
3.	Sibsagar	132	AEGCL	0.94	1,4

8.6.3 Short Circuit Analysis

Short circuit level was calculated for all 132kV and above buses of North Eastern Region and it was observed that no 132kV and above bus were crossing its design limit.

8.6.4 Contingency Analysis

Contingency analysis has been performed on all the 132kV and above transmission lines & transformers to ascertain the loading levels under outage of any other 132kV & above 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 8-10**.**

Table 8-10: ISTS Transmission lines not meeting N-1 Criteria in North Eastern 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.	Kopili – Khandong 132kV line-1	Kopili – Khandong 132kV line-2	1,2,3,4, 5,7,8,	ISTS	57	107	84	127%
2.	Misa – Balipara 400kV line-1	Misa – Balipara 400kV line-2	1,4,7	ISTS	612	922	850	108%

Reconducoting of Kopili – Khandong 132kV line is under discussion in the CMETS-NET meeting. Detailed study for Misa – Balipara 400kV line needs to be carried out to ascertain the requirement of augmentation in this area.

Further, STU lines loaded beyond 90% of thermal rating under N-1 contingency are summarized below at Table 8-11**.**

Table 8-11: STU Transmission lines not meeting N-1 Criteria in North Eastern Region

(All Fig in MW)

Sl. No.	Name of the Line	Contigency	Scenario No.	Owner	Base case Loading	Loading under N-1	Rating	% Loading
1.	BTPS – Kokrajhar 132kV line-1	Gossaigaon – Agamoni 132kV line-1	1,2,3,4, 5,6,8	AEGCL	58	124	84	147%
2.	Gogamukh – Dhemaji 132kV line-1	Gogamukh – North Lakhimpur 132kV line-1	2,5,8	AEGCL	80	95	84	113%
3.	Gogamukh – North Lakhimpur 132kV line-1	Gogamukh – Dhemaji 132kV line-1	2	AEGCL	34	78	84	93%
4.	Kahilipara – GMC 132kV line-1	Kahilipara – GMC 132kV line-2	2,5	AEGCL	44	88	84	105%
5.	Kahilipra – Dispur 132kV line-1	CTPS – Sonapur 132kV line-1	2	AEGCL	30	78	84	93%
6.	CTPS – Sonapur 132kV line-1	Kahilipra – Dispur 132kV line-1	2	AEGCL	60	84	84	100%
7.	Gauraipur – Agamoni 132kV line-1	BTPS – Kokrajhar 132kV line-1	2,3,5,8	AEGCL	44	103	84	123%
8.	Gossaigaon – Gossaigaon New 132kV line-1	Gossaigaon – Gossaigaon New 132kV line-1	1,2,3,5, 6,7,8	AEGCL	68	132	84	157%
9.	Gossaigaon – Agamoni 132kV line-1	BTPS – Kokrajhar 132kV line-1	1,2,3,4, 5,6,8	AEGCL	66	130	84	155%

Sl. No.	Name of the Line	Contigency	Scenario No.	Owner	Base case Loading	Loading under N-1	Rating	% Loading
10.	Dhaligaon – Barpeta 132kV line-1	Bijni bypass – Nathkuchi 132kV line-1	2,3,5,8	AEGCL	100	109	84	130%
11.	Dhaligaon – Bijni bypass 132kV line-1	Rangia – Nalbari 132kV line-1	1,2,3,4 5,6,8	AEGCL	60	124	84	147%
12.	Rangia – Kamalpur 132kV line-1	Rangia – Kamalpur 132kV line-2	2	AEGCL	46	76	84	90%
13.	Rangia – Pathsa bypass 132kV line-1	Dhaligaon – Barpeta 132kV line-1	2,5,8	AEGCL	13	99	84	118%
14.	Rangia – Nalbari 132kV line-1	Bijni bypass – Nathkuchi 132kV line-1	1,2,3,5, 8	AEGCL	57	111	84	132%
15.	Bornagar – Pathsa bypass 132kV line-1	Dhaligaon – Barpeta 132kV line-1	2,5,8	AEGCL	15	94	84	112%
16.	Bordubi – NTPS Namrup 132kV line-1	LTPS Lakwa – Moran 132kV line-1	3,5,6,8	AEGCL	79	111	84	132%
17.	Kalain – Lumshnong 132kV line-1	Khlieriat – Badarpur 132kV line-1	3,4,5,6	AEGCL + MePTCL	90	109	84	130%
18.	Kalain – Panchgram 132kV line-1	Khlieriat – Badarpur 132kV line-1	4,6	AEGCL	81	101	84	120%
19.	Jorhat West – Khumtai 132kV line-1	Khumtai – Golaghat 132kV line-1	1,4	AEGCL	70	80	80	100%
20.	Khumtai – Golaghat 132kV line-1	Jorhat West – Khumtai 132kV line-1	1,2,4	AEGCL	66	85	80	106%
21.	Balipara – Bhalukpong 132kV line -1	Kameng 400/132kV, 1x200MVA ICT-1	2,8	DoP, AP	88	93	84	104%
22.	Bijni bypass – Nathkuchi 132kV line-1	Rangia – Nalbari 132kV line-1	1,2,3,5, 8	AEGCL	59	114	84	138%
23.	Chabua – Tinsukia 132kV line-1	LTPS Lakwa – Moran 132kV line-1	1,2,3,4, 5,6,8	AEGCL	59	132	84	158%
24.	Chabua – Dibrugah 132kV line-1	LTPS Lakwa – Moran 132kV line-1	2,3,5,8	AEGCL	34	103	84	123%
25.	LTPS Lakwa – Moran 132kV line-1	Chabua – Tinsukia 132kV line-1	1,2,3,4, 5,6,8	AEGCL	69	132	84	157%
26.	LTPS Lakwa – Nazira 132kV line-1	LTPS Lakwa – Nazira 132kV line-2	2,3,5,6, 8	AEGCL	64	116	84	139%
27.	Dibrugarh – Moran 132kV line-1	Chabua – Tinsukia 132kV line-1	2,5	AEGCL	30	89	84	106%
28.	Silchar – Srikona 132kV line-1	Silchar – Srikona 132kV line-2	2,3,5,8	AEGCL	61	119	84	142%
29.	Salakati – Agia 220kV line-1	Salakati – Agia 220kV line-1	2,8	AEGCL	154	231	250	93%
30.	Salakati – Dhaligaon 220kV line-1	Salakati – Dhaligaon 220kV line-2	2,8	AEGCL	150	255	250	102%
31.	Khumtai – Mariani 220kV line-1	Khumtai – Mariani 220kV line-1	1,4,7	AEGCL	230	336	200	138%
32.	Sarusujai – Azara 220kV line-1	Sarusujai – Azara 220kV line-2	8	AEGCL	141	238	250	95%
33.	Khupi – Dikshi 132kV line-1	Kameng 400/132kV, 1x200MVA ICT	2	DoP, AP	10	85	84	101%

Sl. No.	Name of the Line	Contigency	Scenario No.	Owner	Base case Loading	Loading under N-1	Rating	% Loading
34.	Khupi – Kimi 132kV line-1	Gerukamukh – Naharlagun New 132kV line-1	1,2,3,4, 5,6,8	DoP, AP	98	121	84	143%
35.	Gerukamukh – Likabali 132kV line-1	Ranganadi – Ziro 132kV line-1	1,2,4	DoP, AP	59	87	84	103%
36.	Likabali – Niglok 132kV line-1	Ranganadi – Ziro 132kV line-1	1,4	DoP, AP	52	80	84	95%
37.	Umiam – Umian-1 132kV line-1	Mawlai – NEHU 132kV line-1	2,7,8	MePTCL	52	85	84	101%
38.	Nangalbibra (ISTS) – Nangalbibra 132kV line-1	Nangalbibra (ISTS) – Nangalbibra 132kV line-1	2,5,8	MePTCL	48	91	84	108%
39.	Mawlai – NEHU 132kV line-1	Umiam – Umian-1 132kV line-1	7.8	MePTCL	55	101	84	120%
40.	NEHU – Umiam 132kV line-1	Mawlai – NEHU 132kV line-1	7	MePTCL	459	91	84	108%
41.	Khlieriat – Lumshnong 132kV line-1	Khlieriat – Badarpur 132kV line-1	1,2,4	MePTCL	67	87	84	103%
42.	Khlieriat – Mynkre 132kV line-1	Khlieriat – Mynkre 132kV line-2	1,2,3,4, 5,6	MePTCL	51	103	84	123%
43.	Leshka HEP – Mynkre 132kV line-1	Leshka HEP – Mynkre 132kV line-2	1,2,3,4, 5,6,8	MePTCL	58	117	84	140%
44.	New Kohima – Kohima 132kV line-1	Dimapur PG – Kohima 132kV line-1	2	DoP, Nagaland	65	80	84	95%
45.	Dimapur PG- Dimapur 132kV line-1	Dimapur PG- Dimapur 132kV line-2	1,2,3,4, 5,6,7,8	ISTS + DoP Nagaland	79	157	84	187%
46.	Ningthoukong – Churachandpur 132kV line-1	Ningthoukong – Churachandpur 132kV line-2	1,2,3,4, 5,8	MSPCL	63	106	84	127%
47.	Melriat – Lunglei 132kV line-1	Zuangtui – Serchip 132kV line-1	2	P&E Dept, Mizoram	40	84	84	100%

From the above table, it is seen that 32 nos. of 132kV and 220kV lines of AEGCL is violating N-1 contingency crieteria. Transmission lines of MePTCL (7 lines), DoP-AP (4 lines) and DoP, Nagaland (2 lines) Manipur (1 line) and Mizoram (1 line) are also found to be loaded substantially. Accordingly, STUs are adviced to initiate actions to mitigate these overloadings in a timely manner.

b) Transformers

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

STU ICTs loaded beyond 90% of MVA rating under N-1 contingency are summarized below at Table 8-12**.**

Table 8-12: STU ICTs not meeting N-1 Criteria in North Eastern 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.	220/132kV, 1x100 MVA ICTs at Agia under outage of 1x160MVA ICT at Agia	2,5,8	AEGCL	46	93	93%	100
2.	220/132kV, 2x100 MVA ICTs at Mariani	2	AEGCL	75	100	100%	100
3.	220/132kV, 2x160 MVA ICTs at Amingaon	2	AEGCL	113	158	99%	160
4.	220/132kV, 2x160 MVA ICTs at Khumtai	1,2,4	AEGCL	102	161	101%	160
5.	220/132kV, 2x160 MVA ICTs at Tinsukia	1,2,5	AEGCL	73	106	106%	100
6.	220/132kV, 1x100 MVA ICTs at Boko under outage of 1x160MVA ICT at Boko	2	AEGCL	34	91	91%	100
7.	400/220kV, 2x500 MVA ICTs at Khumtai	1,4	AEGCL	344	550	110%	500

From above, it is observed that 7 no. of S/s of AEGCL are not complying N-1 criteria in 2027-28 timeframe. Some of them are violating the limits in present timeframe also and are continuously flagged by POSOCO in their Operational Feedback. AEGCL may take actions in a progressive manner for upgradation / replacement of ICT as discussed in the CMETS meeting.

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

- 1948MW 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 4168MW.

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 – 800MW
  - Gorakhpur (India) – New Butwal (Nepal) 400kV D/c (Quad) line: Requisite approvals are being obtained to take up implementation. – 1000MW
- 2nd circuit stringing of Kataiya (India) - Kusaha (Nepal) 132kV S/c on D/c line – 50MW

(iii) Under Discussion interconnection

- New Purnea (India) - New Duhabi (Nepal) 400kV (Quad) D/c line – 1500MW
- Bareilly New (India) - Lumki (Nepal) 400kV (Quad) D/c line – 1500MW

- Lucknow (India) – Kohalpur (Nepal) 400kV (Quad) D/c line – 1500MW
- 2nd circuit stringing of Raxaul (India) - Parwanipur (Nepal) 132kV S/c on D/c line – 50MW
- Nanpara (India) - Kohlapur (Nepal) 132kV D/c line – 35MW
- New Nautanwa (India) - Mainhiya (Nepal) 132kV D/c line – 35MW

9.5 India-Sri Lanka

(i) Under Discussion interconnection

- New Madurai – New Habarana 1000MW HVDC Bipole line

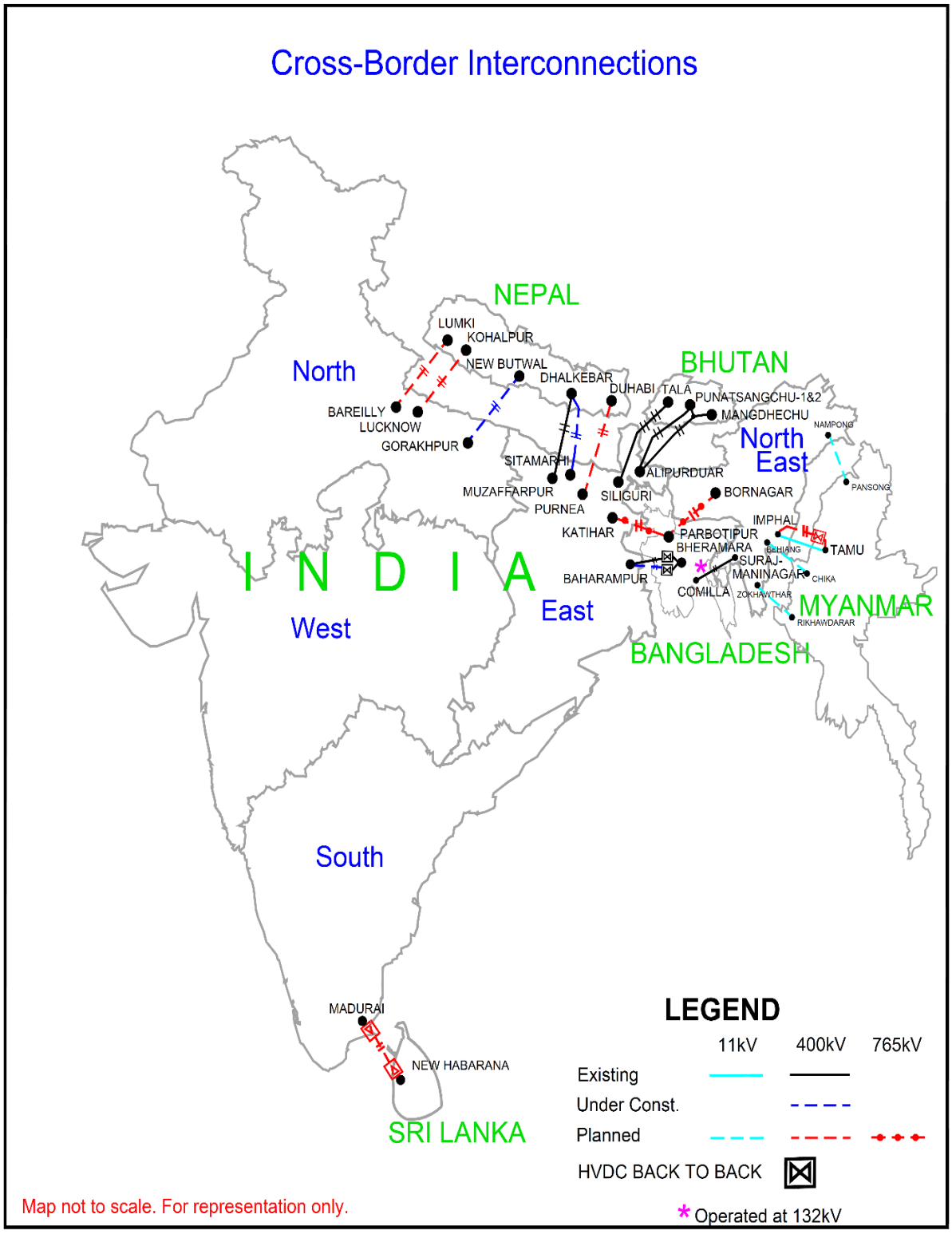
The cross-border transmission capacity of India with neighbouring countries in present time-frame and through under construction interconnections is summarized below in Table 9-1:

Table 9-1:Cross-border power transfer capacity by 2027-28

Country	Existing (MW)	Under Construction (MW)	Planned (MW)	Total (MW)
India-Bangladesh	1160	0	0	1160
India-Bhutan	1948	2220	0	4168
India-Myanmar	3	0	505	508
India-Nepal	1000	1850	4620	7470
India-Sri Lanka	0	0	1000	1000
Total	**4111**	**4070**	**6125**	**14306**

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

Figure 9-1: Cross-Border interconnections



Chapter 10: Conclusion

The installed capacity of Indian grid is expected to be about 594GW by 2027-28, wherein the power sector will see a decline in contribution of fossil fuel based energy source in total installed capacity from 58% (2021-22) to 43% (2027-28). Whereas, it will witness an increase in contribution of non-fossil fuel based energy sources in total installed capacity from 42% to 57%. Renewable generation alone is expected to see an increase of around 123% 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-fossil 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 2027-28 time-frame. 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 316 GW and 202 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 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 67 GW, 70 GW and 27 GW of surplus thermal generation would be available in Monsoon, Summer and Winter season respectively after meeting the all India demand in 2027-28 time-frame. If technical minimum of thermal units is reduced to 40%, then surplus generation reduces to 42 GW and 39 GW in Monsoon and Summer seasons respectively. This study also highlights the need for about 42 GW of energy storage in the grid to facilitate the RE integration of the order of 254 GW by 2027-28. 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 2027-28 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.

Cumulatively by 2027-28, transmission schemes comprising of 33,019 ckm of transmission lines and transformation capacity of 2,42,940 MVA at estimated cost of Rs 1,10,744 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 112.8GW (Mar’22) which constitute capacity from conventional sources (76% share) viz. Thermal (56.5%), Nuclear (1.5%) and large hydro (18%). Balance (24%) 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, Punjab, Rajasthan and Haryana, whereas hydro generation is concentrated in Jammu & Kashmir, Himachal Pradesh and Uttarakhand. Further, Rajasthan is a RE rich state comprising of large Solar & Wind capacity.

To meet the growing demand, NR is continuously progressing in generation capacity addition majorly through hydro and non-conventional/renewable sources. As per the 19th EPS, NR demand for 2027-28 timeframe is expected to increase to about 102.7 GW. As per the inputs received from various stakeholders, total installed capacity of NR for 2027-28 is expected to be about 180 GW.

Various transmission schemes i.e. Scheme to relieve high loading of 400 kV Bhinmal -Zerda line (WR-NR Inter regional scheme), Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-1) (Bikaner Complex), Implementation of "N -1" contingency at RE pooling substations in NR and High voltages in the Northern Region Grid Ph-I (Line reactors) have been evolved for implementation in the Consultation Meeting for Evolution of Transmission System in Northern Region (CMETS-NR) from Mar 2022 to Jul 2022. In this Rolling Plan, transmission schemes of about 2,720 ckm of transmission lines and 23,000 MVA of transformation capacity has been formulated at an estimated cost of Rs. 13,914 Cr. These schemes either been approved or under various stages of approval. Further, new expansions in Northern 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.

Thus, cumulatively by 2027-28, transmission schemes comprising of 17,852 ckm of transmission lines and transformation capacity of 1,09,200 MVA at estimated cost of Rs 88,048 Cr. is expected to be added in the grid.

Additionally, transmission schemes i.e. Transmission system for evacuation of RE power from Rajasthan Ph-IV (75GW) [Out of 75GW, 14GW scheme for Bikaner complex is already planned in this rolling plan], High voltages in the Northern Region Grid Ph-II (Bus reactors) is under planning and would be taken up in next rolling plan.

Western Region (WR)

The total installed generation capacity of WR is about 129GW (Mar'22) which constitute capacity from conventional sources (74% share) viz. Thermal (67%), Nuclear (1%) and large hydro (6%). Balance (26%) 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, Western region is continuously progressing in generation capacity addition majorly through thermal and non-conventional/renewable sources. The peak demand of Western Region for 2027-28 timeframe is expected to increase to about 100.4GW. As per the inputs

received from various stakeholders, total installed capacity of Western Region for 2027-28 is expected to be about 190 GW.

Various transmission systems have been evolved for implementation in the Consultation Meeting for Evolution of Transmission System in WR (CMETS-WR) from March 2022 to July 2022. These schemes have either been approved or are under various stages of approval. For integration of additional RE potential in Neemuch (2GW), Solapur (1GW), Dhule (2GW), Kallam & Parli (2GW), the transmission schemes have been evolved and under finalisation.

For mitigation of the issues highlighted in Rolling Plan of 2026-27-time frame, augmentation works have been discussed with the STUs in the Joint Study /CMETS-WR meetings. In this respect, Western Region Expansion Scheme XXXI Part A to Part C have been evolved in Maharashtra for overloadings on ICTs/lines & short circuit constraints. Further, transmission Network expansion schemes in MP has also been evolved to meet the ISTS drawal requirement of MP. In this Rolling Plan, four Nos. of transmission schemes of about 1500 MVA transformation capacity has been formulated at an estimated cost of Rs.233Cr.

Similarly, a number of ISTS and Intra-state schemes have also been evolved in Maharashtra & Madhya Pradesh to resolve import capability, overloading issues and to meet the growing demand of the state. Further, new expansions in Western 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.

Thus, cumulatively by 2027-28, transmission schemes comprising of 8,583 ckm of transmission lines and transformation capacity of 69,000 MVA at estimated cost of Rs 28,346 Cr. is expected to be added in the grid.

ISTS and Intra-State strengthening required to mitigate the issues highlighted in the current rolling plan are also under planning and would be taken up for detailed analysis.

Southern Region (SR)

Presently total installed generation capacity of SR is about 118 GW (Mar'22) which constitute capacity from conventional sources (61% share) viz. Thermal (48%), Nuclear (2.8%) and large hydro (10%). Balance (40%) 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. Southern Region demand for 2027-28 timeframe is expected to increase to about 89GW. As per the inputs received from various stakeholders, total installed capacity of Southern Region for 2027-28 is expected to be about 159 GW.

Various transmission systems have been evolved for implementation in the Consultation Meeting for Evolution of Transmission System in SR (CMETS-SR) from Mar'22 to Jul'22. These schemes have either been approved or under various stages of approval. For integration of additional RE potential in Gadag, Koppal, Davangere, Bijapur and Bellary area of Karnataka, transmission scheme for renewable energy zone (Phase-II) in Koppal-II and Common Transmission Scheme for integration of additional RE potential in Gadag, Davangere, Bijapur and Bellary & transmission scheme for renewable energy zone (Phase-II) in Gadag-II have been evolved and the scheme is under approval. The proposed scheme will facilitate in integration and immediate evacuation of RE potential in Koppal & Gadag area of Karnataka. In this Rolling Plan, transmission schems of about 440 ckm of transmission lines and 10,500 MVA of transformation capacity has been formulated at an estimated cost of Rs.4,636 Cr.

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, Mamidipally – Maheshwaram TS 400kV D/c line, Raichur – Veltoor 400kV S/c line, Pugalur New – Karur 400kV (Quad) D/c line etc. are crossing thermal limit under N-1 contingency. Further, new expansions in Southern 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

Thus, cumulatively by 2027-28, transmission schemes comprising of 4,780 ckm of transmission lines and transformation capacity of 61,000 MVA at estimated cost of Rs 20,824 Cr. is expected to be added in the grid.

Eastern Region (ER)

The total installed generation capacity of ER is about 34.3GW (Mar'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. The peak demand of Eastern Region for 2027-28 timeframe is expected to increase to about 37.4GW. As per the inputs received from various stakeholders, total installed capacity of Eastern Region for 2027-28 is expected to be about 60.22 GW.

Various transmission schemes i.e reconductoring of Jharsuguda – Rourkela 400kV 2xD/c line (WR-ER interconnections), reconductoring of Rangpo – Gangtok 132kV D/c line, augmentation of reactive compensation at Biharsharif, Jamshedpur, Maithon S/s have been evolved in the

Consultation Meeting for Evolution of Transmission System in Eastern Region (CMETS-ER) from March 2022 to July 2022. In this Rolling Plan, bus / line reactors and reconductoring of Jharsuguda – Rourkela 400kV 2xD/c line at an estimated cost of Rs.481 Cr. has been formulated. 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.

Thus, cumulatively by 2027-28, transmission schemes comprising of 315 ckm of transmission lines and transformation capacity of 1,500 MVA at estimated cost of Rs 1,295 Cr. is expected to be added in the grid.

North Eastern Region (NER)

Presently total installed generation capacity of NER is about 4.9GW (Mar'22) which constitute capacity from coal (16% share), gas (36%), hydro (39%) 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. The peak demand of North Eastern Region demand for 2027-28 timeframe is expected to increase to about 7.2GW. The total installed capacity of Northern Eastern Region for 2027-28 is expected to be about 7.5 GW.

Various transmission schemes i.e. reconductoring of 132kV lines in Mizoram and Manipur in have been evolved in the Consultation Meeting for Evolution of Transmission System in North Eastern Region (CMETS-NER) from Mar 2022 to July 2022. In this Rolling Plan, reconductoring of about 46 ckm of transmission lines has been formulated at an estimated cost of Rs.27 Cr. 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. Thus, cumulatively by 2027-28, transmission schemes comprising of 1,489 ckm of transmission lines and transformation capacity of 2,240 MVA at estimated cost of Rs 2,449 Cr. is expected to be added in the grid. Further, evacuation of power from future hydro projects primarily in Arunachal Pradesh would be planned after firm commission schedule and significant progress in the hydro generation projects.

Cross Border Interconnections (CB)

The existing cross-border interconnections facilitate power transfer of about 4111MW (1948MW: Bhutan, 1160MW: Bangladesh, 1000MW: Nepal and 3MW: Myanmar) with the neighbouring countries. With the commissioning of under-construction cross-border interconnections which are expected in 2-3 years, the power transfer would enhance by about 4020MW resulting in total of about 8181MW (4168MW: Bhutan, 1160MW: Bangladesh, 2850MW: Nepal and 3MW: Myanmar).

Chapter 11: Annexures

Annex-11.1

Retirement of Thermal Installed Capacity by 2028

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+3x210+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+2x210+2x250	1140	220	State
				Total	**18879**	**14629**	

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Annex-11.2

Load Generation Balance (LGB)

Monsoon (Aug'27)

Installed Capacity

Region	Thermal Central	Thermal State	Thermal IPP	Thermal	Hydro	Nuclear	Solar	Rooftop	Wind	Other RE	ESS	Gas	Total	EPS Peak Demand	App. Peak Demand		LTA
NR	11440	41009	0	52449	26269	4420	80785	4500	6401	1360	0	3583	**179766**	**102735**	96539		**0**
WR	19000	34560	35602	89162	8168	3240	44975	4500	29849	0	0	10139	**190033**	**100435**	94378		**0**
SR	12870	36588	4640	54098	18032	3820	37590	4500	35847	2067	0	2366	**158320**	**88576**	83234		**0**
ER	25760	12775	4150	42685	14686	0	1103	400	0	0	0	0	**58874**	**37396**	35141		**0**
NER	750	0	0	750	4375	0	100	100	0	0	0	1854	**7179**	**7221**	6786		**0**
	69820	**124931**	**44392**	**239143**	**71530**	**11480**	**164553**	**14000**	**72097**	**3427**	**0**	**17941**	**594172**	**316077**	316077		
		239143					**254077**							336363			

Scenario 1 : Solar Max Aug 2027

Avail	rmal Cen	hermal Sta	Thermal IPI	Thermal	Hydro	Nuclear	Solar	Rooftop	Wind	Other RE	ESS	Gas		National DF	Regional DF
NR	11%	2%	0%	15%	70%	80%	90%	50%	50%	0%	-100%	0%		82%	77%
WR	31%	4%	25%	14%	40%	80%	80%	50%	55%	0%	-100%	0%		76%	72%
SR	6%	3%	21%	8%	40%	80%	80%	50%	55%	0%	-100%	0%		74%	70%
ER	6%	6%	34%	1%	70%	80%	80%	50%	0%	0%	-100%	0%		83%	78%
NER	55%	0%	0%	0%	70%	80%	80%	50%	0%	0%	-100%	0%		69%	65%
	15%	3%	26%	10%										83%	262344

Avail	Central	State	IPP	Reqd The	Hydro	Nuclear	Solar	olar roofto	Wind	RE RPO	ESS	Gas	Total ava	Demand	Surplus/D	Net Avai	Net Dem
NR	1314	688	0	7834	18388	3536	72707	2250	3201	54165	0	0	102083	83923	18160	99833	81673
WR	5962	1238	9022	12590	3267	2592	35980	2250	16417	58267	0	0	76728	76717	11	74478	74467
SR	825	1254	963	4253	7213	3056	30072	2250	19716	51257	0	0	65349	65779	-430	63099	63529
ER	1617	814	1408	217	10280	0	882	200	0	19588	0	0	15202	30945	-15744	15002	30745
NER	413	0	0	0	3063	0	80	50	0	2777	0	0	3605	4979	-1374	3555	4929
Total	**10130**	**3993**	**11393**	**24894**	**42211**	**9184**	**139721**	**7000**	**39333**	**186055**	**0**	**0**	**262966**	**262344**	**622**	**255966**	**255344**
		25516					**186054**							247285			
16%	**StateTh**																

Scenario 2 : Peak load Aug 2027

Avail	Thermal	Thermal S	Thermal IP	Thermal	Hydro	Nuclear	Solar	Rooftop	Wind	Other RE	ESS	Gas	0	National DF	egional DF
NR	72%	64%	0%	83%	95%	80%	0%	0%	70%	0%	100%	85%		88%	83%
WR	69%	54%	75%	52%	70%	80%	0%	0%	75%	0%	100%	85%		80%	75%
SR	38%	67%	64%	65%	70%	80%	0%	0%	75%	0%	100%	85%		77%	72%
ER	33%	54%	52%	42%	90%	80%	0%	0%	0%	0%	100%	85%		97%	91%
NER	55%	0%	0%	0%	90%	80%	0%	0%	0%	0%	100%	85%		94%	88%
	50%	61%	71%	60%										**89%**	**281309**

Avail	rmal Cen	hermal Sta	ermal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	RE RPO	ESS	Gas	l availab	Demand	Surplus/D	Net Avai	Net Dem
NR	8263	26285	0	43416	24955	3536	0	0	4481	15649	0	3045	70565	90601	-20036	70565	90601
WR	13056	18634	26608	46274	5717	2592	0	0	22387	16834	0	8618	97611	80036	17576	97611	80036
SR	4934	24506	2948	35264	12623	3056	0	0	26886	14809	0	2011	76962	67762	9200	76962	67762
ER	8382	6894	2176	17718	13217	0	0	0	0	5659	0	0	30669	36158	-5489	30669	36158
NER	413	0	0	0	3938	0	0	0	0	802	0	1576	5926	6752	-826	5926	6752
Total	**35047**	**76318**	**31732**	**142671**	**60451**	**9184**	**0**	**0**	**53753**	**53753**	**0**	**15250**	**281733**	**281309**	**425**	**281733**	**281309**
		143096					**53753**							264756			
53%	**StateTh**																

Scenario 3 : off peak load Aug 2027

Avail	Thermal	Thermal S	Thermal IP	Thermal	Hydro	Nuclear	Solar	Rooftop	Wind	Other RE	ESS	Gas		National DF	Regional DF
NR	72%	62%	0%	85%	70%	80%	0%	0%	60%	0%	60%	65%		80%	75%
WR	69%	47%	81%	48%	40%	80%	0%	0%	65%	0%	60%	65%		70%	65%
SR	39%	55%	68%	58%	40%	80%	0%	0%	65%	0%	60%	65%		63%	59%
ER	35%	44%	52%	42%	70%	80%	0%	0%	0%	0%	60%	65%		88%	82%
NER	55%	0%	0%	0%	70%	80%	0%	0%	0%	0%	60%	65%		72%	67%
	51%	54%	77%	57%										78%	246540

Avail	rmal Cen	hermal Sta	ermal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	RE RPO	ESS	Gas	l availab	Demand	Surplus/D	Net Avai	Net Dem
NR	8263	25630	0	44755	18388	3536	0	0	3841	13550	0	2329	61987	82558	-20571	61987	82558
WR	13056	16205	28671	42923	3267	2592	0	0	19402	14576	0	6590	89782	69948	19834	89782	69948
SR	5084	20120	3145	31365	7213	3056	0	0	23301	12822	0	1538	63457	55994	7462	63457	55994
ER	8976	5628	2176	17897	10280	0	0	0	0	4900	0	0	27060	32856	-5796	27060	32856
NER	413	0	0	0	3063	0	0	0	0	695	0	1205	4680	5184	-504	4680	5184
Total	**35791**	**67582**	**33992**	**136940**	**42211**	**9184**	**0**	**0**	**46543**	**46543**	**0**	**11661**	**246965**	**246540**	**425**	**246965**	**246540**
		137365					**46543**							230097			
49%	**StateTh**																

Summer (Jun'27)

Installed Capacity

Region	Thermal Central	Thermal State	Thermal IPP	Thermal	Hydro	Nuclear	Solar	Rooftop	Wind	Other RE	ESS	Gas	Total	EPS Peak Demand	App. Peak Demand		LTA
NR	11440	41009	0	52449	26269	4420	80785	4500	6401	1360	0	3583	**179766**	**102735**	96539		**0**
WR	19000	34560	35602	89162	8168	3240	44975	4500	29849	0	0	10139	**190033**	**100435**	94378		**0**
SR	12870	36588	4640	54098	18032	3820	37590	4500	35847	2067	0	2366	**158320**	**88576**	83234		**0**
ER	25760	12775	4150	42685	14686	0	1103	400	0	0	0	0	**58874**	**37396**	35141		**0**
NER	750	0	0	750	4375	0	100	100	0	0	0	1854	**7179**	**7221**	6786		**0**
	69820	**124931**	**44392**	**239143**	**71530**	**11480**	**164553**	**14000**	**72097**	**3427**	**0**	**17941**	**594172**	**316077**	316077		
		239143						**254077**						336363			

Scenario 4 : Solar Max Jun 2027

Avail	rmal Cen	hermal Sta	Thermal IPI	Thermal	Hydro	Nuclear	Solar	Rooftop	Wind	Other RE	ESS	Gas		National DF	Regional DF
NR	25%	6%	0%	25%	70%	80%	90%	60%	50%	0%	0%	0%		88%	83%
WR	32%	4%	30%	27%	40%	80%	85%	60%	55%	0%	0%	0%		90%	84%
SR	24%	9%	31%	14%	40%	80%	85%	60%	55%	0%	0%	0%		80%	75%
ER	36%	21%	34%	-1%	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%
	31%	8%	31%	19%										91%	287630

Avail	Central	hermal Sta	ermal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	RE RPO	ESS	Gas	Total ava	Demand	Surplus/D	Net Avai	Net Dem
NR	2888	2291	0	13141	18388	3536	72707	2700	3201	55792	0	0	105710	90857	14853	103010	88157
WR	6103	1513	10852	24017	3267	2592	38229	2700	16417	60017	0	0	81672	89893	-8222	78972	87193
SR	3064	3123	1452	7720	7213	3056	31952	2700	19716	52796	0	0	72275	70785	1490	69575	68085
ER	9218	2697	1408	-285	10280	0	938	240	0	20177	0	0	24781	31479	-6698	24541	31239
NER	413	0	0	0	3063	0	85	60	0	2861	0	0	3620	4616	-996	3560	4556
Total	**21684**	**9623**	**13712**	**44592**	**42211**	**9184**	**143909**	**8400**	**39333**	**191643**	**0**	**0**	**288057**	**287630**	**427**	**279657**	**279230**
		45019						**191643**						269943			
21%	StateTh																

Scenario 5 : Peak Load Jun 2027

Avail	Thermal	Thermal S	Thermal IP	Thermal	Hydro	Nuclear	Solar	Rooftop	Wind	Other RE	ESS	Gas		National DF	Regional DF
NR	72%	78%	0%	115%	95%	80%	0%	0%	70%	0%	0%	85%		105%	98%
WR	69%	63%	85%	63%	70%	80%	0%	0%	75%	0%	0%	85%		90%	84%
SR	71%	79%	72%	80%	70%	80%	0%	0%	75%	0%	0%	85%		85%	80%
ER	78%	54%	85%	42%	90%	80%	0%	0%	0%	0%	0%	85%		99%	93%
NER	85%	0%	0%	0%	90%	80%	0%	0%	0%	0%	0%	85%		83%	78%
	73%	72%	84%	74%										**100%**	**316077**

Avail	rmal Cen	hermal Sta	ermal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	RE RPO	ESS	Gas	l availab	Demand	Surplus/D	Net Avai	Net Dem
NR	8263	32052	0	60209	24955	3536	0	0	4481	15649	0	3045	76333	107394	-31062	76333	107394
WR	13056	21770	30262	56230	5717	2592	0	0	22387	16834	0	8618	104402	89991	14411	104402	89991
SR	9110	28913	3344	43088	12623	3056	0	0	26886	14809	0	2011	85941	75586	10355	85941	75586
ER	20037	6894	3528	17913	13217	0	0	0	0	5659	0	0	43675	37097	6578	43675	37097
NER	638	0	0	0	3938	0	0	0	0	802	0	1576	6151	6008	143	6151	6008
Total	**51103**	**89629**	**37133**	**177440**	**60451**	**9184**	**0**	**0**	**53753**	**53753**	**0**	**15250**	**316502**	**316077**	**425**	**316502**	**316077**
		177865						**53753**						296317			
50%	StateTh																

Scenario 6 : Off peak Load Jun 2027

Avail	Thermal	Thermal S	Thermal IP	Thermal	Hydro	Nuclear	Solar	Rooftop	Wind	Other RE	ESS	Gas		National DF	Regional DF
NR	72%	73%	0%	98%	70%	80%	0%	0%	60%	0%	0%	60%		86%	81%
WR	69%	62%	84%	64%	40%	80%	0%	0%	65%	0%	0%	60%		83%	78%
SR	56%	67%	64%	72%	40%	80%	0%	0%	65%	0%	0%	60%		72%	67%
ER	67%	41%	74%	37%	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%
	66%	65%	81%	68%										86%	271826

Avail	rmal Cen	hermal Sta	ermal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	RE RPO	ESS	Gas	l availab	Demand	Surplus/D	Net Avai	Net Dem
NR	8263	29967	0	51211	18388	3536	0	0	3841	13550	0	2150	66145	88835	-22690	66145	88835
WR	13056	21443	29902	57111	3267	2592	0	0	19402	14576	0	6083	95745	83629	12115	95745	83629
SR	7229	24616	2989	38843	7213	3056	0	0	23301	12822	0	1420	69822	63353	6469	69822	63353
ER	17336	5285	3051	15959	10280	0	0	0	0	4900	0	0	35952	31538	4414	35952	31538
NER	413	0	0		3063	0	0	0	0	695	0	1112	4587	4471	116	4587	4471
Total	**46296**	**81311**	**35941**	**163123**	**42211**	**9184**	**0**	**0**	**46543**	**46543**	**0**	**10764**	**272251**	**271826**	**425**	**272251**	**271826**
		163548						**46543**						254632			
50%	StateTh																

Winter (Feb'28)

Installed Capacity

Region	Thermal Central	Thermal State	Thermal IPP	Thermal	Hydro	Nuclear	Solar	Rooftop	Wind	Other RE	ESS	Gas	Total	EPS Peak Demand	App. Peak Demand		LTA
NR	11440	41009	0	52449	26269	4420	80785	4500	6401	1360	0	3583	**179766**	**102735**	96539		**0**
WR	19000	34560	35602	89162	8168	3240	44975	4500	29849	0	0	10139	**190033**	**100435**	94378		**0**
SR	12870	36588	4640	54098	18032	3820	37590	4500	35847	2067	0	2366	**158320**	**88576**	83234		**0**
ER	25760	12775	4150	42685	14686	0	1103	400	0	0	0	0	**58874**	**37396**	35141		**0**
NER	750	0	0	750	4375	0	100	100	0	0	0	1854	**7179**	**7221**	6786		**0**
	69820	**124931**	**44392**	**239143**	**71530**	**11480**	**164553**	**14000**	**72097**	**3427**	**0**	**17941**	**594172**	**316077**	316077		
		239143					**254077**							336363			

Scenario 7 : Solar max Feb 2028

Avai	rmal Ce	rmal Sta	Thermal IP	Thermal	Hydro	Nuclear	Solar	Rooftop	Wind	Other RE	ESS	Gas		National DF	Regional DF		
NR	32%	31%	0%	27%	30%	80%	90%	60%	10%	0%	0%	0%		70%	66%		
WR	44%	29%	55%	50%	20%	80%	90%	60%	10%	0%	0%	0%		99%	93%		
SR	33%	49%	43%	61%	20%	80%	90%	60%	0%	0%	0%	0%		94%	89%		
ER	50%	33%	55%	11%	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%		
	42%	36%	54%	40%										90%	284469		
Avai	rmal Ce	rmal Sta	rmal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	RE RPO	ESS	Gas	Total ava	Demand	Surplus/D	Net Avai	Net Dem
NR	3614	12569	0	13911	7881	3536	72707	2700	640	46616	0	0	103645	71944	31702	100945	69244
WR	8448	9868	19581	44734	1634	2592	40478	2700	2985	50146	0	0	88285	99106	-10821	85585	96406
SR	4274	17796	1984	32869	3606	3056	33831	2700	0	44113	0	0	67247	83644	-16398	64547	80944
ER	12782	4265	2283	4809	4406	0	993	240	0	16858	0	0	24968	25791	-823	24728	25551
NER	413	0	0	0	1313	0	90	60	0	2390	0	0	1875	3984	-2109	1815	3924
Total	**29530**	**44498**	**23847**	**96323**	**18839**	**9184**	**148098**	**8400**	**3625**	**160123**	**0**	**0**	**286020**	**284469**	**1551**	**277620**	**276069**
		97874						**160123**						268105			
45%	StateTh																

Scenario 8 : Peak Load Feb 2028

Avai	Thermal	Thermal S	Thermal IP	Thermal	Hydro	Nuclear	Solar	Rooftop	Wind	Other RE	ESS	Gas		National DF	Regional DF		
NR	85%	70%	0%	93%	60%	80%	0%	0%	35%	0%	0%	85%		74%	70%		
WR	85%	67%	85%	76%	40%	80%	0%	0%	20%	0%	0%	85%		86%	82%		
SR	85%	87%	85%	111%	40%	80%	0%	0%	20%	0%	0%	85%		86%	82%		
ER	85%	71%	85%	50%	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%		
	85%	74%	85%	83%										**87%**	**274987**		
Avai	rmal Ce	rmal Sta	rmal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	RE RPO	ESS	Gas	l availab	Demand	Surplus/D	Net Avai	Net Dem
NR	9724	28627	0	48915	15761	3536	0	0	2240	4477	0	3045	62934	75735	-12802	62934	75735
WR	16150	23037	30262	67439	3267	2592	0	0	5970	4816	0	8618	89895	86732	3163	89895	86732
SR	10940	31983	3944	59974	7213	3056	0	0	7169	4237	0	2011	66315	76491	-10176	66315	76491
ER	21896	9112	3528	21167	8812	0	0	0	0	1619	0	0	43347	30325	13022	43347	30325
NER	638	0	0	0	2625	0	0	0	0	230	0	1576	4838	5703	-865	4838	5703
Total	**59347**	**92758**	**37733**	**197496**	**37678**	**9184**	**0**	**0**	**15380**	**15380**	**0**	**15250**	**267329**	**274987**	**-7658**	**267329**	**274987**
		189838						**15380**						261114			
49%	StateTh																

Scenario 9: Off peak Load Feb 2028

Avai	Thermal	Thermal S	Thermal IP	Thermal	Hydro	Nuclear	Solar	Rooftop	Wind	Other RE	ESS	Gas		National DF	Regional DF		
NR	72%	53%	0%	62%	30%	80%	0%	0%	10%	0%	0%	30%		46%	43%		
WR	79%	64%	84%	68%	20%	80%	0%	0%	20%	0%	0%	30%		70%	66%		
SR	56%	79%	64%	98%	20%	80%	0%	0%	0%	0%	0%	30%		70%	66%		
ER	67%	46%	74%	38%	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%		
	69%	63%	81%	68%										64%	202289		
Avai	rmal Ce	rmal Sta	rmal Priva	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	RE RPO	ESS	Gas	l availab	Demand	Surplus/D	Net Avai	Net Dem
NR	8263	21540	0	32400	7881	3536	0	0	640	1924	0	1075	42934	46816	-3881	42934	46816
WR	15058	22087	29902	60911	1634	2592	0	0	5970	2070	0	3042	80283	70248	10035	80283	70248
SR	7189	29018	2948	52760	3606	3056	0	0	0	1821	0	710	46527	61953	-15426	46527	61953
ER	17336	5896	3051	16204	4406	0	0	0	0	696	0	0	30688	20212	10477	30688	20212
NER	413	0	0	0	1313	0	0	0	0	99	0	556	2281	3061	-780	2281	3061
Total	**48258**	**78541**	**35900**	**162274**	**18839**	**9184**	**0**	**0**	**6610**	**6610**	**0**	**5382**	**202714**	**202289**	**425**	**202714**	**202289**
		162699						**6610**						190884			
48%	StateTh																

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Annex-11.3

Inter-Regional AC transmission Lines Flow

From Name	To Name	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	94	88	66	104	91	64	258	127	101	267
MODAK	BHANPURA-2	220	1	103	86	52	131	77	32	467	355	286	267
RAPS_C4	SHUJALPR-4	400	1	542	40	91	496	114	91	789	384	318	857
RAPS_C4	SHUJALPR-4	400	2	542	40	91	496	114	91	789	384	318	857
SAHUPU_N	PUSAULI BSPT	220	1	330	144	130	147	200	133	181	44	15	267
AURYA2	BHIND -2	220	1	2	51	36	27	32	51	214	241	152	267
RANGIA	MOTANGA	132	1	-67	105	87	67	95	79	54	87	48	84
SALAKATI	GELEPHU1	132	1	-70	107	90	67	94	82	57	89	48	84
RAIGR2	BUDHIPADAR	220	1	166	207	265	149	185	158	87	95	85	268
SIPAT4	RNC-SIPT FSC	400	2	644	792	826	381	495	464	51	93	31	1106
SIPAT4	RNC-SIPT FSC	400	1	641	789	518	379	493	462	51	92	31	1106
BALIMELA	UPPERSILERU	220	2	-249	445	465	127	356	166	250	62	205	250

- **Note: Highlighted cell indicates Power flow > 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	500	0	500	500	0	500	500	0	500	500
NORTH	BAL74-PG	BHIWADI	500	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
NORTH	BIKANER-3	BATHINDA	800	0	0	0	0	0	0	0	0	0
NORTH	BIKANER-3	BATHINDA	800	0	0	0	0	0	0	0	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
IR	CHANDRAPR-SR	BHADR4	70	0	0	0	0	0	0	0	0	0
IR	CHANDRAPR-SR	BHADR4	70	0	0	0	0	0	0	0	0	0
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

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	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	1000	1000	0	1000	1500	0	0	0
IR	PUGALUR-NEW	KOTRA SPLT	800	0	1500	1500	0	1500	1500	0	0	0
SOUTH	PUGALUR-NEW	TCR-HVDC	600	1003	1000	1000	1000	1000	1000	1000	1000	1000
SOUTH	PUGALUR-NEW	TCR-HVDC	600	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

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Annex-11.4

400kV Transmission Line loadings above 70% of thermal limit

Area	From Name	To Name	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	-575	51	52	686	185	221	764	176	302	857
WEST	ASOJ-BYP-KOS	KOSAMBA	400	1	575	51	52	686	185	221	764	176	302	857
NORTH	BAGLIHAR4	NEWWANPO	400	1	851	578	308	938	766	388	870	542	352	857
NORTH	KISHENPUR	CHAMERA-2	400	1	667	304	79	695	410	140	319	103	239	857
NORTH	PARBT-PO	HAMIRPUR	400	1	510	544	353	546	608	390	371	439	280	857
NORTH	MALERKOTLA4	KURUKSHETR	400	2	-392	503	275	495	685	412	449	443	564	857
NORTH	BHIWANI	BHIWANI-PG	400	1	-727	326	65	832	520	50	549	84	175	857
NORTH	BHIWANI-PG	JINDPG	400	1	646	94	213	712	245	170	495	298	388	857
NORTH	BHIWANI-PG	JINDPG	400	2	646	94	213	712	245	170	495	298	388	857
NORTH	MERTA	JODH KANKANI	400	1	-686	232	181	696	191	139	575	94	53	857
NORTH	BARMER-4	RAJWEST	400	1	657	505	364	663	358	349	322	474	614	857
NORTH	BHADLA	BIKANE-4	400	1	1206	221	156	1233	170	132	1063	125	137	1714
NORTH	BHADLA	BIKANE-4	400	2	1206	221	156	1233	170	132	1063	125	137	1714
IR	RAPS_C4	SHUJALPR-4	400	1	542	40	91	496	114	91	789	384	318	857
IR	RAPS_C4	SHUJALPR-4	400	2	542	40	91	496	114	91	789	384	318	857
NORTH	KOTA	ANTA-4	400	1	187	159	139	212	290	369	249	624	463	857
NORTH	MEJA	ALLAHABA	400	1	117	665	643	120	563	518	612	676	393	857
NORTH	MEJA	ALLAHABA	400	2	117	665	643	120	563	518	612	676	393	857
NORTH	AGRAUP4	AGRA	400	2	-756	1069	1117	722	1009	853	268	548	374	857
NORTH	AGRANEW	AGRA	400	2	-360	598	619	349	550	454	131	297	197	857
NORTH	DADR-NCR	GNOIDA4	400	1	1041	1216	1305	864	842	893	866	1595	1387	1988
NORTH	DADR-NCR	DADR-HVD	400	1	-722	802	726	785	727	726	920	975	1128	1600
NORTH	DADR-NCR	DADR-HVD	400	2	-722	802	726	785	727	726	920	975	1128	1600
NORTH	LUCK74-P	KANPRNEW	400	1	-664	380	400	552	293	299	444	142	90	857
NORTH	LUCK74-P	KANPRNEW	400	2	-664	380	400	552	293	299	444	142	90	857
NORTH	KHURJA TPS	ALIGARH	400	1	638	264	331	576	233	200	266	50	69	857
NORTH	ROORKEE	RISHIKE4_PT	400	1	-760	593	421	769	647	403	467	311	163	857
NRTHEAST	MISA-PG	BALIPARA-PG	400	1	-603	387	296	579	315	245	515	285	280	850
NRTHEAST	MISA-PG	BALIPARA-PG	400	2	-603	387	296	579	315	245	515	285	280	850
IR	SIPAT4	RNC-SIPT FSC	400	2	644	792	826	381	495	464	51	93	31	1106
IR	SIPAT4	RNC-SIPT FSC	400	1	641	789	518	379	493	462	51	92	31	1106
WEST	DHAMTARI	JAGADALPUR	400	1	552	507	638	428	441	399	345	249	226	857

Area	From Name	To Name	Voltage	Id	P-Sc1	P-Sc2	P-Sc3	P-Sc4	P-Sc5	P-Sc6	P-Sc7	P-Sc8	P-Sc9	Thermal Limit
WEST	DHAMTARI	JAGADALPUR	400	2	552	507	638	428	441	399	345	249	226	857
WEST	GANCS4	DEHGM4	400	1	-527	96	139	566	214	267	690	233	356	857
WEST	GANCS4	DEHGM4	400	2	-527	96	139	566	214	267	690	233	356	857
WEST	GANCS4	GPEC4	400	1	-711	436	364	796	480	458	763	313	426	857
WEST	GPEC4	KASOR4	400	1	-713	436	364	798	481	458	764	312	426	857
WEST	ZERDA	BANASKANTHA	400	2	-484	368	94	617	253	191	309	73	47	857
WEST	KOSAMBA	VAV4	400	1	565	263	322	537	276	309	617	250	336	857
WEST	SATPURA	KORADI-I	400	1	710	70	10	692	222	141	545	142	50	857
WEST	NAGDA-4	MANDSAUR-4	400	1	-479	208	163	487	252	166	627	111	121	857
WEST	NAGDA-4	MANDSAUR-4	400	2	-479	208	163	487	252	166	627	111	121	857
WEST	KALWA4	KHARGAR	400	1	-496	311	310	652	388	377	582	279	220	857
WEST	KARAD4	JEJ4	400	3	367	690	507	400	708	522	196	400	137	857
WEST	DHULE4	BABLESWAR	400	1	707	328	352	769	333	359	857	390	433	857
WEST	DHULE4	BABLESWAR	400	2	707	328	352	769	333	359	857	390	433	857
WEST	TAPS4	VELGAON4	400	1	532	495	521	558	516	518	616	534	492	857
WEST	TAPS4	VELGAON4	400	2	532	495	521	558	516	518	616	534	492	857
WEST	RGPPL	NAGOTHANE	400	1	308	622	444	369	657	479	153	454	168	857
WEST	RGPPL	NAGOTHANE	400	2	308	622	444	369	657	479	153	454	168	857
WEST	CHAKAN	PUNE-PG-AIS	400	1	-477	337	409	523	375	415	650	457	432	857
WEST	SOLAPUR-PG	ALKUD	400	1	185	130	45	337	69	62	738	358	405	857
WEST	PADGHEGIS	NAVI-MUM	400	1	1110	889	919	1319	1027	1023	1413	963	837	1714
EAST	KAHALGAON-B	FARAKKA	400	1	381	354	411	513	593	664	717	545	477	852
EAST	KAHALGAON-B	FARAKKA	400	2	381	354	411	513	593	664	717	545	477	852
EAST	ROURKELA	CHAIBASA	400	1	566	811	752	358	503	516	119	105	55	1106
EAST	ROURKELA	CHAIBASA	400	2	566	811	752	358	503	516	119	105	55	1106
EAST	STERLITE	LAPANGA	400	1	641	630	748	514	596	457	289	298	114	1061
EAST	STERLITE	LAPANGA	400	2	641	630	748	514	596	457	289	298	114	1061
EAST	LAPANGA	OPGC-OD	400	1	-674	647	772	561	598	578	593	501	473	1061
EAST	LAPANGA	OPGC-OD	400	2	-674	647	772	561	598	578	593	501	473	1061
EAST	OPGC-ISTS	OPGC-OD	400	@1	1352	1297	1551	1125	1198	1158	1188	1004	950	2200
EAST	SAGARDIGHI_4	FARAKKA	400	1	-765	489	643	841	644	602	730	356	338	1093
EAST	SAGARDIGHI_4	FARAKKA	400	2	-765	489	643	841	644	602	730	356	338	1093
EAST	RANCHI	RNC-SIPT FSC	400	2	-613	750	780	382	479	454	196	218	191	850
EAST	RANCHI	RNC-SIPT FSC	400	1	-611	746	499	381	478	452	196	218	191	850
SOUTH	GAZW	GAZU-SR	400	1	-646	669	659	739	693	648	647	649	650	1000
SOUTH	CUDP	CHITOR	400	1	560	19	47	723	133	170	584	123	25	852

Area	From Name	To Name	Voltage	Id	P-Sc1	P-Sc2	P-Sc3	P-Sc4	P-Sc5	P-Sc6	P-Sc7	P-Sc8	P-Sc9	Thermal Limit
SOUTH	KURNOOL4	SSLBPH4	400	1	660	68	83	489	70	35	268	155	228	874
SOUTH	KRISH-AP	NELLORE-AP	400	1	128	733	675	57	672	640	493	697	653	948
SOUTH	KRISH-AP	NELLORE-AP	400	2	128	733	675	57	672	640	493	697	653	948
SOUTH	VELTOOR	RAIC	400	1	-806	365	266	439	250	282	351	195	74	874
SOUTH	KOLAR	DOMSANDRA	400	1	467	445	431	557	555	502	705	583	606	850
SOUTH	MALEKTT	TIRUVLM SE-A	400	1	-490	349	336	602	394	370	570	258	295	850
SOUTH	MALEKTT	TIRUVLM SE-A	400	2	-490	349	336	602	394	370	570	258	295	850

- **Note: Highlighted cell indicates Power flow > 70% of Thermal limit**

Annex-11.5

765/400 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	BHIWANI-PG	400	BHIWN-PG	765	1	-829	-258	48	-883	-461	-10	-601	191	311	1000
NORTH	BHIWANI-PG	400	BHIWN-PG	765	2	-829	-258	48	-883	-461	-10	-601	191	311	1000
NORTH	BHIWANI-PG	400	BHIWN-PG	765	3	-1243	-258	48	-1324	-461	-10	-902	191	311	1500
NORTH	FATEHG-2	400	FATEH-2	765	1	1359	192	124	1311	192	89	1200	12	-44	1500
NORTH	FATEHG-2	400	FATEH-2	765	2	1359	192	124	1311	192	89	1200	12	-44	1500
NORTH	FATEHG-2	400	FATEH-2	765	3	1359	192	124	1311	192	89	1200	12	-44	1500
NORTH	FATEHG-2	400	FATEH-2	765	4	1359	192	124	1311	192	89	1200	12	-44	1500
NORTH	FATEHG-2	400	FATEH-2	765	5	1359	192	124	1311	192	89	1200	12	-44	1500
NORTH	FATEHG-2	400	FATEH-2	765	6	1359	192	124	1311	192	89	1200	12	-44	1500
NORTH	FATEHG-3	400	FATEHG-3	765	1	1244	-61	-60	1243	-80	-46	1305	38	43	1500
NORTH	FATEHG-3	400	FATEHG-3	765	2	1244	-61	-60	1243	-80	-46	1305	38	43	1500
NORTH	FATEHG-3	400	FATEHG-3	765	3	1244	-61	-60	1243	-80	-46	1305	38	43	1500
NORTH	FATEHG-3	400	FATEHG-3	765	4	1244	-61	-60	1243	-80	-46	1305	38	43	1500
NORTH	FATEHG-3	400	FATEHG-3	765	5	1244	-61	-60	1243	-80	-46	1305	38	43	1500
NORTH	FATEHG-3	400	FATEHG-3	765	6	1244	-61	-60	1243	-80	-46	1305	38	43	1500
NORTH	BHADLA-2	400	BHADLA-2	765	1	1316	49	39	1268	34	7	1227	-4	-29	1500
NORTH	BHADLA-2	400	BHADLA-2	765	2	1316	49	39	1268	34	7	1227	-4	-29	1500
NORTH	BHADLA-2	400	BHADLA-2	765	3	1316	49	39	1268	34	7	1227	-4	-29	1500
NORTH	BHADLA-2	400	BHADLA-2	765	4	1316	49	39	1268	34	7	1227	-4	-29	1500
NORTH	BHADLA-2	400	BHADLA-2	765	5	1316	49	39	1268	34	7	1227	-4	-29	1500
NORTH	ORAI	400	ORAI	765	1	139	-730	-702	170	-650	-459	839	50	116	1000
NORTH	ORAI	400	ORAI	765	2	139	-730	-702	170	-650	-459	839	50	116	1000

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	NAVSARI-NEW	400	NAVSARI-NEW	765	1	-1231	-547	-451	-1418	-679	-642	-1389	-494	-515	1500
WEST	NAVSARI-NEW	400	NAVSARI-NEW	765	2	-1231	-547	-451	-1418	-679	-642	-1389	-494	-515	1500
WEST	NAVSARI-NEW	400	NAVSARI-NEW	765	3	-1231	-547	-451	-1418	-679	-642	-1389	-494	-515	1500
WEST	INDORE-74	400	INDORE-7	765	2	-738	51	-8	-931	-3	-132	-1588	-720	-436	1500
WEST	INDOR-SPLT	400	INDORE-7	765	1	-764	122	35	-870	152	-30	-1341	-447	-347	1500
EAST	JHARSUGUDA-A	400	JHARSUGUDA-A	765	1	-1160	-1206	-1302	-805	-952	-813	-102	-22	132	1500
EAST	JHARSUGUDA-A	400	JHARSUGUDA-A	765	2	-1160	-1206	-1302	-805	-952	-813	-102	-22	132	1500
EAST	JHARSUGUDA-B	400	JHARSUGUDA-B	765	3	-1178	-1145	-1269	-872	-903	-890	-740	-439	-421	1500
EAST	JHARSUGUDA-B	400	JHARSUGUDA-B	765	4	-1178	-1145	-1269	-872	-903	-890	-740	-439	-421	1500
SOUTH	KURNOOL-III	400	KURNOOL-III	765	1	1333	686	582	1326	657	558	851	166	-49	1500
SOUTH	KURNOOL-III	400	KURNOOL-III	765	2	1333	686	582	1326	657	558	851	166	-49	1500
SOUTH	KURNOOL-III	400	KURNOOL-III	765	3	1333	686	582	1326	657	558	851	166	-49	1500
SOUTH	MAHESWRM	400	MAHESHWARAM	765	1	-1184	-321	-247	-863	-6	-160	-1297	-495	-354	1500
SOUTH	MAHESWRM	400	MAHESHWARAM	765	2	-1184	-321	-247	-863	-6	-160	-1297	-495	-354	1500

- **Note: Highlighted cell indicates Power flow > 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	-405	-281	-137	-444	-383	-186	-392	-234	-148	315
NORTH	KISHENPUR	220	KISHENPUR	400	2	-405	-281	-137	-444	-383	-186	-392	-234	-148	315
NORTH	KISHENPUR	220	KISHENPUR	400	3	-405	-281	-137	-444	-383	-186	-392	-234	-148	315
NORTH	PANG220SP2	220	PANG400SP2	400	1	276	0	0	272	0	0	271	0	0	315
NORTH	PANG220SP2	220	PANG400SP2	400	2	276	0	0	272	0	0	271	0	0	315
NORTH	PANG220SP2	220	PANG400SP2	400	3	276	0	0	272	0	0	271	0	0	315
NORTH	PANG220SP2	220	PANG400SP2	400	4	276	0	0	272	0	0	271	0	0	315
NORTH	PANG220SP2	220	PANG400SP2	400	5	276	0	0	272	0	0	271	0	0	315
NORTH	PANG220SP2	220	PANG400SP2	400	6	276	0	0	272	0	0	271	0	0	315
NORTH	PANG220SP3	220	PANG400SP3	400	1	276	0	0	272	0	0	271	0	0	315
NORTH	PANG220SP3	220	PANG400SP3	400	2	276	0	0	272	0	0	271	0	0	315
NORTH	PANG220SP3	220	PANG400SP3	400	3	276	0	0	272	0	0	271	0	0	315
NORTH	PANG220SP3	220	PANG400SP3	400	4	276	0	0	272	0	0	271	0	0	315
NORTH	PANG220SP3	220	PANG400SP3	400	5	276	0	0	272	0	0	271	0	0	315
NORTH	PANG220SP3	220	PANG400SP3	400	6	276	0	0	272	0	0	271	0	0	315
NORTH	HINDAU-4	220	HINDAU-4	400	1	-222	-234	-219	-236	-262	-267	-231	-193	-146	315
NORTH	HINDAU-4	220	HINDAU-4	400	2	-222	-234	-219	-236	-262	-267	-231	-193	-146	315
NORTH	BIKANE-4	220	BIKANE-4	400	1	252	-146	-138	211	-156	-182	163	-153	-121	315
NORTH	BHADLA-S	220	BHADLA	400	1	513	-41	-50	473	-69	-109	418	-116	-111	500
NORTH	BHADLA-S	220	BHADLA	400	2	513	-41	-50	473	-69	-109	418	-116	-111	500
NORTH	BHADLA-S	220	BHADLA	400	3	513	-41	-50	473	-69	-109	418	-116	-111	500
NORTH	BHADLA-S	220	BHADLA	400	4	513	-41	-50	473	-69	-109	418	-116	-111	500
NORTH	KALISIND	220	KALISI-4	400	2	-175	-312	-299	-206	-365	-423	-381	-533	-418	500
NORTH	AJMER42	220	AJMER	400	1	-100	-193	-188	-125	-235	-263	-132	-210	-168	315
NORTH	AJMER42	220	AJMER	400	2	-100	-193	-188	-125	-235	-263	-132	-210	-168	315
NORTH	BHIWADI	220	BHIWADI	400	1	-147	-233	-211	-156	-269	-240	-129	-206	-152	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	BHIWADI	220	BHIWADI	400	2	-147	-233	-211	-156	-269	-240	-129	-206	-152	315
NORTH	BHIWADI	220	BHIWADI	400	3	-147	-233	-211	-156	-269	-240	-129	-206	-152	315
NORTH	JODHPURN-42	220	JODH KANKANI	400	1	-20	-198	-193	-44	-254	-300	-83	-285	-240	315
NORTH	BHADLA-PG	220	BHADLA PG	400	1	467	0	0	460	0	0	459	0	0	500
NORTH	BHADLA-PG	220	BHADLA PG	400	2	467	0	0	460	0	0	459	0	0	500
NORTH	BHADLA-PG	220	BHADLA PG	400	3	467	0	0	460	0	0	459	0	0	500
NORTH	BHADLA-PG	220	BHADLA PG	400	4	467	0	0	460	0	0	459	0	0	500
NORTH	BHADLA-PG	220	BHADLA PG	400	5	467	0	0	460	0	0	459	0	0	500
NORTH	BHADLA-PG	220	BHADLA PG	400	6	467	0	0	460	0	0	459	0	0	500
NORTH	RAMGARH-I	220	RAMG-I	400	1	448	0	0	441	0	0	439	0	0	500
NORTH	RAMGARH-I	220	RAMG-I	400	2	448	0	0	441	0	0	439	0	0	500
NORTH	FATEH-2	220	FATEHG-2	400	1	495	0	0	488	0	0	486	0	0	500
NORTH	FATEH-2	220	FATEHG-2	400	2	495	0	0	488	0	0	486	0	0	500
NORTH	FATEH-2	220	FATEHG-2	400	3	495	0	0	488	0	0	486	0	0	500
NORTH	FATEH-2	220	FATEHG-2	400	4	495	0	0	488	0	0	486	0	0	500
NORTH	FATEH-2	220	FATEHG-2	400	5	495	0	0	488	0	0	486	0	0	500
NORTH	FATEHG-3	220	FATEHG-3	400	4	1094	0	0	1078	0	0	1074	0	0	500
NORTH	FATEHG-3	220	FATEHG-3	400	5	1094	0	0	1078	0	0	1074	0	0	500
NORTH	FATEHG-4	220	FATEHG-4	400	1	418	0	0	412	0	0	410	0	0	500
NORTH	FATEHG-4	220	FATEHG-4	400	2	418	0	0	412	0	0	410	0	0	500
NORTH	FATEHG-4	220	FATEHG-4	400	3	418	0	0	412	0	0	410	0	0	500
NORTH	FATEHG-4	220	FATEHG-4	400	4	418	0	0	412	0	0	410	0	0	500
NORTH	FATEHG-4	220	FATEHG-4	400	5	418	0	0	412	0	0	410	0	0	500
NORTH	BHADLA-3	220	BHADLA-3	400	1	448	0	0	441	0	0	439	0	0	500
NORTH	BHADLA-3	220	BHADLA-3	400	2	448	0	0	441	0	0	439	0	0	500
NORTH	BHADLA-3	220	BHADLA-3	400	3	448	0	0	441	0	0	439	0	0	500
NORTH	BHADLA-3	220	BHADLA-3	400	4	448	0	0	441	0	0	439	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	BHADLA-3	220	BHADLA-3	400	5	448	0	0	441	0	0	439	0	0	500
NORTH	BHADLA-2	220	BHADLA-2	400	1	483	0	0	476	0	0	474	0	0	500
NORTH	BHADLA-2	220	BHADLA-2	400	2	483	0	0	476	0	0	474	0	0	500
NORTH	BHADLA-2	220	BHADLA-2	400	3	483	0	0	476	0	0	474	0	0	500
NORTH	BHADLA-2	220	BHADLA-2	400	4	483	0	0	476	0	0	474	0	0	500
NORTH	BHADLA-2	220	BHADLA-2	400	5	483	0	0	476	0	0	474	0	0	500
NORTH	BHAD-2 SPLT	220	BHADLA-2	400	1	471	0	0	464	0	0	462	0	0	500
NORTH	BHAD-2 SPLT	220	BHADLA-2	400	2	471	0	0	464	0	0	462	0	0	500
NORTH	BHAD-2 SPLT	220	BHADLA-2	400	3	471	0	0	464	0	0	462	0	0	500
NORTH	KOTA	220	KOTA	400	1	-181	-203	-195	-216	-222	-263	-249	-207	-186	315
NORTH	KOTA	220	KOTA	400	2	-181	-203	-195	-216	-222	-263	-249	-207	-186	315
NORTH	FATEH-SPL 2	220	FATEHG-2	400	1	491	0	0	484	0	0	482	0	0	500
NORTH	FATEH-SPL 2	220	FATEHG-2	400	2	491	0	0	484	0	0	482	0	0	500
NORTH	FATEH-SPL 2	220	FATEHG-2	400	3	491	0	0	484	0	0	482	0	0	500
NORTH	FATEH-SPL 2	220	FATEHG-2	400	4	491	0	0	484	0	0	482	0	0	500
NORTH	FATEH-SPL 2	220	FATEHG-2	400	5	491	0	0	484	0	0	482	0	0	500
NORTH	BHADLA3-SPL	220	BHADLA-3	400	1	448	0	0	441	0	0	439	0	0	500
NORTH	BHADLA3-SPL	220	BHADLA-3	400	2	448	0	0	441	0	0	439	0	0	500
NORTH	BHADLA3-SPL	220	BHADLA-3	400	3	448	0	0	441	0	0	439	0	0	500
NORTH	BHADLA3-SPL	220	BHADLA-3	400	4	448	0	0	441	0	0	439	0	0	500
NORTH	BHADLA3-SPL	220	BHADLA-3	400	5	448	0	0	441	0	0	439	0	0	500
NORTH	OBRA2	220	OBRA4	400	1	-126	-263	-270	-134	-235	-218	-186	-239	-155	315
NORTH	OBRA2	220	OBRA4	400	2	-126	-263	-270	-134	-235	-218	-186	-239	-155	315
NORTH	OBRA2	220	OBRA4	400	3	-96	-201	-206	-102	-179	-167	-142	-183	-118	240
NORTH	ALLAHABA	220	ALLAHABA	400	1	-195	-254	-269	-207	-266	-236	-166	-198	-123	315
NORTH	ALLAHABA	220	ALLAHABA	400	2	-195	-254	-269	-207	-266	-236	-166	-198	-123	315
NORTH	ALLAHABA	220	ALLAHABA	400	3	-195	-254	-269	-207	-266	-236	-166	-198	-123	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	KANPU-PG	220	KANPUR	400	1	-286	-190	-216	-259	-190	-163	-165	-77	-33	315
NORTH	KANPU-PG	220	KANPUR	400	2	-286	-190	-216	-259	-190	-163	-165	-77	-33	315
NORTH	REWAROAD	220	REWA	400	1	-208	-321	-331	-225	-318	-284	-243	-267	-158	315
NORTH	AGRA-PG	220	AGRA	400	1	-178	-251	-264	-190	-283	-258	-131	-183	-115	315
NORTH	AGRA-PG	220	AGRA	400	2	-178	-251	-264	-190	-283	-258	-131	-183	-115	315
NORTH	PIPALKOTI SW	220	PIPALKOTI SW	400	1	171	222	164	168	220	162	72	154	71	240
NORTH	PIPALKOTI SW	220	PIPALKOTI SW	400	2	171	222	164	168	220	162	72	154	71	240
WEST	BHILAI	220	BHI4	400	1	-258	-235	-242	-209	-204	-205	-232	-195	-179	315
WEST	BHILAI	220	BHI4	400	2	-258	-235	-242	-209	-204	-205	-232	-195	-179	315
WEST	BHILAI	220	BHI4	400	3	-258	-235	-242	-209	-204	-205	-232	-195	-179	315
WEST	SUGEN	220	SUGEN	400	1	-224	-182	-112	-289	-243	-211	-261	-183	-162	315
WEST	SUGEN	220	SUGEN	400	2	-224	-182	-112	-289	-243	-211	-261	-183	-162	315
WEST	SUGEN	220	SUGEN	400	3	-224	-182	-112	-289	-243	-211	-261	-183	-162	315
WEST	VADODARAPG	220	VADODARA	400	1	-355	-133	-49	-470	-203	-189	-449	-140	-173	500
WEST	VADODARAPG	220	VADODARA	400	2	-355	-133	-49	-470	-203	-189	-449	-140	-173	500
WEST	NAVSARI-NEW	220	NAVSARI-NEW	400	1	-334	-145	-57	-441	-221	-198	-382	-116	-139	500
WEST	NAVSARI-NEW	220	NAVSARI-NEW	400	2	-334	-145	-57	-441	-221	-198	-382	-116	-139	500
WEST	NAVSARI-NEW	220	NAVSARI-NEW	400	3	-334	-145	-57	-441	-221	-198	-382	-116	-139	500
WEST	BOISAR-P	220	BOISAR	400	1	-200	-174	-192	-222	-196	-198	-272	-210	-186	315
WEST	BOISAR-P	220	BOISAR	400	2	-200	-174	-192	-222	-196	-198	-272	-210	-186	315
WEST	BOISAR-P	220	BOISAR	400	3	-317	-276	-304	-352	-310	-314	-431	-332	-294	500
WEST	BOISAR-P	220	BOISAR	400	4	-317	-276	-304	-352	-310	-314	-431	-332	-294	500
WEST	WARDH_PG	220	WARDHA SPLT	400	2	-227	-90	-88	-280	-92	-88	-197	-85	-59	315
WEST	WARDH_PG	220	WARDHA SPLT	400	3	-227	-90	-88	-280	-92	-88	-197	-85	-59	315
WEST	WARDH_PG	220	WARDHA SPLT	400	4	-364	-142	-139	-448	-145	-139	-314	-135	-94	500
WEST	DHULE220	220	DHULE4	400	1	-193	-151	-163	-216	-141	-147	-275	-191	-172	315
WEST	DHULE220	220	DHULE4	400	2	-194	-151	-164	-216	-141	-147	-276	-191	-172	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
WEST	KHARGR22	220	KHARGAR	400	1	-205	-178	-178	-248	-207	-205	-259	-187	-167	315
WEST	KHARGR22	220	KHARGAR	400	2	-205	-178	-178	-248	-207	-205	-259	-187	-167	315
WEST	KHARGR22	220	KHARGAR	400	3	-327	-283	-283	-396	-330	-327	-413	-298	-267	500
WEST	PADGHE22	220	PADGH4	400	1	-307	-454	-394	-374	-497	-445	-380	-434	-338	600
WEST	PADGHE22	220	PADGH4	400	2	-250	-370	-321	-305	-406	-363	-309	-354	-276	500
WEST	PADGHE22	220	PADGH4	400	3	-158	-233	-202	-192	-255	-228	-195	-223	-174	315
WEST	PADGHE22	220	PADGH4	400	4	-158	-233	-202	-192	-255	-228	-195	-223	-174	315
WEST	PADGHE22	220	PADGH4	400	6	-157	-233	-202	-192	-256	-228	-194	-223	-174	315
WEST	NAVI-MUM220	220	NAVI-MUM	400	1	-219	-186	-188	-259	-213	-211	-269	-195	-176	315
WEST	NAVI-MUM220	220	NAVI-MUM	400	2	-219	-186	-188	-259	-213	-211	-269	-195	-176	315
WEST	MALEGAON220	220	MALEGAON400	400	1	-347	-267	-270	-397	-285	-289	-458	-314	-300	500
WEST	MALEGAON220	220	MALEGAON400	400	2	-347	-267	-270	-397	-285	-289	-458	-314	-300	500
EAST	MERAMUNDLI	220	MERAMUNDLI	400	1	-189	-232	-256	-171	-213	-184	-118	-135	-95	315
EAST	MERAMUNDLI	220	MERAMUNDLI	400	2	-189	-232	-256	-171	-213	-184	-118	-135	-95	315
EAST	MENDHASAL	220	MENDHASAL	400	1	-183	-233	-281	-189	-240	-182	-155	-193	-104	315
EAST	MENDHASAL	220	MENDHASAL	400	2	-183	-233	-281	-189	-240	-182	-155	-193	-104	315
EAST	MENDHASAL	220	MENDHASAL	400	3	-183	-233	-281	-189	-240	-182	-155	-193	-104	315
EAST	LAPANGA2	220	LAPANGA	400	1	-189	-198	-253	-169	-198	-170	-143	-145	-95	315
EAST	LAPANGA2	220	LAPANGA	400	2	-189	-198	-253	-169	-198	-170	-143	-145	-95	315
EAST	KTPS220	220	KOLAGHAT	400	1	-298	-246	-246	-303	-254	-250	-201	-124	-107	315
EAST	KTPS220	220	KOLAGHAT	400	2	-298	-246	-246	-303	-254	-250	-201	-124	-107	315
EAST	CHANDITALA_N	220	CHANDITALA_N	400	1	-302	-319	-328	-303	-328	-309	-207	-216	-164	315
EAST	CHANDITALA_N	220	CHANDITALA_N	400	2	-302	-319	-328	-303	-328	-309	-207	-216	-164	315
EAST	CHANDITALA_N	220	CHANDITALA_N	400	3	-302	-319	-328	-303	-328	-309	-207	-216	-164	315
EAST	KHARAGPR-WB	220	KHARAGPR-WB	400	1	-246	-272	-268	-247	-273	-268	-151	-162	-128	315
EAST	KHARAGPR-WB	220	KHARAGPR-WB	400	2	-246	-272	-268	-247	-273	-268	-151	-162	-128	315
EAST	KHARAGPR-WB	220	KHARAGPR-WB	400	3	-246	-272	-268	-247	-273	-268	-151	-162	-128	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	JEERAT	220	JEERAT	400	1	-253	-292	-296	-256	-299	-283	-174	-203	-154	315
EAST	JEERAT	220	JEERAT	400	2	-253	-292	-296	-256	-299	-283	-174	-203	-154	315
EAST	JEERAT	220	JEERAT	400	3	-253	-292	-296	-256	-299	-283	-174	-203	-154	315
EAST	JEERAT	220	JEERAT	400	4	-253	-292	-296	-256	-299	-283	-174	-203	-154	315
EAST	BIDHANNGR-WB	220	BIDHAN NGR	400	1	-271	-218	-226	-267	-203	-215	-143	-144	-124	315
EAST	BIDHANNGR-WB	220	BIDHAN NGR	400	2	-271	-218	-226	-267	-203	-215	-143	-144	-124	315
EAST	BIDHANNGR-WB	220	BIDHAN NGR	400	3	-271	-218	-226	-267	-203	-215	-143	-144	-124	315
EAST	BOKARO TPS	220	BOKARO-A	400	1	-375	-238	-357	-419	-255	-289	-460	-310	-277	500
EAST	BOKARO TPS	220	BOKARO-A	400	2	-375	-238	-357	-419	-255	-289	-460	-310	-277	500
EAST	KODEMA_DVC	220	KODERMA-DVC	400	1	-180	-201	-256	-191	-192	-218	-181	-194	-165	315
EAST	KODEMA_DVC	220	KODERMA-DVC	400	2	-180	-201	-256	-191	-192	-218	-181	-194	-165	315
SOUTH	GADAG PS-II	220	GADAG PS-II	400	1	324	-40	-103	280	-71	-114	12	-354	-405	500
SOUTH	GADAG PS-II	220	GADAG PS-II	400	2	324	-40	-103	280	-71	-114	12	-354	-405	500
SOUTH	GADAG PS-II	220	GADAG PS-II	400	3	324	-40	-103	280	-71	-114	12	-354	-405	500
SOUTH	GADAG PS-II	220	GADAG PS-II	400	4	324	-40	-103	280	-71	-114	12	-354	-405	500
SOUTH	KOPPAL PS-II	220	KOPPAL PS-II	400	1	294	-51	-103	279	-71	-115	10	-355	-430	500
SOUTH	KOPPAL PS-II	220	KOPPAL PS-II	400	2	294	-51	-103	279	-71	-115	10	-355	-430	500
SOUTH	KOPPAL PS-II	220	KOPPAL PS-II	400	3	294	-51	-103	279	-71	-115	10	-355	-430	500
SOUTH	KOPPAL PS-II	220	KOPPAL PS-II	400	4	294	-51	-103	279	-71	-115	10	-355	-430	500
SOUTH	NLCTS22	230	NYVL TS 2	400	1	-199	-211	-198	-205	-252	-203	-194	-210	-151	250
SOUTH	NLCTS22	230	NYVL TS 2	400	2	-199	-211	-198	-205	-252	-203	-194	-210	-151	250

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

Annex-11.6

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-2	1.00	1.01	1.00	1.00	1.00	1.01	1.02	1.02	1.06	1.06
NORTH	CHAMERA-1	1.00	1.01	1.00	1.00	1.00	1.01	1.02	1.02	1.07	1.07
NORTH	NANJ PS	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.01	1.05	1.05
NORTH	CHAM-POL	1.00	1.01	1.00	1.00	1.00	1.01	1.02	1.02	1.06	1.06
NORTH	HAMIRPUR	1.00	1.01	1.00	1.01	0.99	1.00	1.02	1.01	1.06	1.06
NORTH	LAHAL-VALLY	1.00	1.01	1.00	1.00	1.00	1.01	1.01	1.01	1.05	1.05
NORTH	ROPAR4	1.00	1.00	1.00	1.00	0.98	1.00	1.04	1.02	1.07	1.07
NORTH	DHANANSU4	1.00	1.01	1.01	1.01	0.98	1.01	1.05	1.04	1.09	1.09
NORTH	BEHMNJSINGH4	1.00	1.01	1.01	1.03	1.00	1.00	1.05	1.05	1.10	1.10
NORTH	TALWNDISABO4	1.00	1.00	1.00	1.03	1.00	1.00	1.05	1.04	1.09	1.09
NORTH	DHURI4	1.00	1.01	1.00	1.02	1.00	1.00	1.05	1.04	1.09	1.09
NORTH	MAKHU4	1.00	1.01	1.02	1.02	0.98	1.01	1.06	1.05	1.10	1.10
NORTH	MUKATSAR4	1.00	1.01	1.01	1.02	0.99	1.01	1.06	1.05	1.10	1.10
NORTH	NAKODAR4	1.00	1.01	1.01	1.02	0.99	1.01	1.05	1.04	1.09	1.09
NORTH	RAJPURA_TH4	1.00	1.00	1.00	1.02	1.00	1.00	1.04	1.03	1.08	1.08
NORTH	RAJPURA4	1.00	1.00	1.00	1.01	1.00	1.00	1.04	1.03	1.08	1.08
NORTH	AMRITSAR4	1.00	1.01	1.02	1.01	0.98	1.01	1.06	1.05	1.10	1.10
NORTH	MOGA4	1.01	1.03	1.02	1.00	1.02	1.02	1.01	1.04	1.05	1.05
NORTH	MOGA SPLT4	1.00	1.02	1.02	1.02	0.99	1.01	1.06	1.05	1.10	1.10
NORTH	PATIALA4	1.00	1.01	1.01	1.01	0.99	1.01	1.04	1.03	1.06	1.06
NORTH	PATRAN4	1.00	1.02	1.01	1.01	1.00	1.01	1.04	1.03	1.06	1.06
NORTH	LUDHIANA4	1.00	1.00	1.00	1.00	0.99	1.00	1.03	1.02	1.07	1.07
NORTH	JALANDHAR4	1.00	1.01	1.02	1.01	0.99	1.01	1.05	1.04	1.09	1.09

Area Name	Bus Name	V-Sc1	V-Sc2	V-Sc3	V-Sc4	V-Sc5	V-Sc6	V-Sc7	V-Sc8	V-Sc9	Max
NORTH	MALERKOTLA4	1.00	1.01	1.01	1.01	0.99	1.01	1.04	1.03	1.06	1.06
NORTH	MITAL(ENG)4	1.00	1.01	1.01	1.03	1.00	1.00	1.05	1.05	1.10	1.10
NORTH	PRITHHLA	0.99	1.03	1.02	1.01	1.00	1.02	1.03	1.04	1.06	1.06
NORTH	QADARPUR	0.99	1.03	1.02	1.01	1.00	1.01	1.02	1.04	1.06	1.06
NORTH	SONAROAD	0.99	1.03	1.02	1.01	1.00	1.01	1.02	1.04	1.06	1.06
NORTH	MANESAR	0.99	1.03	1.02	1.00	1.00	1.01	1.02	1.03	1.06	1.06
NORTH	BAMNAULI4	0.98	1.03	1.00	1.00	0.98	0.99	1.01	1.04	1.05	1.05
NORTH	DWARKA	0.98	1.03	1.00	1.00	0.99	1.00	1.01	1.04	1.05	1.05
NORTH	JHATIKARASP	0.98	1.03	1.00	0.99	0.99	1.00	1.01	1.04	1.05	1.05
NORTH	NEEMR (NEW)	0.99	1.04	1.04	1.01	1.02	1.02	1.02	1.05	1.09	1.09
NORTH	MERTA	0.99	1.06	1.02	1.00	1.01	1.01	0.99	1.04	1.07	1.07
NORTH	BHADLA	0.98	1.03	1.01	0.99	1.00	1.00	1.00	1.03	1.06	1.06
NORTH	HERAPU-4	1.00	1.06	1.03	1.02	1.00	1.00	1.02	1.04	1.07	1.07
NORTH	ALWAR	1.02	1.05	1.02	1.03	0.99	0.99	1.03	1.04	1.06	1.06
NORTH	RATANGAR	1.00	1.05	1.02	1.01	1.00	1.00	1.01	1.04	1.07	1.07
NORTH	HINDAU-4	1.02	1.05	1.01	1.04	0.99	0.98	1.03	1.04	1.07	1.07
NORTH	BHILWA-4	1.03	1.07	1.04	1.04	1.02	1.01	1.01	1.05	1.08	1.08
NORTH	KAWAI	1.04	1.05	1.00	1.04	1.00	1.00	1.01	1.00	1.03	1.05
NORTH	DEEDWANA	1.00	1.07	1.03	1.02	1.00	1.00	1.01	1.05	1.08	1.08
NORTH	AJMER	1.02	1.07	1.04	1.03	1.02	1.02	1.02	1.06	1.08	1.08
NORTH	AJMER-NW	1.02	1.06	1.04	1.03	1.02	1.02	1.01	1.05	1.08	1.08
NORTH	KANKROLI	1.00	1.05	1.02	1.02	1.00	1.00	1.00	1.04	1.05	1.05
NORTH	BABAI	1.00	1.04	1.02	1.01	1.01	1.01	1.02	1.04	1.06	1.06
NORTH	CHITTOR4	1.02	1.07	1.04	1.04	1.02	1.01	1.01	1.05	1.08	1.08
NORTH	CHIT-NEW	1.02	1.07	1.04	1.04	1.03	1.03	1.01	1.05	1.08	1.08
NORTH	BASSI	1.00	1.05	1.02	1.02	1.00	1.00	1.01	1.04	1.06	1.06
NORTH	JODH SURPURA	0.98	1.05	1.03	0.99	1.01	1.01	0.99	1.04	1.06	1.06
NORTH	JODH KANKANI	0.99	1.06	1.03	0.99	1.02	1.02	0.99	1.05	1.07	1.07

Area Name	Bus Name	V-Sc1	V-Sc2	V-Sc3	V-Sc4	V-Sc5	V-Sc6	V-Sc7	V-Sc8	V-Sc9	Max
NORTH	KOTPUT	1.00	1.04	1.03	1.01	1.01	1.01	1.02	1.04	1.08	1.08
NORTH	SIKAR	1.00	1.05	1.03	1.01	1.01	1.01	1.01	1.05	1.07	1.07
NORTH	JAIPUR_RS	1.01	1.06	1.03	1.02	1.01	1.02	1.02	1.05	1.07	1.07
NORTH	BIKANE-4	0.98	1.06	1.02	1.00	1.01	1.01	1.00	1.05	1.07	1.07
NORTH	BIKANER-NW	1.00	1.05	1.04	1.00	1.03	1.03	1.00	1.05	1.09	1.09
NORTH	BHADLA PG	0.99	1.03	1.01	0.99	1.00	1.01	1.00	1.03	1.05	1.05
NORTH	ANTA-4	1.03	1.05	1.01	1.04	1.00	1.00	1.01	1.01	1.04	1.05
NORTH	JAIPUR_PG	1.01	1.04	1.02	1.02	1.00	1.00	1.01	1.03	1.06	1.06
NORTH	SANGOD	1.03	1.05	1.00	1.04	1.00	1.00	1.01	1.01	1.04	1.05
NORTH	BIKANER-II	1.00	1.06	1.05	1.00	1.04	1.04	1.00	1.06	1.11	1.11
NORTH	SIKAR NEW	1.01	1.04	1.03	0.99	1.02	1.03	1.00	1.05	1.06	1.06
NORTH	BEAWAR	1.01	1.07	1.05	1.02	1.04	1.04	1.00	1.06	1.08	1.08
NORTH	BIKANER-3	1.00	1.06	1.05	1.00	1.04	1.04	1.00	1.06	1.11	1.11
NORTH	HANUMAN	1.00	1.06	1.02	1.02	1.01	1.01	1.02	1.05	1.07	1.07
NORTH	KHETRI	1.00	1.05	1.04	0.99	1.02	1.03	1.00	1.05	1.07	1.07
NORTH	ORAI	1.01	1.03	1.02	1.01	1.01	1.02	1.02	1.05	1.05	1.05
NORTH	MAINPURIUP	1.02	1.04	1.02	1.04	1.01	1.02	1.04	1.05	1.05	1.05
NORTH	GONDA	1.01	1.02	1.01	1.04	1.00	1.01	1.03	1.04	1.05	1.05
NORTH	UNNAO4	1.01	1.02	1.01	1.03	1.00	1.01	1.03	1.03	1.05	1.05
NORTH	BARELI4	1.00	1.02	1.01	1.02	1.00	1.01	1.03	1.03	1.06	1.06
NORTH	PARICHHA	1.01	1.03	1.02	1.02	1.00	1.01	1.02	1.05	1.06	1.06
NORTH	BAREL-PG	1.00	1.03	1.02	1.02	1.00	1.01	1.03	1.03	1.06	1.06
NORTH	BAREFSC1	1.00	1.01	1.01	1.02	0.98	1.00	1.02	1.02	1.06	1.06
NORTH	MAINFSC2	0.98	1.03	1.01	0.99	1.00	1.01	1.01	1.05	1.04	1.05
NORTH	ALIGARH-PG	1.01	1.04	1.03	1.02	1.01	1.03	1.03	1.05	1.05	1.05
NORTH	MAINPURI	1.02	1.04	1.02	1.04	1.01	1.03	1.04	1.05	1.05	1.05
NORTH	SHAHJ-PG	1.01	1.02	1.01	1.04	1.00	1.01	1.03	1.04	1.06	1.06
NORTH	ROSA-TP2	1.02	1.02	1.01	1.04	1.00	1.01	1.03	1.04	1.06	1.06

Area Name	Bus Name	V-Sc1	V-Sc2	V-Sc3	V-Sc4	V-Sc5	V-Sc6	V-Sc7	V-Sc8	V-Sc9	Max
NORTH	BAREILY	1.00	1.03	1.02	1.02	1.00	1.01	1.03	1.04	1.06	1.06
NORTH	KHURJA TPS	1.01	1.04	1.02	1.02	1.01	1.02	1.03	1.05	1.05	1.05
NORTH	BAREFSC2	1.00	1.01	1.01	1.02	0.98	1.00	1.02	1.02	1.06	1.06
NORTH	MAINFSC1	0.98	1.03	1.01	0.99	1.00	1.01	1.01	1.05	1.04	1.05
NORTH	MAHEBA	1.01	1.03	1.02	1.03	1.00	1.02	1.03	1.05	1.06	1.06
NORTH	FARRUKHABAD	1.01	1.03	1.01	1.03	1.00	1.01	1.03	1.04	1.06	1.06
NORTH	BADAUN	1.02	1.03	1.01	1.04	1.00	1.01	1.04	1.04	1.06	1.06
NORTH	SAMBHAL400	1.01	1.02	1.01	1.02	0.99	1.01	1.03	1.03	1.05	1.05
NORTH	JAULJIVI	1.00	1.01	1.01	1.02	0.99	1.00	1.02	1.02	1.05	1.05
WEST	BHOGAT	1.01	1.01	1.02	1.01	1.01	1.02	1.01	1.05	1.04	1.05
WEST	BHACHAUNDA	1.04	1.03	1.04	1.05	1.02	1.03	1.03	1.05	1.05	1.05
WEST	SHIVLAKHAPS	1.05	1.06	1.06	1.06	1.05	1.05	1.05	1.07	1.08	1.08
WEST	BHOPAL-4	1.01	1.04	1.03	1.02	1.03	1.03	0.99	1.02	1.05	1.05
WEST	SHUJALPR-4	1.01	1.05	1.03	1.02	1.03	1.03	0.99	1.02	1.05	1.05
WEST	BHOPAL_STER	1.01	1.04	1.03	1.02	1.03	1.03	1.00	1.02	1.05	1.05
WEST	MANDSAUR-4	1.01	1.04	1.03	1.02	1.03	1.02	0.99	1.04	1.06	1.06
WEST	PACHORASP	1.00	1.05	1.03	1.01	1.03	1.03	1.00	1.02	1.05	1.05
WEST	PACHORA_SPLT	1.00	1.06	1.05	1.00	1.04	1.05	1.00	1.04	1.07	1.07
WEST	NEEMUCH_PS	1.01	1.06	1.04	1.03	1.04	1.03	1.00	1.05	1.08	1.08
WEST	NEEMUCH-SPLT	1.00	1.07	1.06	1.02	1.06	1.05	1.00	1.07	1.09	1.09
WEST	JAIGAD II	1.10	0.97	0.97	1.08	0.97	0.97	0.99	0.97	0.98	1.10
WEST	DOLVI	1.09	0.95	0.95	1.08	0.94	0.96	0.98	0.95	0.97	1.09
EAST	DUBURI	0.99	0.96	0.90	1.01	0.99	0.99	1.02	1.00	1.05	1.05
EAST	PARADEEP4	0.99	0.96	0.90	1.01	0.98	0.99	1.02	1.01	1.06	1.06
EAST	MERAMNDLI-B	0.99	0.96	0.90	1.01	0.99	0.99	1.02	1.00	1.05	1.05
EAST	RNC-SIPT FSC	1.02	1.06	1.07	1.00	1.02	1.00	0.96	0.95	0.96	1.07
EAST	RNC-SIPT FSC	1.02	1.06	1.01	1.00	1.02	1.00	0.96	0.95	0.96	1.06
SOUTH	MUDN400	1.05	1.02	1.03	1.05	1.00	1.02	1.05	1.02	1.03	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
SOUTH	KONAS_VMGR 4	1.01	1.02	1.02	1.02	1.01	1.02	1.02	1.01	1.06	1.06
SOUTH	SURYPET4	1.02	1.02	1.03	1.06	1.02	1.04	1.01	1.01	1.04	1.06
SOUTH	RAIDURG	1.02	1.02	1.05	1.06	1.03	1.06	1.00	1.01	1.05	1.06
SOUTH	KETHIREDDYPA	1.02	1.02	1.04	1.06	1.03	1.05	1.00	1.01	1.04	1.06

- **Note: Highlighted cell indicates 400kV 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	MOGA-PG	1.01	1.03	1.02	1.00	1.01	1.02	1.01	1.04	1.05	1.05
NORTH	NEEMR (NEW)	0.99	1.05	1.05	1.01	1.04	1.04	1.02	1.06	1.12	1.12
NORTH	AJMER-NW	1.01	1.06	1.04	1.02	1.03	1.03	1.00	1.05	1.07	1.07
NORTH	CHIT-NEW	1.02	1.06	1.05	1.04	1.04	1.04	1.00	1.06	1.08	1.08
NORTH	BIKANER-NW	1.00	1.05	1.03	0.99	1.02	1.03	1.00	1.05	1.07	1.07
NORTH	BHADLA PG	1.00	1.04	1.02	0.99	1.01	1.02	1.00	1.04	1.06	1.06
NORTH	SIKAR NEW	1.01	1.04	1.03	0.98	1.02	1.03	1.00	1.05	1.06	1.06
NORTH	BHADLA-2	1.00	1.04	1.02	0.99	1.02	1.02	0.99	1.04	1.06	1.06
NORTH	BEAWAR	1.02	1.07	1.05	1.03	1.04	1.04	1.00	1.06	1.08	1.08
NORTH	BIKANER-3	0.99	1.06	1.05	1.00	1.04	1.04	1.00	1.06	1.12	1.12
NORTH	ANTA-7	1.02	1.06	1.02	1.03	1.01	1.01	1.01	1.03	1.05	1.06
NORTH	JAIPUR	1.01	1.06	1.04	1.02	1.03	1.03	1.01	1.05	1.07	1.07
NORTH	KHETRI	1.00	1.05	1.03	0.99	1.02	1.03	1.01	1.05	1.06	1.06
NORTH	JODH KANKANI	1.00	1.06	1.04	1.00	1.02	1.02	1.00	1.05	1.07	1.07
NORTH	DAUSA	1.01	1.06	1.04	1.02	1.02	1.03	1.01	1.05	1.06	1.06
NORTH	ORAI	1.02	1.04	1.03	1.03	1.01	1.03	1.01	1.05	1.05	1.05
NORTH	BAREILLY	0.99	1.03	1.03	1.01	1.02	1.02	1.02	1.04	1.08	1.08
WEST	INDORE-7	1.01	1.04	1.03	1.03	1.04	1.03	1.00	1.05	1.05	1.05
WEST	BHOPAL_STER	1.01	1.04	1.04	1.03	1.03	1.03	1.01	1.03	1.05	1.05
WEST	NEEMUCH7	1.02	1.07	1.06	1.04	1.06	1.05	1.00	1.07	1.09	1.09
WEST	WARDHA	1.04	1.05	1.05	1.05	1.04	1.05	1.03	1.03	1.04	1.05
SOUTH	SRI_POOL	1.02	1.04	1.04	1.04	1.03	1.04	1.05	1.04	1.03	1.05
SOUTH	BIDAR PS SZ	1.01	1.04	1.05	1.02	1.03	1.05	1.01	1.03	1.05	1.05

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

Under Voltage Nodes

400kV Bus Voltage <=0.95 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	KALWA4	0.99	0.99	1.00	0.98	0.97	0.99	0.94	0.99	1.00	0.94
WEST	KHARGAR	0.98	1.00	1.00	0.97	0.97	0.99	0.94	0.99	1.00	0.94
WEST	CHAKAN	0.99	1.00	1.01	0.98	0.97	0.99	0.95	0.99	1.01	0.95
WEST	DOLVI	1.09	0.95	0.95	1.08	0.94	0.96	0.98	0.95	0.97	0.94
WEST	HINJWD40	0.99	1.00	1.01	0.98	0.97	0.99	0.95	0.99	1.01	0.95
WEST	VIKROLI400	0.98	0.99	1.00	0.97	0.97	0.99	0.93	0.98	1.00	0.93
WEST	NAVI-MUM	0.98	1.00	1.00	0.97	0.97	0.99	0.94	0.99	1.00	0.94
WEST	PADGHE-SPLT	0.98	1.00	1.01	0.98	0.98	0.99	0.94	0.99	1.01	0.94
WEST	KALWA-SPLT	0.98	0.99	1.00	0.97	0.97	0.99	0.93	0.99	1.00	0.93
WEST	KUDUS BYP	0.98	1.00	1.01	0.98	0.98	1.00	0.95	1.00	1.01	0.95
EAST	DUBURI	0.99	0.96	0.90	1.01	0.99	0.99	1.02	1.00	1.05	0.90
EAST	MENDHASAL	0.98	0.94	0.90	1.00	0.96	0.98	1.02	1.00	1.04	0.90
EAST	PARADEEP4	0.99	0.96	0.90	1.01	0.98	0.99	1.02	1.01	1.06	0.90
EAST	PANDIABILI	0.99	0.94	0.90	1.00	0.97	0.98	1.02	1.00	1.05	0.90
EAST	MERAMNDLI-B	0.99	0.96	0.90	1.01	0.99	0.99	1.02	1.00	1.05	0.90
EAST	GMR-OD	0.99	0.96	0.90	1.01	0.99	0.99	1.01	1.00	1.05	0.90
EAST	NARENDRAPUR	0.99	0.95	0.91	1.00	0.97	0.98	1.02	1.00	1.04	0.91
EAST	BHADRAK-NEW	0.99	0.97	0.92	1.01	0.99	0.99	1.02	1.00	1.05	0.92
EAST	RAJARHAT	0.99	0.98	0.98	1.01	0.99	0.91	1.00	0.98	1.01	0.91
EAST	JEERAT	0.99	0.99	0.98	1.01	0.99	0.92	1.00	0.99	1.02	0.92
EAST	SUBHASGRAM	0.99	0.98	0.98	1.01	0.99	0.91	1.00	0.99	1.01	0.91
EAST	KOLAGHAT	1.00	0.99	0.99	1.02	1.00	0.94	1.02	1.00	1.03	0.94
EAST	HALDIA-TPS	0.97	1.00	1.00	1.01	1.00	0.94	1.00	1.00	1.00	0.94
EAST	CHANDITALA_N	1.00	0.99	0.99	1.02	1.00	0.94	1.01	0.99	1.02	0.94
EAST	BAKRASWR	1.00	1.00	0.99	1.01	1.00	0.93	1.01	1.00	1.03	0.93

Area Name	Bus Name	V-Sc1	V-Sc2	V-Sc3	V-Sc4	V-Sc5	V-Sc6	V-Sc7	V-Sc8	V-Sc9	Min
EAST	ARAMBAGH	1.00	0.99	0.99	1.02	1.00	0.94	1.01	1.00	1.03	0.94
EAST	NEW LAXMKTNP	0.98	0.99	0.99	1.01	0.99	0.92	1.00	0.99	1.01	0.92
EAST	JEERAT-NEW	0.99	0.98	0.98	1.01	0.99	0.92	1.00	0.99	1.02	0.92
EAST	KATWA-TPS	1.00	1.00	0.99	1.01	1.00	0.94	1.01	1.00	1.02	0.94
EAST	RNC-SIPT FSC	1.02	1.06	1.07	1.00	1.02	1.00	0.96	0.95	0.96	0.95
EAST	RNC-SIPT FSC	1.02	1.06	1.01	1.00	1.02	1.00	0.96	0.95	0.96	0.95

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

765kV Bus Voltage <=0.95 PU

Area Name	Bus Name	V-Sc1	V-Sc2	V-Sc3	V-Sc4	V-Sc5	V-Sc6	V-Sc7	V-Sc8	V-Sc9	Min
EAST	JEERAT7	0.99	0.98	0.97	1.02	0.99	0.94	0.99	0.98	1.02	0.94

Annex-11.7

N-1 Contingency of 765 kV Transmission Lines

S. No.	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% loading	Scenario
1.	157708 JHATI-PG 765.00 167774 KHETRI 765.00 1	OPEN LINE FROM BUS 157708 [JHATI-PG 765.00] TO BUS 167774 [KHETRI 765.00] CKT 2	3442	3507	3500	100.21	Sc-1
2.	157708 JHATI-PG 765.00 167774 KHETRI 765.00 2	OPEN LINE FROM BUS 157708 [JHATI-PG 765.00] TO BUS 167774 [KHETRI 765.00] CKT 1	3442	3507	3500	100.21	Sc-1
3.	358208 NAVSARI-NEW 765.00 378051 PADGHEGIS 765.00 1	OPEN LINE FROM BUS 358208 [NAVSARI-NEW 765.00] TO BUS 378051 [PADGHEGIS 765.00] CKT 2	3287	3401	3500	97.18	Sc-1
4.	358208 NAVSARI-NEW 765.00 378051 PADGHEGIS 765.00 2	OPEN LINE FROM BUS 358208 [NAVSARI-NEW 765.00] TO BUS 378051 [PADGHEGIS 765.00] CKT 1	3287	3401	3500	97.18	Sc-1
5.	167484 BHADLA-3 765.00 167497 SIKAR NEW 765.00 1	OPEN LINE FROM BUS 167484 [BHADLA-3 765.00] TO BUS 167497 [SIKAR NEW 765.00] CKT 2	3346	3364	3500	96.11	Sc-1
6.	167484 BHADLA-3 765.00 167497 SIKAR NEW 765.00 2	OPEN LINE FROM BUS 167484 [BHADLA-3 765.00] TO BUS 167497 [SIKAR NEW 765.00] CKT 1	3346	3364	3500	96.11	Sc-1
7.	358111 VATAMAN 765.00 358208 NAVSARI-NEW 765.00 1	OPEN LINE FROM BUS 358111 [VATAMAN 765.00] TO BUS 358208 [NAVSARI-NEW 765.00] CKT 2	3145	3291	3500	94.02	Sc-1
8.	358111 VATAMAN 765.00 358208 NAVSARI-NEW 765.00 2	OPEN LINE FROM BUS 358111 [VATAMAN 765.00] TO BUS 358208 [NAVSARI-NEW 765.00] CKT 1	3145	3291	3500	94.02	Sc-1
9.	358147 LAKADIA 765 765.00 358202 KHAVDA-II 765.00 1	OPEN LINE FROM BUS 358147 [LAKADIA 765 765.00] TO BUS 358202 [KHAVDA-II 765.00] CKT 2	3225	3252	3500	92.93	Sc-1
10.	358147 LAKADIA 765 765.00 358202 KHAVDA-II 765.00 2	OPEN LINE FROM BUS 358147 [LAKADIA 765 765.00] TO BUS 358202 [KHAVDA-II 765.00] CKT 1	3225	3252	3500	92.93	Sc-1
11.	167458 BIKANER-NW 765.00 167774 KHETRI 765.00 1	OPEN LINE FROM BUS 167458 [BIKANER-NW 765.00] TO BUS 167774 [KHETRI 765.00] CKT 2	3154	3166	3500	90.46	Sc-1
12.	167458 BIKANER-NW 765.00 167774 KHETRI 765.00 2	OPEN LINE FROM BUS 167458 [BIKANER-NW 765.00] TO BUS 167774 [KHETRI 765.00] CKT 1	3154	3166	3500	90.46	Sc-1
13.	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	4524	4506	3500	128.75	Sc-2

S. No.	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% loading	Scenario
14.	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	4524	4506	3500	128.75	Sc-2
15.	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	3941	3901	3500	111.45	Sc-2
16.	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	3941	3901	3500	111.45	Sc-2
17.	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	3621	3618	3500	103.37	Sc-2
18.	368024 SASAN 765.00 368025 VIN-POOL 765.00 2	OPEN LINE FROM BUS 368024 [SASAN 765.00] TO BUS 368025 [VIN-POOL 765.00] CKT 1	3555	3554	3500	101.54	Sc-2
19.	318998 DHRAM_SPL 765.00 478046 RANCHI-NEW 765.00 1	OPEN LINE FROM BUS 318998 [DHRAM_SPL 765.00] TO BUS 478046 [RANCHI-NEW 765.00] CKT 2	3474	3449	3500	98.55	Sc-2
20.	318998 DHRAM_SPL 765.00 478046 RANCHI-NEW 765.00 2	OPEN LINE FROM BUS 318998 [DHRAM_SPL 765.00] TO BUS 478046 [RANCHI-NEW 765.00] CKT 1	3460	3435	3500	98.15	Sc-2
21.	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	4454	4433	3500	126.65	Sc-3
22.	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	4454	4433	3500	126.65	Sc-3
23.	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	3710	3679	3500	105.13	Sc-3
24.	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	3710	3679	3500	105.13	Sc-3
25.	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	3596	3593	3500	102.67	Sc-3
26.	368024 SASAN 765.00 368025 VIN-POOL 765.00 2	OPEN LINE FROM BUS 368024 [SASAN 765.00] TO BUS 368025 [VIN-POOL 765.00] CKT 1	3531	3530	3500	100.86	Sc-3
27.	318998 DHRAM_SPL 765.00 478046 RANCHI-NEW 765.00 1	OPEN LINE FROM BUS 318998 [DHRAM_SPL 765.00] TO BUS 478046 [RANCHI-NEW 765.00] CKT 2	3413	3383	3500	96.67	Sc-3

S. No.	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% loading	Scenario
28.	318998 DHRAM_SPL 765.00 478046 RANCHI-NEW 765.00 2	OPEN LINE FROM BUS 318998 [DHRAM_SPL 765.00] TO BUS 478046 [RANCHI-NEW 765.00] CKT 1	3399	3370	3500	96.28	Sc-3
29.	358147 LAKADIA 765 765.00 358202 KHAVDA-II 765.00 1	OPEN LINE FROM BUS 358147 [LAKADIA 765 765.00] TO BUS 358202 [KHAVDA-II 765.00] CKT 2	3334	3344	3500	95.55	Sc-4
30.	358147 LAKADIA 765 765.00 358202 KHAVDA-II 765.00 2	OPEN LINE FROM BUS 358147 [LAKADIA 765 765.00] TO BUS 358202 [KHAVDA-II 765.00] CKT 1	3334	3344	3500	95.55	Sc-4
31.	157708 JHATI-PG 765.00 167774 KHETRI 765.00 1	OPEN LINE FROM BUS 157708 [JHATI-PG 765.00] TO BUS 167774 [KHETRI 765.00] CKT 2	3301	3336	3500	95.33	Sc-4
32.	157708 JHATI-PG 765.00 167774 KHETRI 765.00 2	OPEN LINE FROM BUS 157708 [JHATI-PG 765.00] TO BUS 167774 [KHETRI 765.00] CKT 1	3301	3336	3500	95.33	Sc-4
33.	358111 VATAMAN 765.00 358208 NAVSARI-NEW 765.00 1	OPEN LINE FROM BUS 358111 [VATAMAN 765.00] TO BUS 358208 [NAVSARI-NEW 765.00] CKT 2	3173	3308	3500	94.51	Sc-4
34.	358111 VATAMAN 765.00 358208 NAVSARI-NEW 765.00 2	OPEN LINE FROM BUS 358111 [VATAMAN 765.00] TO BUS 358208 [NAVSARI-NEW 765.00] CKT 1	3173	3308	3500	94.51	Sc-4
35.	167484 BHADLA-3 765.00 167497 SIKAR NEW 765.00 1	OPEN LINE FROM BUS 167484 [BHADLA-3 765.00] TO BUS 167497 [SIKAR NEW 765.00] CKT 2	3195	3243	3500	92.66	Sc-4
36.	167484 BHADLA-3 765.00 167497 SIKAR NEW 765.00 2	OPEN LINE FROM BUS 167484 [BHADLA-3 765.00] TO BUS 167497 [SIKAR NEW 765.00] CKT 1	3195	3243	3500	92.66	Sc-4
37.	358135 BHUJ POOL 765.00 358299 KHAVDA2 765.00 1	OPEN LINE FROM BUS 358135 [BHUJ POOL 765.00] TO BUS 358299 [KHAVDA2 765.00] CKT 2	3211	3218	3500	91.94	Sc-4
38.	358135 BHUJ POOL 765.00 358299 KHAVDA2 765.00 2	OPEN LINE FROM BUS 358135 [BHUJ POOL 765.00] TO BUS 358299 [KHAVDA2 765.00] CKT 1	3211	3218	3500	91.94	Sc-4
39.	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	4087	4057	3500	115.92	Sc-5
40.	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	4087	4057	3500	115.92	Sc-5
41.	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	3230	3202	3500	91.49	Sc-5

S. No.	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% loading	Scenario
42.	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	3230	3202	3500	91.49	Sc-5
43.	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	3195	3195	3500	91.29	Sc-5
44.	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	4033	4002	3500	114.34	Sc-6
45.	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	4033	4002	3500	114.34	Sc-6
46.	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	3261	3251	3500	92.89	Sc-6
47.	368024 SASAN 765.00 368025 VIN-POOL 765.00 2	OPEN LINE FROM BUS 368024 [SASAN 765.00] TO BUS 368025 [VIN-POOL 765.00] CKT 1	3202	3195	3500	91.27	Sc-6
48.	358208 NAVSARI-NEW 765.00 378051 PADGHEGIS 765.00 1	OPEN LINE FROM BUS 358208 [NAVSARI-NEW 765.00] TO BUS 378051 [PADGHEGIS 765.00] CKT 2	3750	3924	3500	112.12	Sc-7
49.	358208 NAVSARI-NEW 765.00 378051 PADGHEGIS 765.00 2	OPEN LINE FROM BUS 358208 [NAVSARI-NEW 765.00] TO BUS 378051 [PADGHEGIS 765.00] CKT 1	3750	3924	3500	112.12	Sc-7
50.	358135 BHUJ POOL 765.00 358299 KHAVDA2 765.00 1	OPEN LINE FROM BUS 358135 [BHUJ POOL 765.00] TO BUS 358299 [KHAVDA2 765.00] CKT 2	3836	3848	3500	109.95	Sc-7
51.	358135 BHUJ POOL 765.00 358299 KHAVDA2 765.00 2	OPEN LINE FROM BUS 358135 [BHUJ POOL 765.00] TO BUS 358299 [KHAVDA2 765.00] CKT 1	3836	3848	3500	109.95	Sc-7
52.	358111 VATAMAN 765.00 358208 NAVSARI-NEW 765.00 1	OPEN LINE FROM BUS 358111 [VATAMAN 765.00] TO BUS 358208 [NAVSARI-NEW 765.00] CKT 2	3596	3780	3500	108.01	Sc-7
53.	358111 VATAMAN 765.00 358208 NAVSARI-NEW 765.00 2	OPEN LINE FROM BUS 358111 [VATAMAN 765.00] TO BUS 358208 [NAVSARI-NEW 765.00] CKT 1	3596	3780	3500	108.01	Sc-7

N-1 Contingency of 400 kV Transmission Lines

S. No.	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% loading	Scenario
1.	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	2260	2264	1714	132.12	Sc-1
2.	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	2260	2264	1714	132.12	Sc-1
3.	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	1131	1131	857	131.97	Sc-1
4.	174402 BARELI4 400.00 174410 BAREL-PG 400.00 1	OPEN LINE FROM BUS 174402 [BARELI4 400.00] TO BUS 174410 [BAREL-PG 400.00] CKT 2	1080	1076	857	125.53	Sc-1
5.	174402 BARELI4 400.00 174410 BAREL-PG 400.00 2	OPEN LINE FROM BUS 174402 [BARELI4 400.00] TO BUS 174410 [BAREL-PG 400.00] CKT 1	1080	1076	857	125.53	Sc-1
6.	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	2689	2677	2186	122.46	Sc-1
7.	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	2689	2677	2186	122.46	Sc-1
8.	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	1029	1049	857	122.43	Sc-1
9.	174410 BAREL-PG 400.00 174483 BAREILY 400.00 1	OPEN LINE FROM BUS 174410 [BAREL-PG 400.00] TO BUS 174483 [BAREILY 400.00] CKT 2	1992	1985	1714	115.83	Sc-1
10.	174410 BAREL-PG 400.00 174483 BAREILY 400.00 2	OPEN LINE FROM BUS 174410 [BAREL-PG 400.00] TO BUS 174483 [BAREILY 400.00] CKT 1	1992	1985	1714	115.83	Sc-1
11.	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	941	941	857	109.77	Sc-1
12.	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	934	936	857	109.22	Sc-1
13.	374017 TAPS4 400.00 374070 VELGAON4 400.00 1	OPEN LINE FROM BUS 374017 [TAPS4 400.00] TO BUS 374070 [VELGAON4 400.00] CKT 2	925	930	857	108.53	Sc-1
14.	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	925	930	857	108.53	Sc-1
15.	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	922	922	850	108.51	Sc-1
16.	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	922	922	850	108.51	Sc-1
17.	424050 LAPANGA 400.00 424200 OPGC-OD 400.00 1	OPEN LINE FROM BUS 424050 [LAPANGA 400.00] TO BUS 424200 [OPGC-OD 400.00] CKT 2	1176	1176	1093	107.56	Sc-1
18.	424050 LAPANGA 400.00 424200 OPGC-OD 400.00 2	OPEN LINE FROM BUS 424050 [LAPANGA 400.00] TO BUS 424200 [OPGC-OD 400.00] CKT 1	1176	1176	1093	107.56	Sc-1
19.	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	1145	1145	1093	104.8	Sc-1
20.	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	1145	1145	1093	104.8	Sc-1

S. No.	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% loading	Scenario
21.	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	869	897	857	104.7	Sc-1
22.	514012 MAMIDIPALLY 400.00 514104 MAHESH-TS 400.00 1	OPEN LINE FROM BUS 514012 [MAMIDIPALLY 400.00] TO BUS 514104 [MAHESH-TS 400.00] CKT 2	909	905	874	103.54	Sc-1
23.	514012 MAMIDIPALLY 400.00 514104 MAHESH-TS 400.00 2	OPEN LINE FROM BUS 514012 [MAMIDIPALLY 400.00] TO BUS 514104 [MAHESH-TS 400.00] CKT 1	909	905	874	103.54	Sc-1
24.	364002 BHOPAL-4 400.00 364035 BHOPAL_STER 400.00 1	OPEN LINE FROM BUS 364002 [BHOPAL-4 400.00] TO BUS 364035 [BHOPAL_STER 400.00] CKT 2	1777	1764	2100	102.9	Sc-1
25.	364002 BHOPAL-4 400.00 364035 BHOPAL_STER 400.00 2	OPEN LINE FROM BUS 364002 [BHOPAL-4 400.00] TO BUS 364035 [BHOPAL_STER 400.00] CKT 1	1777	1764	2100	102.9	Sc-1
26.	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	868	870	857	101.47	Sc-1
27.	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	868	870	857	101.47	Sc-1
28.	514023 VELTOOR 400.00 524003 RAIC 400.00 1	OPEN LINE FROM BUS 514101 [MAHESWRM 400.00] TO BUS 518051 [MAHESHWARAM 765.00] CKT 1	887	884	874	101.2	Sc-1
29.	374008 DHULE4 400.00 374011 BABLESWAR 400.00 1	OPEN LINE FROM BUS 374008 [DHULE4 400.00] TO BUS 374011 [BABLESWAR 400.00] CKT 2	855	858	857	100.17	Sc-1
30.	374008 DHULE4 400.00 374011 BABLESWAR 400.00 2	OPEN LINE FROM BUS 374008 [DHULE4 400.00] TO BUS 374011 [BABLESWAR 400.00] CKT 1	855	858	857	100.17	Sc-1
31.	164460 FATEHGARH 400.00 164480 FATEHG-2 400.00 1	OPEN LINE FROM BUS 164460 [FATEHGARH 400.00] TO BUS 164480 [FATEHG-2 400.00] CKT 2	2189	2189	2186	100.13	Sc-1
32.	164460 FATEHGARH 400.00 164480 FATEHG-2 400.00 2	OPEN LINE FROM BUS 164460 [FATEHGARH 400.00] TO BUS 164480 [FATEHG-2 400.00] CKT 1	2189	2189	2186	100.13	Sc-1
33.	164481 FATEHG-3 400.00 164482 FATEHG-4 400.00 1	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 164482 [FATEHG-4 400.00] CKT 2	2090	2095	2100	99.76	Sc-1
34.	164481 FATEHG-3 400.00 164482 FATEHG-4 400.00 2	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 164482 [FATEHG-4 400.00] CKT 1	2090	2095	2100	99.76	Sc-1
35.	114001 LEH_PANG 400.00 114013 PANG400SP3 400.00 1	OPEN LINE FROM BUS 114001 [LEH_PANG 400.00] TO BUS 114013 [PANG400SP3 400.00] CKT 2	1669	1688	1714	98.46	Sc-1
36.	114001 LEH_PANG 400.00 114013 PANG400SP3 400.00 2	OPEN LINE FROM BUS 114001 [LEH_PANG 400.00] TO BUS 114013 [PANG400SP3 400.00] CKT 1	1669	1688	1714	98.46	Sc-1
37.	114001 LEH_PANG 400.00 114012 PANG400SP2 400.00 1	OPEN LINE FROM BUS 114001 [LEH_PANG 400.00] TO BUS 114012 [PANG400SP2 400.00] CKT 2	1669	1679	1714	97.95	Sc-1
38.	114001 LEH_PANG 400.00 114012 PANG400SP2 400.00 2	OPEN LINE FROM BUS 114001 [LEH_PANG 400.00] TO BUS 114012 [PANG400SP2 400.00] CKT 1	1669	1679	1714	97.95	Sc-1
39.	114001 LEH_PANG 400.00 114008 PANG 400 SP1400.00 1	OPEN LINE FROM BUS 114001 [LEH_PANG 400.00] TO BUS 114008 [PANG 400 SP1400.00] CKT 2	1668	1670	1714	97.45	Sc-1
40.	114001 LEH_PANG 400.00 114008 PANG 400 SP1400.00 2	OPEN LINE FROM BUS 114001 [LEH_PANG 400.00] TO BUS 114008 [PANG 400 SP1400.00] CKT 1	1668	1670	1714	97.45	Sc-1
41.	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	1633	1666	2100	97.2	Sc-1
42.	144420 BHIWANI 400.00 144469 BHIWANI-PG 400.00 1	OPEN LINE FROM BUS 144469 [BHIWANI-PG 400.00] TO BUS 144480 [JINDPG 400.00] CKT 1	812	814	857	94.93	Sc-1

S. No.	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% loading	Scenario
43.	174491 KHURJA TPS 400.00 174512 ALIGARH 400.00 1	OPEN LINE FROM BUS 177265 [GNOIDAUP 765.00] TO BUS 177512 [ALIGARH 765.00] CKT 1	821	813	857	94.92	Sc-1
44.	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	1515	1515	1600	94.66	Sc-1
45.	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	1515	1515	1600	94.66	Sc-1
46.	174451 LUCK74-P 400.00 174484 KANPRNEW 400.00 1	OPEN LINE FROM BUS 174451 [LUCK74-P 400.00] TO BUS 174484 [KANPRNEW 400.00] CKT 2	807	809	857	94.41	Sc-1
47.	174451 LUCK74-P 400.00 174484 KANPRNEW 400.00 2	OPEN LINE FROM BUS 174451 [LUCK74-P 400.00] TO BUS 174484 [KANPRNEW 400.00] CKT 1	807	809	857	94.41	Sc-1
48.	354009 GPEC4 400.00 354021 KASOR4 400.00 1	OPEN LINE FROM BUS 354002 [GANCS4 400.00] TO BUS 354003 [DEHGM4 400.00] CKT 1	809	803	857	93.75	Sc-1
49.	354002 GANCS4 400.00 354009 GPEC4 400.00 1	OPEN LINE FROM BUS 354002 [GANCS4 400.00] TO BUS 354003 [DEHGM4 400.00] CKT 1	797	803	857	93.75	Sc-1
50.	174479 VARANASI 400.00 414491 SASARAM-ER 400.00 1	OPEN LINE FROM BUS 177705 [FATEH-PG 765.00] TO BUS 418892 [SASARAM 765.00] CKT 1	787	795	857	92.76	Sc-1
51.	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	1479	1479	1600	92.46	Sc-1
52.	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	1479	1479	1600	92.46	Sc-1
53.	164404 BHADLA 400.00 164456 BIKANE-4 400.00 1	OPEN LINE FROM BUS 164404 [BHADLA 400.00] TO BUS 164456 [BIKANE-4 400.00] CKT 2	1544	1578	1714	92.06	Sc-1
54.	164404 BHADLA 400.00 164456 BIKANE-4 400.00 2	OPEN LINE FROM BUS 164404 [BHADLA 400.00] TO BUS 164456 [BIKANE-4 400.00] CKT 1	1544	1578	1714	92.06	Sc-1
55.	444010 SAGARDIGHI_4400.00 444019 FARAKKA 400.00 1	OPEN LINE FROM BUS 444010 [SAGARDIGHI_4400.00] TO BUS 444019 [FARAKKA 400.00] CKT 2	1004	1004	1093	91.86	Sc-1
56.	444010 SAGARDIGHI_4400.00 444019 FARAKKA 400.00 2	OPEN LINE FROM BUS 444010 [SAGARDIGHI_4400.00] TO BUS 444019 [FARAKKA 400.00] CKT 1	1004	1004	1093	91.86	Sc-1
57.	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	778	768	850	90.35	Sc-1
58.	424004 JEYPORE 400.00 424053 JEYP GAZ F1 400.00 1	OPEN LINE FROM BUS 424004 [JEYPORE 400.00] TO BUS 424054 [JEYP GAZ F2 400.00] CKT 1	766	766	850	90.15	Sc-1
59.	424004 JEYPORE 400.00 424054 JEYP GAZ F2 400.00 1	OPEN LINE FROM BUS 424004 [JEYPORE 400.00] TO BUS 424053 [JEYP GAZ F1 400.00] CKT 1	766	766	850	90.15	Sc-1
60.	424053 JEYP GAZ F1 400.00 424099 GAZUWAKA-ER 400.00 3	OPEN LINE FROM BUS 424004 [JEYPORE 400.00] TO BUS 424054 [JEYP GAZ F2 400.00] CKT 1	743	766	850	90.15	Sc-1
61.	424054 JEYP GAZ F2 400.00 424099 GAZUWAKA-ER 400.00 2	OPEN LINE FROM BUS 424004 [JEYPORE 400.00] TO BUS 424053 [JEYP GAZ F1 400.00] CKT 1	743	766	850	90.15	Sc-1
62.	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	775	765	850	90.05	Sc-1
63.	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	1329	1329	857	155.04	Sc-2
64.	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	1317	1317	948	138.93	Sc-2

S. No.	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% loading	Scenario
65.	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	1317	1317	948	138.93	Sc-2
66.	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	1094	1092	857	127.44	Sc-2
67.	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	1094	1092	857	127.44	Sc-2
68.	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	954	943	850	110.99	Sc-2
69.	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	951	940	850	110.62	Sc-2
70.	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	946	946	857	110.33	Sc-2
71.	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	1876	1876	1714	109.46	Sc-2
72.	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	1876	1876	1714	109.46	Sc-2
73.	374024 RGPPL 400.00 374028 NAGOTHANE 400.00 1	OPEN LINE FROM BUS 374024 [RGPPL 400.00] TO BUS 374028 [NAGOTHANE 400.00] CKT 2	924	925	857	107.97	Sc-2
74.	374024 RGPPL 400.00 374028 NAGOTHANE 400.00 2	OPEN LINE FROM BUS 374024 [RGPPL 400.00] TO BUS 374028 [NAGOTHANE 400.00] CKT 1	924	925	857	107.97	Sc-2
75.	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	967	888	850	104.52	Sc-2
76.	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	963	885	850	104.16	Sc-2
77.	424050 LAPANGA 400.00 424200 OPGC-OD 400.00 1	OPEN LINE FROM BUS 424050 [LAPANGA 400.00] TO BUS 424200 [OPGC-OD 400.00] CKT 2	1128	1128	1093	103.18	Sc-2
78.	424050 LAPANGA 400.00 424200 OPGC-OD 400.00 2	OPEN LINE FROM BUS 424050 [LAPANGA 400.00] TO BUS 424200 [OPGC-OD 400.00] CKT 1	1128	1128	1093	103.18	Sc-2
79.	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	1119	1123	1093	102.78	Sc-2
80.	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	1119	1123	1093	102.78	Sc-2
81.	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	2235	2235	2186	102.24	Sc-2
82.	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	2235	2235	2186	102.24	Sc-2
83.	374017 TAPS4 400.00 374070 VELGAON4 400.00 1	OPEN LINE FROM BUS 374017 [TAPS4 400.00] TO BUS 374070 [VELGAON4 400.00] CKT 2	857	856	857	99.85	Sc-2
84.	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	857	856	857	99.85	Sc-2
85.	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	848	856	857	99.84	Sc-2
86.	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	1597	1597	1600	99.84	Sc-2

S. No.	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% loading	Scenario
87.	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	1597	1597	1600	99.84	Sc-2
88.	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	852	852	857	99.39	Sc-2
89.	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	852	852	857	99.39	Sc-2
90.	424012 ROURKELA 400.00 474062 CHAIBASA 400.00 1	OPEN LINE FROM BUS 424012 [ROURKELA 400.00] TO BUS 474062 [CHAIBASA 400.00] CKT 2	1073	1078	1093	98.66	Sc-2
91.	424012 ROURKELA 400.00 474062 CHAIBASA 400.00 2	OPEN LINE FROM BUS 424012 [ROURKELA 400.00] TO BUS 474062 [CHAIBASA 400.00] CKT 1	1073	1078	1093	98.66	Sc-2
92.	354040 JAM KHAMB PS400.00 354147 LAKADIYA 400.00 1	OPEN LINE FROM BUS 354040 [JAM KHAMB PS400.00] TO BUS 354147 [LAKADIYA 400.00] CKT 3	1211	1231	1283	95.92	Sc-2
93.	354040 JAM KHAMB PS400.00 354147 LAKADIYA 400.00 3	OPEN LINE FROM BUS 354040 [JAM KHAMB PS400.00] TO BUS 354147 [LAKADIYA 400.00] CKT 1	1211	1231	1283	95.92	Sc-2
94.	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	1036	1036	1093	94.81	Sc-2
95.	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	1036	1036	1093	94.81	Sc-2
96.	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	1515	1515	1600	94.66	Sc-2
97.	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	1515	1515	1600	94.66	Sc-2
98.	374004 KARAD4 400.00 374015 JEJ4 400.00 3	OPEN LINE FROM BUS 374015 [JEJ4 400.00] TO BUS 374026 [KOY4-4 400.00] CKT 1	809	799	857	93.18	Sc-2
99.	314014 JINDAL-B1 400.00 314101 PITHORA 400.00 1	OPEN LINE FROM BUS 314014 [JINDAL-B1 400.00] TO BUS 314101 [PITHORA 400.00] CKT 2	769	769	850	90.46	Sc-2
100.	314014 JINDAL-B1 400.00 314101 PITHORA 400.00 2	OPEN LINE FROM BUS 314014 [JINDAL-B1 400.00] TO BUS 314101 [PITHORA 400.00] CKT 1	769	769	850	90.46	Sc-2
101.	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	1398	857	163.09	Sc-3
102.	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	1203	1203	948	126.9	Sc-3
103.	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	1203	1203	948	126.9	Sc-3
104.	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	1061	1061	857	123.79	Sc-3
105.	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	1061	1061	857	123.79	Sc-3
106.	424050 LAPANGA 400.00 424200 OPGC-OD 400.00 1	OPEN LINE FROM BUS 424050 [LAPANGA 400.00] TO BUS 424200 [OPGC-OD 400.00] CKT 2	1337	1347	1093	123.22	Sc-3
107.	424050 LAPANGA 400.00 424200 OPGC-OD 400.00 2	OPEN LINE FROM BUS 424050 [LAPANGA 400.00] TO BUS 424200 [OPGC-OD 400.00] CKT 1	1337	1347	1093	123.22	Sc-3
108.	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	1331	1093	121.77	Sc-3

S. No.	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% loading	Scenario
109.	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	1331	1093	121.77	Sc-3
110.	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	991	991	857	115.58	Sc-3
111.	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	935	924	850	108.7	Sc-3
112.	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	1164	1498	1400	106.99	Sc-3
113.	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	1164	1498	1400	106.99	Sc-3
114.	374017 TAPS4 400.00 374070 VELGAON4 400.00 1	OPEN LINE FROM BUS 374017 [TAPS4 400.00] TO BUS 374070 [VELGAON4 400.00] CKT 2	903	900	857	105.03	Sc-3
115.	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	903	900	857	105.03	Sc-3
116.	314050 DHAMTARI 400.00 314051 JAGADALPUR 400.00 1	OPEN LINE FROM BUS 314050 [DHAMTARI 400.00] TO BUS 314051 [JAGADALPUR 400.00] CKT 2	868	880	857	102.7	Sc-3
117.	314050 DHAMTARI 400.00 314051 JAGADALPUR 400.00 2	OPEN LINE FROM BUS 314050 [DHAMTARI 400.00] TO BUS 314051 [JAGADALPUR 400.00] CKT 1	868	880	857	102.7	Sc-3
118.	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	943	871	850	102.45	Sc-3
119.	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	866	866	857	101.1	Sc-3
120.	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	866	866	857	101.1	Sc-3
121.	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	2167	2167	2186	99.13	Sc-3
122.	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	2167	2167	2186	99.13	Sc-3
123.	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	834	837	857	97.62	Sc-3
124.	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	1515	1515	1600	94.66	Sc-3
125.	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	1515	1515	1600	94.66	Sc-3
126.	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	1009	1009	1093	92.35	Sc-3
127.	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	1009	1009	1093	92.35	Sc-3
128.	424012 ROURKELA 400.00 474062 CHAIBASA 400.00 1	OPEN LINE FROM BUS 424012 [ROURKELA 400.00] TO BUS 474062 [CHAIBASA 400.00] CKT 2	995	1007	1093	92.15	Sc-3
129.	424012 ROURKELA 400.00 474062 CHAIBASA 400.00 2	OPEN LINE FROM BUS 424012 [ROURKELA 400.00] TO BUS 474062 [CHAIBASA 400.00] CKT 1	995	1007	1093	92.15	Sc-3
130.	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	1452	1600	90.75	Sc-3

S. No.	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% loading	Scenario
131.	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	1452	1600	90.75	Sc-3
132.	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	1268	1308	857	152.64	Sc-4
133.	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	1251	1251	857	145.96	Sc-4
134.	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	2124	2094	1714	122.16	Sc-4
135.	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	2124	2094	1714	122.16	Sc-4
136.	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	1927	1988	2100	115.96	Sc-4
137.	374017 TAPS4 400.00 374070 VELGAON4 400.00 1	OPEN LINE FROM BUS 374017 [TAPS4 400.00] TO BUS 374070 [VELGAON4 400.00] CKT 2	967	976	857	113.87	Sc-4
138.	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	967	976	857	113.87	Sc-4
139.	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	956	953	857	111.18	Sc-4
140.	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	956	953	857	111.18	Sc-4
141.	374008 DHULE4 400.00 374011 BABLESWAR 400.00 1	OPEN LINE FROM BUS 374008 [DHULE4 400.00] TO BUS 374011 [BABLESWAR 400.00] CKT 2	928	922	857	107.63	Sc-4
142.	374008 DHULE4 400.00 374011 BABLESWAR 400.00 2	OPEN LINE FROM BUS 374008 [DHULE4 400.00] TO BUS 374011 [BABLESWAR 400.00] CKT 1	928	922	857	107.63	Sc-4
143.	144420 BHIWANI 400.00 144469 BHIWANI-PG 400.00 1	OPEN LINE FROM BUS 144469 [BHIWANI-PG 400.00] TO BUS 144480 [JINDPG 400.00] CKT 1	923	920	857	107.38	Sc-4
144.	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	913	911	857	106.35	Sc-4
145.	354002 GANCS4 400.00 354009 GPEC4 400.00 1	OPEN LINE FROM BUS 354002 [GANCS4 400.00] TO BUS 354003 [DEHGM4 400.00] CKT 1	887	907	857	105.8	Sc-4
146.	354009 GPEC4 400.00 354021 KASOR4 400.00 1	OPEN LINE FROM BUS 354002 [GANCS4 400.00] TO BUS 354003 [DEHGM4 400.00] CKT 1	887	907	857	105.8	Sc-4
147.	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	828	906	857	105.76	Sc-4
148.	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	828	906	857	105.76	Sc-4
149.	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	881	879	850	103.43	Sc-4
150.	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	881	879	850	103.43	Sc-4
151.	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	861	879	857	102.57	Sc-4
152.	374049 PARLI NEW 400.00 374941 PARLI SPLT 400.00 1	OPEN LINE FROM BUS 374049 [PARLI NEW 400.00] TO BUS 374941 [PARLI SPLT 400.00] CKT 2	1783	1754	2100	102.32	Sc-4

S. No.	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% loading	Scenario
153.	374049 PARLI NEW 400.00 374941 PARLI SPLT 400.00 2	OPEN LINE FROM BUS 374049 [PARLI NEW 400.00] TO BUS 374941 [PARLI SPLT 400.00] CKT 1	1783	1754	2100	102.32	Sc-4
154.	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	872	872	857	101.7	Sc-4
155.	364002 BHOPAL-4 400.00 364035 BHOPAL_STER 400.00 1	OPEN LINE FROM BUS 364002 [BHOPAL-4 400.00] TO BUS 364035 [BHOPAL_STER 400.00] CKT 2	1760	1723	2100	100.5	Sc-4
156.	364002 BHOPAL-4 400.00 364035 BHOPAL_STER 400.00 2	OPEN LINE FROM BUS 364002 [BHOPAL-4 400.00] TO BUS 364035 [BHOPAL_STER 400.00] CKT 1	1760	1723	2100	100.5	Sc-4
157.	374014 AURANGBD-I 400.00 374047 AURANGABD-II400.00 1	OPEN LINE FROM BUS 374014 [AURANGBD-I 400.00] TO BUS 374047 [AURANGABD-II400.00] CKT 2	876	859	857	100.21	Sc-4
158.	374014 AURANGBD-I 400.00 374047 AURANGABD-II400.00 2	OPEN LINE FROM BUS 374014 [AURANGBD-I 400.00] TO BUS 374047 [AURANGABD-II400.00] CKT 1	876	859	857	100.21	Sc-4
159.	444010 SAGARDIGHI_4400.00 444019 FARAKKA 400.00 1	OPEN LINE FROM BUS 444010 [SAGARDIGHI_4400.00] TO BUS 444019 [FARAKKA 400.00] CKT 2	1090	1090	1093	99.75	Sc-4
160.	444010 SAGARDIGHI_4400.00 444019 FARAKKA 400.00 2	OPEN LINE FROM BUS 444010 [SAGARDIGHI_4400.00] TO BUS 444019 [FARAKKA 400.00] CKT 1	1090	1090	1093	99.75	Sc-4
161.	164460 FATEHGARH 400.00 164480 FATEHG-2 400.00 1	OPEN LINE FROM BUS 164460 [FATEHGARH 400.00] TO BUS 164480 [FATEHG-2 400.00] CKT 2	2156	2156	2186	98.62	Sc-4
162.	164460 FATEHGARH 400.00 164480 FATEHG-2 400.00 2	OPEN LINE FROM BUS 164460 [FATEHGARH 400.00] TO BUS 164480 [FATEHG-2 400.00] CKT 1	2156	2156	2186	98.62	Sc-4
163.	164481 FATEHG-3 400.00 164482 FATEHG-4 400.00 1	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 164482 [FATEHG-4 400.00] CKT 2	2059	2063	2100	98.24	Sc-4
164.	164481 FATEHG-3 400.00 164482 FATEHG-4 400.00 2	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 164482 [FATEHG-4 400.00] CKT 1	2059	2063	2100	98.24	Sc-4
165.	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	1565	1565	1600	97.84	Sc-4
166.	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	1565	1565	1600	97.84	Sc-4
167.	174410 BAREL-PG 400.00 174483 BAREILY 400.00 1	OPEN LINE FROM BUS 174410 [BAREL-PG 400.00] TO BUS 174483 [BAREILY 400.00] CKT 2	1716	1677	1714	97.82	Sc-4
168.	174410 BAREL-PG 400.00 174483 BAREILY 400.00 2	OPEN LINE FROM BUS 174410 [BAREL-PG 400.00] TO BUS 174483 [BAREILY 400.00] CKT 1	1716	1677	1714	97.82	Sc-4
169.	374074 WARDHA SP 400.00 374099 WARDHA SPLT 400.00 1	OPEN LINE FROM BUS 374074 [WARDHA SP 400.00] TO BUS 374099 [WARDHA SPLT 400.00] CKT 2	1674	1674	1714	97.64	Sc-4
170.	374074 WARDHA SP 400.00 374099 WARDHA SPLT 400.00 2	OPEN LINE FROM BUS 374074 [WARDHA SP 400.00] TO BUS 374099 [WARDHA SPLT 400.00] CKT 1	1674	1674	1714	97.64	Sc-4
171.	114001 LEH_PANG 400.00 114013 PANG400SP3 400.00 1	OPEN LINE FROM BUS 114001 [LEH_PANG 400.00] TO BUS 114013 [PANG400SP3 400.00] CKT 2	1643	1661	1714	96.91	Sc-4
172.	114001 LEH_PANG 400.00 114013 PANG400SP3 400.00 2	OPEN LINE FROM BUS 114001 [LEH_PANG 400.00] TO BUS 114013 [PANG400SP3 400.00] CKT 1	1643	1661	1714	96.91	Sc-4
173.	114001 LEH_PANG 400.00 114012 PANG400SP2 400.00 1	OPEN LINE FROM BUS 114001 [LEH_PANG 400.00] TO BUS 114012 [PANG400SP2 400.00] CKT 2	1643	1653	1714	96.43	Sc-4
174.	114001 LEH_PANG 400.00 114012 PANG400SP2 400.00 2	OPEN LINE FROM BUS 114001 [LEH_PANG 400.00] TO BUS 114012 [PANG400SP2 400.00] CKT 1	1643	1653	1714	96.43	Sc-4

S. No.	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% loading	Scenario
175.	114001 LEH_PANG 400.00 114008 PANG 400 SP1400.00 1	OPEN LINE FROM BUS 114001 [LEH_PANG 400.00] TO BUS 114008 [PANG 400 SP1400.00] CKT 2	1643	1645	1714	95.97	Sc-4
176.	114001 LEH_PANG 400.00 114008 PANG 400 SP1400.00 2	OPEN LINE FROM BUS 114001 [LEH_PANG 400.00] TO BUS 114008 [PANG 400 SP1400.00] CKT 1	1643	1645	1714	95.97	Sc-4
177.	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	833	816	852	95.77	Sc-4
178.	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	1515	1515	1600	94.66	Sc-4
179.	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	1515	1515	1600	94.66	Sc-4
180.	164404 BHADLA 400.00 164456 BIKANE-4 400.00 1	OPEN LINE FROM BUS 164404 [BHADLA 400.00] TO BUS 164456 [BIKANE-4 400.00] CKT 2	1576	1601	1714	93.38	Sc-4
181.	164404 BHADLA 400.00 164456 BIKANE-4 400.00 2	OPEN LINE FROM BUS 164404 [BHADLA 400.00] TO BUS 164456 [BIKANE-4 400.00] CKT 1	1576	1601	1714	93.38	Sc-4
182.	114422 KISHENPUR 400.00 114476 NEWWANPO 400.00 1	OPEN LINE FROM BUS 114401 [BAGLIHAR4 400.00] TO BUS 114476 [NEWWANPO 400.00] CKT 1	1017	1018	1093	93.14	Sc-4
183.	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	1974	2036	2186	93.12	Sc-4
184.	544086 MALEKTT 400.00 544087 TIRUVLM SE-A400.00 1	OPEN LINE FROM BUS 544086 [MALEKTT 400.00] TO BUS 544087 [TIRUVLM SE-A400.00] CKT 2	793	789	850	92.8	Sc-4
185.	544086 MALEKTT 400.00 544087 TIRUVLM SE-A400.00 2	OPEN LINE FROM BUS 544086 [MALEKTT 400.00] TO BUS 544087 [TIRUVLM SE-A400.00] CKT 1	793	789	850	92.8	Sc-4
186.	124401 CHAMERA-2 400.00 124448 CHAM-POL 400.00 1	OPEN LINE FROM BUS 124401 [CHAMERA-2 400.00] TO BUS 124411 [CHAMERA-1 400.00] CKT 1	782	781	857	91.11	Sc-4
187.	114422 KISHENPUR 400.00 124401 CHAMERA-2 400.00 1	OPEN LINE FROM BUS 114401 [BAGLIHAR4 400.00] TO BUS 114476 [NEWWANPO 400.00] CKT 1	778	778	857	90.82	Sc-4
188.	354013 PIRANA_T 400.00 354044 AHMDABAD PG 400.00 1	OPEN LINE FROM BUS 354013 [PIRANA_T 400.00] TO BUS 354044 [AHMDABAD PG 400.00] CKT 2	1958	1974	2186	90.29	Sc-4
189.	354013 PIRANA_T 400.00 354044 AHMDABAD PG 400.00 2	OPEN LINE FROM BUS 354013 [PIRANA_T 400.00] TO BUS 354044 [AHMDABAD PG 400.00] CKT 1	1958	1974	2186	90.29	Sc-4
190.	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	1268	1268	857	147.92	Sc-5
191.	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	1211	1222	948	128.94	Sc-5
192.	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	1211	1222	948	128.94	Sc-5
193.	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	999	1037	857	120.95	Sc-5
194.	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	992	992	857	115.73	Sc-5
195.	374024 RGPPL 400.00 374028 NAGOTHANE 400.00 1	OPEN LINE FROM BUS 374024 [RGPPL 400.00] TO BUS 374028 [NAGOTHANE 400.00] CKT 2	951	988	857	115.32	Sc-5
196.	374024 RGPPL 400.00 374028 NAGOTHANE 400.00 2	OPEN LINE FROM BUS 374024 [RGPPL 400.00] TO BUS 374028 [NAGOTHANE 400.00] CKT 1	951	988	857	115.32	Sc-5

S. No.	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% loading	Scenario
197.	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	1871	1871	1714	109.16	Sc-5
198.	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	1871	1871	1714	109.16	Sc-5
199.	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	932	932	857	108.75	Sc-5
200.	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	932	932	857	108.75	Sc-5
201.	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	2369	2369	2186	108.36	Sc-5
202.	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	2369	2369	2186	108.36	Sc-5
203.	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	849	909	857	106.04	Sc-5
204.	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	849	909	857	106.04	Sc-5
205.	374017 TAPS4 400.00 374070 VELGAON4 400.00 1	OPEN LINE FROM BUS 374017 [TAPS4 400.00] TO BUS 374070 [VELGAON4 400.00] CKT 2	894	900	857	105.02	Sc-5
206.	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	894	900	857	105.02	Sc-5
207.	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	892	892	857	104.08	Sc-5
208.	544001 NYVL TS 2 400.00 544029 CUDDALORE TN400.00 1	OPEN LINE FROM BUS 544001 [NYVL TS 2 400.00] TO BUS 544029 [CUDDALORE TN400.00] CKT 2	866	877	857	102.3	Sc-5
209.	544001 NYVL TS 2 400.00 544029 CUDDALORE TN400.00 2	OPEN LINE FROM BUS 544001 [NYVL TS 2 400.00] TO BUS 544029 [CUDDALORE TN400.00] CKT 1	866	877	857	102.3	Sc-5
210.	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	855	853	852	100.09	Sc-5
211.	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	855	853	852	100.09	Sc-5
212.	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	1059	1060	1093	97.03	Sc-5
213.	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	1059	1060	1093	97.03	Sc-5
214.	374004 KARAD4 400.00 374015 JEJ4 400.00 3	OPEN LINE FROM BUS 374015 [JEJ4 400.00] TO BUS 374026 [KOY4-4 400.00] CKT 1	808	830	857	96.85	Sc-5
215.	134925 MALERKOTLA4 400.00 144483 KURUKSHETR 400.00 2	OPEN LINE FROM BUS 134925 [MALERKOTLA4 400.00] TO BUS 144483 [KURUKSHETR 400.00] CKT 1	816	825	857	96.26	Sc-5
216.	354040 JAM KHAMB PS400.00 354147 LAKADIYA 400.00 1	OPEN LINE FROM BUS 354040 [JAM KHAMB PS400.00] TO BUS 354147 [LAKADIYA 400.00] CKT 3	1194	1233	1283	96.11	Sc-5
217.	354040 JAM KHAMB PS400.00 354147 LAKADIYA 400.00 3	OPEN LINE FROM BUS 354040 [JAM KHAMB PS400.00] TO BUS 354147 [LAKADIYA 400.00] CKT 1	1194	1233	1283	96.11	Sc-5
218.	424050 LAPANGA 400.00 424200 OPGC-OD 400.00 1	OPEN LINE FROM BUS 424050 [LAPANGA 400.00] TO BUS 424200 [OPGC-OD 400.00] CKT 2	1040	1039	1093	95.08	Sc-5

S. No.	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% loading	Scenario
219.	424050 LAPANGA 400.00 424200 OPGC-OD 400.00 2	OPEN LINE FROM BUS 424050 [LAPANGA 400.00] TO BUS 424200 [OPGC-OD 400.00] CKT 1	1040	1039	1093	95.08	Sc-5
220.	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	1515	1515	1600	94.66	Sc-5
221.	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	1515	1515	1600	94.66	Sc-5
222.	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	779	793	857	92.5	Sc-5
223.	504016 VIZPOOL 400.00 504098 HINDJ-OA 400.00 1	OPEN LINE FROM BUS 504016 [VIZPOOL 400.00] TO BUS 504098 [HINDJ-OA 400.00] CKT 2	869	869	948	91.65	Sc-5
224.	504016 VIZPOOL 400.00 504098 HINDJ-OA 400.00 2	OPEN LINE FROM BUS 504016 [VIZPOOL 400.00] TO BUS 504098 [HINDJ-OA 400.00] CKT 1	869	869	948	91.65	Sc-5
225.	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	1001	1001	1093	91.54	Sc-5
226.	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	1001	1001	1093	91.54	Sc-5
227.	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	1453	1454	1600	90.86	Sc-5
228.	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	1453	1454	1600	90.86	Sc-5
229.	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	1499	1554	2100	90.64	Sc-5
230.	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	770	774	857	90.37	Sc-5
231.	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	770	774	857	90.37	Sc-5
232.	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	1058	1058	857	123.49	Sc-6
233.	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	1152	1152	948	121.48	Sc-6
234.	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	1152	1152	948	121.48	Sc-6
235.	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	972	990	857	115.48	Sc-6
236.	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	959	959	852	112.6	Sc-6
237.	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	959	959	852	112.6	Sc-6
238.	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	2315	2315	2186	105.88	Sc-6
239.	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	2315	2315	2186	105.88	Sc-6
240.	374017 TAPS4 400.00 374070 VELGAON4 400.00 1	OPEN LINE FROM BUS 374017 [TAPS4 400.00] TO BUS 374070 [VELGAON4 400.00] CKT 2	897	898	857	104.78	Sc-6

S. No.	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% loading	Scenario
241.	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	897	898	857	104.78	Sc-6
242.	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	851	851	857	99.33	Sc-6
243.	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	851	851	857	99.33	Sc-6
244.	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	836	836	857	97.5	Sc-6
245.	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	836	836	857	97.5	Sc-6
246.	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	1040	1040	1093	95.15	Sc-6
247.	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	1040	1040	1093	95.15	Sc-6
248.	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	1515	1515	1600	94.66	Sc-6
249.	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	1515	1515	1600	94.66	Sc-6
250.	424050 LAPANGA 400.00 424200 OPGC-OD 400.00 1	OPEN LINE FROM BUS 424050 [LAPANGA 400.00] TO BUS 424200 [OPGC-OD 400.00] CKT 2	1005	999	1093	91.41	Sc-6
251.	424050 LAPANGA 400.00 424200 OPGC-OD 400.00 2	OPEN LINE FROM BUS 424050 [LAPANGA 400.00] TO BUS 424200 [OPGC-OD 400.00] CKT 1	1005	999	1093	91.41	Sc-6
252.	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	1452	1600	90.75	Sc-6
253.	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	1452	1600	90.75	Sc-6
254.	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	737	774	857	90.27	Sc-6
255.	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	737	774	857	90.27	Sc-6
256.	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	1260	1367	857	159.52	Sc-7
257.	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	1189	1189	857	138.7	Sc-7
258.	374017 TAPS4 400.00 374070 VELGAON4 400.00 1	OPEN LINE FROM BUS 374017 [TAPS4 400.00] TO BUS 374070 [VELGAON4 400.00] CKT 2	1063	1110	857	129.51	Sc-7
259.	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	1063	1110	857	129.51	Sc-7
260.	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	2037	2207	2100	128.78	Sc-7
261.	374008 DHULE4 400.00 374011 BABLESWAR 400.00 1	OPEN LINE FROM BUS 374008 [DHULE4 400.00] TO BUS 374011 [BABLESWAR 400.00] CKT 2	1037	1044	857	121.83	Sc-7
262.	374008 DHULE4 400.00 374011 BABLESWAR 400.00 2	OPEN LINE FROM BUS 374008 [DHULE4 400.00] TO BUS 374011 [BABLESWAR 400.00] CKT 1	1037	1044	857	121.83	Sc-7

S. No.	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% loading	Scenario
263.	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	1033	1033	852	121.19	Sc-7
264.	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	1033	1033	852	121.19	Sc-7
265.	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	1013	1007	857	117.52	Sc-7
266.	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	1013	1007	857	117.52	Sc-7
267.	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	1006	1006	857	117.39	Sc-7
268.	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	1006	1006	857	117.39	Sc-7
269.	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	1827	1827	1600	114.2	Sc-7
270.	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	1827	1827	1600	114.2	Sc-7
271.	364002 BHOPAL-4 400.00 364035 BHOPAL_STER 400.00 1	OPEN LINE FROM BUS 364002 [BHOPAL-4 400.00] TO BUS 364035 [BHOPAL_STER 400.00] CKT 2	1875	1890	2100	110.28	Sc-7
272.	364002 BHOPAL-4 400.00 364035 BHOPAL_STER 400.00 2	OPEN LINE FROM BUS 364002 [BHOPAL-4 400.00] TO BUS 364035 [BHOPAL_STER 400.00] CKT 1	1875	1890	2100	110.28	Sc-7
273.	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	916	929	1050	108.46	Sc-7
274.	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	916	929	1050	108.46	Sc-7
275.	354002 GANCS4 400.00 354009 GPEC4 400.00 1	OPEN LINE FROM BUS 354002 [GANCS4 400.00] TO BUS 354003 [DEHGM4 400.00] CKT 1	875	902	857	105.24	Sc-7
276.	354009 GPEC4 400.00 354021 KASOR4 400.00 1	OPEN LINE FROM BUS 354002 [GANCS4 400.00] TO BUS 354003 [DEHGM4 400.00] CKT 1	875	902	857	105.24	Sc-7
277.	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	2313	2295	2186	104.97	Sc-7
278.	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	2313	2295	2186	104.97	Sc-7
279.	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	891	898	857	104.78	Sc-7
280.	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	891	898	857	104.78	Sc-7
281.	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	2080	2253	2186	103.06	Sc-7
282.	374040 SOLAPUR-PG 400.00 374101 ALKUD 400.00 1	OPEN LINE FROM BUS 374013 [KOLHAPUR 400.00] TO BUS 374040 [SOLAPUR-PG 400.00] CKT 1	864	864	857	100.85	Sc-7
283.	374015 JEJ4 400.00 374045 PUNE-PG-GIS 400.00 1	OPEN LINE FROM BUS 374015 [JEJ4 400.00] TO BUS 374045 [PUNE-PG-GIS 400.00] CKT 2	1092	1146	1158	98.93	Sc-7
284.	374015 JEJ4 400.00 374045 PUNE-PG-GIS 400.00 2	OPEN LINE FROM BUS 374015 [JEJ4 400.00] TO BUS 374045 [PUNE-PG-GIS 400.00] CKT 1	1092	1146	1158	98.93	Sc-7

S. No.	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% loading	Scenario
285.	374049 PARLI NEW 400.00 374941 PARLI SPLT 400.00 1	OPEN LINE FROM BUS 374049 [PARLI NEW 400.00] TO BUS 374941 [PARLI SPLT 400.00] CKT 2	1687	1686	2100	98.34	Sc-7
286.	374049 PARLI NEW 400.00 374941 PARLI SPLT 400.00 2	OPEN LINE FROM BUS 374049 [PARLI NEW 400.00] TO BUS 374941 [PARLI SPLT 400.00] CKT 1	1687	1686	2100	98.34	Sc-7
287.	164460 FATEHGARH 400.00 164480 FATEHG-2 400.00 1	OPEN LINE FROM BUS 164460 [FATEHGARH 400.00] TO BUS 164480 [FATEHG-2 400.00] CKT 2	2148	2148	2186	98.25	Sc-7
288.	164460 FATEHGARH 400.00 164480 FATEHG-2 400.00 2	OPEN LINE FROM BUS 164460 [FATEHGARH 400.00] TO BUS 164480 [FATEHG-2 400.00] CKT 1	2148	2148	2186	98.25	Sc-7
289.	334003 KALA DNH 400.00 374052 KUDUS 400.00 1	OPEN LINE FROM BUS 334003 [KALA DNH 400.00] TO BUS 374052 [KUDUS 400.00] CKT 2	1032	1072	1093	98.08	Sc-7
290.	334003 KALA DNH 400.00 374052 KUDUS 400.00 2	OPEN LINE FROM BUS 334003 [KALA DNH 400.00] TO BUS 374052 [KUDUS 400.00] CKT 1	1032	1072	1093	98.08	Sc-7
291.	164481 FATEHG-3 400.00 164482 FATEHG-4 400.00 1	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 164482 [FATEHG-4 400.00] CKT 2	2051	2055	2100	97.86	Sc-7
292.	164481 FATEHG-3 400.00 164482 FATEHG-4 400.00 2	OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 164482 [FATEHG-4 400.00] CKT 1	2051	2055	2100	97.86	Sc-7
293.	374029 CHAKAN 400.00 374042 PUNE-PG-AIS 400.00 1	OPEN LINE FROM BUS 374003 [LONIKAND I 400.00] TO BUS 374042 [PUNE-PG-AIS 400.00] CKT 1	783	828	857	96.57	Sc-7
294.	114001 LEH_PANG 400.00 114013 PANG400SP3 400.00 1	OPEN LINE FROM BUS 114001 [LEH_PANG 400.00] TO BUS 114013 [PANG400SP3 400.00] CKT 2	1637	1654	1714	96.52	Sc-7
295.	114001 LEH_PANG 400.00 114013 PANG400SP3 400.00 2	OPEN LINE FROM BUS 114001 [LEH_PANG 400.00] TO BUS 114013 [PANG400SP3 400.00] CKT 1	1637	1654	1714	96.52	Sc-7
296.	114001 LEH_PANG 400.00 114012 PANG400SP2 400.00 1	OPEN LINE FROM BUS 114001 [LEH_PANG 400.00] TO BUS 114012 [PANG400SP2 400.00] CKT 2	1637	1646	1714	96.05	Sc-7
297.	114001 LEH_PANG 400.00 114012 PANG400SP2 400.00 2	OPEN LINE FROM BUS 114001 [LEH_PANG 400.00] TO BUS 114012 [PANG400SP2 400.00] CKT 1	1637	1646	1714	96.05	Sc-7
298.	114001 LEH_PANG 400.00 114008 PANG 400 SP1400.00 1	OPEN LINE FROM BUS 114001 [LEH_PANG 400.00] TO BUS 114008 [PANG 400 SP1400.00] CKT 2	1637	1638	1714	95.59	Sc-7
299.	114001 LEH_PANG 400.00 114008 PANG 400 SP1400.00 2	OPEN LINE FROM BUS 114001 [LEH_PANG 400.00] TO BUS 114008 [PANG 400 SP1400.00] CKT 1	1637	1638	1714	95.59	Sc-7
300.	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	1657	1636	1714	95.46	Sc-7
301.	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	1657	1636	1714	95.46	Sc-7
302.	314029 RAIGARH_POOL400.00 314045 LARA STPP 400.00 1	OPEN LINE FROM BUS 314029 [RAIGARH_POOL400.00] TO BUS 314045 [LARA STPP 400.00] CKT 2	817	817	857	95.29	Sc-7
303.	314029 RAIGARH_POOL400.00 314045 LARA STPP 400.00 2	OPEN LINE FROM BUS 314029 [RAIGARH_POOL400.00] TO BUS 314045 [LARA STPP 400.00] CKT 1	817	817	857	95.29	Sc-7
304.	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	745	814	857	95.03	Sc-7
305.	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	745	814	857	95.03	Sc-7
306.	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	1515	1515	1600	94.66	Sc-7

S. No.	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% loading	Scenario
307.	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	1515	1515	1600	94.66	Sc-7
308.	364002 BHOPAL-4 400.00 364053 MANDIDEEP-4 400.00 2	OPEN LINE FROM BUS 364002 [BHOPAL-4 400.00] TO BUS 364053 [MANDIDEEP-4 400.00] CKT 3	1011	1026	1093	93.91	Sc-7
309.	364002 BHOPAL-4 400.00 364053 MANDIDEEP-4 400.00 3	OPEN LINE FROM BUS 364002 [BHOPAL-4 400.00] TO BUS 364053 [MANDIDEEP-4 400.00] CKT 2	1011	1026	1093	93.91	Sc-7
310.	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	890	890	948	93.84	Sc-7
311.	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	890	890	948	93.84	Sc-7
312.	354013 PIRANA_T 400.00 354044 AHMDABAD PG 400.00 1	OPEN LINE FROM BUS 354013 [PIRANA_T 400.00] TO BUS 354044 [AHMDABAD PG 400.00] CKT 2	1964	2043	2186	93.47	Sc-7
313.	354013 PIRANA_T 400.00 354044 AHMDABAD PG 400.00 2	OPEN LINE FROM BUS 354013 [PIRANA_T 400.00] TO BUS 354044 [AHMDABAD PG 400.00] CKT 1	1964	2043	2186	93.47	Sc-7
314.	424050 LAPANGA 400.00 424200 OPGC-OD 400.00 1	OPEN LINE FROM BUS 424050 [LAPANGA 400.00] TO BUS 424200 [OPGC-OD 400.00] CKT 2	1029	1020	1093	93.33	Sc-7
315.	424050 LAPANGA 400.00 424200 OPGC-OD 400.00 2	OPEN LINE FROM BUS 424050 [LAPANGA 400.00] TO BUS 424200 [OPGC-OD 400.00] CKT 1	1029	1020	1093	93.33	Sc-7
316.	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	773	787	850	92.55	Sc-7
317.	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	773	787	850	92.55	Sc-7
318.	354052 FEDRA 400.00 354150 DHOLERASP 400.00 1	OPEN LINE FROM BUS 354052 [FEDRA 400.00] TO BUS 354150 [DHOLERASP 400.00] CKT 2	998	1006	1100	91.44	Sc-7
319.	354052 FEDRA 400.00 354150 DHOLERASP 400.00 2	OPEN LINE FROM BUS 354052 [FEDRA 400.00] TO BUS 354150 [DHOLERASP 400.00] CKT 1	998	1006	1100	91.44	Sc-7
320.	114422 KISHENPUR 400.00 114476 NEWWANPO 400.00 1	OPEN LINE FROM BUS 114401 [BAGLIHAR4 400.00] TO BUS 114476 [NEWWANPO 400.00] CKT 1	997	998	1093	91.34	Sc-7
321.	374008 DHULE4 400.00 374046 DHULE-STER 400.00 1	OPEN LINE FROM BUS 374008 [DHULE4 400.00] TO BUS 374046 [DHULE-STER 400.00] CKT 2	1552	1560	1714	91.03	Sc-7
322.	374008 DHULE4 400.00 374046 DHULE-STER 400.00 2	OPEN LINE FROM BUS 374008 [DHULE4 400.00] TO BUS 374046 [DHULE-STER 400.00] CKT 1	1552	1560	1714	91.03	Sc-7
323.	524011 KOLAR 400.00 524171 DOMSANDRA 400.00 1	OPEN LINE FROM BUS 524001 [SMNH 400.00] TO BUS 524171 [DOMSANDRA 400.00] CKT 1	753	773	850	90.88	Sc-7
324.	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	1256	1256	948	132.44	Sc-8
325.	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	1256	1256	948	132.44	Sc-8
326.	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	1120	1117	857	130.35	Sc-8
327.	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	1120	1117	857	130.35	Sc-8
328.	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	1932	1932	1600	120.74	Sc-8

S. No.	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% loading	Scenario
329.	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	1932	1932	1600	120.74	Sc-8
330.	374017 TAPS4 400.00 374070 VELGAON4 400.00 1	OPEN LINE FROM BUS 374017 [TAPS4 400.00] TO BUS 374070 [VELGAON4 400.00] CKT 2	925	927	857	108.2	Sc-8
331.	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	925	927	857	108.19	Sc-8
332.	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	896	871	857	101.68	Sc-8
333.	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	896	871	857	101.68	Sc-8
334.	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	850	865	857	100.94	Sc-8
335.	374024 RGPPL 400.00 374025 NKOY4 400.00 1	OPEN LINE FROM BUS 374024 [RGPPL 400.00] TO BUS 374025 [NKOY4 400.00] CKT 2	837	840	857	98.02	Sc-8
336.	374024 RGPPL 400.00 374025 NKOY4 400.00 2	OPEN LINE FROM BUS 374024 [RGPPL 400.00] TO BUS 374025 [NKOY4 400.00] CKT 1	837	840	857	98.02	Sc-8
337.	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	1044	1044	1093	95.5	Sc-8
338.	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	1044	1044	1093	95.5	Sc-8
339.	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	829	815	857	95.06	Sc-8
340.	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	829	815	857	95.06	Sc-8
341.	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	1515	1515	1600	94.66	Sc-8
342.	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	1515	1515	1600	94.66	Sc-8
343.	144401 KHEDAR 400.00 144403 KIRORI 400.00 1	OPEN LINE FROM BUS 144401 [KHEDAR 400.00] TO BUS 144403 [KIRORI 400.00] CKT 2	807	797	857	93.06	Sc-8
344.	144401 KHEDAR 400.00 144403 KIRORI 400.00 2	OPEN LINE FROM BUS 144401 [KHEDAR 400.00] TO BUS 144403 [KIRORI 400.00] CKT 1	807	797	857	93.06	Sc-8
345.	174424 DADR-NCR 400.00 174436 GNOIDA4 400.00 1	OPEN LINE FROM BUS 154928 [MAHARANIBAGH400.00] TO BUS 174424 [DADR-NCR 400.00] CKT 1	1848	1847	1988	92.93	Sc-8
346.	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	786	780	852	91.57	Sc-8
347.	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	786	780	852	91.57	Sc-8
348.	314014 JINDAL-B1 400.00 314101 PITHORA 400.00 1	OPEN LINE FROM BUS 314014 [JINDAL-B1 400.00] TO BUS 314101 [PITHORA 400.00] CKT 2	768	768	850	90.4	Sc-8
349.	314014 JINDAL-B1 400.00 314101 PITHORA 400.00 2	OPEN LINE FROM BUS 314014 [JINDAL-B1 400.00] TO BUS 314101 [PITHORA 400.00] CKT 1	768	768	850	90.4	Sc-8
350.	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	2230	2230	1600	139.38	Sc-9

S. No.	Monitored Element	Contingency	Maximum Flow	Flow under Contingency	Rate	% loading	Scenario
351.	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	2230	2230	1600	139.38	Sc-9
352.	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	1170	948	123.38	Sc-9
353.	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	1170	948	123.38	Sc-9
354.	374017 TAPS4 400.00 374070 VELGAON4 400.00 1	OPEN LINE FROM BUS 374017 [TAPS4 400.00] TO BUS 374070 [VELGAON4 400.00] CKT 2	849	848	857	98.98	Sc-9
355.	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	849	848	857	98.98	Sc-9
356.	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	1515	1515	1600	94.66	Sc-9
357.	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	1515	1515	1600	94.66	Sc-9
358.	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	1002	1002	1093	91.65	Sc-9
359.	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	1002	1002	1093	91.65	Sc-9

Annex-11.8

N-1 Contingency of 765/400 kV Transformers

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
1.	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	1344	1915	1500	127.69	Sc-1
2.	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	1344	1915	1500	127.69	Sc-1
3.	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	1344	1915	1500	127.69	Sc-1
4.	424091 JHARSUGUDA-B400.00 428091 JHARSUGUDA-B765.00 3	OPEN LINE FROM BUS 424091 [JHARSUGUDA-B400.00] TO BUS 428091 [JHARSUGUDA-B765.00] CKT 4	1181	1880	1500	125.31	Sc-1
5.	424091 JHARSUGUDA-B400.00 428091 JHARSUGUDA-B765.00 4	OPEN LINE FROM BUS 424091 [JHARSUGUDA-B400.00] TO BUS 428091 [JHARSUGUDA-B765.00] CKT 3	1181	1880	1500	125.31	Sc-1
6.	424015 JHARSUGUDA-A400.00 428015 JHARSUGUDA-A765.00 1	OPEN LINE FROM BUS 424015 [JHARSUGUDA-A400.00] TO BUS 428015 [JHARSUGUDA-A765.00] CKT 2	1176	1819	1500	121.27	Sc-1
7.	424015 JHARSUGUDA-A400.00 428015 JHARSUGUDA-A765.00 2	OPEN LINE FROM BUS 424015 [JHARSUGUDA-A400.00] TO BUS 428015 [JHARSUGUDA-A765.00] CKT 1	1176	1819	1500	121.27	Sc-1
8.	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	832	1109	1000	110.89	Sc-1
9.	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	832	1109	1000	110.89	Sc-1
10.	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	1242	1654	1500	110.27	Sc-1
11.	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	1242	1654	1500	110.27	Sc-1
12.	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	1242	1654	1500	110.27	Sc-1
13.	174479 VARANASI 400.00 177000 VARNASI8 765.00 1	OPEN LINE FROM BUS 174479 [VARANASI 400.00] TO BUS 177000 [VARNASI8 765.00] CKT 2	1131	1617	1500	107.79	Sc-1
14.	174479 VARANASI 400.00 177000 VARNASI8 765.00 2	OPEN LINE FROM BUS 174479 [VARANASI 400.00] TO BUS 177000 [VARNASI8 765.00] CKT 1	1131	1617	1500	107.79	Sc-1
15.	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	1200	1612	1500	107.48	Sc-1
16.	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	1200	1612	1500	107.48	Sc-1
17.	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	1362	1603	1500	106.89	Sc-1
18.	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	1362	1603	1500	106.89	Sc-1
19.	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	1362	1603	1500	106.89	Sc-1
20.	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	1362	1603	1500	106.89	Sc-1

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
21.	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	1362	1603	1500	106.89	Sc-1
22.	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	1362	1603	1500	106.89	Sc-1
23.	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	1320	1585	1500	105.67	Sc-1
24.	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	1320	1585	1500	105.67	Sc-1
25.	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	1320	1585	1500	105.67	Sc-1
26.	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	1320	1585	1500	105.67	Sc-1
27.	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	1320	1585	1500	105.67	Sc-1
28.	164434 JODH KANKANI400.00 167799 JODH KANKANI765.00 2	OPEN LINE FROM BUS 164434 [JODH KANKANI400.00] TO BUS 167799 [JODH KANKANI765.00] CKT 3	1133	1579	1500	105.24	Sc-1
29.	164434 JODH KANKANI400.00 167799 JODH KANKANI765.00 3	OPEN LINE FROM BUS 164434 [JODH KANKANI400.00] TO BUS 167799 [JODH KANKANI765.00] CKT 2	1133	1579	1500	105.24	Sc-1
30.	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	1133	1579	1500	105.24	Sc-1
31.	314008 SIPAT4 400.00 318007 SIPAT 765.00 1	OPEN LINE FROM BUS 314008 [SIPAT4 400.00] TO BUS 318007 [SIPAT 765.00] CKT 2	679	1028	1000	102.75	Sc-1
32.	314008 SIPAT4 400.00 318007 SIPAT 765.00 2	OPEN LINE FROM BUS 314008 [SIPAT4 400.00] TO BUS 318007 [SIPAT 765.00] CKT 1	679	1028	1000	102.75	Sc-1
33.	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	1248	1498	1500	99.83	Sc-1
34.	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	1247	1484	1500	98.9	Sc-1
35.	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	1247	1484	1500	98.9	Sc-1
36.	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	1247	1484	1500	98.9	Sc-1
37.	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	1247	1484	1500	98.9	Sc-1
38.	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	1247	1484	1500	98.9	Sc-1
39.	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	1247	1484	1500	98.9	Sc-1
40.	174990 FATEH VSC 400.00 177990 FATEHPUR 765765.00 1	OPEN LINE FROM BUS 174990 [FATEH VSC 400.00] TO BUS 177990 [FATEHPUR 765765.00] CKT 2	1165	1460	1500	97.3	Sc-1
41.	174990 FATEH VSC 400.00 177990 FATEHPUR 765765.00 2	OPEN LINE FROM BUS 174990 [FATEH VSC 400.00] TO BUS 177990 [FATEHPUR 765765.00] CKT 1	1165	1460	1500	97.3	Sc-1
42.	174990 FATEH VSC 400.00 177990 FATEHPUR 765765.00 3	OPEN LINE FROM BUS 174990 [FATEH VSC 400.00] TO BUS 177990 [FATEHPUR 765765.00] CKT 1	1165	1460	1500	97.3	Sc-1
43.	174990 FATEH VSC 400.00 177990 FATEHPUR 765765.00 4	OPEN LINE FROM BUS 174990 [FATEH VSC 400.00] TO BUS 177990 [FATEHPUR 765765.00] CKT 1	1165	1460	1500	97.3	Sc-1

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
44.	174990 FATEH VSC 400.00 177990 FATEHPUR 765765.00 5	OPEN LINE FROM BUS 174990 [FATEH VSC 400.00] TO BUS 177990 [FATEHPUR 765765.00] CKT 1	1165	1460	1500	97.3	Sc-1
45.	164422 RAMG-I 400.00 167422 RAMGARH-I 765.00 1	OPEN LINE FROM BUS 164422 [RAMG-I 400.00] TO BUS 167422 [RAMGARH-I 765.00] CKT 2	964	1447	1500	96.45	Sc-1
46.	164422 RAMG-I 400.00 167422 RAMGARH-I 765.00 2	OPEN LINE FROM BUS 164422 [RAMG-I 400.00] TO BUS 167422 [RAMGARH-I 765.00] CKT 1	964	1447	1500	96.45	Sc-1
47.	164422 RAMG-I 400.00 167422 RAMGARH-I 765.00 3	OPEN LINE FROM BUS 164422 [RAMG-I 400.00] TO BUS 167422 [RAMGARH-I 765.00] CKT 1	964	1447	1500	96.45	Sc-1
48.	154501 NARELA ISTS 400.00 157001 NARELA ISTS 765.00 1	OPEN LINE FROM BUS 154501 [NARELA ISTS 400.00] TO BUS 157001 [NARELA ISTS 765.00] CKT 2	1097	1435	1500	95.69	Sc-1
49.	154501 NARELA ISTS 400.00 157001 NARELA ISTS 765.00 2	OPEN LINE FROM BUS 154501 [NARELA ISTS 400.00] TO BUS 157001 [NARELA ISTS 765.00] CKT 1	1097	1435	1500	95.69	Sc-1
50.	154501 NARELA ISTS 400.00 157001 NARELA ISTS 765.00 3	OPEN LINE FROM BUS 154501 [NARELA ISTS 400.00] TO BUS 157001 [NARELA ISTS 765.00] CKT 1	1097	1435	1500	95.69	Sc-1
51.	164484 BHADLA-3 400.00 167484 BHADLA-3 765.00 5	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 167484 [BHADLA-3 765.00] CKT 6	822	1395	1500	93.02	Sc-1
52.	164484 BHADLA-3 400.00 167484 BHADLA-3 765.00 6	OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 167484 [BHADLA-3 765.00] CKT 5	822	1395	1500	93.02	Sc-1
53.	414008 GAYA-PG 400.00 418008 GAYA 765.00 1	OPEN LINE FROM BUS 414008 [GAYA-PG 400.00] TO BUS 418008 [GAYA 765.00] CKT 2	1092	1383	1500	92.22	Sc-1
54.	414008 GAYA-PG 400.00 418008 GAYA 765.00 2	OPEN LINE FROM BUS 414008 [GAYA-PG 400.00] TO BUS 418008 [GAYA 765.00] CKT 1	1092	1383	1500	92.22	Sc-1
55.	414008 GAYA-PG 400.00 418008 GAYA 765.00 3	OPEN LINE FROM BUS 414008 [GAYA-PG 400.00] TO BUS 418008 [GAYA 765.00] CKT 1	1092	1383	1500	92.22	Sc-1
56.	414008 GAYA-PG 400.00 418008 GAYA 765.00 4	OPEN LINE FROM BUS 414008 [GAYA-PG 400.00] TO BUS 418008 [GAYA 765.00] CKT 1	1092	1383	1500	92.22	Sc-1
57.	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	839	1381	1500	92.07	Sc-1
58.	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	839	1381	1500	92.07	Sc-1
59.	144998 KAITHAL_VSC 400.00 147705 KAITHAL VSC 765.00 1	OPEN LINE FROM BUS 144998 [KAITHAL_VSC 400.00] TO BUS 147705 [KAITHAL VSC 765.00] CKT 2	960	1363	1500	90.89	Sc-1
60.	144998 KAITHAL_VSC 400.00 147705 KAITHAL VSC 765.00 2	OPEN LINE FROM BUS 144998 [KAITHAL_VSC 400.00] TO BUS 147705 [KAITHAL VSC 765.00] CKT 1	960	1363	1500	90.89	Sc-1
61.	144998 KAITHAL_VSC 400.00 147705 KAITHAL VSC 765.00 3	OPEN LINE FROM BUS 144998 [KAITHAL_VSC 400.00] TO BUS 147705 [KAITHAL VSC 765.00] CKT 1	960	1363	1500	90.89	Sc-1
62.	174483 BAREILY 400.00 177806 BAREILLY 765.00 1	OPEN LINE FROM BUS 174483 [BAREILY 400.00] TO BUS 177806 [BAREILLY 765.00] CKT 2	888	1362	1500	90.8	Sc-1
63.	174483 BAREILY 400.00 177806 BAREILLY 765.00 2	OPEN LINE FROM BUS 174483 [BAREILY 400.00] TO BUS 177806 [BAREILLY 765.00] CKT 1	888	1362	1500	90.8	Sc-1
64.	424015 JHARSUGUDA-A400.00 428015 JHARSUGUDA-A765.00 1	OPEN LINE FROM BUS 424015 [JHARSUGUDA-A400.00] TO BUS 428015 [JHARSUGUDA-A765.00] CKT 2	1227	1899	1500	126.58	Sc-2
65.	424015 JHARSUGUDA-A400.00 428015 JHARSUGUDA-A765.00 2	OPEN LINE FROM BUS 424015 [JHARSUGUDA-A400.00] TO BUS 428015 [JHARSUGUDA-A765.00] CKT 1	1227	1899	1500	126.58	Sc-2
66.	424091 JHARSUGUDA-B400.00 428091 JHARSUGUDA-B765.00 3	OPEN LINE FROM BUS 424091 [JHARSUGUDA-B400.00] TO BUS 428091 [JHARSUGUDA-B765.00] CKT 4	1149	1829	1500	121.93	Sc-2

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
67.	424091 JHARSUGUDA-B400.00 428091 JHARSUGUDA-B765.00 4	OPEN LINE FROM BUS 424091 [JHARSUGUDA-B400.00] TO BUS 428091 [JHARSUGUDA-B765.00] CKT 3	1149	1829	1500	121.93	Sc-2
68.	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	1088	1792	1500	119.45	Sc-2
69.	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	1088	1792	1500	119.45	Sc-2
70.	314008 SIPAT4 400.00 318007 SIPAT 765.00 1	OPEN LINE FROM BUS 314008 [SIPAT4 400.00] TO BUS 318007 [SIPAT 765.00] CKT 2	722	1090	1000	109.03	Sc-2
71.	314008 SIPAT4 400.00 318007 SIPAT 765.00 2	OPEN LINE FROM BUS 314008 [SIPAT4 400.00] TO BUS 318007 [SIPAT 765.00] CKT 1	722	1090	1000	109.03	Sc-2
72.	354147 LAKADIYA 400.00 358147 LAKADIA 765 765.00 3	OPEN LINE FROM BUS 354147 [LAKADIYA 400.00] TO BUS 358147 [LAKADIA 765 765.00] CKT 4	1023	1624	1500	108.3	Sc-2
73.	354147 LAKADIYA 400.00 358147 LAKADIA 765 765.00 4	OPEN LINE FROM BUS 354147 [LAKADIYA 400.00] TO BUS 358147 [LAKADIA 765 765.00] CKT 3	1023	1624	1500	108.3	Sc-2
74.	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	732	1054	1000	105.43	Sc-2
75.	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	732	1054	1000	105.43	Sc-2
76.	544095 TUTICORIN PS400.00 548095 TUTICORIN PS765.00 1	OPEN LINE FROM BUS 544095 [TUTICORIN PS400.00] TO BUS 548095 [TUTICORIN PS765.00] CKT 2	881	1500	1500	99.98	Sc-2
77.	544095 TUTICORIN PS400.00 548095 TUTICORIN PS765.00 2	OPEN LINE FROM BUS 544095 [TUTICORIN PS400.00] TO BUS 548095 [TUTICORIN PS765.00] CKT 1	881	1500	1500	99.98	Sc-2
78.	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	639	925	1000	92.48	Sc-2
79.	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	639	925	1000	92.48	Sc-2
80.	424015 JHARSUGUDA-A400.00 428015 JHARSUGUDA-A765.00 1	OPEN LINE FROM BUS 424015 [JHARSUGUDA-A400.00] TO BUS 428015 [JHARSUGUDA-A765.00] CKT 2	1328	2055	1500	137.01	Sc-3
81.	424015 JHARSUGUDA-A400.00 428015 JHARSUGUDA-A765.00 2	OPEN LINE FROM BUS 424015 [JHARSUGUDA-A400.00] TO BUS 428015 [JHARSUGUDA-A765.00] CKT 1	1328	2055	1500	137.01	Sc-3
82.	424091 JHARSUGUDA-B400.00 428091 JHARSUGUDA-B765.00 3	OPEN LINE FROM BUS 424091 [JHARSUGUDA-B400.00] TO BUS 428091 [JHARSUGUDA-B765.00] CKT 4	1271	2025	1500	134.97	Sc-3
83.	424091 JHARSUGUDA-B400.00 428091 JHARSUGUDA-B765.00 4	OPEN LINE FROM BUS 424091 [JHARSUGUDA-B400.00] TO BUS 428091 [JHARSUGUDA-B765.00] CKT 3	1271	2025	1500	134.97	Sc-3
84.	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	1023	1685	1500	112.35	Sc-3
85.	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	1023	1685	1500	112.35	Sc-3
86.	354147 LAKADIYA 400.00 358147 LAKADIA 765 765.00 3	OPEN LINE FROM BUS 354147 [LAKADIYA 400.00] TO BUS 358147 [LAKADIA 765 765.00] CKT 4	1058	1678	1500	111.9	Sc-3
87.	354147 LAKADIYA 400.00 358147 LAKADIA 765 765.00 4	OPEN LINE FROM BUS 354147 [LAKADIYA 400.00] TO BUS 358147 [LAKADIA 765 765.00] CKT 3	1058	1678	1500	111.9	Sc-3
88.	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	708	1021	1000	102.11	Sc-3
89.	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	708	1021	1000	102.11	Sc-3

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
90.	314008 SIPAT4 400.00 318007 SIPAT 765.00 1	OPEN LINE FROM BUS 314008 [SIPAT4 400.00] TO BUS 318007 [SIPAT 765.00] CKT 2	652	996	1000	99.6	Sc-3
91.	314008 SIPAT4 400.00 318007 SIPAT 765.00 2	OPEN LINE FROM BUS 314008 [SIPAT4 400.00] TO BUS 318007 [SIPAT 765.00] CKT 1	652	996	1000	99.6	Sc-3
92.	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	1355	1927	1500	128.49	Sc-4
93.	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	1355	1927	1500	128.49	Sc-4
94.	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	1355	1927	1500	128.49	Sc-4
95.	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	1423	1894	1500	126.28	Sc-4
96.	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	1423	1894	1500	126.28	Sc-4
97.	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	1423	1894	1500	126.28	Sc-4
98.	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	890	1185	1000	118.55	Sc-4
99.	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	890	1185	1000	118.55	Sc-4
100	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	1334	1601	1500	106.72	Sc-4
101	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	1318	1550	1500	103.36	Sc-4
102	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	1318	1550	1500	103.36	Sc-4
103	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	1318	1550	1500	103.36	Sc-4
104	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	1318	1550	1500	103.36	Sc-4
105	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	1318	1550	1500	103.36	Sc-4
106	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	1318	1550	1500	103.36	Sc-4
107	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	1282	1540	1500	102.66	Sc-4
108	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	1282	1540	1500	102.66	Sc-4
109	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	1282	1540	1500	102.66	Sc-4
110	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	1282	1540	1500	102.66	Sc-4
111	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	1282	1540	1500	102.66	Sc-4
112	374043 AURANG-CHTPM400.00 378043 AURANG-CHTPM765.00 1	OPEN LINE FROM BUS 374043 [AURANG-CHTPM400.00] TO BUS 378043 [AURANG-CHTPM765.00] CKT 2	1061	1516	1500	101.06	Sc-4

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
113	374043 AURANG-CHTPM400.00 378043 AURANG-CHTPM765.00 2	OPEN LINE FROM BUS 374043 [AURANG-CHTPM400.00] TO BUS 378043 [AURANG-CHTPM765.00] CKT 1	1061	1516	1500	101.06	Sc-4
114	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	1246	1482	1500	98.77	Sc-4
115	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	1246	1482	1500	98.77	Sc-4
116	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	1246	1482	1500	98.77	Sc-4
117	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	1246	1482	1500	98.77	Sc-4
118	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	1246	1482	1500	98.77	Sc-4
119	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	1246	1482	1500	98.77	Sc-4
120	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	1059	1471	1500	98.05	Sc-4
121	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	1059	1471	1500	98.05	Sc-4
122	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	1059	1471	1500	98.05	Sc-4
123	174990 FATEH VSC 400.00 177990 FATEHPUR 765765.00 1	OPEN LINE FROM BUS 174990 [FATEH VSC 400.00] TO BUS 177990 [FATEHPUR 765765.00] CKT 2	1174	1467	1500	97.79	Sc-4
124	174990 FATEH VSC 400.00 177990 FATEHPUR 765765.00 2	OPEN LINE FROM BUS 174990 [FATEH VSC 400.00] TO BUS 177990 [FATEHPUR 765765.00] CKT 1	1174	1467	1500	97.79	Sc-4
125	174990 FATEH VSC 400.00 177990 FATEHPUR 765765.00 3	OPEN LINE FROM BUS 174990 [FATEH VSC 400.00] TO BUS 177990 [FATEHPUR 765765.00] CKT 1	1174	1467	1500	97.79	Sc-4
126	174990 FATEH VSC 400.00 177990 FATEHPUR 765765.00 4	OPEN LINE FROM BUS 174990 [FATEH VSC 400.00] TO BUS 177990 [FATEHPUR 765765.00] CKT 1	1174	1467	1500	97.79	Sc-4
127	174990 FATEH VSC 400.00 177990 FATEHPUR 765765.00 5	OPEN LINE FROM BUS 174990 [FATEH VSC 400.00] TO BUS 177990 [FATEHPUR 765765.00] CKT 1	1174	1467	1500	97.79	Sc-4
128	164422 RAMG-I 400.00 167422 RAMGARH-I 765.00 1	OPEN LINE FROM BUS 164422 [RAMG-I 400.00] TO BUS 167422 [RAMGARH-I 765.00] CKT 2	954	1436	1500	95.72	Sc-4
129	164422 RAMG-I 400.00 167422 RAMGARH-I 765.00 2	OPEN LINE FROM BUS 164422 [RAMG-I 400.00] TO BUS 167422 [RAMGARH-I 765.00] CKT 1	954	1436	1500	95.72	Sc-4
130	164422 RAMG-I 400.00 167422 RAMGARH-I 765.00 3	OPEN LINE FROM BUS 164422 [RAMG-I 400.00] TO BUS 167422 [RAMGARH-I 765.00] CKT 1	954	1436	1500	95.72	Sc-4
131	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	777	933	1000	93.27	Sc-4
132	424091 JHARSUGUDA-B400.00 428091 JHARSUGUDA-B765.00 3	OPEN LINE FROM BUS 424091 [JHARSUGUDA-B400.00] TO BUS 428091 [JHARSUGUDA-B765.00] CKT 4	878	1396	1500	93.06	Sc-4
133	424091 JHARSUGUDA-B400.00 428091 JHARSUGUDA-B765.00 4	OPEN LINE FROM BUS 424091 [JHARSUGUDA-B400.00] TO BUS 428091 [JHARSUGUDA-B765.00] CKT 3	878	1396	1500	93.06	Sc-4
134	174483 BAREILY 400.00 177806 BAREILLY 765.00 1	OPEN LINE FROM BUS 174483 [BAREILY 400.00] TO BUS 177806 [BAREILLY 765.00] CKT 2	892	1368	1500	91.2	Sc-4
135	174483 BAREILY 400.00 177806 BAREILLY 765.00 2	OPEN LINE FROM BUS 174483 [BAREILY 400.00] TO BUS 177806 [BAREILLY 765.00] CKT 1	892	1368	1500	91.2	Sc-4

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
136	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	955	1578	1500	105.19	Sc-5
137	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	955	1578	1500	105.19	Sc-5
138	354147 LAKADIYA 400.00 358147 LAKADIA 765 765.00 3	OPEN LINE FROM BUS 354147 [LAKADIYA 400.00] TO BUS 358147 [LAKADIA 765 765.00] CKT 4	994	1578	1500	105.18	Sc-5
139	354147 LAKADIYA 400.00 358147 LAKADIA 765 765.00 4	OPEN LINE FROM BUS 354147 [LAKADIYA 400.00] TO BUS 358147 [LAKADIA 765 765.00] CKT 3	994	1578	1500	105.18	Sc-5
140	424015 JHARSUGUDA-A400.00 428015 JHARSUGUDA-A765.00 1	OPEN LINE FROM BUS 424015 [JHARSUGUDA-A400.00] TO BUS 428015 [JHARSUGUDA-A765.00] CKT 2	972	1502	1500	100.15	Sc-5
141	424015 JHARSUGUDA-A400.00 428015 JHARSUGUDA-A765.00 2	OPEN LINE FROM BUS 424015 [JHARSUGUDA-A400.00] TO BUS 428015 [JHARSUGUDA-A765.00] CKT 1	972	1502	1500	100.15	Sc-5
142	424091 JHARSUGUDA-B400.00 428091 JHARSUGUDA-B765.00 3	OPEN LINE FROM BUS 424091 [JHARSUGUDA-B400.00] TO BUS 428091 [JHARSUGUDA-B765.00] CKT 4	909	1448	1500	96.5	Sc-5
143	424091 JHARSUGUDA-B400.00 428091 JHARSUGUDA-B765.00 4	OPEN LINE FROM BUS 424091 [JHARSUGUDA-B400.00] TO BUS 428091 [JHARSUGUDA-B765.00] CKT 3	909	1448	1500	96.5	Sc-5
144	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	652	939	1000	93.94	Sc-5
145	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	652	939	1000	93.94	Sc-5
146	544095 TUTICORIN PS400.00 548095 TUTICORIN PS765.00 1	OPEN LINE FROM BUS 544095 [TUTICORIN PS400.00] TO BUS 548095 [TUTICORIN PS765.00] CKT 2	812	1366	1500	91.07	Sc-5
147	544095 TUTICORIN PS400.00 548095 TUTICORIN PS765.00 2	OPEN LINE FROM BUS 544095 [TUTICORIN PS400.00] TO BUS 548095 [TUTICORIN PS765.00] CKT 1	812	1366	1500	91.07	Sc-5
148	174401 UNNAO4 400.00 177407 UNNAO7 765.00 1	OPEN LINE FROM BUS 174401 [UNNAO4 400.00] TO BUS 177407 [UNNAO7 765.00] CKT 2	658	907	1000	90.67	Sc-5
149	174401 UNNAO4 400.00 177407 UNNAO7 765.00 2	OPEN LINE FROM BUS 174401 [UNNAO4 400.00] TO BUS 177407 [UNNAO7 765.00] CKT 1	658	907	1000	90.67	Sc-5
150	174401 UNNAO4 400.00 177407 UNNAO7 765.00 3	OPEN LINE FROM BUS 174401 [UNNAO4 400.00] TO BUS 177407 [UNNAO7 765.00] CKT 1	658	907	1000	90.67	Sc-5
151	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	954	1583	1500	105.5	Sc-6
152	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	954	1583	1500	105.5	Sc-6
153	354147 LAKADIYA 400.00 358147 LAKADIA 765 765.00 3	OPEN LINE FROM BUS 354147 [LAKADIYA 400.00] TO BUS 358147 [LAKADIA 765 765.00] CKT 4	932	1480	1500	98.69	Sc-6
154	354147 LAKADIYA 400.00 358147 LAKADIA 765 765.00 4	OPEN LINE FROM BUS 354147 [LAKADIYA 400.00] TO BUS 358147 [LAKADIA 765 765.00] CKT 3	932	1480	1500	98.69	Sc-6
155	424091 JHARSUGUDA-B400.00 428091 JHARSUGUDA-B765.00 3	OPEN LINE FROM BUS 424091 [JHARSUGUDA-B400.00] TO BUS 428091 [JHARSUGUDA-B765.00] CKT 4	900	1433	1500	95.51	Sc-6
156	424091 JHARSUGUDA-B400.00 428091 JHARSUGUDA-B765.00 4	OPEN LINE FROM BUS 424091 [JHARSUGUDA-B400.00] TO BUS 428091 [JHARSUGUDA-B765.00] CKT 3	900	1433	1500	95.51	Sc-6
157	364023 INDORE-74 400.00 368023 INDORE-7 765.00 2	OPEN LINE FROM BUS 364799 [INDOR-SPLT 400.00] TO BUS 368023 [INDORE-7 765.00] CKT 1	1609	1950	1500	130.02	Sc-7
158	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	1395	1858	1500	123.89	Sc-7

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
159	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	1395	1858	1500	123.89	Sc-7
160	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	1395	1858	1500	123.89	Sc-7
161	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	851	1218	1000	121.76	Sc-7
162	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	851	1218	1000	121.76	Sc-7
163	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	1303	1751	1500	116.71	Sc-7
164	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	1303	1751	1500	116.71	Sc-7
165	364799 INDOR-SPLT 400.00 368023 INDORE-7 765.00 1	OPEN LINE FROM BUS 364023 [INDORE-74 400.00] TO BUS 368023 [INDORE-7 765.00] CKT 2	1346	1728	1500	115.23	Sc-7
166	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	1315	1566	1500	104.37	Sc-7
167	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	1315	1566	1500	104.37	Sc-7
168	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	1315	1566	1500	104.37	Sc-7
169	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	1315	1566	1500	104.37	Sc-7
170	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	1315	1566	1500	104.37	Sc-7
171	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	1315	1566	1500	104.37	Sc-7
172	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	1234	1481	1500	98.73	Sc-7
173	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	1234	1481	1500	98.73	Sc-7
174	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	1234	1481	1500	98.73	Sc-7
175	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	1234	1481	1500	98.73	Sc-7
176	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	1234	1481	1500	98.73	Sc-7
177	174990 FATEH VSC 400.00 177990 FATEHPUR 765765.00 1	OPEN LINE FROM BUS 174990 [FATEH VSC 400.00] TO BUS 177990 [FATEHPUR 765765.00] CKT 2	1171	1464	1500	97.58	Sc-7
178	174990 FATEH VSC 400.00 177990 FATEHPUR 765765.00 2	OPEN LINE FROM BUS 174990 [FATEH VSC 400.00] TO BUS 177990 [FATEHPUR 765765.00] CKT 1	1171	1464	1500	97.58	Sc-7
179	174990 FATEH VSC 400.00 177990 FATEHPUR 765765.00 3	OPEN LINE FROM BUS 174990 [FATEH VSC 400.00] TO BUS 177990 [FATEHPUR 765765.00] CKT 1	1171	1464	1500	97.58	Sc-7
180	174990 FATEH VSC 400.00 177990 FATEHPUR 765765.00 4	OPEN LINE FROM BUS 174990 [FATEH VSC 400.00] TO BUS 177990 [FATEHPUR 765765.00] CKT 1	1171	1464	1500	97.58	Sc-7
181	174990 FATEH VSC 400.00 177990 FATEHPUR 765765.00 5	OPEN LINE FROM BUS 174990 [FATEH VSC 400.00] TO BUS 177990 [FATEHPUR 765765.00] CKT 1	1171	1464	1500	97.58	Sc-7

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
182	164422 RAMG-I 400.00 167422 RAMGARH-I 765.00 1	OPEN LINE FROM BUS 164422 [RAMG-I 400.00] TO BUS 167422 [RAMGARH-I 765.00] CKT 2	946	1424	1500	94.91	Sc-7
183	164422 RAMG-I 400.00 167422 RAMGARH-I 765.00 2	OPEN LINE FROM BUS 164422 [RAMG-I 400.00] TO BUS 167422 [RAMGARH-I 765.00] CKT 1	946	1424	1500	94.91	Sc-7
184	164422 RAMG-I 400.00 167422 RAMGARH-I 765.00 3	OPEN LINE FROM BUS 164422 [RAMG-I 400.00] TO BUS 167422 [RAMGARH-I 765.00] CKT 1	946	1424	1500	94.91	Sc-7
185	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	1203	1415	1500	94.36	Sc-7
186	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	1203	1415	1500	94.36	Sc-7
187	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	1203	1415	1500	94.36	Sc-7
188	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	1203	1415	1500	94.36	Sc-7
189	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	1203	1415	1500	94.36	Sc-7
190	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	1203	1415	1500	94.36	Sc-7
191	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	1078	1404	1500	93.59	Sc-7
192	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	1078	1404	1500	93.59	Sc-7
193	374045 PUNE-PG-GIS 400.00 378045 PUNE-PG-GIS 765.00 3	OPEN LINE FROM BUS 374045 [PUNE-PG-GIS 400.00] TO BUS 378045 [PUNE-PG-GIS 765.00] CKT 1	1078	1404	1500	93.59	Sc-7
194	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	1112	1386	1500	92.41	Sc-7
195	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	1112	1386	1500	92.41	Sc-7
196	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	1112	1386	1500	92.41	Sc-7
197	374051 PADGHEGIS 400.00 378051 PADGHEGIS 765.00 4	OPEN LINE FROM BUS 374051 [PADGHEGIS 400.00] TO BUS 378051 [PADGHEGIS 765.00] CKT 1	1112	1386	1500	92.41	Sc-7
198	374048 AURANGBD-III400.00 378048 AURANGBD-III765.00 1	OPEN LINE FROM BUS 374048 [AURANGBD-III400.00] TO BUS 378048 [AURANGBD-III765.00] CKT 2	876	1444	1500	96.3	Sc-8
199	374048 AURANGBD-III400.00 378048 AURANGBD-III765.00 2	OPEN LINE FROM BUS 374048 [AURANGBD-III400.00] TO BUS 378048 [AURANGBD-III765.00] CKT 1	876	1444	1500	96.3	Sc-8
200	524888 KOPPAL PS-II400.00 528888 KOPPAL PS-II765.00 1	OPEN LINE FROM BUS 524888 [KOPPAL PS-II400.00] TO BUS 528888 [KOPPAL PS-II765.00] CKT 2	952	1436	1500	95.76	Sc-8
201	524888 KOPPAL PS-II400.00 528888 KOPPAL PS-II765.00 2	OPEN LINE FROM BUS 524888 [KOPPAL PS-II400.00] TO BUS 528888 [KOPPAL PS-II765.00] CKT 1	952	1436	1500	95.76	Sc-8
202	524888 KOPPAL PS-II400.00 528888 KOPPAL PS-II765.00 3	OPEN LINE FROM BUS 524888 [KOPPAL PS-II400.00] TO BUS 528888 [KOPPAL PS-II765.00] CKT 1	952	1436	1500	95.76	Sc-8
203	524888 KOPPAL PS-II400.00 528888 KOPPAL PS-II765.00 1	OPEN LINE FROM BUS 524888 [KOPPAL PS-II400.00] TO BUS 528888 [KOPPAL PS-II765.00] CKT 2	1148	1758	1500	117.2	Sc-9
204	524888 KOPPAL PS-II400.00 528888 KOPPAL PS-II765.00 2	OPEN LINE FROM BUS 524888 [KOPPAL PS-II400.00] TO BUS 528888 [KOPPAL PS-II765.00] CKT 1	1148	1758	1500	117.2	Sc-9

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
205	524888 KOPPAL PS-II400.00 528888 KOPPAL PS-II765.00 3	OPEN LINE FROM BUS 524888 [KOPPAL PS-II400.00] TO BUS 528888 [KOPPAL PS-II765.00] CKT 1	1148	1758	1500	117.2	Sc-9
206	374048 AURANGBD-III400.00 378048 AURANGBD-III765.00 1	OPEN LINE FROM BUS 374048 [AURANGBD-III400.00] TO BUS 378048 [AURANGBD-III765.00] CKT 2	833	1375	1500	91.67	Sc-9
207	374048 AURANGBD-III400.00 378048 AURANGBD-III765.00 2	OPEN LINE FROM BUS 374048 [AURANGBD-III400.00] TO BUS 378048 [AURANGBD-III765.00] CKT 1	833	1375	1500	91.67	Sc-9

N-1 Contingency of 400/220 kV Transformers

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
1.	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 5	1094	2006	500	401.29	Sc-1
2.	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 4	1094	2006	500	401.29	Sc-1
3.	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	448	901	500	180.22	Sc-1
4.	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	448	901	500	180.22	Sc-1
5.	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	410	512	315	162.59	Sc-1
6.	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	410	512	315	162.59	Sc-1
7.	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	410	512	315	162.59	Sc-1
8.	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	371	741	500	148.21	Sc-1
9.	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	371	741	500	148.21	Sc-1
10.	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	172	345	240	143.58	Sc-1
11.	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	172	345	240	143.58	Sc-1
12.	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	218	448	315	142.23	Sc-1
13.	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	218	448	315	142.23	Sc-1
14.	164498 BHADLA-2 400.00 162499 BHAD-2 SPLT 220.00 1	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162499 [BHAD-2 SPLT 220.00] CKT 2	472	709	500	141.83	Sc-1
15.	164498 BHADLA-2 400.00 162499 BHAD-2 SPLT 220.00 2	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162499 [BHAD-2 SPLT 220.00] CKT 1	472	709	500	141.83	Sc-1
16.	164498 BHADLA-2 400.00 162499 BHAD-2 SPLT 220.00 3	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162499 [BHAD-2 SPLT 220.00] CKT 1	472	709	500	141.83	Sc-1
17.	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	298	442	315	140.26	Sc-1
18.	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	298	442	315	140.26	Sc-1
19.	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	517	657	500	131.44	Sc-1
20.	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	517	657	500	131.44	Sc-1

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
21.	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	517	657	500	131.44	Sc-1
22.	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	517	657	500	131.44	Sc-1
23.	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	496	621	500	124.23	Sc-1
24.	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	496	621	500	124.23	Sc-1
25.	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	496	621	500	124.23	Sc-1
26.	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	496	621	500	124.23	Sc-1
27.	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	496	621	500	124.23	Sc-1
28.	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	492	616	500	123.23	Sc-1
29.	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	492	616	500	123.23	Sc-1
30.	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	492	616	500	123.23	Sc-1
31.	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	492	616	500	123.23	Sc-1
32.	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	492	616	500	123.23	Sc-1
33.	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	247	385	315	122.11	Sc-1
34.	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	247	385	315	122.11	Sc-1
35.	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	484	606	500	121.22	Sc-1
36.	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	484	606	500	121.22	Sc-1
37.	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	484	606	500	121.22	Sc-1
38.	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	484	606	500	121.22	Sc-1
39.	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	484	606	500	121.22	Sc-1
40.	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	371	315	117.89	Sc-1
41.	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	371	315	117.89	Sc-1
42.	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	371	315	117.89	Sc-1

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
43.	544132 KAMUTHI4 400.00 542130 KAMUDHI42 230.00 1	OPEN LINE FROM BUS 544132 [KAMUTHI4 400.00] TO BUS 542130 [KAMUDHI42 230.00] CKT 2	184	368	315	116.76	Sc-1
44.	544132 KAMUTHI4 400.00 542130 KAMUDHI42 230.00 2	OPEN LINE FROM BUS 544132 [KAMUTHI4 400.00] TO BUS 542130 [KAMUDHI42 230.00] CKT 1	184	368	315	116.76	Sc-1
45.	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	263	367	315	116.48	Sc-1
46.	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	376	580	500	115.98	Sc-1
47.	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	376	580	500	115.98	Sc-1
48.	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	287	364	315	115.57	Sc-1
49.	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	287	364	315	115.57	Sc-1
50.	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	468	562	500	112.4	Sc-1
51.	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	468	562	500	112.4	Sc-1
52.	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	468	562	500	112.4	Sc-1
53.	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	468	562	500	112.4	Sc-1
54.	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	468	562	500	112.4	Sc-1
55.	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	468	562	500	112.4	Sc-1
56.	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	448	561	500	112.2	Sc-1
57.	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	448	561	500	112.2	Sc-1
58.	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	448	561	500	112.2	Sc-1
59.	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	448	561	500	112.2	Sc-1
60.	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	448	561	500	112.2	Sc-1
61.	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	448	561	500	112.2	Sc-1
62.	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	448	561	500	112.2	Sc-1
63.	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	448	561	500	112.2	Sc-1
64.	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	448	561	500	112.2	Sc-1

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
65.	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	448	561	500	112.2	Sc-1
66.	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	273	347	315	110.07	Sc-1
67.	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	273	347	315	110.07	Sc-1
68.	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	273	347	315	110.07	Sc-1
69.	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	344	550	500	109.98	Sc-1
70.	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	344	550	500	109.98	Sc-1
71.	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	343	315	109.03	Sc-1
72.	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	343	315	109.03	Sc-1
73.	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	343	315	109.03	Sc-1
74.	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	223	336	315	106.77	Sc-1
75.	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	223	336	315	106.77	Sc-1
76.	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	278	335	315	106.24	Sc-1
77.	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	278	335	315	106.24	Sc-1
78.	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	278	335	315	106.24	Sc-1
79.	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	278	335	315	106.24	Sc-1
80.	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	278	335	315	106.24	Sc-1
81.	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	278	335	315	106.24	Sc-1
82.	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	278	335	315	106.24	Sc-1
83.	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	278	335	315	106.24	Sc-1
84.	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	278	335	315	106.24	Sc-1
85.	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	278	335	315	106.24	Sc-1
86.	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	278	335	315	106.24	Sc-1

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
87.	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	278	335	315	106.24	Sc-1
88.	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	278	335	315	106.23	Sc-1
89.	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	278	335	315	106.23	Sc-1
90.	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	278	335	315	106.23	Sc-1
91.	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	278	335	315	106.23	Sc-1
92.	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	278	335	315	106.23	Sc-1
93.	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	278	335	315	106.23	Sc-1
94.	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	419	524	500	104.72	Sc-1
95.	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	419	524	500	104.72	Sc-1
96.	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	419	524	500	104.72	Sc-1
97.	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	419	524	500	104.72	Sc-1
98.	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	419	524	500	104.72	Sc-1
99.	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	348	520	500	103.99	Sc-1
100.	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	348	520	500	103.99	Sc-1
101.	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	229	322	315	102.3	Sc-1
102.	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	229	322	315	102.3	Sc-1
103.	544026 KANAPATT 400.00 542148 KANARP42 230.00 1	OPEN LINE FROM BUS 544026 [KANAPATT 400.00] TO BUS 542148 [KANARP42 230.00] CKT 2	161	322	315	102.17	Sc-1
104.	544026 KANAPATT 400.00 542148 KANARP42 230.00 2	OPEN LINE FROM BUS 544026 [KANAPATT 400.00] TO BUS 542148 [KANARP42 230.00] CKT 1	161	322	315	102.17	Sc-1
105.	524050 JAGALUR4 400.00 522158 JAGALUR2 220.00 1	OPEN LINE FROM BUS 524050 [JAGALUR4 400.00] TO BUS 522158 [JAGALUR2 220.00] CKT 2	330	505	500	100.95	Sc-1
106.	524050 JAGALUR4 400.00 522158 JAGALUR2 220.00 2	OPEN LINE FROM BUS 524050 [JAGALUR4 400.00] TO BUS 522158 [JAGALUR2 220.00] CKT 1	330	505	500	100.95	Sc-1
107.	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	390	505	500	100.94	Sc-1
108.	164505 BIKANER-3 400.00 162505 BIKANER-3 220.00 1	OPEN LINE FROM BUS 164505 [BIKANER-3 400.00] TO BUS 162505 [BIKANER-3 220.00] CKT 2	397	497	500	99.33	Sc-1

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
109.	164505 BIKANER-3 400.00 162505 BIKANER-3 220.00 2	OPEN LINE FROM BUS 164505 [BIKANER-3 400.00] TO BUS 162505 [BIKANER-3 220.00] CKT 1	397	497	500	99.33	Sc-1
110.	164505 BIKANER-3 400.00 162505 BIKANER-3 220.00 3	OPEN LINE FROM BUS 164505 [BIKANER-3 400.00] TO BUS 162505 [BIKANER-3 220.00] CKT 1	397	497	500	99.33	Sc-1
111.	164505 BIKANER-3 400.00 162505 BIKANER-3 220.00 4	OPEN LINE FROM BUS 164505 [BIKANER-3 400.00] TO BUS 162505 [BIKANER-3 220.00] CKT 1	397	497	500	99.33	Sc-1
112.	164505 BIKANER-3 400.00 162505 BIKANER-3 220.00 5	OPEN LINE FROM BUS 164505 [BIKANER-3 400.00] TO BUS 162505 [BIKANER-3 220.00] CKT 1	397	497	500	99.33	Sc-1
113.	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	217	310	315	98.4	Sc-1
114.	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	217	310	315	98.4	Sc-1
115.	314004 BHI4 400.00 312004 BHILAI 220.00 1	OPEN LINE FROM BUS 314004 [BHI4 400.00] TO BUS 312004 [BHILAI 220.00] CKT 2	259	310	315	98.38	Sc-1
116.	314004 BHI4 400.00 312004 BHILAI 220.00 2	OPEN LINE FROM BUS 314004 [BHI4 400.00] TO BUS 312004 [BHILAI 220.00] CKT 1	259	310	315	98.38	Sc-1
117.	314004 BHI4 400.00 312004 BHILAI 220.00 3	OPEN LINE FROM BUS 314004 [BHI4 400.00] TO BUS 312004 [BHILAI 220.00] CKT 1	259	310	315	98.38	Sc-1
118.	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	356	485	500	97.07	Sc-1
119.	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	356	485	500	97.07	Sc-1
120.	154497 DWARKA 400.00 152287 DWARKA-II 220.00 3	OPEN LINE FROM BUS 154497 [DWARKA 400.00] TO BUS 152287 [DWARKA-II 220.00] CKT 4	353	484	500	96.79	Sc-1
121.	154497 DWARKA 400.00 152287 DWARKA-II 220.00 4	OPEN LINE FROM BUS 154497 [DWARKA 400.00] TO BUS 152287 [DWARKA-II 220.00] CKT 3	353	484	500	96.79	Sc-1
122.	444024 GOKARNA 400.00 442566 GOKARNA 220.00 1	OPEN LINE FROM BUS 444024 [GOKARNA 400.00] TO BUS 442566 [GOKARNA 220.00] CKT 2	245	304	315	96.6	Sc-1
123.	444024 GOKARNA 400.00 442566 GOKARNA 220.00 2	OPEN LINE FROM BUS 444024 [GOKARNA 400.00] TO BUS 442566 [GOKARNA 220.00] CKT 1	245	304	315	96.6	Sc-1
124.	444024 GOKARNA 400.00 442566 GOKARNA 220.00 3	OPEN LINE FROM BUS 444024 [GOKARNA 400.00] TO BUS 442566 [GOKARNA 220.00] CKT 1	245	304	315	96.6	Sc-1
125.	534952 EDAMAN4 400.00 532003 EDAMON2 220.00 2	OPEN LINE FROM BUS 534952 [EDAMAN4 400.00] TO BUS 532003 [EDAMON2 220.00] CKT 1	220	298	315	94.66	Sc-1
126.	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	253	297	315	94.23	Sc-1
127.	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	253	297	315	94.23	Sc-1
128.	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	253	297	315	94.23	Sc-1
129.	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	253	297	315	94.23	Sc-1
130.	544001 NYVL TS 2 400.00 542012 NLCTS22 230.00 1	OPEN LINE FROM BUS 544001 [NYVL TS 2 400.00] TO BUS 542012 [NLCTS22 230.00] CKT 2	200	235	250	93.98	Sc-1

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
131.	544001 NYVL TS 2 400.00 542012 NLCTS22 230.00 2	OPEN LINE FROM BUS 544001 [NYVL TS 2 400.00] TO BUS 542012 [NLCTS22 230.00] CKT 1	200	235	250	93.98	Sc-1
132.	354150 DHOLERASP 400.00 352327 DHOLERASP2 220.00 1	OPEN LINE FROM BUS 354150 [DHOLERASP 400.00] TO BUS 352327 [DHOLERASP2 220.00] CKT 2	301	461	500	92.22	Sc-1
133.	354150 DHOLERASP 400.00 352327 DHOLERASP2 220.00 2	OPEN LINE FROM BUS 354150 [DHOLERASP 400.00] TO BUS 352327 [DHOLERASP2 220.00] CKT 1	301	461	500	92.22	Sc-1
134.	354150 DHOLERASP 400.00 352327 DHOLERASP2 220.00 3	OPEN LINE FROM BUS 354150 [DHOLERASP 400.00] TO BUS 352327 [DHOLERASP2 220.00] CKT 1	301	461	500	92.22	Sc-1
135.	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	326	460	500	92.03	Sc-1
136.	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	326	460	500	92.03	Sc-1
137.	524044 HIRY 400.00 522044 HIRY 220.00 1	OPEN LINE FROM BUS 524044 [HIRY 400.00] TO BUS 522044 [HIRY 220.00] CKT 3	197	287	315	91.24	Sc-1
138.	524044 HIRY 400.00 522044 HIRY 220.00 2	OPEN LINE FROM BUS 524044 [HIRY 400.00] TO BUS 522044 [HIRY 220.00] CKT 3	197	287	315	91.24	Sc-1
139.	164401 AKAL-4 400.00 162280 AKAL-2 220.00 1	OPEN LINE FROM BUS 164401 [AKAL-4 400.00] TO BUS 162280 [AKAL-2 220.00] CKT 3	365	455	500	91.09	Sc-1
140.	164401 AKAL-4 400.00 162280 AKAL-2 220.00 2	OPEN LINE FROM BUS 164401 [AKAL-4 400.00] TO BUS 162280 [AKAL-2 220.00] CKT 3	365	455	500	91.09	Sc-1
141.	164401 AKAL-4 400.00 162280 AKAL-2 220.00 4	OPEN LINE FROM BUS 164401 [AKAL-4 400.00] TO BUS 162280 [AKAL-2 220.00] CKT 3	230	287	315	91.09	Sc-1
142.	164401 AKAL-4 400.00 162280 AKAL-2 220.00 3	OPEN LINE FROM BUS 164401 [AKAL-4 400.00] TO BUS 162280 [AKAL-2 220.00] CKT 1	365	455	500	91.09	Sc-1
143.	354140 CHARANKA 400.00 352141 CHARANKA 220.00 1	OPEN LINE FROM BUS 354140 [CHARANKA 400.00] TO BUS 352141 [CHARANKA 220.00] CKT 2	179	286	315	90.67	Sc-1
144.	354140 CHARANKA 400.00 352141 CHARANKA 220.00 3	OPEN LINE FROM BUS 354140 [CHARANKA 400.00] TO BUS 352141 [CHARANKA 220.00] CKT 2	179	286	315	90.67	Sc-1
145.	474028 DALTONGANJ 400.00 472228 DALTONGANJ_2220.00 1	OPEN LINE FROM BUS 474028 [DALTONGANJ 400.00] TO BUS 472228 [DALTONGANJ_2220.00] CKT 2	177	285	315	90.61	Sc-1
146.	474028 DALTONGANJ 400.00 472228 DALTONGANJ_2220.00 2	OPEN LINE FROM BUS 474028 [DALTONGANJ 400.00] TO BUS 472228 [DALTONGANJ_2220.00] CKT 1	177	285	315	90.61	Sc-1
147.	174964 GURUSARAI400400.00 172301 GURUSARAI2 220.00 1	OPEN LINE FROM BUS 174964 [GURUSARAI400400.00] TO BUS 172301 [GURUSARAI2 220.00] CKT 2	299	451	500	90.11	Sc-1
148.	174964 GURUSARAI400400.00 172301 GURUSARAI2 220.00 2	OPEN LINE FROM BUS 174964 [GURUSARAI400400.00] TO BUS 172301 [GURUSARAI2 220.00] CKT 1	299	451	500	90.11	Sc-1
149.	174964 GURUSARAI400400.00 172301 GURUSARAI2 220.00 3	OPEN LINE FROM BUS 174964 [GURUSARAI400400.00] TO BUS 172301 [GURUSARAI2 220.00] CKT 1	299	451	500	90.11	Sc-1
150.	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	224	451	240	187.86	Sc-2
151.	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	224	451	240	187.86	Sc-2
152.	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	235	483	315	153.28	Sc-2

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
153.	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	235	483	315	153.28	Sc-2
154.	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	325	398	315	126.43	Sc-2
155.	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	325	398	315	126.43	Sc-2
156.	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	325	398	315	126.43	Sc-2
157.	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	308	617	500	123.3	Sc-2
158.	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	308	617	500	123.3	Sc-2
159.	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	377	604	500	120.84	Sc-2
160.	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	377	604	500	120.84	Sc-2
161.	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	273	375	315	118.93	Sc-2
162.	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	273	375	315	118.93	Sc-2
163.	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	273	375	315	118.93	Sc-2
164.	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	248	368	315	116.86	Sc-2
165.	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	248	368	315	116.86	Sc-2
166.	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	323	359	315	114.02	Sc-2
167.	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	239	358	315	113.74	Sc-2
168.	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	239	358	315	113.74	Sc-2
169.	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	283	354	315	112.29	Sc-2
170.	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	283	354	315	112.29	Sc-2
171.	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	283	354	315	112.29	Sc-2
172.	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	294	344	315	109.36	Sc-2
173.	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	294	344	315	109.36	Sc-2
174.	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	294	344	315	109.36	Sc-2

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
175.	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	294	344	315	109.36	Sc-2
176.	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	203	261	240	108.65	Sc-2
177.	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	266	342	315	108.61	Sc-2
178.	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	266	342	315	108.61	Sc-2
179.	374072 KALLAM 400.00 372498 KALLAM 220.00 1	OPEN LINE FROM BUS 374072 [KALLAM 400.00] TO BUS 372498 [KALLAM 220.00] CKT 2	402	536	500	107.21	Sc-2
180.	374072 KALLAM 400.00 372498 KALLAM 220.00 2	OPEN LINE FROM BUS 374072 [KALLAM 400.00] TO BUS 372498 [KALLAM 220.00] CKT 1	402	536	500	107.21	Sc-2
181.	374072 KALLAM 400.00 372498 KALLAM 220.00 3	OPEN LINE FROM BUS 374072 [KALLAM 400.00] TO BUS 372498 [KALLAM 220.00] CKT 1	402	536	500	107.21	Sc-2
182.	374072 KALLAM 400.00 372498 KALLAM 220.00 4	OPEN LINE FROM BUS 374072 [KALLAM 400.00] TO BUS 372498 [KALLAM 220.00] CKT 1	402	536	500	107.21	Sc-2
183.	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	243	336	315	106.71	Sc-2
184.	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	243	336	315	106.71	Sc-2
185.	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	255	333	315	105.58	Sc-2
186.	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	255	333	315	105.58	Sc-2
187.	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	206	323	315	102.61	Sc-2
188.	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	206	323	315	102.61	Sc-2
189.	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	244	240	101.87	Sc-2
190.	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	228	315	315	99.86	Sc-2
191.	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	228	315	315	99.86	Sc-2
192.	544001 NYVL TS 2 400.00 542012 NLCTS22 230.00 1	OPEN LINE FROM BUS 544001 [NYVL TS 2 400.00] TO BUS 542012 [NLCTS22 230.00] CKT 2	212	249	250	99.7	Sc-2
193.	544001 NYVL TS 2 400.00 542012 NLCTS22 230.00 2	OPEN LINE FROM BUS 544001 [NYVL TS 2 400.00] TO BUS 542012 [NLCTS22 230.00] CKT 1	212	249	250	99.7	Sc-2
194.	524022 KOPPAL 400.00 522370 KOPPAL 220.00 1	OPEN LINE FROM BUS 524022 [KOPPAL 400.00] TO BUS 522370 [KOPPAL 220.00] CKT 2	397	496	500	99.16	Sc-2
195.	524022 KOPPAL 400.00 522370 KOPPAL 220.00 2	OPEN LINE FROM BUS 524022 [KOPPAL 400.00] TO BUS 522370 [KOPPAL 220.00] CKT 1	397	496	500	99.16	Sc-2
196.	524022 KOPPAL 400.00 522370 KOPPAL 220.00 3	OPEN LINE FROM BUS 524022 [KOPPAL 400.00] TO BUS 522370 [KOPPAL 220.00] CKT 1	397	496	500	99.16	Sc-2

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
197.	524022 KOPPAL 400.00 522370 KOPPAL 220.00 4	OPEN LINE FROM BUS 524022 [KOPPAL 400.00] TO BUS 522370 [KOPPAL 220.00] CKT 1	397	496	500	99.16	Sc-2
198.	524022 KOPPAL 400.00 522370 KOPPAL 220.00 5	OPEN LINE FROM BUS 524022 [KOPPAL 400.00] TO BUS 522370 [KOPPAL 220.00] CKT 1	397	496	500	99.16	Sc-2
199.	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	219	312	315	99.16	Sc-2
200.	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	219	312	315	99.16	Sc-2
201.	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	256	308	315	97.63	Sc-2
202.	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	256	308	315	97.63	Sc-2
203.	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	256	308	315	97.63	Sc-2
204.	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	248	304	315	96.64	Sc-2
205.	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	248	304	315	96.64	Sc-2
206.	424022 MENDHASAL 400.00 422586 MENDHASAL 220.00 3	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 422586 [MENDHASAL 220.00] CKT 1	248	304	315	96.64	Sc-2
207.	374041 PARLI-PG 400.00 372241 PARLIPG2 220.00 1	OPEN LINE FROM BUS 374041 [PARLI-PG 400.00] TO BUS 372241 [PARLIPG2 220.00] CKT 2	335	481	500	96.28	Sc-2
208.	374041 PARLI-PG 400.00 372241 PARLIPG2 220.00 2	OPEN LINE FROM BUS 374041 [PARLI-PG 400.00] TO BUS 372241 [PARLIPG2 220.00] CKT 1	335	481	500	96.28	Sc-2
209.	374012 PADGH4 400.00 372163 PADGHE22 220.00 6	OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 372163 [PADGHE22 220.00] CKT 1	239	302	315	95.83	Sc-2
210.	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	379	479	500	95.82	Sc-2
211.	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	238	301	315	95.42	Sc-2
212.	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	238	301	315	95.42	Sc-2
213.	474014 TENUGHAT 400.00 472214 TENUGHAT2 220.00 1	OPEN LINE FROM BUS 474014 [TENUGHAT 400.00] TO BUS 472214 [TENUGHAT2 220.00] CKT 2	201	298	315	94.55	Sc-2
214.	474014 TENUGHAT 400.00 472214 TENUGHAT2 220.00 2	OPEN LINE FROM BUS 474014 [TENUGHAT 400.00] TO BUS 472214 [TENUGHAT2 220.00] CKT 1	201	298	315	94.55	Sc-2
215.	424040 MERAMUNDLI 400.00 422584 MERAMUNDLI 220.00 1	OPEN LINE FROM BUS 424040 [MERAMUNDLI 400.00] TO BUS 422584 [MERAMUNDLI 220.00] CKT 2	233	294	315	93.27	Sc-2
216.	424040 MERAMUNDLI 400.00 422584 MERAMUNDLI 220.00 2	OPEN LINE FROM BUS 424040 [MERAMUNDLI 400.00] TO BUS 422584 [MERAMUNDLI 220.00] CKT 1	233	294	315	93.27	Sc-2
217.	374012 PADGH4 400.00 372163 PADGHE22 220.00 1	OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 372163 [PADGHE22 220.00] CKT 2	463	558	600	93.07	Sc-2
218.	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	335	464	500	92.84	Sc-2

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
219.	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	335	464	500	92.84	Sc-2
220.	504133 URVKND 400.00 502133 URAVAKONDA 220.00 1	OPEN LINE FROM BUS 504133 [URVKND 400.00] TO BUS 502133 [URAVAKONDA 220.00] CKT 2	327	458	500	91.65	Sc-2
221.	504133 URVKND 400.00 502133 URAVAKONDA 220.00 2	OPEN LINE FROM BUS 504133 [URVKND 400.00] TO BUS 502133 [URAVAKONDA 220.00] CKT 1	327	458	500	91.65	Sc-2
222.	504133 URVKND 400.00 502133 URAVAKONDA 220.00 3	OPEN LINE FROM BUS 504133 [URVKND 400.00] TO BUS 502133 [URAVAKONDA 220.00] CKT 1	206	289	315	91.61	Sc-2
223.	144483 KURUKSHETR 400.00 142287 KURUKSHETRA 220.00 1	OPEN LINE FROM BUS 144483 [KURUKSHETR 400.00] TO BUS 142287 [KURUKSHETRA 220.00] CKT 2	368	457	500	91.33	Sc-2
224.	144483 KURUKSHETR 400.00 142287 KURUKSHETRA 220.00 2	OPEN LINE FROM BUS 144483 [KURUKSHETR 400.00] TO BUS 142287 [KURUKSHETRA 220.00] CKT 1	368	457	500	91.33	Sc-2
225.	144483 KURUKSHETR 400.00 142287 KURUKSHETRA 220.00 3	OPEN LINE FROM BUS 144483 [KURUKSHETR 400.00] TO BUS 142287 [KURUKSHETRA 220.00] CKT 1	368	457	500	91.33	Sc-2
226.	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	215	287	315	91.21	Sc-2
227.	444009 SUBHASGRAM 400.00 442076 SUBHAS-PG 220.00 1	OPEN LINE FROM BUS 444009 [SUBHASGRAM 400.00] TO BUS 442076 [SUBHAS-PG 220.00] CKT 5	232	287	315	91.13	Sc-2
228.	444009 SUBHASGRAM 400.00 442076 SUBHAS-PG 220.00 2	OPEN LINE FROM BUS 444009 [SUBHASGRAM 400.00] TO BUS 442076 [SUBHAS-PG 220.00] CKT 5	232	287	315	91.13	Sc-2
229.	444009 SUBHASGRAM 400.00 442076 SUBHAS-PG 220.00 3	OPEN LINE FROM BUS 444009 [SUBHASGRAM 400.00] TO BUS 442076 [SUBHAS-PG 220.00] CKT 5	232	287	315	91.13	Sc-2
230.	444009 SUBHASGRAM 400.00 442076 SUBHAS-PG 220.00 4	OPEN LINE FROM BUS 444009 [SUBHASGRAM 400.00] TO BUS 442076 [SUBHAS-PG 220.00] CKT 5	232	287	315	91.13	Sc-2
231.	444007 RAJARHAT 400.00 442007 RAJARHAT 220.00 1	OPEN LINE FROM BUS 444007 [RAJARHAT 400.00] TO BUS 442007 [RAJARHAT 220.00] CKT 2	333	456	500	91.13	Sc-2
232.	444007 RAJARHAT 400.00 442007 RAJARHAT 220.00 2	OPEN LINE FROM BUS 444007 [RAJARHAT 400.00] TO BUS 442007 [RAJARHAT 220.00] CKT 1	333	456	500	91.13	Sc-2
233.	444024 GOKARNA 400.00 442566 GOKARNA 220.00 1	OPEN LINE FROM BUS 444024 [GOKARNA 400.00] TO BUS 442566 [GOKARNA 220.00] CKT 2	231	287	315	91.1	Sc-2
234.	444024 GOKARNA 400.00 442566 GOKARNA 220.00 2	OPEN LINE FROM BUS 444024 [GOKARNA 400.00] TO BUS 442566 [GOKARNA 220.00] CKT 1	231	287	315	91.1	Sc-2
235.	444024 GOKARNA 400.00 442566 GOKARNA 220.00 3	OPEN LINE FROM BUS 444024 [GOKARNA 400.00] TO BUS 442566 [GOKARNA 220.00] CKT 1	231	287	315	91.1	Sc-2
236.	164401 AKAL-4 400.00 162280 AKAL-2 220.00 4	OPEN LINE FROM BUS 164401 [AKAL-4 400.00] TO BUS 162280 [AKAL-2 220.00] CKT 2	229	287	315	90.95	Sc-2
237.	164401 AKAL-4 400.00 162280 AKAL-2 220.00 1	OPEN LINE FROM BUS 164401 [AKAL-4 400.00] TO BUS 162280 [AKAL-2 220.00] CKT 2	364	455	500	90.95	Sc-2
238.	164401 AKAL-4 400.00 162280 AKAL-2 220.00 2	OPEN LINE FROM BUS 164401 [AKAL-4 400.00] TO BUS 162280 [AKAL-2 220.00] CKT 3	364	455	500	90.95	Sc-2
239.	164401 AKAL-4 400.00 162280 AKAL-2 220.00 3	OPEN LINE FROM BUS 164401 [AKAL-4 400.00] TO BUS 162280 [AKAL-2 220.00] CKT 2	364	455	500	90.95	Sc-2
240.	314004 BHI4 400.00 312004 BHILAI 220.00 1	OPEN LINE FROM BUS 314004 [BHI4 400.00] TO BUS 312004 [BHILAI 220.00] CKT 2	238	284	315	90.28	Sc-2

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
241.	314004 BHI4 400.00 312004 BHILAI 220.00 2	OPEN LINE FROM BUS 314004 [BHI4 400.00] TO BUS 312004 [BHILAI 220.00] CKT 1	238	284	315	90.28	Sc-2
242.	314004 BHI4 400.00 312004 BHILAI 220.00 3	OPEN LINE FROM BUS 314004 [BHI4 400.00] TO BUS 312004 [BHILAI 220.00] CKT 1	238	284	315	90.28	Sc-2
243.	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	165	331	240	138	Sc-3
244.	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	165	331	240	138	Sc-3
245.	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	268	422	315	133.92	Sc-3
246.	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	268	422	315	133.92	Sc-3
247.	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	335	410	315	130.22	Sc-3
248.	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	335	410	315	130.22	Sc-3
249.	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	335	410	315	130.22	Sc-3
250.	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	188	383	315	121.51	Sc-3
251.	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	188	383	315	121.51	Sc-3
252.	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	342	382	315	121.34	Sc-3
253.	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	306	379	315	120.36	Sc-3
254.	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	306	379	315	120.36	Sc-3
255.	424022 MENDHASAL 400.00 422586 MENDHASAL 220.00 3	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 422586 [MENDHASAL 220.00] CKT 1	306	379	315	120.36	Sc-3
256.	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	369	315	117.27	Sc-3
257.	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	369	315	117.27	Sc-3
258.	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	369	315	117.27	Sc-3
259.	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	248	368	315	116.95	Sc-3
260.	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	248	368	315	116.95	Sc-3
261.	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	364	564	500	112.75	Sc-3
262.	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	364	564	500	112.75	Sc-3

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
263.	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	254	354	315	112.23	Sc-3
264.	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	254	354	315	112.23	Sc-3
265.	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	298	349	315	110.94	Sc-3
266.	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	298	349	315	110.94	Sc-3
267.	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	298	349	315	110.94	Sc-3
268.	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	298	349	315	110.94	Sc-3
269.	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	206	265	240	110.57	Sc-3
270.	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	271	348	315	110.53	Sc-3
271.	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	271	348	315	110.53	Sc-3
272.	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	265	346	315	109.82	Sc-3
273.	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	265	346	315	109.82	Sc-3
274.	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	176	263	240	109.68	Sc-3
275.	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	280	337	315	106.97	Sc-3
276.	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	280	337	315	106.97	Sc-3
277.	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	280	337	315	106.97	Sc-3
278.	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	379	527	500	105.3	Sc-3
279.	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	379	527	500	105.3	Sc-3
280.	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	220	329	315	104.54	Sc-3
281.	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	220	329	315	104.54	Sc-3
282.	424040 MERAMUNDLI 400.00 422584 MERAMUNDLI 220.00 1	OPEN LINE FROM BUS 424040 [MERAMUNDLI 400.00] TO BUS 422584 [MERAMUNDLI 220.00] CKT 2	260	328	315	104.21	Sc-3
283.	424040 MERAMUNDLI 400.00 422584 MERAMUNDLI 220.00 2	OPEN LINE FROM BUS 424040 [MERAMUNDLI 400.00] TO BUS 422584 [MERAMUNDLI 220.00] CKT 1	260	328	315	104.21	Sc-3
284.	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	346	501	500	100.27	Sc-3

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
285.	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	346	501	500	100.27	Sc-3
286.	444024 GOKARNA 400.00 442566 GOKARNA 220.00 1	OPEN LINE FROM BUS 444024 [GOKARNA 400.00] TO BUS 442566 [GOKARNA 220.00] CKT 2	252	313	315	99.47	Sc-3
287.	444024 GOKARNA 400.00 442566 GOKARNA 220.00 2	OPEN LINE FROM BUS 444024 [GOKARNA 400.00] TO BUS 442566 [GOKARNA 220.00] CKT 1	252	313	315	99.47	Sc-3
288.	444024 GOKARNA 400.00 442566 GOKARNA 220.00 3	OPEN LINE FROM BUS 444024 [GOKARNA 400.00] TO BUS 442566 [GOKARNA 220.00] CKT 1	252	313	315	99.47	Sc-3
289.	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	231	309	315	98.13	Sc-3
290.	174002 BAGPAT 400.00 172114 BAGPAT-PG 220.00 1	OPEN LINE FROM BUS 174002 [BAGPAT 400.00] TO BUS 172114 [BAGPAT-PG 220.00] CKT 2	357	490	500	97.94	Sc-3
291.	174002 BAGPAT 400.00 172114 BAGPAT-PG 220.00 2	OPEN LINE FROM BUS 174002 [BAGPAT 400.00] TO BUS 172114 [BAGPAT-PG 220.00] CKT 1	357	490	500	97.94	Sc-3
292.	174467 SHAHJ-PG 400.00 172107 SHAHJAHAN4 220.00 1	OPEN LINE FROM BUS 174467 [SHAHJ-PG 400.00] TO BUS 172107 [SHAHJAHAN4 220.00] CKT 2	205	302	315	95.81	Sc-3
293.	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	335	478	500	95.68	Sc-3
294.	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	335	478	500	95.68	Sc-3
295.	424429 BHADRAK-NEW 400.00 422029 BHADRAK-NEW 220.00 1	OPEN LINE FROM BUS 424429 [BHADRAK-NEW 400.00] TO BUS 422029 [BHADRAK-NEW 220.00] CKT 2	201	301	315	95.54	Sc-3
296.	424429 BHADRAK-NEW 400.00 422029 BHADRAK-NEW 220.00 2	OPEN LINE FROM BUS 424429 [BHADRAK-NEW 400.00] TO BUS 422029 [BHADRAK-NEW 220.00] CKT 1	201	301	315	95.54	Sc-3
297.	444007 RAJARHAT 400.00 442007 RAJARHAT 220.00 1	OPEN LINE FROM BUS 444007 [RAJARHAT 400.00] TO BUS 442007 [RAJARHAT 220.00] CKT 2	349	477	500	95.47	Sc-3
298.	444007 RAJARHAT 400.00 442007 RAJARHAT 220.00 2	OPEN LINE FROM BUS 444007 [RAJARHAT 400.00] TO BUS 442007 [RAJARHAT 220.00] CKT 1	349	477	500	95.47	Sc-3
299.	544001 NYVL TS 2 400.00 542012 NLCTS22 230.00 1	OPEN LINE FROM BUS 544001 [NYVL TS 2 400.00] TO BUS 542012 [NLCTS22 230.00] CKT 2	202	238	250	95.08	Sc-3
300.	544001 NYVL TS 2 400.00 542012 NLCTS22 230.00 2	OPEN LINE FROM BUS 544001 [NYVL TS 2 400.00] TO BUS 542012 [NLCTS22 230.00] CKT 1	202	238	250	95.08	Sc-3
301.	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	236	471	500	94.19	Sc-3
302.	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	236	471	500	94.19	Sc-3
303.	374072 KALLAM 400.00 372498 KALLAM 220.00 1	OPEN LINE FROM BUS 374072 [KALLAM 400.00] TO BUS 372498 [KALLAM 220.00] CKT 2	350	465	500	92.99	Sc-3
304.	374072 KALLAM 400.00 372498 KALLAM 220.00 2	OPEN LINE FROM BUS 374072 [KALLAM 400.00] TO BUS 372498 [KALLAM 220.00] CKT 1	350	465	500	92.99	Sc-3
305.	374072 KALLAM 400.00 372498 KALLAM 220.00 3	OPEN LINE FROM BUS 374072 [KALLAM 400.00] TO BUS 372498 [KALLAM 220.00] CKT 1	350	465	500	92.99	Sc-3
306.	374072 KALLAM 400.00 372498 KALLAM 220.00 4	OPEN LINE FROM BUS 374072 [KALLAM 400.00] TO BUS 372498 [KALLAM 220.00] CKT 1	350	465	500	92.98	Sc-3

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
307.	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	212	293	315	92.95	Sc-3
308.	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	212	293	315	92.95	Sc-3
309.	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	289	464	500	92.89	Sc-3
310.	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	289	464	500	92.89	Sc-3
311.	314004 BHI4 400.00 312004 BHILAI 220.00 1	OPEN LINE FROM BUS 314004 [BHI4 400.00] TO BUS 312004 [BHILAI 220.00] CKT 2	244	292	315	92.8	Sc-3
312.	314004 BHI4 400.00 312004 BHILAI 220.00 2	OPEN LINE FROM BUS 314004 [BHI4 400.00] TO BUS 312004 [BHILAI 220.00] CKT 1	244	292	315	92.8	Sc-3
313.	314004 BHI4 400.00 312004 BHILAI 220.00 3	OPEN LINE FROM BUS 314004 [BHI4 400.00] TO BUS 312004 [BHILAI 220.00] CKT 1	244	292	315	92.8	Sc-3
314.	444009 SUBHASGRAM 400.00 442076 SUBHAS-PG 220.00 1	OPEN LINE FROM BUS 444009 [SUBHASGRAM 400.00] TO BUS 442076 [SUBHAS-PG 220.00] CKT 5	236	291	315	92.5	Sc-3
315.	444009 SUBHASGRAM 400.00 442076 SUBHAS-PG 220.00 2	OPEN LINE FROM BUS 444009 [SUBHASGRAM 400.00] TO BUS 442076 [SUBHAS-PG 220.00] CKT 5	236	291	315	92.5	Sc-3
316.	444009 SUBHASGRAM 400.00 442076 SUBHAS-PG 220.00 3	OPEN LINE FROM BUS 444009 [SUBHASGRAM 400.00] TO BUS 442076 [SUBHAS-PG 220.00] CKT 5	236	291	315	92.5	Sc-3
317.	444009 SUBHASGRAM 400.00 442076 SUBHAS-PG 220.00 4	OPEN LINE FROM BUS 444009 [SUBHASGRAM 400.00] TO BUS 442076 [SUBHAS-PG 220.00] CKT 5	236	291	315	92.5	Sc-3
318.	374041 PARLI-PG 400.00 372241 PARLIPG2 220.00 1	OPEN LINE FROM BUS 374041 [PARLI-PG 400.00] TO BUS 372241 [PARLIPG2 220.00] CKT 2	321	462	500	92.41	Sc-3
319.	374041 PARLI-PG 400.00 372241 PARLIPG2 220.00 2	OPEN LINE FROM BUS 374041 [PARLI-PG 400.00] TO BUS 372241 [PARLIPG2 220.00] CKT 1	321	462	500	92.41	Sc-3
320.	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	228	290	315	92.04	Sc-3
321.	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 2	228	290	315	92.04	Sc-3
322.	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 1	228	290	315	92.04	Sc-3
323.	444112 KATWA-TPS 400.00 442111 NEW KATWA 220.00 1	OPEN LINE FROM BUS 444112 [KATWA-TPS 400.00] TO BUS 442111 [NEW KATWA 220.00] CKT 2	296	456	500	91.24	Sc-3
324.	444112 KATWA-TPS 400.00 442111 NEW KATWA 220.00 2	OPEN LINE FROM BUS 444112 [KATWA-TPS 400.00] TO BUS 442111 [NEW KATWA 220.00] CKT 1	296	456	500	91.24	Sc-3
325.	194002 SAHARANPUR 400.00 172117 SAHARANPR-PG220.00 3	OPEN LINE FROM BUS 194002 [SAHARANPUR 400.00] TO BUS 172117 [SAHARANPR-PG220.00] CKT 1	232	287	315	91	Sc-3
326.	474452 MAITHON-B 400.00 472634 MAITHON-PG 220.00 1	OPEN LINE FROM BUS 474452 [MAITHON-B 400.00] TO BUS 472634 [MAITHON-PG 220.00] CKT 2	233	286	315	90.74	Sc-3
327.	474452 MAITHON-B 400.00 472634 MAITHON-PG 220.00 2	OPEN LINE FROM BUS 474452 [MAITHON-B 400.00] TO BUS 472634 [MAITHON-PG 220.00] CKT 1	233	286	315	90.74	Sc-3
328.	474452 MAITHON-B 400.00 472634 MAITHON-PG 220.00 3	OPEN LINE FROM BUS 474452 [MAITHON-B 400.00] TO BUS 472634 [MAITHON-PG 220.00] CKT 1	233	286	315	90.74	Sc-3

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
329.	424016 BOLANGIR 400.00 422611 BOLANGIR 220.00 1	OPEN LINE FROM BUS 424016 [BOLANGIR 400.00] TO BUS 422611 [BOLANGIR 220.00] CKT 2	179	285	315	90.51	Sc-3
330.	424016 BOLANGIR 400.00 422611 BOLANGIR 220.00 2	OPEN LINE FROM BUS 424016 [BOLANGIR 400.00] TO BUS 422611 [BOLANGIR 220.00] CKT 1	179	285	315	90.51	Sc-3
331.	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 5	1078	1976	500	395.25	Sc-4
332.	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 4	1078	1976	500	395.25	Sc-4
333.	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	449	561	315	178.12	Sc-4
334.	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	449	561	315	178.12	Sc-4
335.	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	449	561	315	178.12	Sc-4
336.	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	442	887	500	177.47	Sc-4
337.	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	442	887	500	177.47	Sc-4
338.	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	365	730	500	145.98	Sc-4
339.	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	365	730	500	145.98	Sc-4
340.	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	219	450	315	142.99	Sc-4
341.	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	219	450	315	142.99	Sc-4
342.	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	304	450	315	142.85	Sc-4
343.	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	304	450	315	142.85	Sc-4
344.	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	169	340	240	141.51	Sc-4
345.	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	169	340	240	141.51	Sc-4
346.	164498 BHADLA-2 400.00 162499 BHAD-2 SPLT 220.00 1	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162499 [BHAD-2 SPLT 220.00] CKT 2	465	698	500	139.68	Sc-4
347.	164498 BHADLA-2 400.00 162499 BHAD-2 SPLT 220.00 2	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162499 [BHAD-2 SPLT 220.00] CKT 1	465	698	500	139.68	Sc-4
348.	164498 BHADLA-2 400.00 162499 BHAD-2 SPLT 220.00 3	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162499 [BHAD-2 SPLT 220.00] CKT 1	465	698	500	139.68	Sc-4
349.	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	474	648	500	129.53	Sc-4
350.	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	474	648	500	129.53	Sc-4

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
351.	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	421	647	500	129.35	Sc-4
352.	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	421	647	500	129.35	Sc-4
353.	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	256	400	315	126.84	Sc-4
354.	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	256	400	315	126.84	Sc-4
355.	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	282	397	315	126	Sc-4
356.	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	282	397	315	126	Sc-4
357.	544132 KAMUTHI4 400.00 542130 KAMUDHI42 230.00 1	OPEN LINE FROM BUS 544132 [KAMUTHI4 400.00] TO BUS 542130 [KAMUDHI42 230.00] CKT 2	197	391	315	124.05	Sc-4
358.	544132 KAMUTHI4 400.00 542130 KAMUDHI42 230.00 2	OPEN LINE FROM BUS 544132 [KAMUTHI4 400.00] TO BUS 542130 [KAMUDHI42 230.00] CKT 1	197	391	315	124.05	Sc-4
359.	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	489	612	500	122.42	Sc-4
360.	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	489	612	500	122.42	Sc-4
361.	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	489	612	500	122.42	Sc-4
362.	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	489	612	500	122.42	Sc-4
363.	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	489	612	500	122.42	Sc-4
364.	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	485	607	500	121.43	Sc-4
365.	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	485	607	500	121.43	Sc-4
366.	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	485	607	500	121.43	Sc-4
367.	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	485	607	500	121.43	Sc-4
368.	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	485	607	500	121.43	Sc-4
369.	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	474	598	500	119.65	Sc-4
370.	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	474	598	500	119.65	Sc-4
371.	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	474	598	500	119.65	Sc-4
372.	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	474	598	500	119.65	Sc-4

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
373.	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	400	597	500	119.41	Sc-4
374.	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	400	597	500	119.41	Sc-4
375.	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	477	597	500	119.39	Sc-4
376.	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	477	597	500	119.39	Sc-4
377.	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	477	597	500	119.39	Sc-4
378.	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	477	597	500	119.39	Sc-4
379.	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	477	597	500	119.39	Sc-4
380.	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	305	374	315	118.7	Sc-4
381.	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	305	374	315	118.7	Sc-4
382.	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	305	374	315	118.7	Sc-4
383.	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	289	358	315	113.69	Sc-4
384.	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	289	358	315	113.69	Sc-4
385.	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	289	358	315	113.69	Sc-4
386.	534952 EDAMAN4 400.00 532003 EDAMON2 220.00 2	OPEN LINE FROM BUS 534952 [EDAMAN4 400.00] TO BUS 532003 [EDAMON2 220.00] CKT 1	263	358	315	113.61	Sc-4
387.	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	357	315	113.24	Sc-4
388.	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	357	315	113.24	Sc-4
389.	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	554	500	110.75	Sc-4
390.	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	554	500	110.75	Sc-4
391.	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	554	500	110.75	Sc-4
392.	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	554	500	110.75	Sc-4
393.	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	554	500	110.75	Sc-4
394.	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	554	500	110.75	Sc-4

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
395.	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	442	553	500	110.5	Sc-4
396.	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	442	553	500	110.5	Sc-4
397.	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	442	553	500	110.5	Sc-4
398.	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	442	553	500	110.5	Sc-4
399.	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	442	553	500	110.5	Sc-4
400.	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	442	553	500	110.5	Sc-4
401.	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	442	553	500	110.5	Sc-4
402.	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	442	553	500	110.5	Sc-4
403.	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	442	553	500	110.5	Sc-4
404.	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	442	553	500	110.5	Sc-4
405.	374099 WARDHA SPLT 400.00 372071 WARDH_PG 220.00 4	OPEN LINE FROM BUS 374099 [WARDHA SPLT 400.00] TO BUS 372071 [WARDH_PG 220.00] CKT 2	449	549	500	109.82	Sc-4
406.	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	251	345	315	109.52	Sc-4
407.	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	251	345	315	109.52	Sc-4
408.	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	251	345	315	109.52	Sc-4
409.	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	270	343	315	108.9	Sc-4
410.	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	270	343	315	108.9	Sc-4
411.	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	270	343	315	108.9	Sc-4
412.	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	443	542	500	108.31	Sc-4
413.	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	443	542	500	108.31	Sc-4
414.	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	443	542	500	108.31	Sc-4
415.	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	264	334	315	106.07	Sc-4
416.	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	264	334	315	106.07	Sc-4

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
417.	544026 KANAPATT 400.00 542148 KANARP42 230.00 1	OPEN LINE FROM BUS 544026 [KANAPATT 400.00] TO BUS 542148 [KANARP42 230.00] CKT 2	167	334	315	105.94	Sc-4
418.	544026 KANAPATT 400.00 542148 KANARP42 230.00 2	OPEN LINE FROM BUS 544026 [KANAPATT 400.00] TO BUS 542148 [KANARP42 230.00] CKT 1	167	334	315	105.94	Sc-4
419.	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	328	524	500	104.86	Sc-4
420.	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	328	524	500	104.86	Sc-4
421.	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	405	524	500	104.78	Sc-4
422.	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	274	330	315	104.62	Sc-4
423.	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	274	330	315	104.62	Sc-4
424.	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	274	330	315	104.62	Sc-4
425.	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	274	330	315	104.62	Sc-4
426.	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	274	330	315	104.62	Sc-4
427.	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	274	330	315	104.62	Sc-4
428.	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	274	330	315	104.61	Sc-4
429.	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	274	330	315	104.61	Sc-4
430.	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	274	330	315	104.61	Sc-4
431.	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	274	330	315	104.61	Sc-4
432.	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	274	330	315	104.61	Sc-4
433.	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	274	330	315	104.61	Sc-4
434.	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	274	329	315	104.6	Sc-4
435.	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	274	329	315	104.6	Sc-4
436.	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	274	329	315	104.6	Sc-4
437.	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	274	329	315	104.6	Sc-4
438.	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	274	329	315	104.6	Sc-4

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
439.	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	274	329	315	104.6	Sc-4
440.	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	516	500	103.15	Sc-4
441.	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	516	500	103.15	Sc-4
442.	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	516	500	103.15	Sc-4
443.	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	516	500	103.15	Sc-4
444.	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	516	500	103.15	Sc-4
445.	524050 JAGALUR4 400.00 522158 JAGALUR2 220.00 1	OPEN LINE FROM BUS 524050 [JAGALUR4 400.00] TO BUS 522158 [JAGALUR2 220.00] CKT 2	337	515	500	103.07	Sc-4
446.	524050 JAGALUR4 400.00 522158 JAGALUR2 220.00 2	OPEN LINE FROM BUS 524050 [JAGALUR4 400.00] TO BUS 522158 [JAGALUR2 220.00] CKT 1	337	515	500	103.07	Sc-4
447.	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	213	318	315	100.87	Sc-4
448.	134484 PATRAN4 400.00 132241 PATRAN42 220.00 1	OPEN LINE FROM BUS 134484 [PATRAN4 400.00] TO BUS 132241 [PATRAN42 220.00] CKT 2	383	494	500	98.74	Sc-4
449.	134484 PATRAN4 400.00 132241 PATRAN42 220.00 2	OPEN LINE FROM BUS 134484 [PATRAN4 400.00] TO BUS 132241 [PATRAN42 220.00] CKT 1	383	494	500	98.74	Sc-4
450.	134484 PATRAN4 400.00 132241 PATRAN42 220.00 3	OPEN LINE FROM BUS 134484 [PATRAN4 400.00] TO BUS 132241 [PATRAN42 220.00] CKT 1	383	494	500	98.74	Sc-4
451.	444024 GOKARNA 400.00 442566 GOKARNA 220.00 1	OPEN LINE FROM BUS 444024 [GOKARNA 400.00] TO BUS 442566 [GOKARNA 220.00] CKT 2	251	311	315	98.61	Sc-4
452.	444024 GOKARNA 400.00 442566 GOKARNA 220.00 2	OPEN LINE FROM BUS 444024 [GOKARNA 400.00] TO BUS 442566 [GOKARNA 220.00] CKT 1	251	311	315	98.61	Sc-4
453.	444024 GOKARNA 400.00 442566 GOKARNA 220.00 3	OPEN LINE FROM BUS 444024 [GOKARNA 400.00] TO BUS 442566 [GOKARNA 220.00] CKT 1	251	311	315	98.61	Sc-4
454.	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	349	492	500	98.31	Sc-4
455.	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	349	492	500	98.31	Sc-4
456.	374217 NAVI-MUM 400.00 372365 NAVI-MUM220 220.00 1	OPEN LINE FROM BUS 374217 [NAVI-MUM 400.00] TO BUS 372365 [NAVI-MUM220 220.00] CKT 2	261	309	315	98.08	Sc-4
457.	374217 NAVI-MUM 400.00 372365 NAVI-MUM220 220.00 2	OPEN LINE FROM BUS 374217 [NAVI-MUM 400.00] TO BUS 372365 [NAVI-MUM220 220.00] CKT 1	261	309	315	98.08	Sc-4
458.	354150 DHOLERASP 400.00 352327 DHOLERASP2 220.00 1	OPEN LINE FROM BUS 354150 [DHOLERASP 400.00] TO BUS 352327 [DHOLERASP2 220.00] CKT 2	316	488	500	97.55	Sc-4
459.	354150 DHOLERASP 400.00 352327 DHOLERASP2 220.00 2	OPEN LINE FROM BUS 354150 [DHOLERASP 400.00] TO BUS 352327 [DHOLERASP2 220.00] CKT 1	316	488	500	97.55	Sc-4
460.	354150 DHOLERASP 400.00 352327 DHOLERASP2 220.00 3	OPEN LINE FROM BUS 354150 [DHOLERASP 400.00] TO BUS 352327 [DHOLERASP2 220.00] CKT 1	316	488	500	97.55	Sc-4

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
461.	374008 DHULE4 400.00 372086 DHULE220 220.00 2	OPEN LINE FROM BUS 374008 [DHULE4 400.00] TO BUS 372086 [DHULE220 220.00] CKT 3	217	306	315	97.01	Sc-4
462.	374008 DHULE4 400.00 372086 DHULE220 220.00 1	OPEN LINE FROM BUS 374008 [DHULE4 400.00] TO BUS 372086 [DHULE220 220.00] CKT 3	217	305	315	96.76	Sc-4
463.	544001 NYVL TS 2 400.00 542012 NLCTS22 230.00 1	OPEN LINE FROM BUS 544001 [NYVL TS 2 400.00] TO BUS 542012 [NLCTS22 230.00] CKT 2	205	242	250	96.63	Sc-4
464.	544001 NYVL TS 2 400.00 542012 NLCTS22 230.00 2	OPEN LINE FROM BUS 544001 [NYVL TS 2 400.00] TO BUS 542012 [NLCTS22 230.00] CKT 1	205	242	250	96.63	Sc-4
465.	164505 BIKANER-3 400.00 162505 BIKANER-3 220.00 1	OPEN LINE FROM BUS 164505 [BIKANER-3 400.00] TO BUS 162505 [BIKANER-3 220.00] CKT 2	385	482	500	96.31	Sc-4
466.	164505 BIKANER-3 400.00 162505 BIKANER-3 220.00 2	OPEN LINE FROM BUS 164505 [BIKANER-3 400.00] TO BUS 162505 [BIKANER-3 220.00] CKT 1	385	482	500	96.31	Sc-4
467.	164505 BIKANER-3 400.00 162505 BIKANER-3 220.00 3	OPEN LINE FROM BUS 164505 [BIKANER-3 400.00] TO BUS 162505 [BIKANER-3 220.00] CKT 1	385	482	500	96.31	Sc-4
468.	164505 BIKANER-3 400.00 162505 BIKANER-3 220.00 4	OPEN LINE FROM BUS 164505 [BIKANER-3 400.00] TO BUS 162505 [BIKANER-3 220.00] CKT 1	385	482	500	96.31	Sc-4
469.	164505 BIKANER-3 400.00 162505 BIKANER-3 220.00 5	OPEN LINE FROM BUS 164505 [BIKANER-3 400.00] TO BUS 162505 [BIKANER-3 220.00] CKT 1	385	482	500	96.31	Sc-4
470.	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	257	301	315	95.49	Sc-4
471.	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	257	301	315	95.49	Sc-4
472.	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	257	301	315	95.49	Sc-4
473.	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	257	301	315	95.49	Sc-4
474.	154497 DWARKA 400.00 152287 DWARKA-II 220.00 3	OPEN LINE FROM BUS 154497 [DWARKA 400.00] TO BUS 152287 [DWARKA-II 220.00] CKT 4	349	475	500	95.09	Sc-4
475.	154497 DWARKA 400.00 152287 DWARKA-II 220.00 4	OPEN LINE FROM BUS 154497 [DWARKA 400.00] TO BUS 152287 [DWARKA-II 220.00] CKT 3	349	475	500	95.09	Sc-4
476.	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	191	299	315	95.01	Sc-4
477.	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	191	299	315	95.01	Sc-4
478.	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	210	299	315	94.77	Sc-4
479.	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	210	299	315	94.77	Sc-4
480.	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	316	473	500	94.58	Sc-4
481.	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	316	473	500	94.58	Sc-4
482.	354140 CHARANKA 400.00 352141 CHARANKA 220.00 1	OPEN LINE FROM BUS 354140 [CHARANKA 400.00] TO BUS 352141 [CHARANKA 220.00] CKT 2	189	298	315	94.55	Sc-4

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
483.	354140 CHARANKA 400.00 352141 CHARANKA 220.00 3	OPEN LINE FROM BUS 354140 [CHARANKA 400.00] TO BUS 352141 [CHARANKA 220.00] CKT 2	189	298	315	94.55	Sc-4
484.	374043 AURANG-CHTPM400.00 372340 PG-AURANGABD220.00 1	OPEN LINE FROM BUS 374043 [AURANG-CHTPM400.00] TO BUS 372340 [PG-AURANGABD220.00] CKT 2	214	297	315	94.44	Sc-4
485.	374043 AURANG-CHTPM400.00 372340 PG-AURANGABD220.00 2	OPEN LINE FROM BUS 374043 [AURANG-CHTPM400.00] TO BUS 372340 [PG-AURANGABD220.00] CKT 1	214	297	315	94.44	Sc-4
486.	194426 RISHIKE4_PT 400.00 192225 RISHIKE2 220.00 2	OPEN LINE FROM BUS 194426 [RISHIKE4_PT 400.00] TO BUS 192225 [RISHIKE2 220.00] CKT 1	154	226	240	94.21	Sc-4
487.	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	228	295	315	93.61	Sc-4
488.	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	228	295	315	93.61	Sc-4
489.	164415 DEEDWANA 400.00 162093 DEEDWANA-42 220.00 1	OPEN LINE FROM BUS 164415 [DEEDWANA 400.00] TO BUS 162093 [DEEDWANA-42 220.00] CKT 2	196	294	315	93.47	Sc-4
490.	164415 DEEDWANA 400.00 162093 DEEDWANA-42 220.00 2	OPEN LINE FROM BUS 164415 [DEEDWANA 400.00] TO BUS 162093 [DEEDWANA-42 220.00] CKT 1	196	294	315	93.47	Sc-4
491.	374002 KHARGAR 400.00 372125 KHARGR22 220.00 1	OPEN LINE FROM BUS 374002 [KHARGAR 400.00] TO BUS 372125 [KHARGR22 220.00] CKT 3	249	293	315	92.96	Sc-4
492.	374002 KHARGAR 400.00 372125 KHARGR22 220.00 2	OPEN LINE FROM BUS 374002 [KHARGAR 400.00] TO BUS 372125 [KHARGR22 220.00] CKT 3	249	293	315	92.96	Sc-4
493.	354021 KASOR4 400.00 352021 KASOR2 220.00 1	OPEN LINE FROM BUS 354002 [GANCS4 400.00] TO BUS 354009 [GPEC4 400.00] CKT 1	229	290	315	91.92	Sc-4
494.	354021 KASOR4 400.00 352021 KASOR2 220.00 2	OPEN LINE FROM BUS 354002 [GANCS4 400.00] TO BUS 354009 [GPEC4 400.00] CKT 1	229	290	315	91.92	Sc-4
495.	354021 KASOR4 400.00 352021 KASOR2 220.00 3	OPEN LINE FROM BUS 354002 [GANCS4 400.00] TO BUS 354009 [GPEC4 400.00] CKT 1	229	290	315	91.92	Sc-4
496.	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	331	458	500	91.67	Sc-4
497.	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	331	458	500	91.67	Sc-4
498.	194426 RISHIKE4_PT 400.00 192225 RISHIKE2 220.00 1	OPEN LINE FROM BUS 194425 [ROORKEE 400.00] TO BUS 194426 [RISHIKE4_PT 400.00] CKT 1	202	288	315	91.42	Sc-4
499.	374002 KHARGAR 400.00 372125 KHARGR22 220.00 3	OPEN LINE FROM BUS 374001 [KALWA4 400.00] TO BUS 374002 [KHARGAR 400.00] CKT 1	398	453	500	90.54	Sc-4
500.	134438 MOGA SPLT4 400.00 132912 MOGA42 220.00 1	OPEN LINE FROM BUS 134438 [MOGA SPLT4 400.00] TO BUS 132912 [MOGA42 220.00] CKT 3	229	285	315	90.44	Sc-4
501.	134438 MOGA SPLT4 400.00 132912 MOGA42 220.00 2	OPEN LINE FROM BUS 134438 [MOGA SPLT4 400.00] TO BUS 132912 [MOGA42 220.00] CKT 3	182	226	250	90.25	Sc-4
502.	134438 MOGA SPLT4 400.00 132912 MOGA42 220.00 3	OPEN LINE FROM BUS 134438 [MOGA SPLT4 400.00] TO BUS 132912 [MOGA42 220.00] CKT 4	363	451	500	90.25	Sc-4
503.	134438 MOGA SPLT4 400.00 132912 MOGA42 220.00 4	OPEN LINE FROM BUS 134438 [MOGA SPLT4 400.00] TO BUS 132912 [MOGA42 220.00] CKT 3	363	451	500	90.25	Sc-4
504.	134925 MALERKOTLA4 400.00 132911 MALERKOTLA42220.00 1	OPEN LINE FROM BUS 134925 [MALERKOTLA4 400.00] TO BUS 132911 [MALERKOTLA42220.00] CKT 3	215	284	315	90.11	Sc-4

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
505.	134925 MALERKOTLA4 400.00 132911 MALERKOTLA42220.00 2	OPEN LINE FROM BUS 134925 [MALERKOTLA4 400.00] TO BUS 132911 [MALERKOTLA42220.00] CKT 3	215	284	315	90.11	Sc-4
506.	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	222	447	240	186.4	Sc-5
507.	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	222	447	240	186.4	Sc-5
508.	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	389	486	315	154.22	Sc-5
509.	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	389	486	315	154.22	Sc-5
510.	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	389	486	315	154.22	Sc-5
511.	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	226	465	315	147.55	Sc-5
512.	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	226	465	315	147.55	Sc-5
513.	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	336	412	315	130.82	Sc-5
514.	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	336	412	315	130.82	Sc-5
515.	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	336	412	315	130.82	Sc-5
516.	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	266	402	315	127.55	Sc-5
517.	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	266	402	315	127.55	Sc-5
518.	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	306	612	500	122.35	Sc-5
519.	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	306	612	500	122.35	Sc-5
520.	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	258	383	315	121.45	Sc-5
521.	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	258	383	315	121.45	Sc-5
522.	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	274	377	315	119.55	Sc-5
523.	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	274	377	315	119.55	Sc-5
524.	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	274	377	315	119.55	Sc-5
525.	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	288	377	315	119.53	Sc-5
526.	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	288	377	315	119.53	Sc-5

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
527.	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	335	376	315	119.5	Sc-5
528.	544001 NYVL TS 2 400.00 542012 NLCTS22 230.00 1	OPEN LINE FROM BUS 544001 [NYVL TS 2 400.00] TO BUS 542012 [NLCTS22 230.00] CKT 2	252	297	250	118.84	Sc-5
529.	544001 NYVL TS 2 400.00 542012 NLCTS22 230.00 2	OPEN LINE FROM BUS 544001 [NYVL TS 2 400.00] TO BUS 542012 [NLCTS22 230.00] CKT 1	252	297	250	118.84	Sc-5
530.	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	253	363	315	115.14	Sc-5
531.	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	253	363	315	115.14	Sc-5
532.	534952 EDAMAN4 400.00 532003 EDAMON2 220.00 2	OPEN LINE FROM BUS 534952 [EDAMAN4 400.00] TO BUS 532003 [EDAMON2 220.00] CKT 1	266	361	315	114.7	Sc-5
533.	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	301	353	315	112.16	Sc-5
534.	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	301	353	315	112.16	Sc-5
535.	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	301	353	315	112.16	Sc-5
536.	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	301	353	315	112.16	Sc-5
537.	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	283	341	315	108.19	Sc-5
538.	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	283	341	315	108.19	Sc-5
539.	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	283	341	315	108.19	Sc-5
540.	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	244	340	315	108.02	Sc-5
541.	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	244	340	315	108.02	Sc-5
542.	174467 SHAHJ-PG 400.00 172107 SHAHJAHAN4 220.00 1	OPEN LINE FROM BUS 174467 [SHAHJ-PG 400.00] TO BUS 172107 [SHAHJAHAN4 220.00] CKT 2	228	337	315	106.91	Sc-5
543.	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	331	532	500	106.46	Sc-5
544.	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	331	532	500	106.46	Sc-5
545.	194467 KASHIPU4 400.00 192221 KASHIPU2 220.00 1	OPEN LINE FROM BUS 194467 [KASHIPU4 400.00] TO BUS 192221 [KASHIPU2 220.00] CKT 2	244	333	315	105.87	Sc-5
546.	194467 KASHIPU4 400.00 192221 KASHIPU2 220.00 2	OPEN LINE FROM BUS 194467 [KASHIPU4 400.00] TO BUS 192221 [KASHIPU2 220.00] CKT 1	244	333	315	105.87	Sc-5
547.	194467 KASHIPU4 400.00 192221 KASHIPU2 220.00 3	OPEN LINE FROM BUS 194467 [KASHIPU4 400.00] TO BUS 192221 [KASHIPU2 220.00] CKT 1	244	333	315	105.87	Sc-5
548.	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	374	528	500	105.67	Sc-5

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
549.	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	374	528	500	105.67	Sc-5
550.	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	256	332	315	105.48	Sc-5
551.	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	241	332	315	105.39	Sc-5
552.	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	241	332	315	105.39	Sc-5
553.	374072 KALLAM 400.00 372498 KALLAM 220.00 1	OPEN LINE FROM BUS 374072 [KALLAM 400.00] TO BUS 372498 [KALLAM 220.00] CKT 2	394	526	500	105.18	Sc-5
554.	374072 KALLAM 400.00 372498 KALLAM 220.00 2	OPEN LINE FROM BUS 374072 [KALLAM 400.00] TO BUS 372498 [KALLAM 220.00] CKT 1	394	526	500	105.18	Sc-5
555.	374072 KALLAM 400.00 372498 KALLAM 220.00 3	OPEN LINE FROM BUS 374072 [KALLAM 400.00] TO BUS 372498 [KALLAM 220.00] CKT 1	394	526	500	105.18	Sc-5
556.	374072 KALLAM 400.00 372498 KALLAM 220.00 4	OPEN LINE FROM BUS 374072 [KALLAM 400.00] TO BUS 372498 [KALLAM 220.00] CKT 1	394	526	500	105.18	Sc-5
557.	374012 PADGH4 400.00 372163 PADGHE22 220.00 6	OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 372163 [PADGHE22 220.00] CKT 1	261	330	315	104.72	Sc-5
558.	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	414	524	500	104.71	Sc-5
559.	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	168	251	240	104.57	Sc-5
560.	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	260	328	315	104.27	Sc-5
561.	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	260	328	315	104.27	Sc-5
562.	374041 PARLI-PG 400.00 372241 PARLIPG2 220.00 1	OPEN LINE FROM BUS 374041 [PARLI-PG 400.00] TO BUS 372241 [PARLIPG2 220.00] CKT 2	362	521	500	104.17	Sc-5
563.	374041 PARLI-PG 400.00 372241 PARLIPG2 220.00 2	OPEN LINE FROM BUS 374041 [PARLI-PG 400.00] TO BUS 372241 [PARLIPG2 220.00] CKT 1	362	521	500	104.17	Sc-5
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 2	505	610	600	101.71	Sc-5
565.	164921 BHIWADI 400.00 162330 BHIWADI 220.00 1	OPEN LINE FROM BUS 164921 [BHIWADI 400.00] TO BUS 162330 [BHIWADI 220.00] CKT 2	276	320	315	101.7	Sc-5
566.	164921 BHIWADI 400.00 162330 BHIWADI 220.00 2	OPEN LINE FROM BUS 164921 [BHIWADI 400.00] TO BUS 162330 [BHIWADI 220.00] CKT 3	276	320	315	101.7	Sc-5
567.	164921 BHIWADI 400.00 162330 BHIWADI 220.00 3	OPEN LINE FROM BUS 164921 [BHIWADI 400.00] TO BUS 162330 [BHIWADI 220.00] CKT 2	276	320	315	101.7	Sc-5
568.	544004 TRICHY 400.00 542048 ALUNDR42 230.00 1	OPEN LINE FROM BUS 544004 [TRICHY 400.00] TO BUS 542048 [ALUNDR42 230.00] CKT 3	226	320	315	101.5	Sc-5
569.	544004 TRICHY 400.00 542048 ALUNDR42 230.00 2	OPEN LINE FROM BUS 544004 [TRICHY 400.00] TO BUS 542048 [ALUNDR42 230.00] CKT 3	226	320	315	101.5	Sc-5
570.	144460 PANCHKULA-PG400.00 142285 NAGGAL 220.00 3	OPEN LINE FROM BUS 144460 [PANCHKULA-PG400.00] TO BUS 142285 [NAGGAL 220.00] CKT 1	401	496	500	99.16	Sc-5

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
571.	174438 LUCK4-PG 400.00 172098 LUCKNOW 220.00 1	OPEN LINE FROM BUS 174438 [LUCK4-PG 400.00] TO BUS 172098 [LUCKNOW 220.00] CKT 2	349	491	500	98.16	Sc-5
572.	174438 LUCK4-PG 400.00 172098 LUCKNOW 220.00 2	OPEN LINE FROM BUS 174438 [LUCK4-PG 400.00] TO BUS 172098 [LUCKNOW 220.00] CKT 1	349	491	500	98.16	Sc-5
573.	134405 NAKODAR4 400.00 132214 NAKODAR42 220.00 1	OPEN LINE FROM BUS 134405 [NAKODAR4 400.00] TO BUS 132214 [NAKODAR42 220.00] CKT 3	346	490	500	98.06	Sc-5
574.	134405 NAKODAR4 400.00 132214 NAKODAR42 220.00 3	OPEN LINE FROM BUS 134405 [NAKODAR4 400.00] TO BUS 132214 [NAKODAR42 220.00] CKT 1	346	490	500	98.06	Sc-5
575.	144410 NUHIYANWALI 400.00 142263 NUHIYANWALI 220.00 1	OPEN LINE FROM BUS 144410 [NUHIYANWALI 400.00] TO BUS 142263 [NUHIYANWALI 220.00] CKT 2	206	309	315	98.05	Sc-5
576.	144410 NUHIYANWALI 400.00 142263 NUHIYANWALI 220.00 2	OPEN LINE FROM BUS 144410 [NUHIYANWALI 400.00] TO BUS 142263 [NUHIYANWALI 220.00] CKT 1	206	309	315	98.05	Sc-5
577.	174927 GORAKHPU 400.00 172101 GORAK-PG 220.00 1	OPEN LINE FROM BUS 174927 [GORAKHPU 400.00] TO BUS 172101 [GORAK-PG 220.00] CKT 2	250	308	315	97.87	Sc-5
578.	174927 GORAKHPU 400.00 172101 GORAK-PG 220.00 2	OPEN LINE FROM BUS 174927 [GORAKHPU 400.00] TO BUS 172101 [GORAK-PG 220.00] CKT 1	250	308	315	97.87	Sc-5
579.	174927 GORAKHPU 400.00 172101 GORAK-PG 220.00 3	OPEN LINE FROM BUS 174927 [GORAKHPU 400.00] TO BUS 172101 [GORAK-PG 220.00] CKT 1	250	308	315	97.87	Sc-5
580.	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	197	308	315	97.82	Sc-5
581.	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	197	308	315	97.82	Sc-5
582.	444024 GOKARNA 400.00 442566 GOKARNA 220.00 1	OPEN LINE FROM BUS 444024 [GOKARNA 400.00] TO BUS 442566 [GOKARNA 220.00] CKT 2	248	308	315	97.79	Sc-5
583.	444024 GOKARNA 400.00 442566 GOKARNA 220.00 2	OPEN LINE FROM BUS 444024 [GOKARNA 400.00] TO BUS 442566 [GOKARNA 220.00] CKT 1	248	308	315	97.79	Sc-5
584.	444024 GOKARNA 400.00 442566 GOKARNA 220.00 3	OPEN LINE FROM BUS 444024 [GOKARNA 400.00] TO BUS 442566 [GOKARNA 220.00] CKT 1	248	308	315	97.79	Sc-5
585.	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	251	308	315	97.68	Sc-5
586.	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	251	308	315	97.68	Sc-5
587.	424022 MENDHASAL 400.00 422586 MENDHASAL 220.00 3	OPEN LINE FROM BUS 424022 [MENDHASAL 400.00] TO BUS 422586 [MENDHASAL 220.00] CKT 1	251	308	315	97.68	Sc-5
588.	444007 RAJARHAT 400.00 442007 RAJARHAT 220.00 1	OPEN LINE FROM BUS 444007 [RAJARHAT 400.00] TO BUS 442007 [RAJARHAT 220.00] CKT 2	356	486	500	97.25	Sc-5
589.	444007 RAJARHAT 400.00 442007 RAJARHAT 220.00 2	OPEN LINE FROM BUS 444007 [RAJARHAT 400.00] TO BUS 442007 [RAJARHAT 220.00] CKT 1	356	486	500	97.25	Sc-5
590.	524022 KOPPAL 400.00 522370 KOPPAL 220.00 1	OPEN LINE FROM BUS 524022 [KOPPAL 400.00] TO BUS 522370 [KOPPAL 220.00] CKT 2	387	484	500	96.83	Sc-5
591.	524022 KOPPAL 400.00 522370 KOPPAL 220.00 2	OPEN LINE FROM BUS 524022 [KOPPAL 400.00] TO BUS 522370 [KOPPAL 220.00] CKT 1	387	484	500	96.83	Sc-5
592.	524022 KOPPAL 400.00 522370 KOPPAL 220.00 3	OPEN LINE FROM BUS 524022 [KOPPAL 400.00] TO BUS 522370 [KOPPAL 220.00] CKT 1	387	484	500	96.83	Sc-5

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
593.	524022 KOPPAL 400.00 522370 KOPPAL 220.00 4	OPEN LINE FROM BUS 524022 [KOPPAL 400.00] TO BUS 522370 [KOPPAL 220.00] CKT 1	387	484	500	96.83	Sc-5
594.	524022 KOPPAL 400.00 522370 KOPPAL 220.00 5	OPEN LINE FROM BUS 524022 [KOPPAL 400.00] TO BUS 522370 [KOPPAL 220.00] CKT 1	387	484	500	96.83	Sc-5
595.	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	181	232	240	96.74	Sc-5
596.	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	237	305	315	96.71	Sc-5
597.	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	237	305	315	96.71	Sc-5
598.	164407 ALWAR 400.00 162333 ALWAR-42 220.00 1	OPEN LINE FROM BUS 164407 [ALWAR 400.00] TO BUS 162333 [ALWAR-42 220.00] CKT 2	214	302	315	96.02	Sc-5
599.	164407 ALWAR 400.00 162333 ALWAR-42 220.00 2	OPEN LINE FROM BUS 164407 [ALWAR 400.00] TO BUS 162333 [ALWAR-42 220.00] CKT 1	214	302	315	96.02	Sc-5
600.	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	243	301	315	95.58	Sc-5
601.	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	243	301	315	95.58	Sc-5
602.	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	243	301	315	95.58	Sc-5
603.	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	215	299	315	95.03	Sc-5
604.	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	215	299	315	95.03	Sc-5
605.	134917 LUDHIANA4 400.00 132913 LUDHIANA42 220.00 1	OPEN LINE FROM BUS 134917 [LUDHIANA4 400.00] TO BUS 132913 [LUDHIANA42 220.00] CKT 3	245	297	315	94.42	Sc-5
606.	134917 LUDHIANA4 400.00 132913 LUDHIANA42 220.00 2	OPEN LINE FROM BUS 134917 [LUDHIANA4 400.00] TO BUS 132913 [LUDHIANA42 220.00] CKT 3	245	297	315	94.42	Sc-5
607.	134917 LUDHIANA4 400.00 132913 LUDHIANA42 220.00 3	OPEN LINE FROM BUS 134917 [LUDHIANA4 400.00] TO BUS 132913 [LUDHIANA42 220.00] CKT 4	387	471	500	94.23	Sc-5
608.	134917 LUDHIANA4 400.00 132913 LUDHIANA42 220.00 4	OPEN LINE FROM BUS 134917 [LUDHIANA4 400.00] TO BUS 132913 [LUDHIANA42 220.00] CKT 3	387	471	500	94.23	Sc-5
609.	154497 DWARKA 400.00 152287 DWARKA-II 220.00 3	OPEN LINE FROM BUS 154497 [DWARKA 400.00] TO BUS 152287 [DWARKA-II 220.00] CKT 4	341	470	500	93.91	Sc-5
610.	154497 DWARKA 400.00 152287 DWARKA-II 220.00 4	OPEN LINE FROM BUS 154497 [DWARKA 400.00] TO BUS 152287 [DWARKA-II 220.00] CKT 3	341	470	500	93.91	Sc-5
611.	374043 AURANG-CHTPM400.00 372340 PG-AURANGABD220.00 1	OPEN LINE FROM BUS 374043 [AURANG-CHTPM400.00] TO BUS 372340 [PG-AURANGABD220.00] CKT 2	213	296	315	93.89	Sc-5
612.	374043 AURANG-CHTPM400.00 372340 PG-AURANGABD220.00 2	OPEN LINE FROM BUS 374043 [AURANG-CHTPM400.00] TO BUS 372340 [PG-AURANGABD220.00] CKT 1	213	296	315	93.89	Sc-5
613.	144480 JINDPG 400.00 142286 JINDPG 220.00 1	OPEN LINE FROM BUS 144480 [JINDPG 400.00] TO BUS 142286 [JINDPG 220.00] CKT 2	361	469	500	93.8	Sc-5
614.	144480 JINDPG 400.00 142286 JINDPG 220.00 2	OPEN LINE FROM BUS 144480 [JINDPG 400.00] TO BUS 142286 [JINDPG 220.00] CKT 1	361	469	500	93.8	Sc-5

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
615.	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	221	295	315	93.62	Sc-5
616.	174465 FATEH-PG 400.00 172097 FATEH-PG 220.00 3	OPEN LINE FROM BUS 174465 [FATEH-PG 400.00] TO BUS 172097 [FATEH-PG 220.00] CKT 1	247	295	315	93.58	Sc-5
617.	444009 SUBHASGRAM 400.00 442076 SUBHAS-PG 220.00 1	OPEN LINE FROM BUS 444009 [SUBHASGRAM 400.00] TO BUS 442076 [SUBHAS-PG 220.00] CKT 5	238	295	315	93.57	Sc-5
618.	444009 SUBHASGRAM 400.00 442076 SUBHAS-PG 220.00 2	OPEN LINE FROM BUS 444009 [SUBHASGRAM 400.00] TO BUS 442076 [SUBHAS-PG 220.00] CKT 5	238	295	315	93.57	Sc-5
619.	444009 SUBHASGRAM 400.00 442076 SUBHAS-PG 220.00 3	OPEN LINE FROM BUS 444009 [SUBHASGRAM 400.00] TO BUS 442076 [SUBHAS-PG 220.00] CKT 5	238	295	315	93.57	Sc-5
620.	444009 SUBHASGRAM 400.00 442076 SUBHAS-PG 220.00 4	OPEN LINE FROM BUS 444009 [SUBHASGRAM 400.00] TO BUS 442076 [SUBHAS-PG 220.00] CKT 5	238	295	315	93.57	Sc-5
621.	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	336	467	500	93.32	Sc-5
622.	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	336	467	500	93.32	Sc-5
623.	174490 BASTI 400.00 172490 BASTI 220.00 1	OPEN LINE FROM BUS 174490 [BASTI 400.00] TO BUS 172490 [BASTI 220.00] CKT 2	333	467	500	93.32	Sc-5
624.	174490 BASTI 400.00 172490 BASTI 220.00 2	OPEN LINE FROM BUS 174490 [BASTI 400.00] TO BUS 172490 [BASTI 220.00] CKT 1	333	467	500	93.32	Sc-5
625.	174471 ROSA-TP2 400.00 172022 ROSA-TP1 220.00 1	OPEN LINE FROM BUS 174467 [SHAHJ-PG 400.00] TO BUS 172107 [SHAHJAHAN4 220.00] CKT 2	154	186	200	92.98	Sc-5
626.	174471 ROSA-TP2 400.00 172022 ROSA-TP1 220.00 2	OPEN LINE FROM BUS 174467 [SHAHJ-PG 400.00] TO BUS 172107 [SHAHJAHAN4 220.00] CKT 2	154	186	200	92.98	Sc-5
627.	164406 HERAPU-4 400.00 162211 HIRAPURA 220.00 2	OPEN LINE FROM BUS 164406 [HERAPU-4 400.00] TO BUS 162211 [HIRAPURA 220.00] CKT 1	198	232	250	92.86	Sc-5
628.	164406 HERAPU-4 400.00 162211 HIRAPURA 220.00 3	OPEN LINE FROM BUS 164406 [HERAPU-4 400.00] TO BUS 162211 [HIRAPURA 220.00] CKT 1	198	232	250	92.86	Sc-5
629.	164406 HERAPU-4 400.00 162211 HIRAPURA 220.00 4	OPEN LINE FROM BUS 164406 [HERAPU-4 400.00] TO BUS 162211 [HIRAPURA 220.00] CKT 1	198	232	250	92.86	Sc-5
630.	414094 BUXAR 400.00 412094 BUXAR 220.00 1	OPEN LINE FROM BUS 414094 [BUXAR 400.00] TO BUS 412094 [BUXAR 220.00] CKT 2	288	464	500	92.83	Sc-5
631.	414094 BUXAR 400.00 412094 BUXAR 220.00 2	OPEN LINE FROM BUS 414094 [BUXAR 400.00] TO BUS 412094 [BUXAR 220.00] CKT 1	288	464	500	92.83	Sc-5
632.	144483 KURUKSHETR 400.00 142287 KURUKSHETRA 220.00 1	OPEN LINE FROM BUS 144483 [KURUKSHETR 400.00] TO BUS 142287 [KURUKSHETRA 220.00] CKT 2	372	462	500	92.37	Sc-5
633.	144483 KURUKSHETR 400.00 142287 KURUKSHETRA 220.00 2	OPEN LINE FROM BUS 144483 [KURUKSHETR 400.00] TO BUS 142287 [KURUKSHETRA 220.00] CKT 1	372	462	500	92.37	Sc-5
634.	144483 KURUKSHETR 400.00 142287 KURUKSHETRA 220.00 3	OPEN LINE FROM BUS 144483 [KURUKSHETR 400.00] TO BUS 142287 [KURUKSHETRA 220.00] CKT 1	372	462	500	92.37	Sc-5
635.	174993 JEHTA_HARDOI400.00 172987 JEHTA_HARDOI220.00 1	OPEN LINE FROM BUS 174993 [JEHTA_HARDOI400.00] TO BUS 172987 [JEHTA_HARDOI220.00] CKT 2	318	460	500	92.02	Sc-5
636.	174993 JEHTA_HARDOI400.00 172987 JEHTA_HARDOI220.00 2	OPEN LINE FROM BUS 174993 [JEHTA_HARDOI400.00] TO BUS 172987 [JEHTA_HARDOI220.00] CKT 1	318	460	500	92.02	Sc-5

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
637.	174445 MUZAFRN4 400.00 172036 MUZAFN2 220.00 4	OPEN LINE FROM BUS 174445 [MUZAFRN4 400.00] TO BUS 172036 [MUZAFN2 220.00] CKT 1	254	290	315	91.94	Sc-5
638.	124404 NALLAGAR 400.00 122904 NALLAGAR 220.00 1	OPEN LINE FROM BUS 124404 [NALLAGAR 400.00] TO BUS 122904 [NALLAGAR 220.00] CKT 2	232	290	315	91.93	Sc-5
639.	124404 NALLAGAR 400.00 122904 NALLAGAR 220.00 2	OPEN LINE FROM BUS 124404 [NALLAGAR 400.00] TO BUS 122904 [NALLAGAR 220.00] CKT 1	232	290	315	91.93	Sc-5
640.	124404 NALLAGAR 400.00 122904 NALLAGAR 220.00 3	OPEN LINE FROM BUS 124404 [NALLAGAR 400.00] TO BUS 122904 [NALLAGAR 220.00] CKT 1	232	290	315	91.93	Sc-5
641.	174965 BADAUN 400.00 172997 BADAUN220 220.00 1	OPEN LINE FROM BUS 174965 [BADAUN 400.00] TO BUS 172997 [BADAUN220 220.00] CKT 2	222	289	315	91.77	Sc-5
642.	174965 BADAUN 400.00 172997 BADAUN220 220.00 2	OPEN LINE FROM BUS 174965 [BADAUN 400.00] TO BUS 172997 [BADAUN220 220.00] CKT 1	222	289	315	91.77	Sc-5
643.	174467 SHAHJ-PG 400.00 172107 SHAHJAHAN4 220.00 2	OPEN LINE FROM BUS 174467 [SHAHJ-PG 400.00] TO BUS 172107 [SHAHJAHAN4 220.00] CKT 1	356	449	491	91.38	Sc-5
644.	174466 PANKI4 400.00 172056 PANKI2 220.00 1	OPEN LINE FROM BUS 174466 [PANKI4 400.00] TO BUS 172056 [PANKI2 220.00] CKT 2	227	288	315	91.38	Sc-5
645.	174466 PANKI4 400.00 172056 PANKI2 220.00 2	OPEN LINE FROM BUS 174466 [PANKI4 400.00] TO BUS 172056 [PANKI2 220.00] CKT 1	227	288	315	91.38	Sc-5
646.	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	223	287	315	91.1	Sc-5
647.	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	223	287	315	91.1	Sc-5
648.	134403 MAKHU4 400.00 132284 MAKHU42 220.00 1	OPEN LINE FROM BUS 134403 [MAKHU4 400.00] TO BUS 132284 [MAKHU42 220.00] CKT 3	217	287	315	91.04	Sc-5
649.	134403 MAKHU4 400.00 132284 MAKHU42 220.00 2	OPEN LINE FROM BUS 134403 [MAKHU4 400.00] TO BUS 132284 [MAKHU42 220.00] CKT 3	217	287	315	91.04	Sc-5
650.	444112 KATWA-TPS 400.00 442111 NEW KATWA 220.00 1	OPEN LINE FROM BUS 444112 [KATWA-TPS 400.00] TO BUS 442111 [NEW KATWA 220.00] CKT 2	294	454	500	90.81	Sc-5
651.	444112 KATWA-TPS 400.00 442111 NEW KATWA 220.00 2	OPEN LINE FROM BUS 444112 [KATWA-TPS 400.00] TO BUS 442111 [NEW KATWA 220.00] CKT 1	294	454	500	90.81	Sc-5
652.	164412 KALISI-4 400.00 162300 KALISIND 220.00 2	OPEN LINE FROM BUS 164412 [KALISI-4 400.00] TO BUS 164463 [ANTA-4 400.00] CKT 1	365	452	500	90.46	Sc-5
653.	444010 SAGARDIGHI_4400.00 442010 SAGARDIGHI_2220.00 1	OPEN LINE FROM BUS 444024 [GOKARNA 400.00] TO BUS 442566 [GOKARNA 220.00] CKT 1	252	284	315	90.2	Sc-5
654.	134438 MOGA SPLT4 400.00 132912 MOGA42 220.00 1	OPEN LINE FROM BUS 134438 [MOGA SPLT4 400.00] TO BUS 132912 [MOGA42 220.00] CKT 3	228	284	315	90.19	Sc-5
655.	134438 MOGA SPLT4 400.00 132912 MOGA42 220.00 2	OPEN LINE FROM BUS 134438 [MOGA SPLT4 400.00] TO BUS 132912 [MOGA42 220.00] CKT 3	181	225	250	90.01	Sc-5
656.	134438 MOGA SPLT4 400.00 132912 MOGA42 220.00 3	OPEN LINE FROM BUS 134438 [MOGA SPLT4 400.00] TO BUS 132912 [MOGA42 220.00] CKT 4	362	450	500	90.01	Sc-5
657.	134438 MOGA SPLT4 400.00 132912 MOGA42 220.00 4	OPEN LINE FROM BUS 134438 [MOGA SPLT4 400.00] TO BUS 132912 [MOGA42 220.00] CKT 3	362	450	500	90.01	Sc-5
658.	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	163	327	240	136.13	Sc-6

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
659.	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	163	327	240	136.13	Sc-6
660.	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	339	419	315	133.02	Sc-6
661.	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	339	419	315	133.02	Sc-6
662.	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	339	419	315	133.02	Sc-6
663.	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	276	419	315	132.99	Sc-6
664.	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	276	419	315	132.99	Sc-6
665.	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	307	398	315	126.39	Sc-6
666.	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	260	388	315	123.14	Sc-6
667.	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	260	388	315	123.14	Sc-6
668.	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	277	387	315	122.79	Sc-6
669.	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	277	387	315	122.79	Sc-6
670.	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	275	381	315	120.87	Sc-6
671.	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	275	381	315	120.87	Sc-6
672.	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	275	381	315	120.87	Sc-6
673.	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	238	374	315	118.85	Sc-6
674.	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	238	374	315	118.85	Sc-6
675.	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	304	358	315	113.78	Sc-6
676.	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	304	358	315	113.78	Sc-6
677.	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	304	358	315	113.78	Sc-6
678.	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	304	358	315	113.78	Sc-6
679.	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	169	343	315	108.96	Sc-6
680.	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	169	343	315	108.96	Sc-6

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
681.	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	246	343	315	108.83	Sc-6
682.	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	246	343	315	108.83	Sc-6
683.	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	264	340	315	107.89	Sc-6
684.	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	264	340	315	107.89	Sc-6
685.	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	339	315	107.64	Sc-6
686.	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	339	315	107.64	Sc-6
687.	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	249	326	315	103.45	Sc-6
688.	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	249	326	315	103.45	Sc-6
689.	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	249	326	315	103.45	Sc-6
690.	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	290	326	315	103.35	Sc-6
691.	194467 KASHIPU4 400.00 192221 KASHIPU2 220.00 1	OPEN LINE FROM BUS 194467 [KASHIPU4 400.00] TO BUS 192221 [KASHIPU2 220.00] CKT 2	237	321	315	102.06	Sc-6
692.	194467 KASHIPU4 400.00 192221 KASHIPU2 220.00 2	OPEN LINE FROM BUS 194467 [KASHIPU4 400.00] TO BUS 192221 [KASHIPU2 220.00] CKT 1	237	321	315	102.06	Sc-6
693.	194467 KASHIPU4 400.00 192221 KASHIPU2 220.00 3	OPEN LINE FROM BUS 194467 [KASHIPU4 400.00] TO BUS 192221 [KASHIPU2 220.00] CKT 1	237	321	315	102.06	Sc-6
694.	534952 EDAMAN4 400.00 532003 EDAMON2 220.00 2	OPEN LINE FROM BUS 534952 [EDAMAN4 400.00] TO BUS 532003 [EDAMON2 220.00] CKT 1	235	318	315	101.09	Sc-6
695.	444024 GOKARNA 400.00 442566 GOKARNA 220.00 1	OPEN LINE FROM BUS 444024 [GOKARNA 400.00] TO BUS 442566 [GOKARNA 220.00] CKT 2	253	316	315	100.42	Sc-6
696.	444024 GOKARNA 400.00 442566 GOKARNA 220.00 2	OPEN LINE FROM BUS 444024 [GOKARNA 400.00] TO BUS 442566 [GOKARNA 220.00] CKT 1	253	316	315	100.42	Sc-6
697.	444024 GOKARNA 400.00 442566 GOKARNA 220.00 3	OPEN LINE FROM BUS 444024 [GOKARNA 400.00] TO BUS 442566 [GOKARNA 220.00] CKT 1	253	316	315	100.42	Sc-6
698.	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	424	501	500	100.28	Sc-6
699.	444007 RAJARHAT 400.00 442007 RAJARHAT 220.00 1	OPEN LINE FROM BUS 444007 [RAJARHAT 400.00] TO BUS 442007 [RAJARHAT 220.00] CKT 2	358	495	500	98.95	Sc-6
700.	444007 RAJARHAT 400.00 442007 RAJARHAT 220.00 2	OPEN LINE FROM BUS 444007 [RAJARHAT 400.00] TO BUS 442007 [RAJARHAT 220.00] CKT 1	358	495	500	98.95	Sc-6
701.	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	226	310	315	98.56	Sc-6
702.	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	226	310	315	98.56	Sc-6

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
703.	454003 RAGHUNATHTPS400.00 452003 RAGHUNATHTPS220.00 1	OPEN LINE FROM BUS 454003 [RAGHUNATHTPS400.00] TO BUS 452003 [RAGHUNATHTPS220.00] CKT 2	218	308	315	97.88	Sc-6
704.	454003 RAGHUNATHTPS400.00 452003 RAGHUNATHTPS220.00 2	OPEN LINE FROM BUS 454003 [RAGHUNATHTPS400.00] TO BUS 452003 [RAGHUNATHTPS220.00] CKT 1	218	308	315	97.88	Sc-6
705.	374041 PARLI-PG 400.00 372241 PARLIPG2 220.00 1	OPEN LINE FROM BUS 374041 [PARLI-PG 400.00] TO BUS 372241 [PARLIPG2 220.00] CKT 2	338	486	500	97.19	Sc-6
706.	374041 PARLI-PG 400.00 372241 PARLIPG2 220.00 2	OPEN LINE FROM BUS 374041 [PARLI-PG 400.00] TO BUS 372241 [PARLIPG2 220.00] CKT 1	338	486	500	97.19	Sc-6
707.	444009 SUBHASGRAM 400.00 442076 SUBHAS-PG 220.00 1	OPEN LINE FROM BUS 444009 [SUBHASGRAM 400.00] TO BUS 442076 [SUBHAS-PG 220.00] CKT 5	243	303	315	96.17	Sc-6
708.	444009 SUBHASGRAM 400.00 442076 SUBHAS-PG 220.00 2	OPEN LINE FROM BUS 444009 [SUBHASGRAM 400.00] TO BUS 442076 [SUBHAS-PG 220.00] CKT 5	243	303	315	96.17	Sc-6
709.	444009 SUBHASGRAM 400.00 442076 SUBHAS-PG 220.00 3	OPEN LINE FROM BUS 444009 [SUBHASGRAM 400.00] TO BUS 442076 [SUBHAS-PG 220.00] CKT 5	243	303	315	96.17	Sc-6
710.	444009 SUBHASGRAM 400.00 442076 SUBHAS-PG 220.00 4	OPEN LINE FROM BUS 444009 [SUBHASGRAM 400.00] TO BUS 442076 [SUBHAS-PG 220.00] CKT 5	243	303	315	96.17	Sc-6
711.	164406 HERAPU-4 400.00 162211 HIRAPURA 220.00 2	OPEN LINE FROM BUS 164406 [HERAPU-4 400.00] TO BUS 162211 [HIRAPURA 220.00] CKT 1	204	239	250	95.72	Sc-6
712.	164406 HERAPU-4 400.00 162211 HIRAPURA 220.00 3	OPEN LINE FROM BUS 164406 [HERAPU-4 400.00] TO BUS 162211 [HIRAPURA 220.00] CKT 1	204	239	250	95.72	Sc-6
713.	164406 HERAPU-4 400.00 162211 HIRAPURA 220.00 4	OPEN LINE FROM BUS 164406 [HERAPU-4 400.00] TO BUS 162211 [HIRAPURA 220.00] CKT 1	204	239	250	95.72	Sc-6
714.	544001 NYVL TS 2 400.00 542012 NLCTS22 230.00 1	OPEN LINE FROM BUS 544001 [NYVL TS 2 400.00] TO BUS 542012 [NLCTS22 230.00] CKT 2	204	239	250	95.56	Sc-6
715.	544001 NYVL TS 2 400.00 542012 NLCTS22 230.00 2	OPEN LINE FROM BUS 544001 [NYVL TS 2 400.00] TO BUS 542012 [NLCTS22 230.00] CKT 1	204	239	250	95.56	Sc-6
716.	374012 PADGH4 400.00 372163 PADGHE22 220.00 6	OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 372163 [PADGHE22 220.00] CKT 1	235	297	315	94.24	Sc-6
717.	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	372	471	500	94.24	Sc-6
718.	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	234	296	315	93.84	Sc-6
719.	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	234	296	315	93.84	Sc-6
720.	444010 SAGARDIGHI_4400.00 442010 SAGARDIGHI_2220.00 1	OPEN LINE FROM BUS 444024 [GOKARNA 400.00] TO BUS 442566 [GOKARNA 220.00] CKT 1	258	294	315	93.24	Sc-6
721.	444112 KATWA-TPS 400.00 442111 NEW KATWA 220.00 1	OPEN LINE FROM BUS 444112 [KATWA-TPS 400.00] TO BUS 442111 [NEW KATWA 220.00] CKT 2	300	466	500	93.19	Sc-6
722.	444112 KATWA-TPS 400.00 442111 NEW KATWA 220.00 2	OPEN LINE FROM BUS 444112 [KATWA-TPS 400.00] TO BUS 442111 [NEW KATWA 220.00] CKT 1	300	466	500	93.19	Sc-6
723.	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	244	293	315	93.01	Sc-6
724.	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	244	293	315	93.01	Sc-6

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
725.	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	244	293	315	93.01	Sc-6
726.	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	303	464	500	92.79	Sc-6
727.	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	303	464	500	92.79	Sc-6
728.	164410 BHILWA-4 400.00 162288 BHILWA-4 220.00 1	OPEN LINE FROM BUS 164410 [BHILWA-4 400.00] TO BUS 162288 [BHILWA-4 220.00] CKT 2	220	292	315	92.62	Sc-6
729.	164410 BHILWA-4 400.00 162288 BHILWA-4 220.00 2	OPEN LINE FROM BUS 164410 [BHILWA-4 400.00] TO BUS 162288 [BHILWA-4 220.00] CKT 1	220	292	315	92.62	Sc-6
730.	164406 HERAPU-4 400.00 162211 HIRAPURA 220.00 1	OPEN LINE FROM BUS 164406 [HERAPU-4 400.00] TO BUS 162211 [HIRAPURA 220.00] CKT 2	257	291	315	92.45	Sc-6
731.	374072 KALLAM 400.00 372498 KALLAM 220.00 1	OPEN LINE FROM BUS 374072 [KALLAM 400.00] TO BUS 372498 [KALLAM 220.00] CKT 2	345	459	500	91.83	Sc-6
732.	374072 KALLAM 400.00 372498 KALLAM 220.00 2	OPEN LINE FROM BUS 374072 [KALLAM 400.00] TO BUS 372498 [KALLAM 220.00] CKT 1	345	459	500	91.83	Sc-6
733.	374072 KALLAM 400.00 372498 KALLAM 220.00 3	OPEN LINE FROM BUS 374072 [KALLAM 400.00] TO BUS 372498 [KALLAM 220.00] CKT 1	345	459	500	91.83	Sc-6
734.	374072 KALLAM 400.00 372498 KALLAM 220.00 4	OPEN LINE FROM BUS 374072 [KALLAM 400.00] TO BUS 372498 [KALLAM 220.00] CKT 1	345	459	500	91.83	Sc-6
735.	374012 PADGH4 400.00 372163 PADGHE22 220.00 1	OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 372163 [PADGHE22 220.00] CKT 2	455	549	600	91.52	Sc-6
736.	164431 BASSI 400.00 162283 BASSI 220.00 1	OPEN LINE FROM BUS 164431 [BASSI 400.00] TO BUS 162283 [BASSI 220.00] CKT 3	214	288	315	91.45	Sc-6
737.	164431 BASSI 400.00 162283 BASSI 220.00 2	OPEN LINE FROM BUS 164431 [BASSI 400.00] TO BUS 162283 [BASSI 220.00] CKT 3	214	288	315	91.45	Sc-6
738.	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	225	286	315	90.85	Sc-6
739.	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 2	225	286	315	90.85	Sc-6
740.	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 1	225	286	315	90.85	Sc-6
741.	374043 AURANG-CHTPM400.00 372340 PG-AURANGABD220.00 1	OPEN LINE FROM BUS 374043 [AURANG-CHTPM400.00] TO BUS 372340 [PG-AURANGABD220.00] CKT 2	205	286	315	90.68	Sc-6
742.	374043 AURANG-CHTPM400.00 372340 PG-AURANGABD220.00 2	OPEN LINE FROM BUS 374043 [AURANG-CHTPM400.00] TO BUS 372340 [PG-AURANGABD220.00] CKT 1	205	286	315	90.68	Sc-6
743.	544004 TRICHY 400.00 542048 ALUNDR42 230.00 1	OPEN LINE FROM BUS 544004 [TRICHY 400.00] TO BUS 542048 [ALUNDR42 230.00] CKT 3	202	285	315	90.62	Sc-6
744.	544004 TRICHY 400.00 542048 ALUNDR42 230.00 2	OPEN LINE FROM BUS 544004 [TRICHY 400.00] TO BUS 542048 [ALUNDR42 230.00] CKT 3	202	285	315	90.62	Sc-6
745.	164407 ALWAR 400.00 162333 ALWAR-42 220.00 1	OPEN LINE FROM BUS 164407 [ALWAR 400.00] TO BUS 162333 [ALWAR-42 220.00] CKT 2	201	284	315	90.3	Sc-6
746.	164407 ALWAR 400.00 162333 ALWAR-42 220.00 2	OPEN LINE FROM BUS 164407 [ALWAR 400.00] TO BUS 162333 [ALWAR-42 220.00] CKT 1	201	284	315	90.3	Sc-6

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
747.	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 5	1074	1969	500	393.73	Sc-7
748.	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 4	1074	1969	500	393.73	Sc-7
749.	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	440	884	500	176.78	Sc-7
750.	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	440	884	500	176.78	Sc-7
751.	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	396	494	315	156.84	Sc-7
752.	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	396	494	315	156.84	Sc-7
753.	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	396	494	315	156.84	Sc-7
754.	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	727	500	145.42	Sc-7
755.	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	727	500	145.42	Sc-7
756.	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	462	709	500	141.89	Sc-7
757.	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	462	709	500	141.89	Sc-7
758.	164498 BHADLA-2 400.00 162499 BHAD-2 SPLT 220.00 1	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162499 [BHAD-2 SPLT 220.00] CKT 2	463	696	500	139.14	Sc-7
759.	164498 BHADLA-2 400.00 162499 BHAD-2 SPLT 220.00 2	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162499 [BHAD-2 SPLT 220.00] CKT 1	463	696	500	139.14	Sc-7
760.	164498 BHADLA-2 400.00 162499 BHAD-2 SPLT 220.00 3	OPEN LINE FROM BUS 164498 [BHADLA-2 400.00] TO BUS 162499 [BHAD-2 SPLT 220.00] CKT 1	463	696	500	139.14	Sc-7
761.	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	213	437	315	138.73	Sc-7
762.	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	213	437	315	138.73	Sc-7
763.	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	463	692	500	138.34	Sc-7
764.	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	463	692	500	138.34	Sc-7
765.	544132 KAMUTHI4 400.00 542130 KAMUDHI42 230.00 1	OPEN LINE FROM BUS 544132 [KAMUTHI4 400.00] TO BUS 542130 [KAMUDHI42 230.00] CKT 2	208	415	315	131.87	Sc-7
766.	544132 KAMUTHI4 400.00 542130 KAMUDHI42 230.00 2	OPEN LINE FROM BUS 544132 [KAMUTHI4 400.00] TO BUS 542130 [KAMUDHI42 230.00] CKT 1	208	415	315	131.87	Sc-7
767.	534952 EDAMAN4 400.00 532003 EDAMON2 220.00 2	OPEN LINE FROM BUS 534952 [EDAMAN4 400.00] TO BUS 532003 [EDAMON2 220.00] CKT 1	292	397	315	126.18	Sc-7
768.	374008 DHULE4 400.00 372086 DHULE220 220.00 2	OPEN LINE FROM BUS 374008 [DHULE4 400.00] TO BUS 372086 [DHULE220 220.00] CKT 3	278	390	315	123.92	Sc-7

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
769.	374008 DHULE4 400.00 372086 DHULE220 220.00 1	OPEN LINE FROM BUS 374008 [DHULE4 400.00] TO BUS 372086 [DHULE220 220.00] CKT 3	277	389	315	123.61	Sc-7
770.	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	451	616	500	123.21	Sc-7
771.	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	451	616	500	123.21	Sc-7
772.	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	487	609	500	121.88	Sc-7
773.	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	487	609	500	121.88	Sc-7
774.	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	487	609	500	121.88	Sc-7
775.	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	487	609	500	121.88	Sc-7
776.	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	487	609	500	121.88	Sc-7
777.	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	483	604	500	120.9	Sc-7
778.	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	483	604	500	120.9	Sc-7
779.	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	483	604	500	120.9	Sc-7
780.	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	483	604	500	120.9	Sc-7
781.	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	483	604	500	120.9	Sc-7
782.	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	475	595	500	118.93	Sc-7
783.	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	475	595	500	118.93	Sc-7
784.	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	475	595	500	118.93	Sc-7
785.	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	475	595	500	118.93	Sc-7
786.	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	475	595	500	118.93	Sc-7
787.	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	260	559	500	111.8	Sc-7
788.	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	260	559	500	111.8	Sc-7
789.	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	233	349	315	110.76	Sc-7
790.	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	233	349	315	110.76	Sc-7

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
791.	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	460	553	500	110.52	Sc-7
792.	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	460	553	500	110.52	Sc-7
793.	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	460	553	500	110.52	Sc-7
794.	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	460	553	500	110.52	Sc-7
795.	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	460	553	500	110.52	Sc-7
796.	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	460	553	500	110.52	Sc-7
797.	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	440	550	500	110.07	Sc-7
798.	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	440	550	500	110.07	Sc-7
799.	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	440	550	500	110.07	Sc-7
800.	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	440	550	500	110.07	Sc-7
801.	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	440	550	500	110.07	Sc-7
802.	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	440	550	500	110.07	Sc-7
803.	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	440	550	500	110.07	Sc-7
804.	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	440	550	500	110.07	Sc-7
805.	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	440	550	500	110.07	Sc-7
806.	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	440	550	500	110.07	Sc-7
807.	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	419	529	500	105.77	Sc-7
808.	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	419	529	500	105.77	Sc-7
809.	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	419	529	500	105.77	Sc-7
810.	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	419	529	500	105.77	Sc-7
811.	354150 DHOLERASP 400.00 352327 DHOLERASP2 220.00 1	OPEN LINE FROM BUS 354150 [DHOLERASP 400.00] TO BUS 352327 [DHOLERASP2 220.00] CKT 2	334	528	500	105.69	Sc-7
812.	354150 DHOLERASP 400.00 352327 DHOLERASP2 220.00 2	OPEN LINE FROM BUS 354150 [DHOLERASP 400.00] TO BUS 352327 [DHOLERASP2 220.00] CKT 1	334	528	500	105.69	Sc-7

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
813.	354150 DHOLERASP 400.00 352327 DHOLERASP2 220.00 3	OPEN LINE FROM BUS 354150 [DHOLERASP 400.00] TO BUS 352327 [DHOLERASP2 220.00] CKT 1	334	528	500	105.69	Sc-7
814.	374043 AURANG-CHTPM400.00 372340 PG-AURANGABD220.00 1	OPEN LINE FROM BUS 374043 [AURANG-CHTPM400.00] TO BUS 372340 [PG-AURANGABD220.00] CKT 2	239	332	315	105.38	Sc-7
815.	374043 AURANG-CHTPM400.00 372340 PG-AURANGABD220.00 2	OPEN LINE FROM BUS 374043 [AURANG-CHTPM400.00] TO BUS 372340 [PG-AURANGABD220.00] CKT 1	239	332	315	105.38	Sc-7
816.	194426 RISHIKE4_PT 400.00 192225 RISHIKE2 220.00 2	OPEN LINE FROM BUS 194426 [RISHIKE4_PT 400.00] TO BUS 192225 [RISHIKE2 220.00] CKT 1	170	250	240	104.28	Sc-7
817.	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	328	315	104.21	Sc-7
818.	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	328	315	104.21	Sc-7
819.	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	328	315	104.21	Sc-7
820.	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	328	315	104.21	Sc-7
821.	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	328	315	104.21	Sc-7
822.	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	328	315	104.21	Sc-7
823.	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	328	315	104.2	Sc-7
824.	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	328	315	104.2	Sc-7
825.	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	328	315	104.2	Sc-7
826.	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	328	315	104.2	Sc-7
827.	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	328	315	104.2	Sc-7
828.	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	328	315	104.2	Sc-7
829.	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	328	315	104.19	Sc-7
830.	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	328	315	104.19	Sc-7
831.	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	328	315	104.19	Sc-7
832.	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	328	315	104.19	Sc-7
833.	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	328	315	104.19	Sc-7
834.	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	328	315	104.19	Sc-7

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
835.	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	278	327	315	103.82	Sc-7
836.	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	278	327	315	103.82	Sc-7
837.	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	440	518	500	103.58	Sc-7
838.	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	440	518	500	103.58	Sc-7
839.	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	263	325	315	103.26	Sc-7
840.	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	263	325	315	103.26	Sc-7
841.	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	263	325	315	103.26	Sc-7
842.	374217 NAVI-MUM 400.00 372365 NAVI-MUM220 220.00 1	OPEN LINE FROM BUS 374217 [NAVI-MUM 400.00] TO BUS 372365 [NAVI-MUM220 220.00] CKT 2	274	325	315	103.22	Sc-7
843.	374217 NAVI-MUM 400.00 372365 NAVI-MUM220 220.00 2	OPEN LINE FROM BUS 374217 [NAVI-MUM 400.00] TO BUS 372365 [NAVI-MUM220 220.00] CKT 1	274	325	315	103.22	Sc-7
844.	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	411	514	500	102.75	Sc-7
845.	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	411	514	500	102.75	Sc-7
846.	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	411	514	500	102.75	Sc-7
847.	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	411	514	500	102.75	Sc-7
848.	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	411	514	500	102.75	Sc-7
849.	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	251	323	315	102.57	Sc-7
850.	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	251	323	315	102.57	Sc-7
851.	354024 BACHAU 400.00 352024 BHIMASAR 220.00 1	OPEN LINE FROM BUS 354024 [BACHAU 400.00] TO BUS 352024 [BHIMASAR 220.00] CKT 2	222	318	315	100.92	Sc-7
852.	354024 BACHAU 400.00 352024 BHIMASAR 220.00 2	OPEN LINE FROM BUS 354024 [BACHAU 400.00] TO BUS 352024 [BHIMASAR 220.00] CKT 1	222	318	315	100.92	Sc-7
853.	374015 JEJ4 400.00 372104 JEJURI2 220.00 1	OPEN LINE FROM BUS 374015 [JEJ4 400.00] TO BUS 372104 [JEJURI2 220.00] CKT 2	399	504	500	100.74	Sc-7
854.	374015 JEJ4 400.00 372104 JEJURI2 220.00 2	OPEN LINE FROM BUS 374015 [JEJ4 400.00] TO BUS 372104 [JEJURI2 220.00] CKT 1	399	504	500	100.74	Sc-7
855.	374015 JEJ4 400.00 372104 JEJURI2 220.00 3	OPEN LINE FROM BUS 374015 [JEJ4 400.00] TO BUS 372104 [JEJURI2 220.00] CKT 1	399	504	500	100.73	Sc-7
856.	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	230	313	315	99.4	Sc-7

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
857.	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	230	313	315	99.4	Sc-7
858.	374008 DHULE4 400.00 372086 DHULE220 220.00 3	OPEN LINE FROM BUS 374008 [DHULE4 400.00] TO BUS 372086 [DHULE220 220.00] CKT 2	397	497	500	99.4	Sc-7
859.	364002 BHOPAL-4 400.00 362006 BHOPAL-42 220.00 1	OPEN LINE FROM BUS 364002 [BHOPAL-4 400.00] TO BUS 362006 [BHOPAL-42 220.00] CKT 4	248	309	315	98.22	Sc-7
860.	364002 BHOPAL-4 400.00 362006 BHOPAL-42 220.00 2	OPEN LINE FROM BUS 364002 [BHOPAL-4 400.00] TO BUS 362006 [BHOPAL-42 220.00] CKT 4	248	309	315	98.22	Sc-7
861.	364002 BHOPAL-4 400.00 362006 BHOPAL-42 220.00 3	OPEN LINE FROM BUS 364002 [BHOPAL-4 400.00] TO BUS 362006 [BHOPAL-42 220.00] CKT 4	248	309	315	98.22	Sc-7
862.	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	208	308	315	97.82	Sc-7
863.	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	208	308	315	97.82	Sc-7
864.	504007 CUDP 400.00 502216 CHINAKAMPALL220.00 1	OPEN LINE FROM BUS 504007 [CUDP 400.00] TO BUS 502216 [CHINAKAMPALL220.00] CKT 3	224	308	315	97.8	Sc-7
865.	504007 CUDP 400.00 502216 CHINAKAMPALL220.00 2	OPEN LINE FROM BUS 504007 [CUDP 400.00] TO BUS 502216 [CHINAKAMPALL220.00] CKT 3	224	308	315	97.8	Sc-7
866.	374002 KHARGAR 400.00 372125 KHARGR22 220.00 1	OPEN LINE FROM BUS 374002 [KHARGAR 400.00] TO BUS 372125 [KHARGR22 220.00] CKT 3	262	308	315	97.78	Sc-7
867.	374002 KHARGAR 400.00 372125 KHARGR22 220.00 2	OPEN LINE FROM BUS 374002 [KHARGAR 400.00] TO BUS 372125 [KHARGR22 220.00] CKT 3	262	308	315	97.78	Sc-7
868.	474028 DALTONGANJ 400.00 472228 DALTONGANJ_2220.00 1	OPEN LINE FROM BUS 474028 [DALTONGANJ 400.00] TO BUS 472228 [DALTONGANJ_2220.00] CKT 2	191	307	315	97.59	Sc-7
869.	474028 DALTONGANJ 400.00 472228 DALTONGANJ_2220.00 2	OPEN LINE FROM BUS 474028 [DALTONGANJ 400.00] TO BUS 472228 [DALTONGANJ_2220.00] CKT 1	191	307	315	97.59	Sc-7
870.	364001 INDORE-4 400.00 362003 INDORE-42 220.00 1	OPEN LINE FROM BUS 364023 [INDORE-74 400.00] TO BUS 368023 [INDORE-7 765.00] CKT 2	258	304	315	96.37	Sc-7
871.	364001 INDORE-4 400.00 362003 INDORE-42 220.00 2	OPEN LINE FROM BUS 364023 [INDORE-74 400.00] TO BUS 368023 [INDORE-7 765.00] CKT 2	258	304	315	96.37	Sc-7
872.	364001 INDORE-4 400.00 362003 INDORE-42 220.00 3	OPEN LINE FROM BUS 364023 [INDORE-74 400.00] TO BUS 368023 [INDORE-7 765.00] CKT 2	258	304	315	96.37	Sc-7
873.	364001 INDORE-4 400.00 362003 INDORE-42 220.00 4	OPEN LINE FROM BUS 364023 [INDORE-74 400.00] TO BUS 368023 [INDORE-7 765.00] CKT 2	258	304	315	96.37	Sc-7
874.	164505 BIKANER-3 400.00 162505 BIKANER-3 220.00 1	OPEN LINE FROM BUS 164505 [BIKANER-3 400.00] TO BUS 162505 [BIKANER-3 220.00] CKT 2	383	479	500	95.86	Sc-7
875.	164505 BIKANER-3 400.00 162505 BIKANER-3 220.00 2	OPEN LINE FROM BUS 164505 [BIKANER-3 400.00] TO BUS 162505 [BIKANER-3 220.00] CKT 1	383	479	500	95.86	Sc-7
876.	164505 BIKANER-3 400.00 162505 BIKANER-3 220.00 3	OPEN LINE FROM BUS 164505 [BIKANER-3 400.00] TO BUS 162505 [BIKANER-3 220.00] CKT 1	383	479	500	95.86	Sc-7
877.	164505 BIKANER-3 400.00 162505 BIKANER-3 220.00 4	OPEN LINE FROM BUS 164505 [BIKANER-3 400.00] TO BUS 162505 [BIKANER-3 220.00] CKT 1	383	479	500	95.86	Sc-7
878.	164505 BIKANER-3 400.00 162505 BIKANER-3 220.00 5	OPEN LINE FROM BUS 164505 [BIKANER-3 400.00] TO BUS 162505 [BIKANER-3 220.00] CKT 1	383	479	500	95.86	Sc-7

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
879.	354140 CHARANKA 400.00 352141 CHARANKA 220.00 1	OPEN LINE FROM BUS 354140 [CHARANKA 400.00] TO BUS 352141 [CHARANKA 220.00] CKT 2	188	301	315	95.6	Sc-7
880.	354140 CHARANKA 400.00 352141 CHARANKA 220.00 3	OPEN LINE FROM BUS 354140 [CHARANKA 400.00] TO BUS 352141 [CHARANKA 220.00] CKT 2	188	301	315	95.6	Sc-7
881.	364189 DATIYA NEW4 400.00 362189 DATIYA NEW2 220.00 1	OPEN LINE FROM BUS 364189 [DATIYA NEW4 400.00] TO BUS 362189 [DATIYA NEW2 220.00] CKT 2	309	476	500	95.17	Sc-7
882.	364189 DATIYA NEW4 400.00 362189 DATIYA NEW2 220.00 2	OPEN LINE FROM BUS 364189 [DATIYA NEW4 400.00] TO BUS 362189 [DATIYA NEW2 220.00] CKT 1	309	476	500	95.17	Sc-7
883.	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	395	470	500	94.06	Sc-7
884.	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	395	470	500	94.06	Sc-7
885.	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	395	470	500	94.05	Sc-7
886.	114476 NEWWANPO 400.00 112276 NEWWANPO 220.00 1	OPEN LINE FROM BUS 114476 [NEWWANPO 400.00] TO BUS 112276 [NEWWANPO 220.00] CKT 2	224	296	315	93.89	Sc-7
887.	114476 NEWWANPO 400.00 112276 NEWWANPO 220.00 2	OPEN LINE FROM BUS 114476 [NEWWANPO 400.00] TO BUS 112276 [NEWWANPO 220.00] CKT 1	224	296	315	93.89	Sc-7
888.	194426 RISHIKE4_PT 400.00 192225 RISHIKE2 220.00 1	OPEN LINE FROM BUS 194426 [RISHIKE4_PT 400.00] TO BUS 192225 [RISHIKE2 220.00] CKT 2	224	295	315	93.78	Sc-7
889.	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	383	469	500	93.73	Sc-7
890.	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	383	469	500	93.73	Sc-7
891.	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	383	469	500	93.73	Sc-7
892.	374002 KHARGAR 400.00 372125 KHARGR22 220.00 3	OPEN LINE FROM BUS 374001 [KALWA4 400.00] TO BUS 374002 [KHARGAR 400.00] CKT 1	418	468	500	93.51	Sc-7
893.	374996 KALWA-SPLT 400.00 372996 KALWA-SPLT 220.00 1	OPEN LINE FROM BUS 374996 [KALWA-SPLT 400.00] TO BUS 372996 [KALWA-SPLT 220.00] CKT 2	369	467	500	93.37	Sc-7
894.	374996 KALWA-SPLT 400.00 372996 KALWA-SPLT 220.00 2	OPEN LINE FROM BUS 374996 [KALWA-SPLT 400.00] TO BUS 372996 [KALWA-SPLT 220.00] CKT 1	369	467	500	93.37	Sc-7
895.	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	195	292	315	92.57	Sc-7
896.	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	195	292	315	92.57	Sc-7
897.	364015 RAJGARH-4 400.00 362035 RAJGARH-PG42220.00 1	OPEN LINE FROM BUS 364015 [RAJGARH-4 400.00] TO BUS 362035 [RAJGARH-PG42220.00] CKT 2	201	291	315	92.48	Sc-7
898.	364015 RAJGARH-4 400.00 362035 RAJGARH-PG42220.00 2	OPEN LINE FROM BUS 364015 [RAJGARH-4 400.00] TO BUS 362035 [RAJGARH-PG42220.00] CKT 1	201	291	315	92.48	Sc-7
899.	374042 PUNE-PG-AIS 400.00 372275 PUNEPG22 220.00 1	OPEN LINE FROM BUS 374029 [CHAKAN 400.00] TO BUS 374042 [PUNE-PG-AIS 400.00] CKT 1	246	290	315	91.94	Sc-7
900.	374042 PUNE-PG-AIS 400.00 372275 PUNEPG22 220.00 2	OPEN LINE FROM BUS 374029 [CHAKAN 400.00] TO BUS 374042 [PUNE-PG-AIS 400.00] CKT 1	246	290	315	91.94	Sc-7

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
901.	374042 PUNE-PG-AIS 400.00 372275 PUNEPG22 220.00 3	OPEN LINE FROM BUS 374029 [CHAKAN 400.00] TO BUS 374042 [PUNE-PG-AIS 400.00] CKT 1	246	290	315	91.94	Sc-7
902.	174426 AURYA4 400.00 172176 AURYA2 220.00 1	OPEN LINE FROM BUS 174426 [AURYA4 400.00] TO BUS 172176 [AURYA2 220.00] CKT 2	189	289	315	91.76	Sc-7
903.	174426 AURYA4 400.00 172176 AURYA2 220.00 2	OPEN LINE FROM BUS 174426 [AURYA4 400.00] TO BUS 172176 [AURYA2 220.00] CKT 1	189	289	315	91.76	Sc-7
904.	544001 NYVL TS 2 400.00 542012 NLCTS22 230.00 1	OPEN LINE FROM BUS 544001 [NYVL TS 2 400.00] TO BUS 542012 [NLCTS22 230.00] CKT 2	194	228	250	91.39	Sc-7
905.	544001 NYVL TS 2 400.00 542012 NLCTS22 230.00 2	OPEN LINE FROM BUS 544001 [NYVL TS 2 400.00] TO BUS 542012 [NLCTS22 230.00] CKT 1	194	228	250	91.39	Sc-7
906.	524169 PEENYA4 400.00 522363 PENYA22 220.00 1	OPEN LINE FROM BUS 524169 [PEENYA4 400.00] TO BUS 522363 [PENYA22 220.00] CKT 2	315	456	500	91.14	Sc-7
907.	524169 PEENYA4 400.00 522363 PENYA22 220.00 2	OPEN LINE FROM BUS 524169 [PEENYA4 400.00] TO BUS 522363 [PENYA22 220.00] CKT 1	315	456	500	91.14	Sc-7
908.	194467 KASHIPU4 400.00 192221 KASHIPU2 220.00 1	OPEN LINE FROM BUS 194467 [KASHIPU4 400.00] TO BUS 192221 [KASHIPU2 220.00] CKT 2	213	286	315	90.83	Sc-7
909.	194467 KASHIPU4 400.00 192221 KASHIPU2 220.00 2	OPEN LINE FROM BUS 194467 [KASHIPU4 400.00] TO BUS 192221 [KASHIPU2 220.00] CKT 1	213	286	315	90.83	Sc-7
910.	194467 KASHIPU4 400.00 192221 KASHIPU2 220.00 3	OPEN LINE FROM BUS 194467 [KASHIPU4 400.00] TO BUS 192221 [KASHIPU2 220.00] CKT 1	213	286	315	90.83	Sc-7
911.	524171 DOMSANDRA 400.00 523040 DOMSNDRA22 220.00 1	OPEN LINE FROM BUS 524171 [DOMSANDRA 400.00] TO BUS 523040 [DOMSNDRA22 220.00] CKT 2	313	454	500	90.74	Sc-7
912.	524171 DOMSANDRA 400.00 523040 DOMSNDRA22 220.00 2	OPEN LINE FROM BUS 524171 [DOMSANDRA 400.00] TO BUS 523040 [DOMSNDRA22 220.00] CKT 1	313	454	500	90.74	Sc-7
913.	474452 MAITHON-B 400.00 472634 MAITHON-PG 220.00 1	OPEN LINE FROM BUS 474452 [MAITHON-B 400.00] TO BUS 472634 [MAITHON-PG 220.00] CKT 2	233	285	315	90.6	Sc-7
914.	474452 MAITHON-B 400.00 472634 MAITHON-PG 220.00 2	OPEN LINE FROM BUS 474452 [MAITHON-B 400.00] TO BUS 472634 [MAITHON-PG 220.00] CKT 1	233	285	315	90.6	Sc-7
915.	474452 MAITHON-B 400.00 472634 MAITHON-PG 220.00 3	OPEN LINE FROM BUS 474452 [MAITHON-B 400.00] TO BUS 472634 [MAITHON-PG 220.00] CKT 1	233	285	315	90.6	Sc-7
916.	374067 KARJAT 400.00 372418 KARJAT 220.00 1	OPEN LINE FROM BUS 374067 [KARJAT 400.00] TO BUS 372418 [KARJAT 220.00] CKT 2	300	453	500	90.53	Sc-7
917.	374067 KARJAT 400.00 372418 KARJAT 220.00 2	OPEN LINE FROM BUS 374067 [KARJAT 400.00] TO BUS 372418 [KARJAT 220.00] CKT 1	300	453	500	90.53	Sc-7
918.	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	302	452	500	90.38	Sc-7
919.	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	302	452	500	90.38	Sc-7
920.	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	337	673	500	134.68	Sc-8
921.	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	337	673	500	134.68	Sc-8
922.	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	155	310	240	129.27	Sc-8

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
923.	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	155	310	240	129.27	Sc-8
924.	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	538	618	500	123.62	Sc-8
925.	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	190	388	315	123.11	Sc-8
926.	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	190	388	315	123.11	Sc-8
927.	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	290	375	315	119.03	Sc-8
928.	534952 EDAMAN4 400.00 532003 EDAMON2 220.00 2	OPEN LINE FROM BUS 534952 [EDAMAN4 400.00] TO BUS 532003 [EDAMON2 220.00] CKT 1	254	344	315	109.3	Sc-8
929.	174265 REWA 400.00 172112 REWAROAD 220.00 1	OPEN LINE FROM BUS 177262 [MAINPURIUP 765.00] TO BUS 177263 [BARA 765.00] CKT 1	269	319	315	101.37	Sc-8
930.	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	185	238	240	99.29	Sc-8
931.	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	243	313	315	99.26	Sc-8
932.	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	243	313	315	99.26	Sc-8
933.	544001 NYVL TS 2 400.00 542012 NLCTS22 230.00 1	OPEN LINE FROM BUS 544001 [NYVL TS 2 400.00] TO BUS 542012 [NLCTS22 230.00] CKT 2	211	248	250	99.14	Sc-8
934.	544001 NYVL TS 2 400.00 542012 NLCTS22 230.00 2	OPEN LINE FROM BUS 544001 [NYVL TS 2 400.00] TO BUS 542012 [NLCTS22 230.00] CKT 1	211	248	250	99.14	Sc-8
935.	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	198	311	315	98.58	Sc-8
936.	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	198	311	315	98.58	Sc-8
937.	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	299	484	500	96.89	Sc-8
938.	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	299	484	500	96.89	Sc-8
939.	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	217	301	315	95.65	Sc-8
940.	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	217	301	315	95.65	Sc-8
941.	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	310	477	500	95.48	Sc-8
942.	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	310	477	500	95.48	Sc-8
943.	414094 BUXAR 400.00 412094 BUXAR 220.00 1	OPEN LINE FROM BUS 414094 [BUXAR 400.00] TO BUS 412094 [BUXAR 220.00] CKT 2	296	477	500	95.38	Sc-8
944.	414094 BUXAR 400.00 412094 BUXAR 220.00 2	OPEN LINE FROM BUS 414094 [BUXAR 400.00] TO BUS 412094 [BUXAR 220.00] CKT 1	296	477	500	95.38	Sc-8

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
945.	524888 KOPPAL PS-II400.00 522888 KOPPAL PS-II220.00 1	OPEN LINE FROM BUS 524888 [KOPPAL PS-II400.00] TO BUS 522888 [KOPPAL PS-II220.00] CKT 2	357	476	500	95.14	Sc-8
946.	524888 KOPPAL PS-II400.00 522888 KOPPAL PS-II220.00 2	OPEN LINE FROM BUS 524888 [KOPPAL PS-II400.00] TO BUS 522888 [KOPPAL PS-II220.00] CKT 1	357	476	500	95.14	Sc-8
947.	524888 KOPPAL PS-II400.00 522888 KOPPAL PS-II220.00 3	OPEN LINE FROM BUS 524888 [KOPPAL PS-II400.00] TO BUS 522888 [KOPPAL PS-II220.00] CKT 1	357	476	500	95.14	Sc-8
948.	524888 KOPPAL PS-II400.00 522888 KOPPAL PS-II220.00 4	OPEN LINE FROM BUS 524888 [KOPPAL PS-II400.00] TO BUS 522888 [KOPPAL PS-II220.00] CKT 1	357	476	500	95.14	Sc-8
949.	524887 GADAG PS-II 400.00 522887 GADAG PS-II 220.00 1	OPEN LINE FROM BUS 524887 [GADAG PS-II 400.00] TO BUS 522887 [GADAG PS-II 220.00] CKT 2	356	474	500	94.8	Sc-8
950.	524887 GADAG PS-II 400.00 522887 GADAG PS-II 220.00 2	OPEN LINE FROM BUS 524887 [GADAG PS-II 400.00] TO BUS 522887 [GADAG PS-II 220.00] CKT 1	356	474	500	94.8	Sc-8
951.	524887 GADAG PS-II 400.00 522887 GADAG PS-II 220.00 3	OPEN LINE FROM BUS 524887 [GADAG PS-II 400.00] TO BUS 522887 [GADAG PS-II 220.00] CKT 1	356	474	500	94.8	Sc-8
952.	524887 GADAG PS-II 400.00 522887 GADAG PS-II 220.00 4	OPEN LINE FROM BUS 524887 [GADAG PS-II 400.00] TO BUS 522887 [GADAG PS-II 220.00] CKT 1	356	474	500	94.8	Sc-8
953.	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	316	472	500	94.42	Sc-8
954.	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	316	472	500	94.42	Sc-8
955.	374043 AURANG-CHTPM400.00 372340 PG-AURANGABD220.00 1	OPEN LINE FROM BUS 374043 [AURANG-CHTPM400.00] TO BUS 372340 [PG-AURANGABD220.00] CKT 2	212	295	315	93.54	Sc-8
956.	374043 AURANG-CHTPM400.00 372340 PG-AURANGABD220.00 2	OPEN LINE FROM BUS 374043 [AURANG-CHTPM400.00] TO BUS 372340 [PG-AURANGABD220.00] CKT 1	212	295	315	93.54	Sc-8
957.	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	235	293	315	93.16	Sc-8
958.	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	235	293	315	93.16	Sc-8
959.	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	235	293	315	93.16	Sc-8
960.	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	211	292	315	92.65	Sc-8
961.	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	211	292	315	92.65	Sc-8
962.	374041 PARLI-PG 400.00 372241 PARLIPG2 220.00 1	OPEN LINE FROM BUS 374041 [PARLI-PG 400.00] TO BUS 372241 [PARLIPG2 220.00] CKT 2	321	462	500	92.33	Sc-8
963.	374041 PARLI-PG 400.00 372241 PARLIPG2 220.00 2	OPEN LINE FROM BUS 374041 [PARLI-PG 400.00] TO BUS 372241 [PARLIPG2 220.00] CKT 1	321	462	500	92.33	Sc-8
964.	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	193	290	315	92.13	Sc-8
965.	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	193	290	315	92.13	Sc-8
966.	374012 PADGH4 400.00 372163 PADGHE22 220.00 6	OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 372163 [PADGHE22 220.00] CKT 1	229	290	315	91.93	Sc-8

S. No.	Monitored Element	Contingency	Base Flow	Maximum Flow	Rate	% loading	Scenario
967.	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	363	460	500	91.92	Sc-8
968.	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	228	288	315	91.54	Sc-8
969.	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	228	288	315	91.54	Sc-8
970.	544004 TRICHY 400.00 542048 ALUNDR42 230.00 1	OPEN LINE FROM BUS 544004 [TRICHY 400.00] TO BUS 542048 [ALUNDR42 230.00] CKT 3	204	288	315	91.4	Sc-8
971.	544004 TRICHY 400.00 542048 ALUNDR42 230.00 2	OPEN LINE FROM BUS 544004 [TRICHY 400.00] TO BUS 542048 [ALUNDR42 230.00] CKT 3	204	288	315	91.4	Sc-8
972.	524888 KOPPAL PS-II400.00 522888 KOPPAL PS-II220.00 1	OPEN LINE FROM BUS 524888 [KOPPAL PS-II400.00] TO BUS 522888 [KOPPAL PS-II220.00] CKT 2	433	580	500	116.01	Sc-9
973.	524888 KOPPAL PS-II400.00 522888 KOPPAL PS-II220.00 2	OPEN LINE FROM BUS 524888 [KOPPAL PS-II400.00] TO BUS 522888 [KOPPAL PS-II220.00] CKT 1	433	580	500	116.01	Sc-9
974.	524888 KOPPAL PS-II400.00 522888 KOPPAL PS-II220.00 3	OPEN LINE FROM BUS 524888 [KOPPAL PS-II400.00] TO BUS 522888 [KOPPAL PS-II220.00] CKT 1	433	580	500	116.01	Sc-9
975.	524888 KOPPAL PS-II400.00 522888 KOPPAL PS-II220.00 4	OPEN LINE FROM BUS 524888 [KOPPAL PS-II400.00] TO BUS 522888 [KOPPAL PS-II220.00] CKT 1	433	580	500	116.01	Sc-9
976.	524887 GADAG PS-II 400.00 522887 GADAG PS-II 220.00 1	OPEN LINE FROM BUS 524887 [GADAG PS-II 400.00] TO BUS 522887 [GADAG PS-II 220.00] CKT 2	408	547	500	109.3	Sc-9
977.	524887 GADAG PS-II 400.00 522887 GADAG PS-II 220.00 2	OPEN LINE FROM BUS 524887 [GADAG PS-II 400.00] TO BUS 522887 [GADAG PS-II 220.00] CKT 1	408	547	500	109.3	Sc-9
978.	524887 GADAG PS-II 400.00 522887 GADAG PS-II 220.00 3	OPEN LINE FROM BUS 524887 [GADAG PS-II 400.00] TO BUS 522887 [GADAG PS-II 220.00] CKT 1	408	547	500	109.3	Sc-9
979.	524887 GADAG PS-II 400.00 522887 GADAG PS-II 220.00 4	OPEN LINE FROM BUS 524887 [GADAG PS-II 400.00] TO BUS 522887 [GADAG PS-II 220.00] CKT 1	408	547	500	109.3	Sc-9
980.	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	255	331	315	105.17	Sc-9
981.	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	434	496	500	99.24	Sc-9
982.	534952 EDAMAN4 400.00 532003 EDAMON2 220.00 2	OPEN LINE FROM BUS 534952 [EDAMAN4 400.00] TO BUS 532003 [EDAMON2 220.00] CKT 1	226	307	315	97.44	Sc-9
983.	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	274	467	500	93.5	Sc-9
984.	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	274	467	500	93.5	Sc-9
985.	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	301	450	500	90.02	Sc-9
986.	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	301	450	500	90.02	Sc-9

Annex-11.9

765kV Buses Exceeding Design Fault Current

Area	Bus Name	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	42	32	32	41	33	32	42	32	32	42	40	ISTS
NORTH	JAIPUR	39	40	39	39	41	41	42	40	40	42	40	STU
NORTH	GNOIDAUP	37	41	41	38	43	43	41	42	42	43	40	STU
NORTH	ALIGARH	40	43	43	41	45	45	44	44	44	45	40	ISTS
WEST	BLPSR WR	38	43	43	40	44	44	44	44	44	44	40	ISTS
WEST	JABALPR-POOL	45	51	51	46	52	52	53	52	52	53	50	ISTS
WEST	BINA-PG-7	39	41	41	40	42	42	42	42	42	42	40	ISTS
WEST	WARDHA	38	40	40	39	41	41	41	42	42	42	40	ISTS
SOUTH	KURL800	43	44	44	44	45	45	45	46	44	46	40	ISTS
SOUTH	MAHESHWARAM	39	40	40	40	40	40	41	41	40	41	40	ISTS

- **Highlighted cell indicates 765 kV Bus Fault Current > Design level**

400kV Buses Exceeding Design Fault Current

Area	Bus Name	Sc-1	Sc-2	Sc-3	Sc-4	Sc-5	Sc-6	Sc-7	Sc-8	Sc-9	Max	Design Level	Remark
WEST	CHANDRAPUR I400.00	23	45	45	24	45	45	45	45	45	45	40	GEN
NORTH	NAKODAR4 400.00	36	43	43	36	43	43	41	43	43	43	40	STU
NORTH	PATIALA4 400.00	43	46	47	43	47	47	46	47	47	47	40	ISTS
NORTH	JALANDHAR4 400.00	40	45	45	40	45	45	43	45	45	45	40	ISTS
NORTH	MALERKOTLA4 400.00	37	40	41	37	41	41	39	41	41	41	40	ISTS
NORTH	DAULATABAD4 400.00	43	48	48	43	49	49	44	49	49	49	40	STU
NORTH	JHAJAR_N 400.00	38	46	46	38	47	47	39	47	47	47	40	GEN
NORTH	KABULPUR 400.00	38	44	44	38	44	44	39	44	44	44	40	STU
NORTH	DHANONDA 400.00	48	55	56	48	56	56	50	56	56	56	40	STU
NORTH	PANCHKULA-PG400.00	44	46	47	44	47	47	45	47	47	47	40	ISTS
NORTH	BHIWANI-PG 400.00	49	52	52	49	53	52	51	52	52	53	50	ISTS
NORTH	ABDULLAP 400.00	46	51	51	46	51	51	48	51	51	51	40	ISTS
NORTH	KAITHAL 400.00	38	40	41	38	41	41	39	41	41	41	40	ISTS
NORTH	BALLABHG 400.00	44	47	47	44	48	47	45	47	47	48	40	ISTS
NORTH	BAWANA-G 400.00	42	52	52	42	52	52	43	52	52	52	40	STU
NORTH	BAWANA 400.00	42	52	52	42	52	52	43	52	52	52	40	STU
NORTH	MANDOLA 400.00	38	43	43	39	44	44	40	43	43	44	40	ISTS
NORTH	MUNDKA 400.00	35	40	40	35	40	40	36	40	40	40	40	STU
NORTH	MANDOLASP2 400.00	38	43	43	39	44	44	40	43	43	44	40	ISTS
NORTH	MANDOLASP3 400.00	38	43	43	39	44	44	40	43	43	44	40	ISTS
NORTH	GOPAL PUR 400.00	40	44	44	40	44	44	41	44	44	44	40	STU
NORTH	BHADLA 400.00	44	36	36	43	37	37	45	37	37	45	40	STU
NORTH	BASSI 400.00	48	48	48	48	49	49	50	49	49	50	40	ISTS
NORTH	NEEMR-PG 400.00	49	52	52	49	53	53	51	52	52	53	40	ISTS
NORTH	SIKAR 400.00	40	41	41	39	42	42	42	42	42	42	40	ISTS
NORTH	JAIPUR_RS 400.00	49	49	49	49	50	50	51	50	50	51	40	STU
NORTH	BIKANER-NW 400.00	59	40	40	53	40	40	54	40	40	59	40	#N/A
NORTH	BHADLA PG 400.00	52	41	40	52	41	41	53	41	41	53	50	ISTS
NORTH	ANTA-4 400.00	25	35	35	25	40	40	32	40	40	40	40	STU
NORTH	FATEHG-2 400.00	56	39	38	56	40	38	56	38	38	56	50	ISTS
NORTH	BIKANER-II 400.00	56	32	32	47	33	32	47	32	32	56	40	#N/A
NORTH	BHADLA-2 400.00	55	41	41	55	42	41	56	41	41	56	50	ISTS
NORTH	BHIWADI 400.00	46	48	48	46	48	48	48	48	48	48	40	ISTS
NORTH	DAUSA 400.00	42	34	34	42	35	35	44	35	35	44	40	ISTS
NORTH	MEJA 400.00	30	49	49	36	49	49	48	49	49	49	40	GEN
NORTH	MAINPURIUP 400.00	37	40	40	38	41	41	40	40	40	41	40	STU

Area	Bus Name	Sc-1	Sc-2	Sc-3	Sc-4	Sc-5	Sc-6	Sc-7	Sc-8	Sc-9	Max	Design Level	Remark
NORTH	BARA 400.00	26	45	45	32	45	45	45	45	45	45	40	STU
NORTH	REWA 400.00	27	40	40	33	40	40	40	40	40	40	40	STU
NORTH	GNOIDAUP 400.00	50	57	57	50	58	58	54	57	57	58	40	STU
NORTH	HAPUR 400.00	38	41	41	39	42	42	41	42	42	42	40	STU
NORTH	GAZIABAD 400.00	39	42	42	40	43	43	41	42	42	43	40	STU
NORTH	UNNAO4 400.00	36	42	42	39	42	42	42	42	42	42	40	STU
NORTH	SIKANDERABAD400.00	37	42	42	38	43	43	41	42	42	43	40	STU
NORTH	BAREL-PG 400.00	47	51	51	48	52	52	51	52	52	52	50	ISTS
NORTH	AGRANEW 400.00	39	42	42	39	43	43	41	42	42	43	40	STU
NORTH	DADR-NCR 400.00	45	57	57	46	58	58	48	57	57	58	40	GEN
NORTH	GNOIDA4 400.00	48	56	56	48	57	57	51	56	56	57	40	STU
NORTH	LUCK4-PG 400.00	45	53	53	48	54	54	53	53	53	54	40	ISTS
NORTH	LUCK74-P 400.00	44	51	51	47	51	51	51	51	51	51	40	ISTS
NORTH	DADR-HVD 400.00	45	56	56	45	57	57	47	56	56	57	40	GEN
NORTH	FATEH-PG 400.00	41	49	49	44	50	50	46	50	50	50	50	ISTS
NORTH	ANPARA4 400.00	32	54	54	50	54	54	54	54	54	54	40	GEN
NORTH	ANPARA-D 400.00	30	47	47	44	47	47	47	47	47	47	40	GEN
NORTH	ANPARAC 400.00	32	53	53	48	53	53	53	53	53	53	40	GEN
NORTH	ALLAHABA 400.00	37	51	51	43	51	51	50	51	51	51	40	ISTS
NORTH	BAL74-PG 400.00	39	45	45	43	47	47	47	48	48	48	40	ISTS
NORTH	SARNATH4 400.00	37	43	43	41	43	43	43	43	43	43	40	STU
NORTH	BAREILY 400.00	47	51	51	48	51	51	51	51	51	51	50	ISTS
NORTH	ALIGARH 400.00	36	41	41	37	42	42	40	41	41	42	40	ISTS
NORTH	MEERUT 400.00	58	64	64	59	65	65	61	64	64	65	40	ISTS
NORTH	AGRA 400.00	51	54	54	51	55	55	54	54	54	55	40	STU
NORTH	SINGRL4 400.00	28	44	44	43	44	44	44	44	44	44	40	GEN
NORTH	TIKRI KHURD 400.00	38	46	46	38	46	46	39	46	46	46	40	STU
WEST	JINDAL_EX 400.00	42	44	44	42	44	44	44	45	45	45	40	GEN
WEST	BIL-POOL 400.00	37	47	47	43	47	47	47	47	47	47	40	ISTS
WEST	CHORN4 400.00	39	43	43	39	44	44	42	44	44	44	40	STU
WEST	CGPL 400.00	44	44	44	44	44	44	45	44	44	45	40	GEN
WEST	MUNDRA-APL 400.00	20	39	39	20	40	40	40	40	40	40	40	GEN
WEST	RANCHODPURA 400.00	37	40	40	37	40	40	39	40	40	40	40	STU
WEST	SANKHARI 400.00	41	44	44	41	45	45	45	45	45	45	40	STU
WEST	BINA-4 400.00	39	41	41	39	41	41	42	41	41	42	40	STU
WEST	NAGDA-4 400.00	40	42	42	40	42	42	41	42	42	42	40	STU
WEST	JABALPUR-4 400.00	36	40	40	36	42	42	43	42	42	43	40	ISTS
WEST	BINA-PG-74 400.00	39	41	41	39	41	41	42	41	41	42	40	ISTS

Area	Bus Name	Sc-1	Sc-2	Sc-3	Sc-4	Sc-5	Sc-6	Sc-7	Sc-8	Sc-9	Max	Design Level	Remark
WEST	BHOPAL-4 400.00	39	38	38	39	39	39	40	39	39	40	40	STU
WEST	KHANDWA-4 400.00	37	40	40	37	40	40	38	41	41	41	40	ISTS
WEST	KHARGAR 400.00	38	40	40	38	41	41	39	41	41	41	40	STU
WEST	BHADR4 400.00	23	41	41	23	41	41	41	41	41	41	40	ISTS
WEST	BABLESWAR 400.00	38	40	40	38	41	41	39	41	41	41	40	STU
WEST	AURANGBD-I 400.00	40	43	43	41	45	45	43	46	46	46	40	STU
WEST	CHANDRPR-II 400.00	23	45	45	24	45	45	45	45	45	45	40	GEN
WEST	SOLAPUR-PG 400.00	40	36	36	40	36	36	41	42	42	42	40	ISTS
WEST	PUNE-PG-GIS 400.00	47	49	49	48	50	50	49	50	50	50	50	ISTS
WEST	AURANGABD-II400.00	39	42	42	39	44	44	42	45	45	45	40	STU
WEST	AURANGBD-III400.00	38	41	41	38	43	43	41	44	43	44	40	STU
WEST	CHNDPUR_SW 400.00	23	43	43	23	43	43	43	43	43	43	40	GEN
EAST	BARH-I 400.00	25	28	28	28	43	43	43	43	43	43	40	GEN
EAST	SAGARDIGHI_4400.00	28	31	31	30	33	33	32	43	43	43	40	GEN
EAST	FARAKKA 400.00	35	38	38	39	41	41	41	46	46	46	40	ISTS
EAST	PATRATU 400.00	26	39	39	39	41	41	40	41	41	41	40	GEN
EAST	JHARKND-POOL400.00	32	43	43	44	46	46	46	46	46	46	40	ISTS
EAST	RANCHI 400.00	37	44	44	45	51	51	48	51	51	51	40	ISTS
EAST	RNC-SIPT FSC400.00	4	3	42	3	3	3	3	3	3	42	40	FSC
SOUTH	KURNOOL4 400.00	55	55	55	56	55	55	56	55	54	56	40	STU
SOUTH	SIMHADRI 400.00	27	40	40	28	40	40	33	40	41	41	40	ISTS
SOUTH	SIMHD-II 400.00	27	40	40	28	40	40	33	40	41	41	40	ISTS
SOUTH	VIZPOOL 400.00	27	40	40	28	40	40	34	40	42	42	40	STU
SOUTH	VEMAGIR4 400.00	37	49	49	38	49	49	40	49	57	57	40	STU
SOUTH	VIJ-AP 400.00	41	47	47	42	47	47	46	48	48	48	40	STU
SOUTH	KURL-NEW 400.00	60	60	60	61	61	61	61	61	60	61	50	ISTS
SOUTH	GUDDIGUDEM 400.00	40	44	44	40	44	44	41	44	45	45	40	STU
SOUTH	KAKINADA SEZ400.00	32	40	40	33	40	40	36	40	43	43	40	STU
SOUTH	RAMGUNDM STP400.00	27	41	41	40	41	41	42	42	42	42	40	ISTS
SOUTH	HYDERABAD 400.00	36	40	40	39	40	40	41	41	41	41	40	ISTS
SOUTH	KHAMMAM 400.00	36	42	42	38	43	43	42	43	43	43	40	ISTS
SOUTH	MAMIDIPALLY 400.00	42	47	47	43	47	47	47	48	47	48	40	STU
SOUTH	DICHPAL4 400.00	38	41	41	41	42	42	43	43	43	43	40	STU
SOUTH	GAJWEL4 400.00	35	39	39	38	39	39	43	42	43	43	40	STU
SOUTH	MAHESWRM 400.00	58	65	65	61	66	66	67	67	66	67	63	ISTS
SOUTH	MAHESH-TS 400.00	58	65	65	61	66	66	67	67	67	67	50	STU
SOUTH	RAIC 400.00	37	38	38	38	44	44	38	44	43	44	40	STU
SOUTH	NELMANG4 400.00	42	43	43	43	43	43	44	43	43	44	40	STU

Area	Bus Name	Sc-1	Sc-2	Sc-3	Sc-4	Sc-5	Sc-6	Sc-7	Sc-8	Sc-9	Max	Design Level	Remark
SOUTH	NARDR-NW 400.00	45	43	43	45	53	53	43	53	50	53	50	ISTS
SOUTH	KUDGI-NT 400.00	41	39	39	41	50	50	39	50	47	50	50	ISTS
SOUTH	BIDADI 400.00	39	39	39	39	40	40	40	40	39	40	40	ISTS
SOUTH	MADHUGI4 400.00	49	49	49	50	50	50	52	50	49	52	50	ISTS
SOUTH	SALE 400.00	37	40	40	38	41	41	39	41	40	41	40	ISTS
SOUTH	UDMP 400.00	44	48	48	45	49	49	45	49	46	49	40	ISTS
SOUTH	PUGALUR4 400.00	38	41	41	39	42	42	38	42	39	42	40	ISTS
SOUTH	TIRUNEL4 400.00	42	47	47	43	49	49	43	49	49	49	40	ISTS
SOUTH	KUDAN4 400.00	31	33	33	31	33	33	31	33	41	41	40	ISTS
SOUTH	DHARMPR 400.00	46	51	51	47	53	53	50	53	51	53	40	ISTS

Highlighted cell indicates 400 kV Bus Fault Current > Design level

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Annex-11.10

ISTS Network Expansion upto 2027-28

Prior to Rolling Plan (upto Feb' 2022)

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 minimum 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 reactor 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, 2x63MVAr 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
11.	2024-25	NR	Kaza-Wangtoo (HPPTCL) 400 kV D/c (Quad) line	400kV	D/c	360	80	
12.	2024-25	NR	Wangtoo (HPPTCL) - Panchkula (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 Gogamukh 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/ Ludhiana one line (Triple snowbird)	400kV	S/c	0		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
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 – Kishenpur D/c & Samba – Kishenpur D/c at Kishenpur)	400kV	D/c	0		

2. Transformers

Sl.No	Timeframe	Region	Transformers	Voltage ratio (kV)	No. of trans-former	Rating of transformer (MVA)	Total transformation capacity (MVA)
1.	2022-23	WR	Augmentation of transformation capacity at Vadodara 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
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
12.	2023-24	SR	Augmentation of transformation 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

Sl.No	Timeframe	Region	Transformers	Voltage ratio (kV)	No. of trans-former	Rating of transformer (MVA)	Total transformation capacity (MVA)
15.	2024-25	WR	Augmentation of transformation capacity at Banaskantha 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 Kishenpur 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

This Interim Rolling Plan (Mar'22 to Jul'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.	2024-25	SR	Koppal-II - Narendra New 765kV D/c line with 240 MVAr SLR at Koppal-II PS end	765kV	D/c	150	240	
2.	2024-25	SR	Gadag-II PS - Koppal-II PS 400kV (Quad Moose) D/c line	400kV	D/c	100		
3.	2024-25	SR	Koppal-II - Raichur 765kV D/c linw with 330 MVAr SLR at Koppal-II PS end	765kV	D/c	190	240	
4.	2025-26	NR	LILO of both ckts of 400kV Bikaner (PG)-Bikaner-II D/c line at Bikaner-III PS	400kV	D/c	80		
5.	2025-26	NR	Bikaner-II PS – Bikaner-III PS 400 kV D/c line (Quad)	400kV	D/c	60		
6.	2025-26	NR	LILO of both ckts of 400 kV Sohna Road(GPTL)-Gurgaon(PG) D/c line at Neemrana-II S/s	400kV	D/c	340		
7.	2025-26	NR	Neemrana-II -Kotputli 400 kV D/c line (Quad	400kV	D/c	140		
8.	2025-26	NR	Bikaner-III – Neemrana-II 765 kV 2xD/c line	765kV	D/c	1400	660	660
9.	2025-26	NR	Neemrana-II- Bareilly(PG) 765 kV D/c line	765kV	D/c	700	330	330

2. Transformers

Sl.No	Timeframe	Region	Transformers	Voltage ratio (kV)	No. of transformer	Rating of transformer (MVA)	Total transformation capacity (MVA)
1.	2024-25	SR	Establishment of 765/400kV , 2X1500 MVA transformer at Koppal-II	765/400	2	1500	3000
2.	2024-25	SR	Establishment of 400/220kV , 2X500 MVA transformer at Koppal-II	400/220	2	500	1000
3.	2024-25	SR	Establishment of 400/220kV , 2X500 MVA transformer at Gadag-II	400/220	2	500	1000
4.	2024-25	SR	Augmentation of transformation capacity at Koppal-II with 765/400kV , 2X1500 MVA transformers	765/400	2	1500	3000
5.	2024-25	SR	Augmentation of transformation capacity at Koppal-II with 400/220kV , 2X500 MVA transformers	400/220	2	500	1000
6.	2023-24	SR	Augmentation of transformation capacity at Pavagada by 1x500 MVA, 400/220 kV ICT (6th)	400/220	1	500	500
7.	2023-24	SR	Augmentation of transformation capacity at Arasur by 1x500 MVA, 400/230 kV ICT (4th)	400/230	1	500	500
8.	2023-24	SR	Augmentation of transformation capacity at Hosur by 1x500 MVA, 400/230 kV ICT (4th)	400/230	1	500	500
9.	2023-24	WR	Augmentation of 1x500 MVA, 400/220 kV ICT (3rd) at Raigarh(PG) S/s along with associated ICT bays (400& 220kV bay each -01nos)	400/220	1	500	500
10.	2023-24	WR	Augmentation of transformation capacity at Kallam PS by 2x500MVA, 400/220kV ICTs (3rd & 4th) along with 220kV bays for RE interconnection	400/220	2	500	1000

Sl.No	Timeframe	Region	Transformers	Voltage ratio (kV)	No. of transformer	Rating of transformer (MVA)	Total transformation capacity (MVA)
11.	2025-26	NR	Establishment of 6x1500 MVA, 765/400kV & 5x500 MVA 400/220kV Bikaner-III Pooling Station at a suitable location near Bikaner	765/400	6	1500	9000
12.	2025-26	NR	Establishment of 6x1500 MVA, 765/400kV & 5x500 MVA 400/220kV Bikaner-III Pooling Station at a suitable location near Bikaner	400/220	5	500	2500
13.	2025-26	NR	Establishment of 765/400 kV, 4x1500 MVA Neemrana-II S/s at a suitable location near Neemrana	765/400	4	1500	6000
14.	2025-26	NR	Augmentation with 400/220 kV, 5x500 MVA^ ICT at Bikaner-II PS	400/220	5	500	2500
15.	2025-26	NR	Augmentation with 765/400 kV, 1x1500MVA ICT (4th) at Bikaner (PG)	765/400	1	1500	1500
16.	2025-26	NR	Augmentation by 400/220 kV, 1x500 MVA (3rd) ICT at Kotputli (PG)	400/220	1	500	500
17.	2023-24	NR	Augmentation with 400/220kV, 1x500MVA Transformer at Fatehgarh-2 PS (6th ICT at Section-1 with cable/GIS duct connection at 220kV side)	400/220	1	500	500
18.	2023-24	NR	Augmentation with 400/220kV, 1x500MVA Transformer at Bikaner PS (3rd ICT)	400/220	1	500	500

3. Bus Reactors

Sl. No.	Time Frame	Region	Bus Reactors	No of reactors	Rating of reactor	Total reactive compensation (MVAR)
1.	2024-25	SR	2X330 MVAr Bus Reactors at 765kV Koppal-II	2	330	660
2.	2024-25	SR	2X125 MVAr Bus Reactors at 400kV Koppal-II	2	125	250
3.	2024-25	SR	2X125 MVAr Bus Reactors at 400kV Gadag-II	2	125	250
4.	2025-26	NR	2X330 MVAr Bus Reactors at 765kV Bikaner-III	2	330	660
5.	2025-26	NR	2X125MVAr Bus Reactors at 765kV Bikaner-III	2	125	250
6.	2025-26	NR	2X330 MVAr Bus Reactors at 765kV Neemrana-2	2	330	660
7.	2025-26	NR	2X125MVAr Bus Reactors at 765kV Neemrana-2	2	125	250
8.	2023-24	ER	Installation of 420kV, 1x125MVAr bus reactor along with associated bay at Biharsharif (POWERGRID) S/s in the bus section having 1x80MVAr existing bus reactor.	1	125	125
9.	2023-24	ER	Installation of new 420kV, 1x125MVAr bus reactor along with associated bay at Jamshedpur (POWERGRID) S/s	1	125	125

4. Other Schemes

Sl. No.	Time Frame	Region	Scope (each element as separate row)	Voltage ratio (kV)
1.	2023-24	ER	Installation of new 420kV, 1x63MVAr line reactor at Maithon-A end of Maithon-A – Kahalgaon-B ckt-1 400kV line along with new 700ohm NGR (with NGR bypass arrangement for operation of line reactor as a bus reactor	400
2.	2024-25	ER	Reconductoring of Rango-Gangtok 132kV D/c line	132
3.	2025-26	NER	Reconductoring of Melriat (POWERGRID) – Zuangtui (Mizoram) 132kV ACSR Panther S/c line with Single HTLS rating of HTLS	132

Sl. No.	Time Frame	Region	Scope (each element as separate row)	Voltage ratio (kV)
			conductor of 900A (at nominal voltage level) along with new one (1) 132kV line bay at Melriat (POWERGRID) S/s (of rating commensurate with rating of HTLS) for termination of this HTLS line	
4.	2025-26	NER	Replacement of existing CT of 600/1A at Zuangtui (Mizoram) end in Melriat (POWERGRID) – Zuangtui (Mizoram) 132kV S/c line with rating commensurate with ampacity (900A) of HTLS conductor	132
5.	2025-26	NER	Reconductoring of Aizawl (POWERGRID) – Luangmual (Mizoram) 132kV ACSR Panther S/c line with Single HTLS rating of HTLS conductor of 800A (at nominal voltage level) along with upgradation of line bay equipment at Aizawl (POWERGRID) end commensurate with rating of HTLS, as required	132
6.	2025-26	NER	Replacement of existing CT of 600/1A at Luangmual (Mizoram) end in Aizawl (POWERGRID) – Luangmual (Mizoram) 132kV S/c line with rating commensurate with ampacity (800A) of HTLS conductor	132
7.	2025-26	NER	Installation of OPGW in Aizawl (POWERGRID) – Luangmual (Mizoram) 132kV S/c line	132
8.	2023-24	NER	Reconductoring of Loktak (NHPC) – Imphal (POWERGRID) 132kV S/c line with HTLS conductor (with Ampacity of single HTLS as 800A at nominal voltage) along with strengthening of associated structure in NHPC switchyard, if necessary	132
9.	2023-24	NER	Replacement of existing CT of 600-400-200/1A at Loktak HEP end in Loktak – Imphal 132kV S/c line with rating commensurate with ampacity (800A) of HTLS conductor	132
10.	2025-26	ER	Reconductoring of Jharsuguda/Sundargarh (POWERGRID) – Rourkela (POWERGRID) 400kV 2xD/c Twin Moose line with Twin HTLS conductor (with ampacity Single HTLS as 1228A at nominal voltage).	400
11.	2025-26	ER	Bay upgradation at Rourkela (POWERGRID) end for 3150A rating – 04 nos. diameters in one and half breaker scheme (except 09 nos. existing circuit breakers which are of minimum 3150 A rating).	400
12.	2023-24	WR	Conversion of 2x240MVAr non-switchable line reactors at Raipur PS (associated with Raipur PS – Champa PS 765kV circuits 1 & 2) into Switchable line reactors along with NGR bypass arrangement	765
13.	2023-24	WR	Bypassing of Parli(PG) – Parli(M) 400kV D/c line (~5km.) and Parli(PG) – Parli(New) 400kV D/c (quad) line (~18km.) at Parli(PG) S/s at outskirts of the Parli(PG) S/s so as to form Parli(M) – Parli(New) 400kV D/c direct line	400
14.	2023-24	WR	Reconductoring of Parli(PG) – Parli(M) 400kV D/c line section of above line (at Sl. 1) with twin HTLS conductor with a minimum capacity of 1940MVA per circuit at a nominal voltage	400
15.	2023-24	WR	400kV Bay Upgradation work at Parli(M) S/s (Parli(M) S/s has a DMT scheme. The current rating of existing bays is 2000A which would be upgraded to 3150A to suit the reconductoring with Twin HTLS conductor)	400
16.	2024-25	NR	Reconductoring of 400 kV Jodhpur (Surpura)(RVPN) – Kankroli S/c (twin moose) line with twin HTLS conductor	400
17.	2024-25	NR	Bypassing of 400 kV Kankroli - BhinmalZerda line at Bhinmal to form 400 kV Kankroli – Zerda (direct) line	400
18.	2023.24	NR	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	400
19.	2023.24	NR	Installation of fixed 50 MVAR line reactor at Bhiwadi end for uncompensated circuit of 400 kV Agra- Bhiwadi D/c line	400

Annex-11.11

Inter-Regional Transmission Capacity (MW)

Transmission Line	Present	Capacity by 2027-28
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
Jeypore - Jagdalpur 400 kV D/c		1600
Sub-total	**21,190**	**22,790**

Transmission Line	Present	Capacity by 2027-28
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**
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
Neemuch-Chittorgarh 400 kV D/c		1600
Chittorgarh-Indore 765 kV D/c		4200
Sub-total	**36,720**	**42,520**

Transmission Line	Present	Capacity by 2027-28
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
Narendra-Pune 765 kV D/c	-	4200
Sub-total	**18,120**	**28,120**
TOTAL	**112,250**	**130,340**
* Barsur (WR) – L. Sileru (SR) 220kV HVDC Monopole of 200MW capacity is currently not in operation.		

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