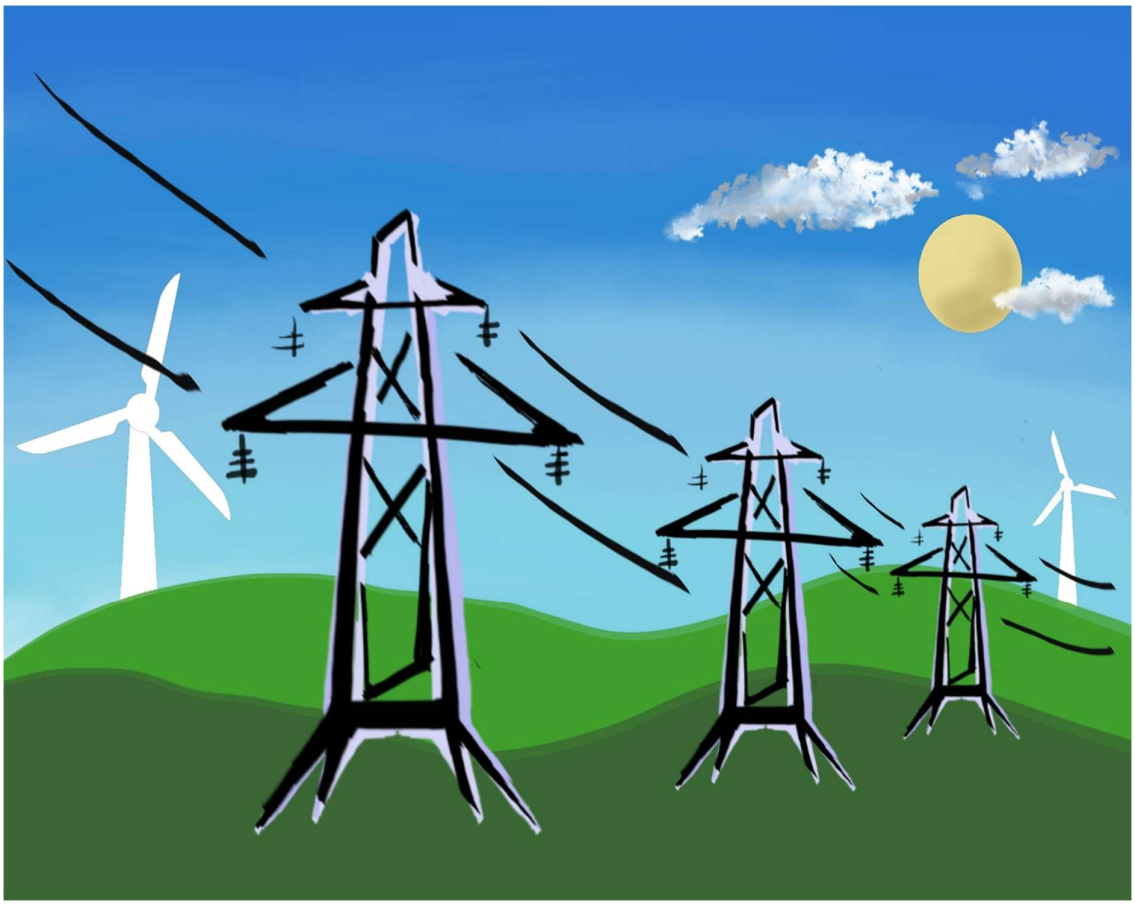
# NETWORK PLAN (2024-25)

Inter State Transmission System (ISTS)



**Prepared by**
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# Executive Summary

Electricity sector is one of the key enablers for achieving socio-economic development of the country. The Indian electricity grid is one of the largest synchronous power system networks in the world. To combat the emerging environmental issues, especially climate change, there is a paradigm shift globally for sustainable growth. In view of this, all countries across the globe are being actively engaged in climate negotiations on different platforms. Consequently, the world has now started moving towards carbon free energy. India being an active participant globally has started taking initiative towards sustainable development and cleaner environment. In this direction, at the COP26 climate conference in Glasgow, India committed to achieve non-fossil energy capacity to 500 GW by 2030 and to meet 50 per cent of its energy requirement through renewable energy by 2030, which are two of the five major commitments of "Panchamrit" to mitigate climate change. India is now at 5$^{th}$ position globally for overall renewable energy installed capacity, with a share of about 25% in its the total installed generation capacity.

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 01$^{st}$ 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 upto 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, a procedure has been prepared and published by CTU on 16$^{th}$ 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, this ISTS Network Plan report is being brought out wherein transmission system adequacy in ISTS has been assessed for 2024-25 time-frame.

In **Chapter-2**, installed capacity & demand of FY 2020-2021 and projected installed capacity & demand of FY 2024-25 have been presented. All India installed capacity & peak demand are expected to increase from 382 GW & 189 GW respectively in FY 2020-21 to 528 GW & 266 GW respectively in FY 2024-25.

To integrate envisaged generation capacity (primarily RE) and meet the projected demand, comprehensive studies have been performed on All India basis for planning ISTS. To perform the studies, Load Generation Balance (LGB) has been prepared in line with the CEA's Manual on Transmission Planning Criteria considering the diurnal and seasonal variations across the country. Accordingly, nine number of load-generation scenarios have been identified corresponding to Monsoon, Summer and Winter season along with three points on daily load

curve for each season. Maximum and minimum demand of 266 GW and 179 GW have been considered in 2024-25 while working out the LGBs.

Detailed overview of the load generation balance preparation and challenges observed while balancing the same have been brought out in **Chapter-3**. While preparing LGB, merit order economic dispatch of thermal generation and RPO obligations of states have been taken into consideration. The Renewable Energy (RE) due to its intermittent nature will need to be balanced through other generation resources. Solar max and Peak demand are occurring at distinct time in a day which necessitates the requirement of Battery Energy Storage System (BESS) in the grid.

Northern and Southern regions, which have been deficit and are importing power from other regions would actually approach self-sufficiency and even export power during high RE generations during 2024-25. Further, due to high variability of RE generation and due to negligible Solar generation in the Evening peak hours, the Inter-Regional (IR) power flow pattern would change even within a day.

**Chapter-4** provides the glimpse of year wise ISTS network expansion plan across the country upto FY 2024-25 along with summary of transmission line (ckm) and transformation capacity (MVA) addition.

Region wise RE integration plan including associated ISTS system along with its schematics are outlined in **Chapter-5**.

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-6**, details on existing, under-construction and under discussion cross-border interconnections between India and neighbouring countries have been brought out.

Comprehensive studies at all India level has been carried out in nine scenarios using PSS®E software after considering all the planned and under construction system. Inter-Regional flows along with individual tie-lines flows have been tabulated in **Chapter-7**. Further, base case flow loadings on EHV system (above 400kV) have been analysed and the violations have been highlighted in this chapter. In addition, N-1 contingency analysis on EHV Network has also been simulated and results have been brought out. Inter-Regional corridor capacity is found to be adequate to cater the peak demand of respective regions in 2024-25. Augmentation of the network, if any, considering these violations are under study and the same would be published in the subsequent Network Plan report.

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. Further, transmission lines associated with thermal and hydro generations would be lightly loaded during high RE scenario. Transmission line and ICT loadings have been analysed and results have been brought out in Chapter-7. Over-Voltage and Under-Voltage levels considering IEGC band for all 765 kV and 400 kV buses in all the scenarios have also been analysed and brought out in the report. Reactive power compensation details in ISTS network i.e. no load reactive power generation by 765kV and 400 kV lines vis-à-vis compensation provided has been analysed for

present and 2024-25 timeframe in this chapter. The Over-Voltage and Under-Voltage issues observed in the study are under review for planning and implementation of suitable shunt compensation devices. Details of the same would be brought out in the subsequent Network Plan reports.

Size of the Indian power system has grown notably over the past years and has become more and more meshed due to synchronous interconnection of various regions. It becomes pertinent to identify the fault level violation at various 765 kV and 400 kV buses from design ratings. Accordingly, Short circuit level has been calculated for all 765 kV and 400 kV buses on pan India basis for all the scenarios. Details about the buses exceeding design fault current limit have also been presented in Chapter-7.

The summary of the studies carried out, remedial measures, way forward etc. have been mentioned in **Chapter-8**.

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# Chapter 1: Background and Objective

India is presently going through a phase of rapid growth. Socio-economic development and growth in electricity demand go hand in hand. The power demand of the country has grown from 136 GW at the end of 2013-14 to 190 GW at the end of 2020-21, a growth of about 40%. This demand is expected to further increase to about 267 GW by 2024-25, which translates to growth by about 41%. To meet this fast growing demand, generation capacity is also being continuously added into the grid. By 2024-25, the installed capacity of India is expected to be about 528 GW, a growth of 38% from 382 GW at end of 2020-21.

To meet the growing energy demand in a sustainable manner, environmental issues are now being given special attention. Towards this India is aiming to have about 500 GW of non-fossil fuel based generation in the total installed capacity by the year 2030, as committed in COP26. By 2024-25, about 210 GW of RE (Solar & Wind) generation is expected to be integrated into the grid. With such a large quantum of RE generation addition, the transmission system should be designed considering techno-economic aspects so as to meet the operational challenges like low Capacity Utilisation Factor (CUF) and intermittency & variability etc. of RE generators. Thus, it can be said that transmission is playing a very vital role not only in integration of RE into the National Grid, but also in meeting the energy security of the country by supplying reliable, secure, and affordable power across the length and breadth of the country.

In this direction, Ministry of Power vide gazette notification dated 01$^{st}$ 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 upto 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, a procedure has been prepared and published by CTU on 16$^{th}$ Dec 2021 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, 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, this ISTS Network Plan report is being brought out wherein transmission system adequacy in ISTS has been ascertained for 2024-25 time-frame. This report covers year wise ISTS requirement on pan India basis to integrate the RE generation and also to 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 on all India basis for 2024-25 timeframe for nine perspective load-generation scenarios covering three seasons and three load-generation conditions in each season.

Remedial measures for some of the identified issues in ISTS have been suggested in this report. Further, ISTS planning being a continuous exercise detailed studies are being carried out for the remaining issues and new transmission elements, as required, would be planned to address the issue and the details in this regard would be brought out in the next Network Plan report to be published in Mar 2022.

# Chapter 2: Power Supply Scenario

## 2.1 Present Power Supply Scenario

As on Mar'2021, total Installed Capacity (IC) in India was about 382 GW and the peak demand met was about 190GW. The region-wise breakup is summarised at **Table-2.1-1** below. At present, there is no shortage of power supply in meeting these demands.

*Table 2.1-1:All India Installed Capacity and Demand met as on Mar'21*

| | Generation (GW) | | | | | | | | Demand |
|---|---|---|---|---|---|---|---|---|---|
| **Region** | **Thermal** | | | | **Nuclear** | **Hydro** | **RES** | **Total** | **(GW)** |
| | ***Coal*** | ***Lignite*** | ***Gas*** | ***Diesel*** | | | | | |
| **NR** | 54.83 | 1.58 | 5.78 | 0.00 | 1.62 | 20.29 | 18.59 | 102.69 | 68.29 |
| **WR** | 74.32 | 1.40 | 10.81 | 0.00 | 1.84 | 7.56 | 29.25 | 125.18 | 61.78 |
| **SR** | 44.90 | 3.64 | 6.49 | 0.43 | 3.32 | 11.77 | 44.60 | 115.16 | 58.40 |
| **ER** | 27.85 | 0.00 | 0.10 | 0.00 | 0.00 | 4.64 | 1.59 | 34.18 | 24.02 |
| **NER** | 0.77 | 0.00 | 1.74 | 0.04 | 0.00 | 1.94 | 0.37 | 5 | 3.29 |
| **All India** | **202.67** | **6.62** | **24.92** | **0.47** | **6.78** | **46.21** | **94.40** | **382.07** | **190.20** |

## 2.2 Envisaged Power Supply Scenario

As per the 19th EPS, all India peak demand for 2024-25 is expected to increase to about 267 GW. To meet the increase in demand of 77 GW from present, net 147 GW generation is envisaged to be added after considering retirement of 18 GW of thermal generation by 2025 **(Annex-2.2).** Total installed capacity for 2025 shall be about 528GW. Installed capacity and projected demand for 2024-25 are tabulated below:

*Table 2.2-1:All India Installed Capacity and projected demand as on Mar'25*

| | Generation (GW) | | | | | | | | Demand |
|---|---|---|---|---|---|---|---|---|---|
| **Region** | **Thermal** | | | **Diesel** | **Nuclear** | **Hydro** | **RES** | **Total** | (GW) |
| | ***Central*** | ***State*** | ***IPP*** | | | | | | |
| **NR** | 11.44 | 39.62 | 0.00 | 3.96 | 4.42 | 22.58 | 70.90 | 152.91 | 86.70 |
| **WR** | 19.00 | 35.79 | 36.99 | 10.00 | 3.24 | 8.17 | 69.59 | 182.77 | 84.50 |
| **SR** | 12.19 | 29.78 | 6.64 | 2.98 | 3.32 | 11.92 | 68.44 | 135.26 | 74.60 |
| **ER** | 24.44 | 12.17 | 4.50 | 0.00 | 0.00 | 8.18 | 0.65 | 49.94 | 32.30 |
| **NER** | 0.75 | 0.13 | 0.00 | 1.82 | 0.00 | 4.82 | 0.20 | 7.72 | 5.70 |
| **All India** | **67.82** | **117.47** | **48.13** | **18.77** | **10.98** | **55.66** | **209.78** | **528.60** | **266.80** |

The region wise growth in demand and fuel type wise increase in installed generation capacity for 2024-25 from present time-frame is tabulated below:

| Peak Demand (GW) | | | | |
|---|---|---|---|---|
| | *2020-21* | *2024-25* | *Diff* | *% increase* |
| **NR** | 68.20 | 86.70 | 18.50 | 27.13% |
| **WR** | 61.70 | 84.50 | 22.80 | 36.95% |
| **SR** | 58.30 | 74.60 | 16.30 | 27.96% |
| **ER** | 24.10 | 32.30 | 8.20 | 34.02% |
| **NER** | 3.30 | 5.70 | 2.40 | 72.73% |
| **All India** | **190.20** | **266.80** | **76.60** | **40.27%** |

| Generation IC (GW) | | | | |
|---|---|---|---|---|
| | *Present* | *2025* | *Diff* | *% change* |
| **Thermal** | 209.76 | 233.41 | 23.65 | 11.27% |
| **Gas** | 24.92 | 18.77 | -6.16 | -24.72% |
| **Nuclear** | 6.78 | 10.98 | 4.20 | 61.95% |
| **Hydro** | 46.21 | 55.66 | 9.46 | 20.47% |
| **Solar** | 40.10 | 135.55 | 95.45 | 238.03% |
| **Others** | 54.30 | 74.22 | 19.93 | 36.70% |
| **Total** | **382.07** | **528.60** | **146.53** | 38.35% |

Out of about 147 GW of generation addition about 130 GW is based on non-fossil fuels. Major renewable generation is coming up in NR, WR and SR.

# Chapter 3: Load Generation Preparation

## 3.1 Paradigm shift

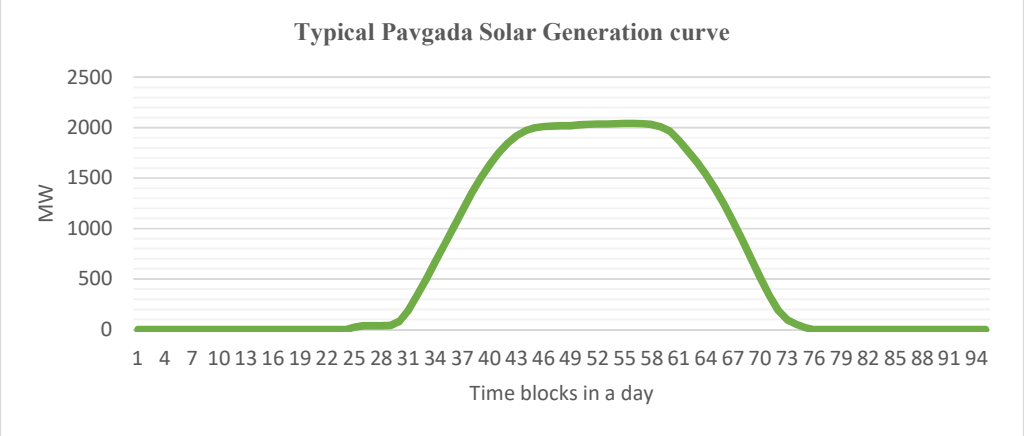
The planning philosophy has undergone vast changes over time as per the technical and socio-economic requirements. The RE (Solar & Wind) capacity penetration has grown from about 14% at the end of 2013-14 to about 25% at the end of Mar 2021, which has been further growing at fast pace, and by 2025 the RE penetration is expected to be about 40%. With large scale integration of Renewable Energy (RE) based generation (primarily Solar and Wind) the ISTS is now being planned on RE potential basis, which is shift from earlier practice of planning of system mainly based on conventional generation.

Presently, the Plant Load Factor (PLF) of demand is about 80% (**Table 3.1-1**) and major portion of the same is being met by thermal generation having PLF in similar range. However, solar generation has a PLF of about 25-30%. At 30% PLF, 1 MW solar plant would generate about 7.2 MWh of energy in a day. From the **Figure 3.1-1**, it may be observed that a solar plant generates electricity only for 10-12 hours in a day. Therein, for about 4 hours in a day the solar plant generates about 100% of its design capacity (1*4=4 MWh) while for remaining 6-8 hours it generates about 3.2 MWh. Thus, it may be observed that more than 50% of energy from solar plants is generated in a short duration of 4 hours. During these 4 hours energy produced by the thermal power plant has to be either reduced or utilised alternatively.

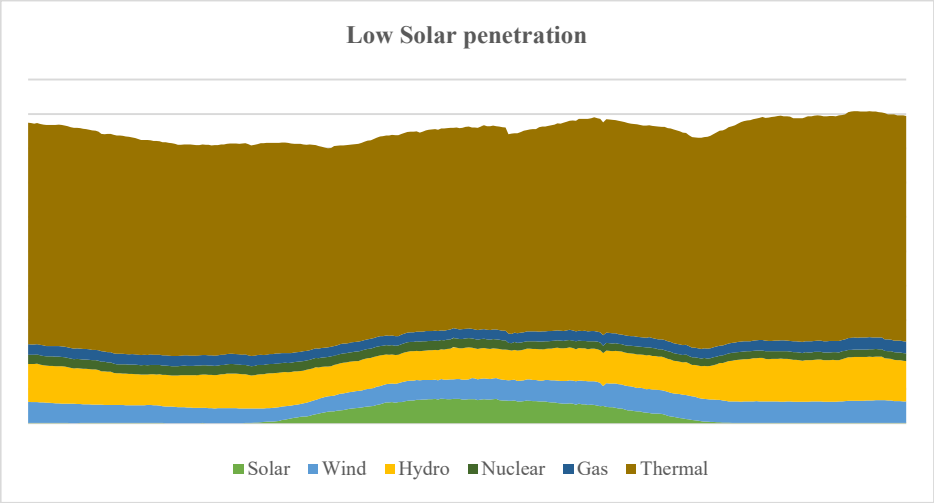
*Table 3.1-1:Load PLF*

| Year | Peak Demand (MW) | Energy Calculated from Peak Demand (BU) | Actual Energy Consumption (BU) | Calculated Load PLF |
|---|---|---|---|---|
| **2019-20** | 1,83,804 | 1610 | 1291 | 0.80 |
| **2018-19** | 1,77,022 | 1550 | 1274 | 0.82 |
| **2017-18** | 1,64,066 | 1437 | 1213 | 0.84 |
| **2016-17** | 1,59,542 | 1397 | 1143 | 0.82 |

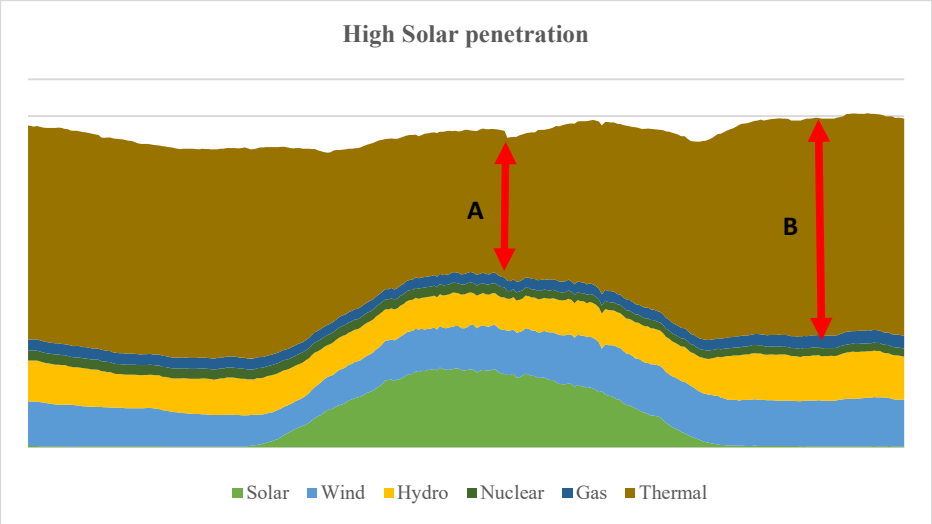
*Figure 3.1-1:Solar Generation curve*



Typical generation pattern for a day with low Solar penetration is given below:




From the above pattern, it may be observed that thermal generation is acting as base load plants, supplying same amount of power almost throughout the day. However, in case of high Solar generation for about 4 hours in a day as shown below, it may be observed that during that time i.e. point A in below schematic the thermal generation may need to be backed down. For meeting the peak load in evening thermal generation shall run at its maximum capacity corresponding to point B. Same number of the thermal units shall be backed down to 55% despatch in the afternoon time to accommodate max Solar generation at point A. However, there is a limited capacity which can be backed down at point A. For example, if 100 GW of thermal generation capacity was on bar at point B and generating 85 GW at that time then during the afternoon period this capacity shall generate 55 GW at 55% of technical minimum, which shall create a margin of about 30 GW, which can accommodate about 30 GW of solar generation. To integrate additional quantum of Solar capacity, surplus energy needs to be utilised alternatively in the grid as the thermal generations cannot be put out of service as they are required to meet the Peak demand conditions during the Evening, and due to technical limitations thermal generations cannot be started or stopped swiftly.



Accordingly, various alternatives are being looked into to store surplus energy, however, the quantum of energy produced in a day should be equal to the quantum of energy consumed within the same day, so that 100% of the storage capacity is available for the next day for reuse. The stored energy during peak Solar generation can be used to supply power during the evening peak load condition along with other thermal generations on bar. This is only one of the factors, however, in reality large number of parameters may need to be taken care of, and accordingly granular analysis is required.

### 3.2 Scenarios adopted

To replicate and simulate seasonal power requirement variations on annual basis, three load-generation scenarios within a day in three different seasons were chosen as per CEA's Manual on Transmission Planning Criteria. 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 number of scenarios:

- Aug'24: Solar max, Evening Peak and Night off-peak
- Jun'24: Solar max, Evening Peak and Night off-peak
- Feb'25: Solar max, Evening Peak and Night off-peak

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. Details about the selection of points on load curve and generation despatching philosophies are discussed in subsequent sections.

### 3.3 Demand

As per 19th EPS All India peak demand is expected to be about 267 GW in 2024-25. CEA vide report dated 30.01.2020, published demand factors for the timeframe of 2021-22, which is reproduced in **Table-3.3-1** below**.** For identifying these demand factors, demand data for the years 2016-17, 2017-18 and 2018-19 was considered.

*Table 3.3-1:Demand Factors for 2021-22 as per CEA*

| Region | February | | | June | | | August | | |
|---|---|---|---|---|---|---|---|---|---|
| | AN Peak (%) | Eve Peak (%) | Night Off -Peak (%) | AN Peak (%) | Eve Peak (%) | Night Off -Peak (%) | AN Peak (%) | Eve Peak (%) | Night Off -Peak (%) |
| **NR** | 70 | 78 | 48 | 85 | 97 | 67 | 82 | 96 | 72 |
| **WR** | 93 | 92 | 67 | 82 | 85 | 66 | 75 | 84 | 60 |
| **SR** | 88 | 93 | 66 | 74 | 85 | 60 | 80 | 90 | 60 |
| **ER** | 68 | 90 | 55 | 78 | 95 | 66 | 75 | 97 | 70 |

| Region | February | | | June | | | August | | |
|---|---|---|---|---|---|---|---|---|---|
| | AN Peak (%) | Eve Peak (%) | Night Off -Peak (%) | AN Peak (%) | Eve Peak (%) | Night Off -Peak (%) | AN Peak (%) | Eve Peak (%) | Night Off -Peak (%) |
| **NER** | 53 | 91 | 40 | 65 | 97 | 50 | 70 | 99 | 56 |
| **All India** | 88 | 95 | 65 | 86 | 95 | 75 | 85 | 96 | 76 |

However, due to changing demand pattern throughout the day and shift in agricultural load, it is envisaged to revise these factors based on latest demand data. Considering the impact of COVID epidemic in 2020-21, demand data of year 2019-20 for the three representative months was collected from POSOCO and accordingly 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 below figures.

*Figure 3.3-1:Summer (June'19) Load Curve*

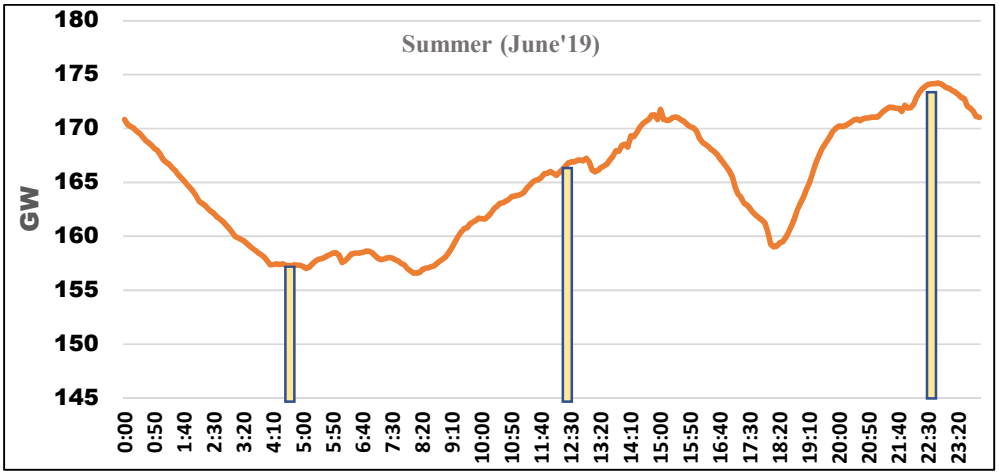



*Figure 3.3-2: Monsoon (Aug'19) Load Curve*

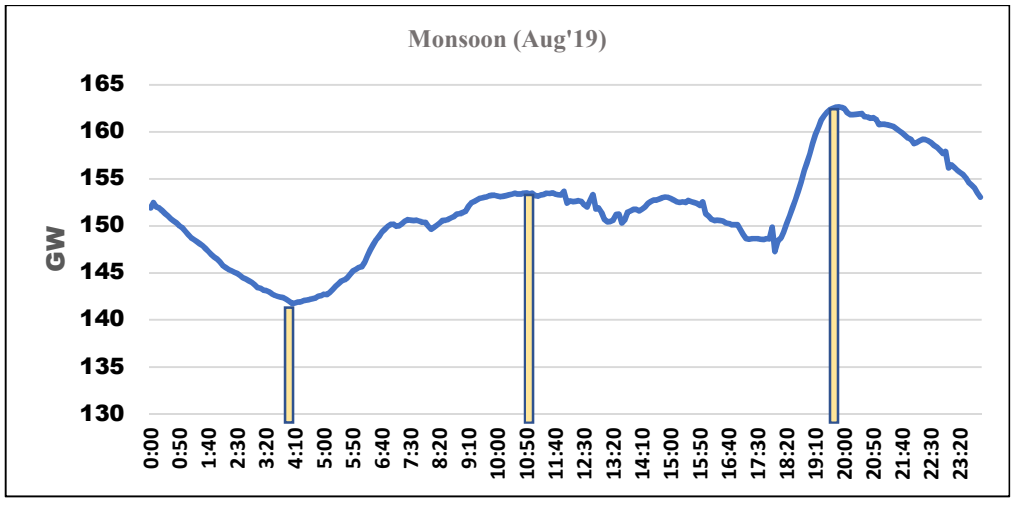
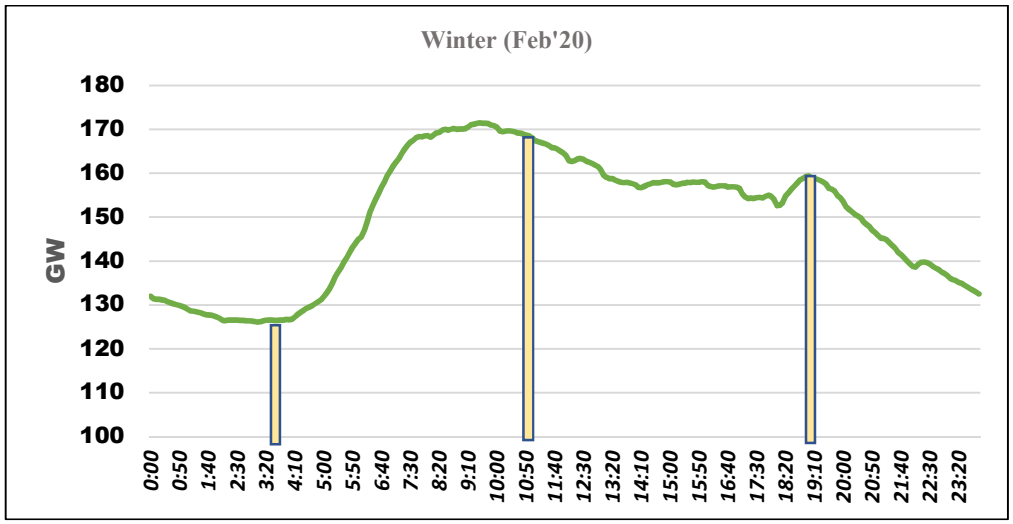


*Figure 3.3-3:Winter (Feb'20) Load Curve*



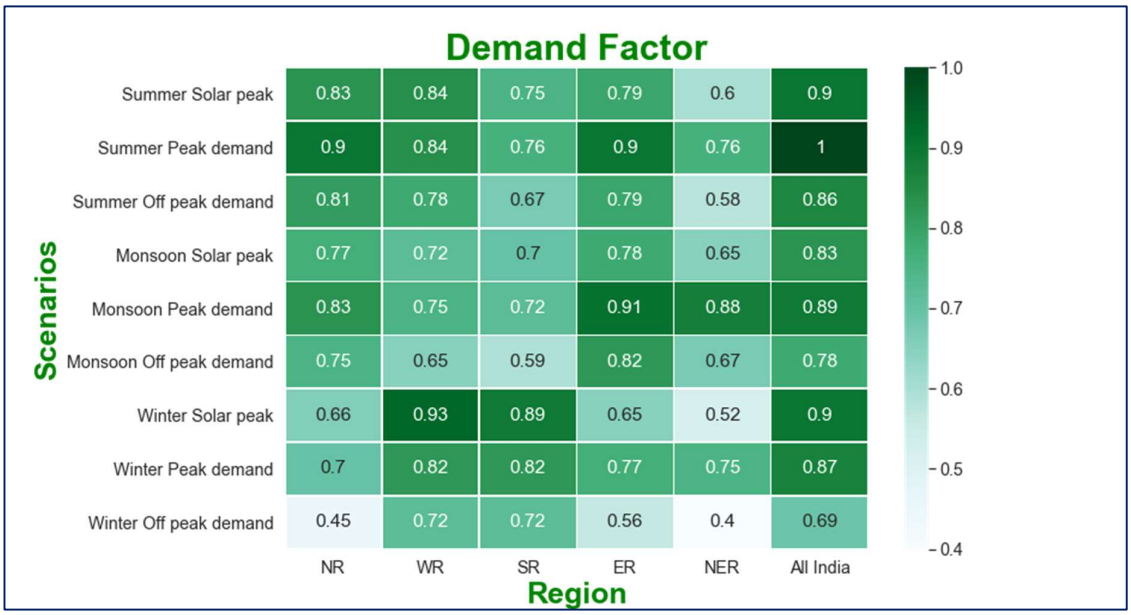

Details about these points like time and demand encountered in 2019-20 during the month of June, August and February are tabulated in **Table-3.3-2.**

*Table 3.3-2: Data Points selected on Demand Curve*

| Month | Time | NR | WR | SR | ER | NER | All India |
|---|---|---|---|---|---|---|---|
| **Jun-19** | 12:00:00 | 55.51 | 49.76 | 39.91 | 18.78 | 1.89 | 165.85 |
| | 22:45:00 | 60.19 | 49.66 | 40.62 | 21.39 | 2.38 | 174.23 |
| | 5:00:00 | 54.33 | 46.21 | 36.08 | 18.77 | 1.81 | 157.20 |
| **Aug-19** | 12:00:00 | 51.36 | 42.89 | 37.59 | 18.55 | 2.06 | 152.44 |
| | 19:50:00 | 55.64 | 44.24 | 38.26 | 21.75 | 2.77 | 162.66 |
| | 4:05:00 | 49.71 | 38.67 | 31.68 | 19.56 | 2.11 | 141.74 |
| **Feb-20** | 12:00:00 | 43.97 | 55.22 | 47.77 | 15.38 | 1.62 | 163.96 |
| | 9:30:00 | 48.06 | 56.34 | 48.99 | 16.31 | 1.78 | 171.48 |
| | 19:00:00 | 46.50 | 48.67 | 43.60 | 18.29 | 2.34 | 159.41 |
| **14th Jun** | 22:30:00 | 65.08 | 49.99 | 42.86 | 22.07 | 2.45 | 182.45 |
| **3rd Feb** | 02:05:00 | 28.50 | 39.42 | 35.35 | 12.20 | 1.26 | 116.71 |
| **Actual Peak** | | **66.69** | **59.39** | **53.47** | **23.78** | **3.15** | **182.61** |

Above demand data was divided by maximum regional demand of the corresponding year to obtain the demand factors which is tabulated in **Figure-3.3-4** below. The same has been used for calculating regional demand for 2024-25 time-frame.

*Figure 3.3-4:Demand factors considered for 2024-25 study time frame*




## 3.4 Generation

To meet the anticipated demand as per 19th EPS, various sources of generations viz. Thermal, Nuclear, Hydro, Gas, RE are available. However, dispatch of these generators shall depend upon the availability of generation especially RE which vary within a day and also seasonally.

For this purpose, region wise load generation balancing philosophy was considered for the study. Primarily the demand was met by RE generation. Since RE has been considered as must-run generators, hence 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 meeting the demand by RE generation, balance demand was met by other generation resources viz., Nuclear, Gas, Hydro and 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, state thermal units were dispatched at technical maximum (85% or 90%) in merit order for each state.

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

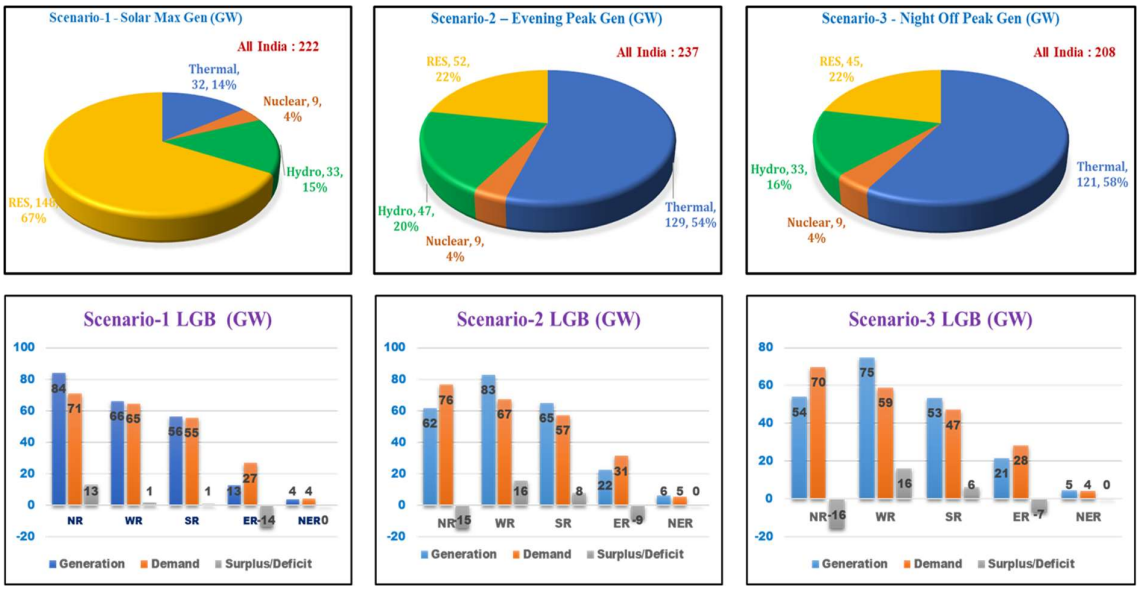
For night off-peak scenario, on bar thermal units were scaled down proportionately.

## 3.5 Load Generation Balance

Load Generation Balance (LGB) for above mentioned nine scenarios considered for the study was prepared in consultation with CEA and POSOCO. A meeting in this regard was also held on 11.03.2021 and minutes of the same are attached at **Annex-3.5.1**. Based on the discussion and deliberations LGB scenarios are summarised in below figures and details about the same are attached at **Annex-3.5.2.**

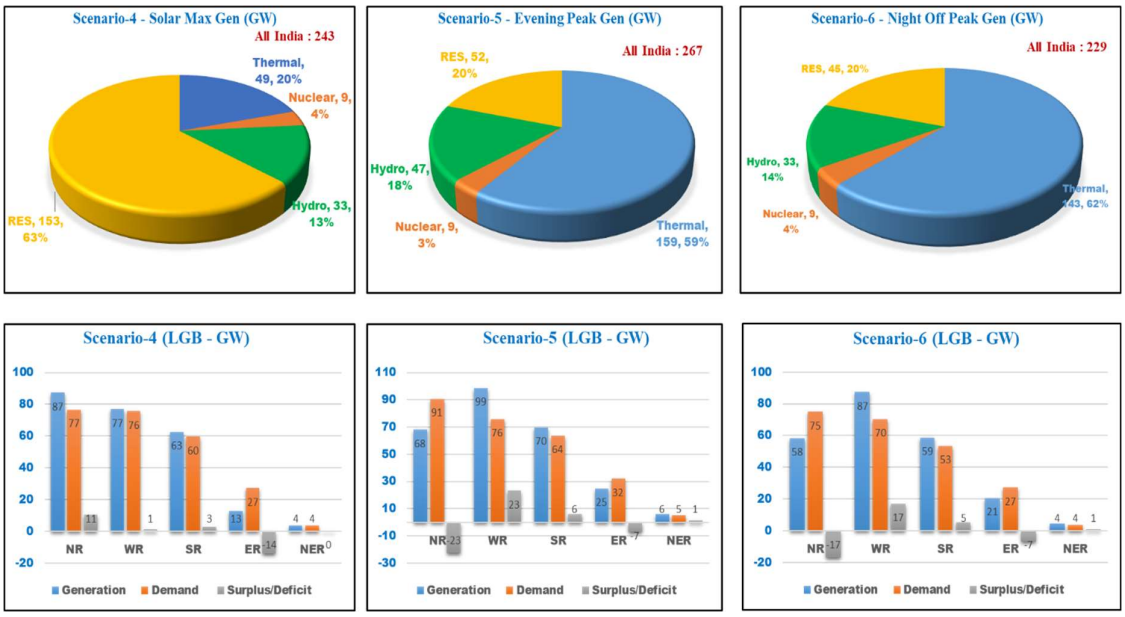
### 3.5.1 Monsoon Aug'2024

*Figure 3.5-1:LGB for Monsoon Aug'2024*



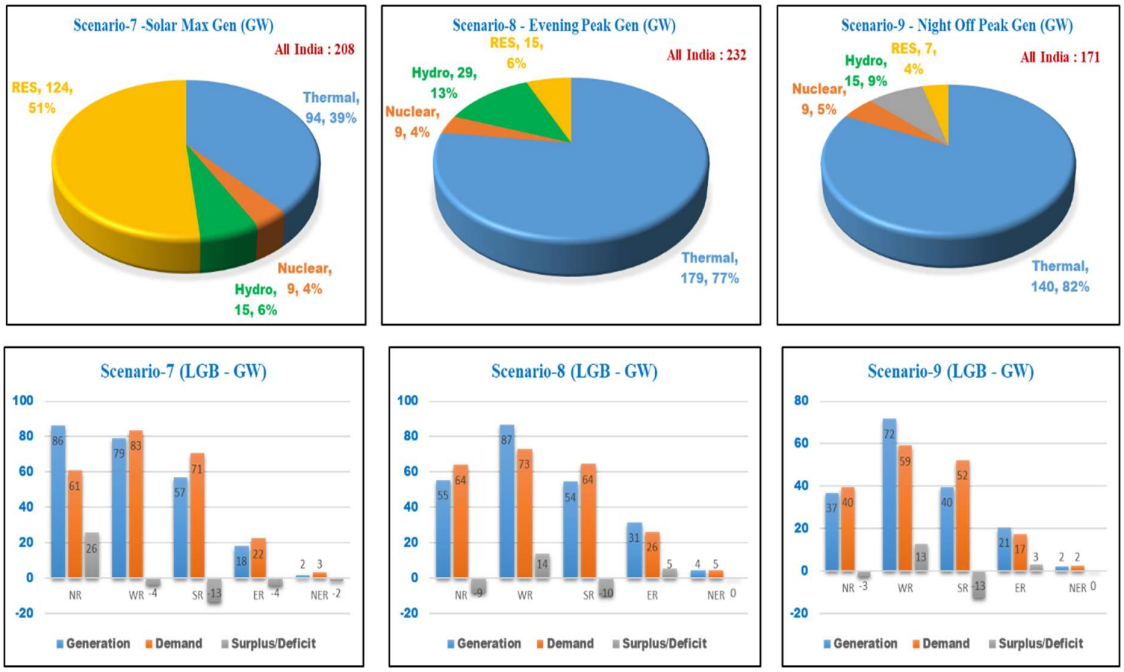

### 3.5.2 Summer June'2024

*Figure 3.5-2: LGB for Summer June'2024*



### 3.5.3 Winter Feb'2025

*Figure 3.5-3: LGB for Winter Feb'2025*




Out of these nine scenarios, Scenario-5 and Scenario-9 corresponds to two extreme cases with respect to demand i.e. highest demand (267 GW) and lowest demand (171 GW) scenarios respectively. In all other scenarios, all India demand is varying between these two demands as per demand factors. Based on LGB, region wise surplus/deficit in these scenarios is summarised in **Table 3.5-1.** Further, both maximum surplus and deficit of each region is highlighted in table below.

*Table 3.5-1:Regional Surplus/Deficit summary*

| Surplus (+) / Deficit (-) | Aug'24 (Monsoon) | | | Jun'24 (Summer) | | | Feb'25 (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** | 13019 | -14812 | -15740 | 10527 | **-22693** | -16603 | **25577** | -8516 | -2624 |
| **WR** | 1492 | 15529 | 16082 | 1228 | **23044** | 17013 | **-4217** | 13664 | 12643 |
| **SR** | 770 | **7748** | 6215 | 2901 | 5868 | 5357 | **-13475** | -10062 | -12632 |
| **ER** | -13932 | -8937 | -6959 | **-14242** | -7287 | -6648 | -4247 | **5049** | 3077 |
| **NER** | -489 | 472 | 402 | -184 | **1068** | 881 | **-1600** | -135 | -463 |

From the above table it may be inferred that:

- NR is importing as well as exporting power in different scenarios. Export of power is taking place in solar max scenarios due to high solar generation in NR, whereas maximum import of power is happening in Summer (June) evening peak load scenario.
- WR generally exports the power with a maximum export of 23 GW in Summer (June) evening peak scenario. Due to low availability of RE during Winter (Feb), WR becomes deficit to the tune of 4 GW.
- SR is importing as well as exporting power under various scenarios. Maximum export of power is 8 GW in Monsoon (August) evening peak scenario due to high wind generation in monsoon season, whereas maximum import of the order of 13.5 GW is taking place in the Winter (February) Solar max case due to very low wind generation at that time.
- ER is mostly importing power in high renewable generation scenarios due to RE RPO requirements of ER which it shall not be able to meet from its own regional RE and it has to import power from neighbouring regions. ER is exporting power during Monsoon (February) evening and night off peak scenarios due to absence of Solar as well as low Wind generation in other regions.
- NER also import as well as export power in different scenarios. Mostly export of power shall take place in the Monsoon (August) and Summer (June) months due to high hydro generation during these seasons, whereas it shall import in Winter (February) scenario due to low hydro and RE RPO obligation.

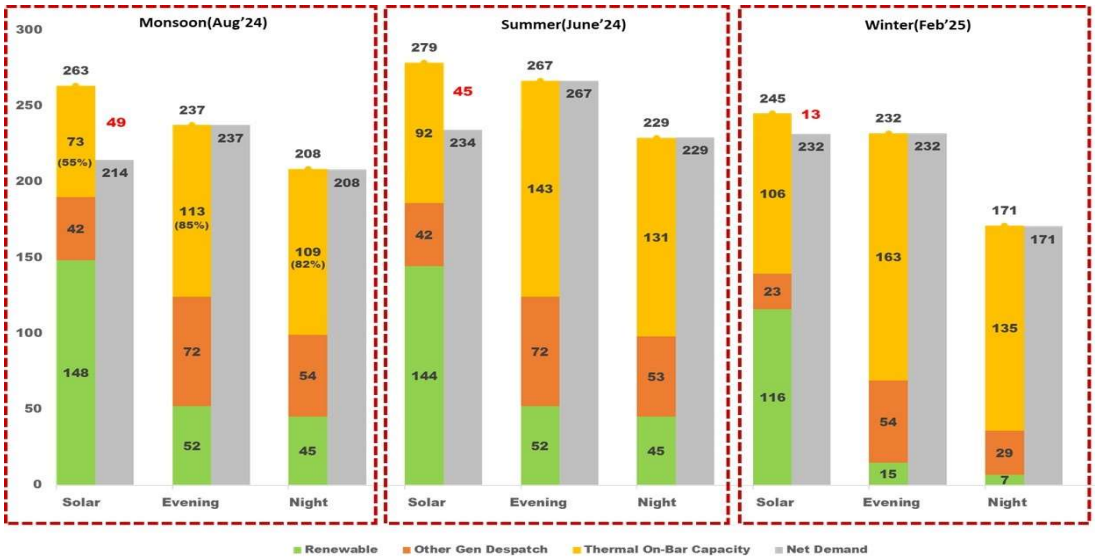
Considering the above LGB for nine scenarios, load flow cases were prepared for detailed studies incorporating assessment of adequacy of ISTS including inter-regional corridors planned to cater the power transfer requirement across the region in 2024-25 timeframe. Detailed study results have been discussed in subsequent chapters.

### 3.6 Energy Storage requirement

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.

Accordingly, 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 MW dispatches is given below.

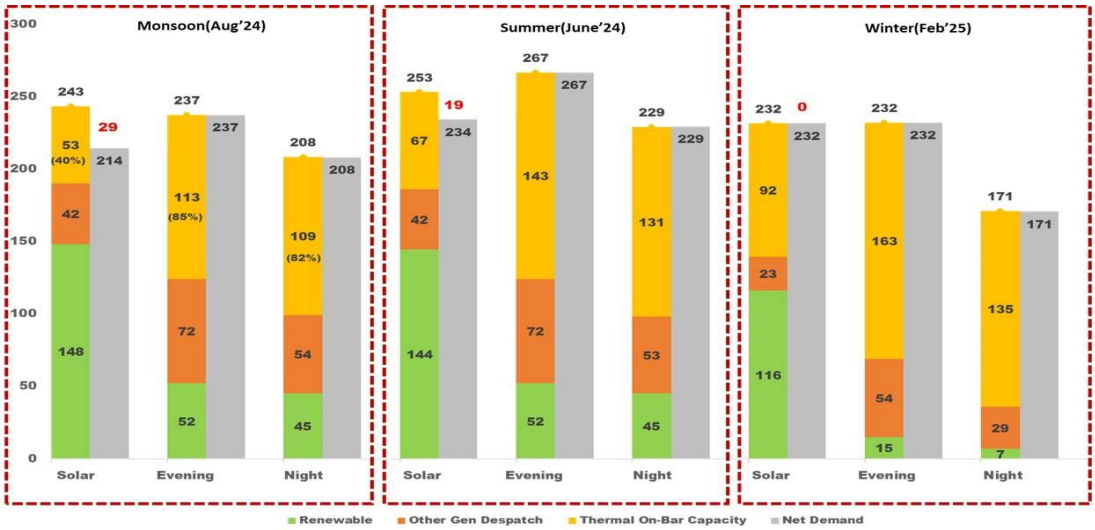
*Figure 3.6-1: Generation surplus with Tech Min (55%) for Thermal Units*




It may be observed that surplus generation is 49 GW, 45 GW, and 13 GW during Solar max in Monsoon, Summer, and Winter scenario respectively which need to be stored using BESS and used in other times during the same day.

A sensitivity analysis is done to see the quantum of surplus generation, if technical minimum of thermal units is reduced at 40% and the corresponding results are given below:

*Figure 3.6-2:Generation surplus with Tech Min (40%) for Thermal Units*




Even after operating thermal units at technical minimum of 40%, surplus generation of the order of 29 GW and 15 GW are observed during Solar max in Monsoon and Summer seasons respectively. Thus, BESS of about 29 GW capacity may be required to be installed in the grid to facilitate integration of about 210 GW of RE. In case, BESS is not adequately installed and if the number of on bar thermal units are to be kept same throughout the day during 2024-25, then thermal unit may need to be despatched to 27% and 28% during Solar max scenario in Monsoon and Summer respectively, which may not be practically feasible.

# Chapter 4: ISTS Expansion plan upto 2024-25

## 4.1 Summary of ISTS network

Region and year wise ISTS network expansion plan across the country upto FY 2024-2025 is enclosed in **Annex-4.1**. Summary of ckm addition, MVA addition and the broad estimated cost are tabulated below in Table 4.1-1, 4.1-2 and 4.1-3 respectively.

*Table 4.1-1: ckm addition*

| FY | WR | SR | NR | ER | NER | Total |
|---|---|---|---|---|---|---|
| **2021-22** | 1,721 | 0 | 659 | 112 | 79 | 2,571 |
| **2022-23** | 495 | 1,453 | 4,123 | 50 | 793 | 6,914 |
| **2023-24** | 3,798 | 550 | 0 | 265 | 340 | 4,953 |
| **2024-25** | 292 | 1,520 | 5,475 | 0 | 150 | 7,437 |
| **Total** | **6,306** | **3,523** | **10,257** | **427** | **1,362** | **21,875** |

*Table 4.1-2: MVA addition*

| FY | WR | SR | NR | ER | NER | Total |
|---|---|---|---|---|---|---|
| **2021-22** | 10,500 | 500 | 9,950 | 2,915 | 390 | 24,255 |
| **2022-23** | 3,000 | 5,000 | 15,185 | 0 | 100 | 23,285 |
| **2023-24** | 40,000 | 10,500 | 0 | 1,000 | 320 | 51,820 |
| **2024-25** | 3,000 | 34,500 | 42,080 | 0 | 320 | 79,900 |
| **Total** | **56,500** | **50,500** | **67,215** | **3,915** | **1,130** | **179,260** |

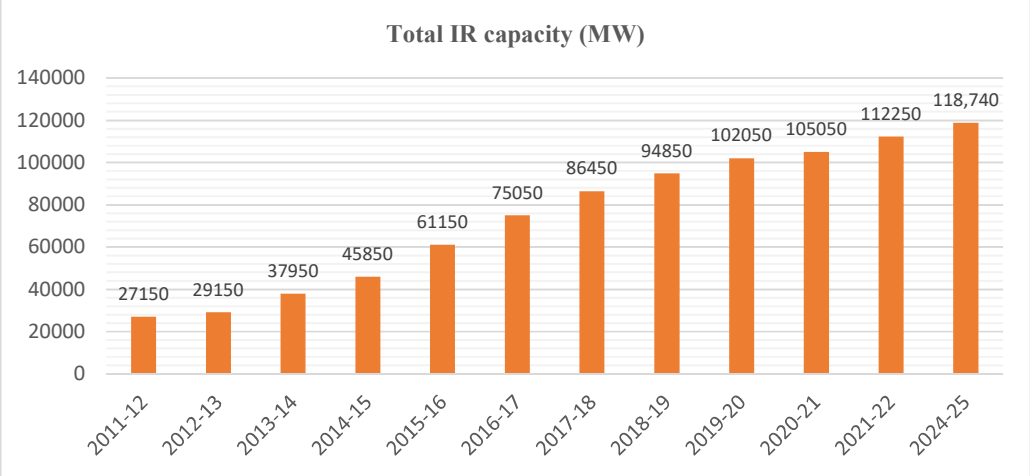
*Table 4.1-3:Broad estimated cost (in ₹ Cr.)*

| FY | WR | SR | NR | ER | NER | Total |
|---|---|---|---|---|---|---|
| **2021-22** | 5,168 | 129 | 2,950 | 585 | 290 | 9,122 |
| **2022-23** | 794 | 5,698 | 11,960 | 775 | 1,545 | 20,772 |
| **2023-24** | 12,343 | 1,773 | 0 | 325 | 0 | 15,126 |
| **2024-25** | 395 | 6,652 | 16,015 | 0 | 130 | 22,507 |
| **Total** | **18,700** | **14,252** | **30,925** | **1,685** | **1,965** | **67,527** |

## 4.2 Inter-Regional (IR) Capacity

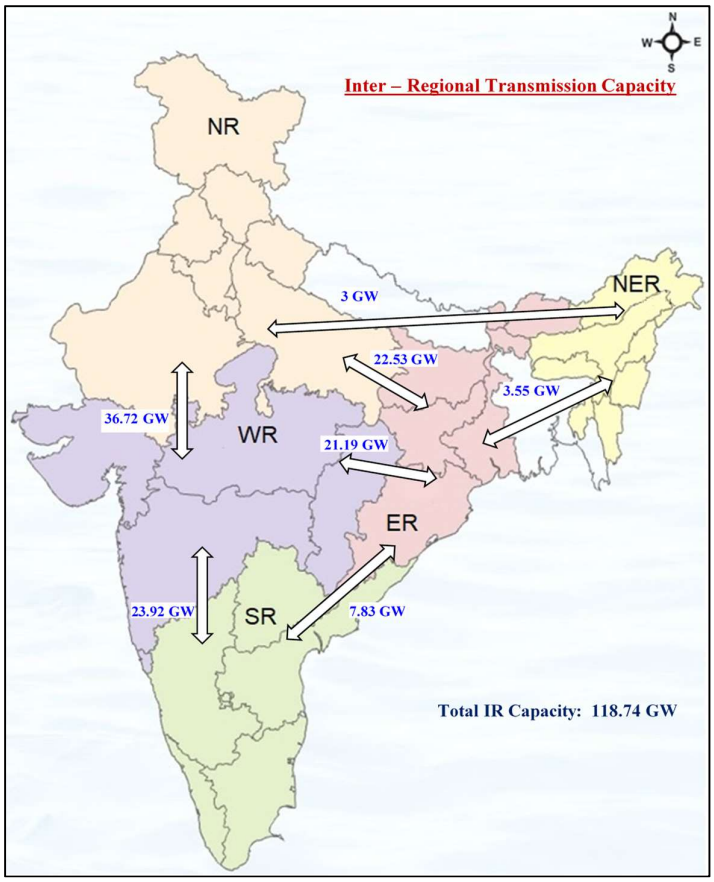
The progressive growth in Inter-Regional (IR) transmission capacity and till 2024-25 is given below:

*Figure 4.2-1: Growth in IR Capacity (MW)*




Details of Inter Regional corridor capacity are attached at **Annex 4.2** for 2024-25 and the schematic of the same is given below.

*Figure 4.2-2: Inter-Regional Transmission Capacity in 2024-25*



### 4.3 TTC-ATC

The Total Transfer Capability (TTC), Available Transfer Capability (ATC) and Transmission Reliability Margin (TRM) are defined as under:

*"Total Transfer Capability (TTC)" means the amount of electric power that can be transferred reliably over the inter-control area transmission system under a given set of operating conditions considering the effect of occurrence of the worst credible contingency.*

*"Transmission Reliability Margin (TRM)" means the amount of margin kept in the total transfer capability necessary to ensure that the interconnected transmission network is secure under a reasonable range of uncertainties in system conditions.*

*"Available Transfer Capability (ATC)" means the transfer capability of the inter-control area transmission system available for scheduling commercial transactions through access requests in a specific direction, considering the network security. Mathematically ATC is the TTC less TRM."*

TTC is generally less than aggregated transmission capacity between regions. This is owing to the fact that the transmission capacity of regional corridor is arrived by adding the ratings of all transmission lines connecting two regions and it is a fixed parameter, whereas transfer capability is the measure of the ability of the corridor, as a whole, for reliable transfer of power from one region to another which depends upon network topology, load generation balance and strength of the weakest link in the corridor, downstream network etc. The delay and deferment of transmission elements/load/generation greatly affects the value of the transmission capability. Therefore, TTC may vary widely with respect to transmission capacity. Further, looking into the uncertainties in implementation of various generation projects and transmission elements, declaration of TTC for upcoming few years ahead may not be accurate.

As on date TTC/ATC has been declared by CTU for Apr 2023 time-frame for various critical inter-regional corridors and the same is as given below:

*Table 4.3-1:TTC-ATC for Apr 2023*

| Corridor | Total Transfer Capability (TTC) | Transmission Reliability Margin (TRM) | Available Transfer Capability (ATC) |
|---|---|---|---|
| **WR-NR** | 25000 | 500 | 24500 |
| **ER-NR** | 6900 | 300 | 6600 |
| **WR-SR** | 16000 | 500 | 15500 |
| **ER-SR** | 5450 | 250 | 5200 |
| **ER-NER** | 2000 | 40 | 1960 |

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# Chapter 5: Renewable Energy Integration plan

## 5.1 Summary

Govt. of India has set a target of establishing 500 GW of generation installed capacity from non-fossil fuel based energy resources. Towards this, about 157 GW of generation capacity *[RES: 104GW, Large Hydro: 46.5GW & Nuclear: 6.78GW]* through non-fossil fuel based resources is already commissioned, which is being evacuated through existing Inter-state Transmission System (ISTS) and Intra-state Transmission System (In-STS). Thus, about 343GW of additional installed capacity of non-fossil fuel based generation resources need to be integrated till 2030. The status of transmission system already planned under ISTS for upcoming non-fossil fuel based generation capacity is given below:

*Table 5.1-1:Region wise RE potential*

| Sl. No. | Scheme | Potential (in GW) | Region-wise Breakup |
|---|---|---|---|
| **1** | Transmission schemes planned for 66.5GW REZ | 66.5 | NR: 20GW<br>WR: 28GW *(Incl. 10.5GW in Khavda area)*<br>SR: 18.5GW |
| **2** | Transmission Schemes planned / under planning beyond identified 66.5 GW REZ | 52 | NR: 30.88GW<br>• *Rajasthan: 20GW*<br>• *Ladakh: 10GW*<br>• *Kaza (Spiti): 0.88GW*<br>WR: 21.2GW<br>• *Khavda: 17.2GW*<br>• *Dholera: 4GW* |
| **3** | Transmission Schemes planned / under planning for future Large Hydro Projects | 13.8 | NR: 8.4GW<br>ER: 5.4GW |
| **4** | Margins for injection in existing ISTS System | 42 | NR: 15GW<br>WR: 9.1GW<br>SR: 4.7GW<br>ER: 13.2GW |
| | **Total Capacity (Planned/Under Planning)** | **174.3*** | |

** 2.5GW RE generation already commissioned as part of 66.5GW REZ (as on Nov-21)*

For achievement of balance 166GW capacity *[343-174.3-2.5],* SECI has identified 179GW potential RE zones in various states in SR, WR, and NR viz. Andhra Pradesh, Karnataka, Telangana, Rajasthan, Maharashtra and Madhya Pradesh with various Hybrid & Solar locations planned with storage such that total evacuation system requirement in terms of transmission infrastructure shall be required for about 102GW only (to ensure minimum transmission system utilization to at least 50%).

By 2024-25, RE capacity to the tune of 210 GW is expected to be commissioned which includes 121 GW Solar, 70 GW Wind, 14 GW Solar Rooftop and 4 GW other RES.

Region wise brief on power evacuation schemes along with the schematics is given below and the detailed scope of each of the scheme is at **Annex 5.1**.

## 5.2 Northern Region

In Northern Region, RE potential is mainly concentrated in Rajasthan (that too mainly solar potential). Accordingly, potential Solar Energy Zones (SEZs) of 20GW in Ramgarh/Kuchheri & Fatehgarh (Jaisalmer distt), Phalodi (Jodhpur distt), Kolayat /Pugal (Bikaner distt) were identified in western Rajasthan. Out of this, 17GW potential zones are to be developed in Phase-I (8.9GW) & Phase-II (8.1GW) under ISTS and balance 3GW are to be developed under intra-state by RVPNL. The potential of 17GW is to be materialized in phase wise manner i.e. 8.9GW in Phase-I and 8.1GW in Phase-II. The details are as below:

*Table 5.2-1:RE potential in NR*

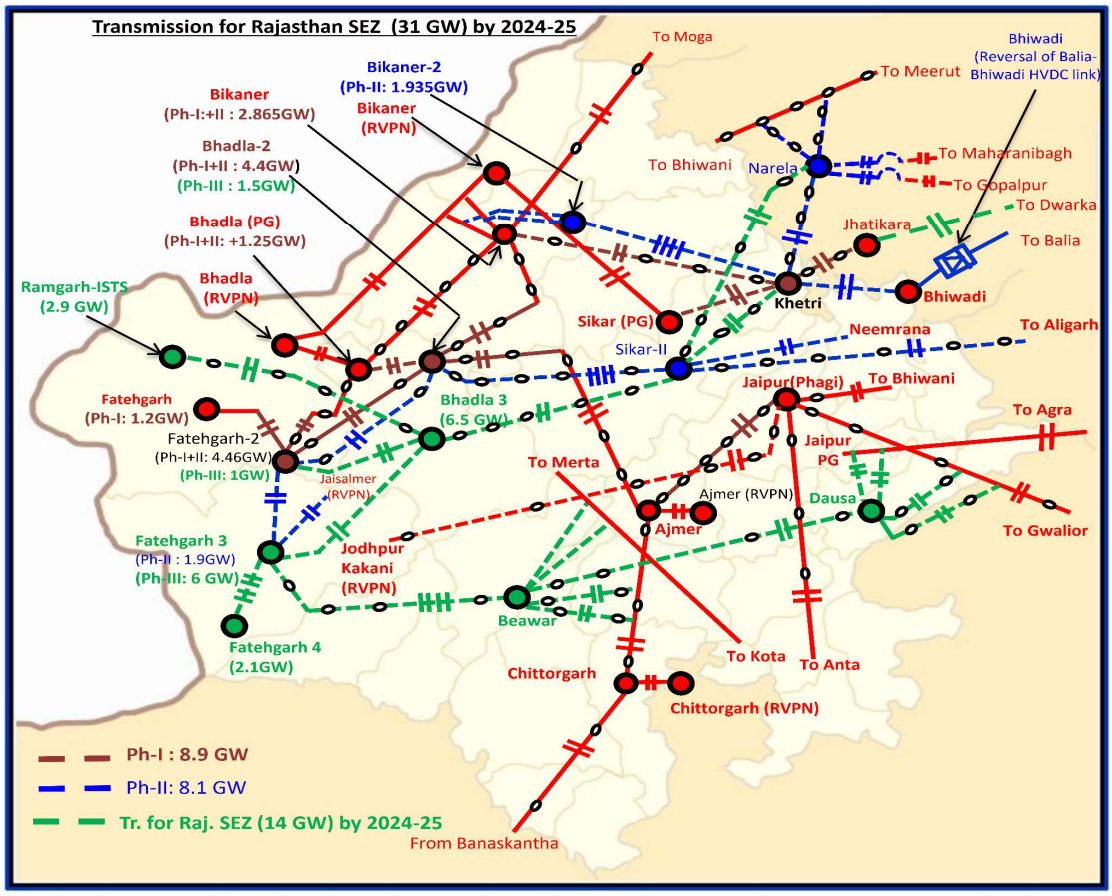
| Location | Potential (GW) | | Total (GW) |
|---|---|---|---|
| | Phase-I | Phase-II | |
| **Ramgarh** | 0 | 1.9 | 1.9 |
| **Fatehgarh** | 3.5 | 2.2 | 5.7 |
| **Bhadla** | 3.55 | 1.05 | 4.6 |
| **Bikaner** | 1.85 | 2.95 | 4.8 |
| **Total** | **8.9** | **8.1** | **17** |

Accordingly, to evacuate power from above solar energy zones, transmission system has been identified and is currently under various stages of implementation. Transmission System for evacuation of power under Phase-I i.e. Transmission System for Solar Energy Zones in Rajasthan (8.9GW) under Phase-I has been commissioned. Further, Transmission System for Solar Energy Zones in Rajasthan (8.1GW) under Phase-II is envisaged progressively from Dec 2022.

In addition to above, additional 20GW SEZs (Fatehgarh: 9.1 GW, Bhadla: 8GW, Ramgarh: 2.9 GW) were also envisaged in Rajasthan by SECI. In order to integrate and evacuate power from additional 20 GW SEZs, hybrid (EHVAC & HVDC) transmission system comprising EHV AC (765kV) & HVDC corridors for 6GW towards Delhi & Southern UP has been planned & agreed for evacuation of power from additional 20 GW SEZs in Rajasthan (Phase-III). However, HVDC corridors for 6GW has been deferred and currently under review due to non-visibility of RE projects as well as option of emerging Battery Energy Storage System (BESS) so as to enhance the utilization of existing system and minimize the requirement of HVDC lines.

A schematic of planned transmission system for RE in Rajasthan is given below:

*Figure 5.2-1: Transmission system for RE in Rajasthan, NR*



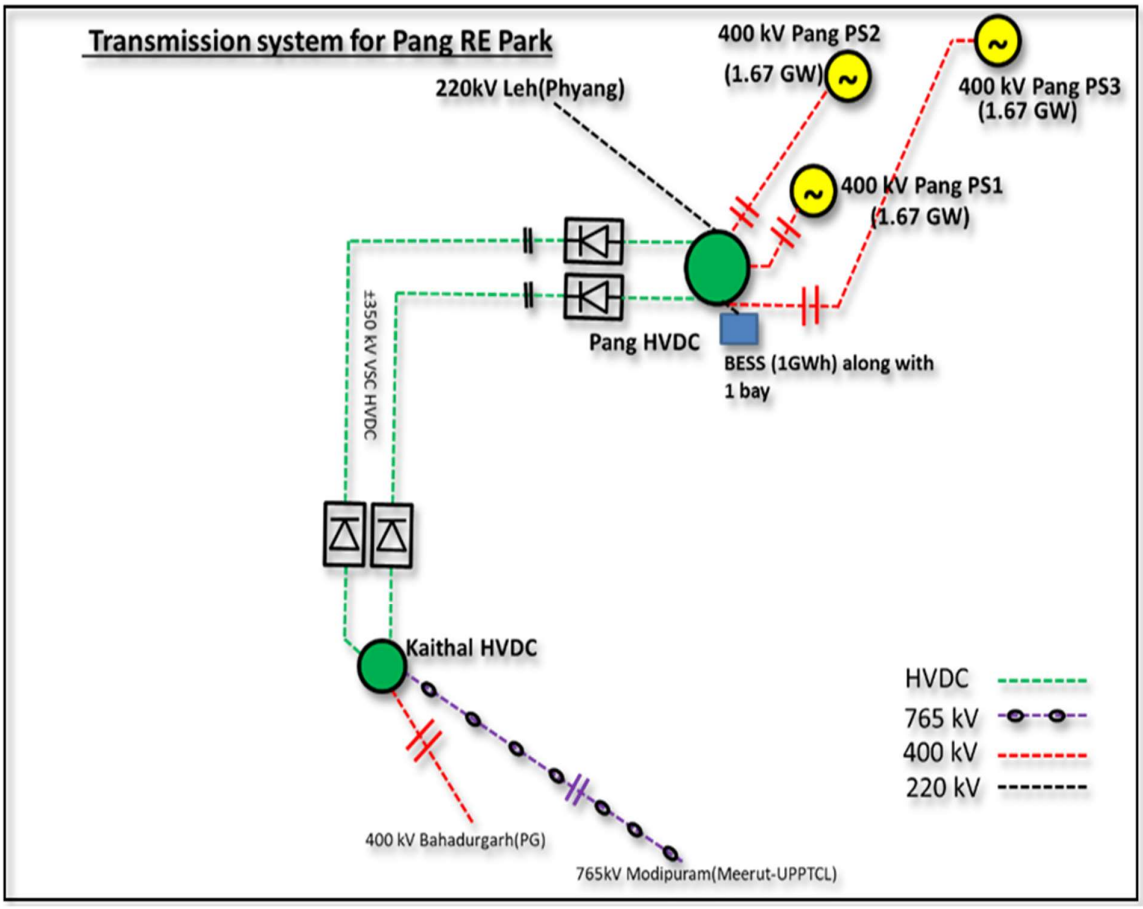

Transmission system for evacuation of power from renewable energy parks in Leh

Based on the directions of MoP, the possibility of developing and evacuating 10GW of renewable energy from Leh has been explored. Two locations have been identified for pooling of renewable energy in Leh i.e. Nyoma and Pang with a capacity of 5GW each. Power from above locations is proposed to be evacuated through VSC based HVDC system upto Kaithal and Kashipur respectively. Beyond Kaithal & Kashipur, it is to be integrated with National Grid through 765kV line as well as 400kV lines. However, in a meeting held on 22.06.2021 under the chairmanship of Secretary, Ministry of Power, the issue of wild life sanctuary involvement in Nyoma-Kashipur section was highlighted. It was also suggested that integration of 12 GWh of BESS at Pang may reduce the overall transmission capacity to 5 GW and accordingly, one of the planned ISTS links from Ladakh can be completely eliminated. With BESS, superior power supply and higher capacity utilization of the lines from Leh can be achieved.

After deliberations, it was decided that the transmission system for evacuation of 10 GW RE generation would comprise 5 GW transmission link from Pang to Kaithal along with 12 GWh BESS under Phase-I. It is also to mention that by integrating 12 GWh of BESS at Pang, one transmission system corridor of 5 GW from Pang to Kaithal shall be sufficient to cater to the

evacuation up to 13 GW (9 GW Solar + 4 GW Wind) RE capacity. BESS will increase the utilization of the transmission corridor, besides ensuring superior power supply. As capacity addition of RE generation i.e., hybrid of Solar and Wind is expected to be built up gradually over a period of time, implementation of BESS can be taken up at the later stage of Phase-I of transmission system, which would help in optimizing the cost of BESS. A schematic of the proposed transmission system is given below.

*Figure 5.2-2: Transmission system for Pang RE park, NR*

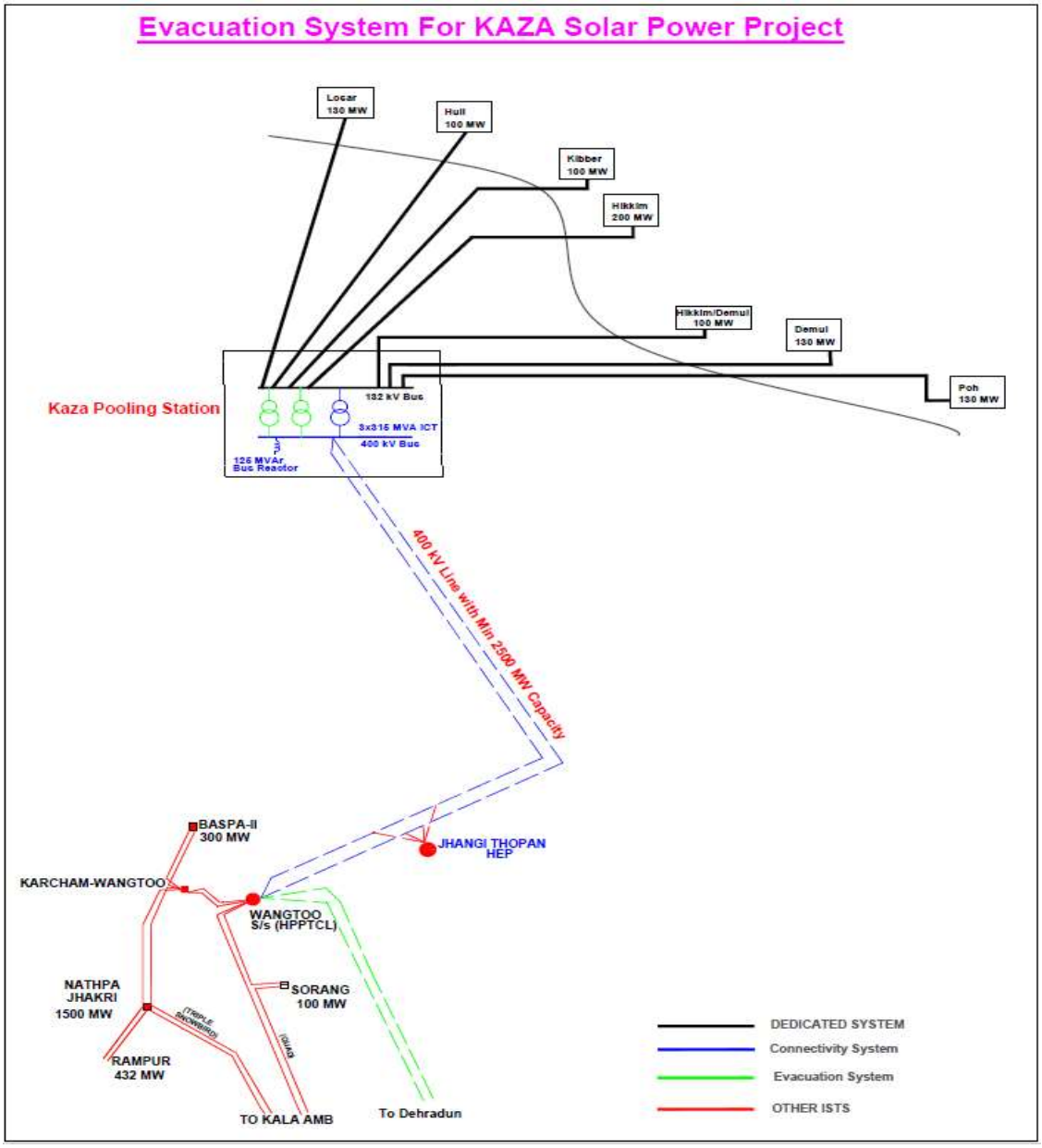



Transmission System for Evacuation of Power from Kaza Solar Park (880 MW)

To provide connectivity for proposed Kaza solar park being developed by SJVN Ltd., establishment of 1x315 MVA, 400/132kV substation at Kaza along with Kaza – Wangtoo (HPPTCL) 400 kV D/c line is agreed to be implemented under ISTS. Subsequently, availability of additional RE potential in Kinnaur area in proximity to Kaza was confirmed by HIMURJA. Accordingly, considering RE potential in contiguous area of Kaza complex as well as severe RoW limitations in Kaza-Wangtoo corridor, the line capacity of Kaza – Wangtoo 400 kV D/c line was decided to be developed with high capacity conductor capable of carrying about 2500 MVA per circuit at nominal voltage. This high capacity line shall also help in evacuating power from envisaged hydro potential in that area. Further, for transfer of power beyond Wangtoo,

Wangtoo (HPPTCL) – Dehradun (PG) 400 kV D/c line is also to be implemented under ISTS. A schematic of the proposed transmission system is given below.

*Figure 5.2-3: Transmission system for Kaza Solar Power Project, NR*




## 5.3 Western Region

A number of potential renewable energy zones (as part of 66.5GW REZ) have been identified in the states of Gujarat, Madhya Pradesh and Maharashtra by MNRE/SECI having cumulative potential of 28 GW, including 16 GW in Gujarat, 5 GW in Madhya Pradesh, and 7 GW in Maharashtra. The proposed transmission system has been agreed to be implemented as ISTS in phased manner as per the visibility of generation in these potential areas. The present status of implementation of planned transmission system is given below.

*Table 5.3-1:RE potential in WR and associated Transmission Plan*

| Location of REZ | REZ Potential (GW) | Transmission Plan |
|---|---|---|
| ***Bhuj*** | *2* | *Transmission System under implementation and expected by Mar'22.* |
| ***Dwarka (Jam Khambaliya)*** | *1.5* | |
| ***Lakadia*** | *2* | *Transmission System is yet to be taken up for implementation due to no visibility of RE generation.* |
| ***Khavda*** | *8* | *Transmission System for Khavda Phase-A (Ph-I) (3GW) is under tendering process and award is expected shortly with implementation time-frame of Dec'23. Transmission System for Khavda Phase-A (Ph-II) (5GW) is under tendering stage with implementation schedule of 24 months from SPV transfer.* |
| ***Khavda*** | *2.5* | *The potential is part of Khavda REZ Phase-B (7GW) and associated transmission System is yet to be taken up for implementation due to no visibility of RE generation.* |
| **Gujarat** | **16** | |
| ***Rajgarh*** | *2.5* | *Transmission System for Rajgarh (1.5GW) is under tendering process and award is expected shortly with implementation time-frame of Jun'23. Transmission System for balance 1GW REZ is yet to be taken up for implementation due to no visibility of RE generation beyond 1.5GW at Rajgarh.* |
| ***Neemuch*** | *1* | *Transmission System is under tendering stage with implementation schedule of 18 months from SPV transfer.* |
| ***Chattarpur*** | *1.5* | *Transmission System is under tendering stage with implementation schedule of 18 months from SPV transfer.* |
| **Madhya Pradesh** | **5** | |
| ***Sholapur*** | *2.5* | *Transmission System is yet to be taken up for implementation due to no visibility of RE generation* |
| ***Wardha*** | *2.5* | |
| ***Osmanabad*** | *1 (ISTS) + 1 (Intra-state)* | *Transmission System is under tendering process and award is expected shortly with implementation time-frame of Jun'23* |
| **Maharashtra** | **7*** | |
| **Grand Total** | **28*** | |

**With 1 GW is under intra-state*

The transmission system for evacuation of power from cumulative 7 GW REZ in Khavda area under Phase-B (including 2.5GW potential under 66.5GW REZ) as well as for Dholera UMSP (Phase-I: 2GW) have also been planned. However, the schemes have been deferred as per details given below:

- Khavda Phase-B (7GW) to be studied again with consideration of BESS at Khavda RE park.
- Dholera scheme to be deliberated based on outcome of the RE potential studies for Dholera Solar Park as well as clarity on various clearances for the park.

The schematics of the proposed transmission system for 28 GW REZ projects in Gujarat, Madhya Pradesh, and Maharashtra are given below:

*Figure 5.3-1: Transmission system for RE in Gujarat, WR*

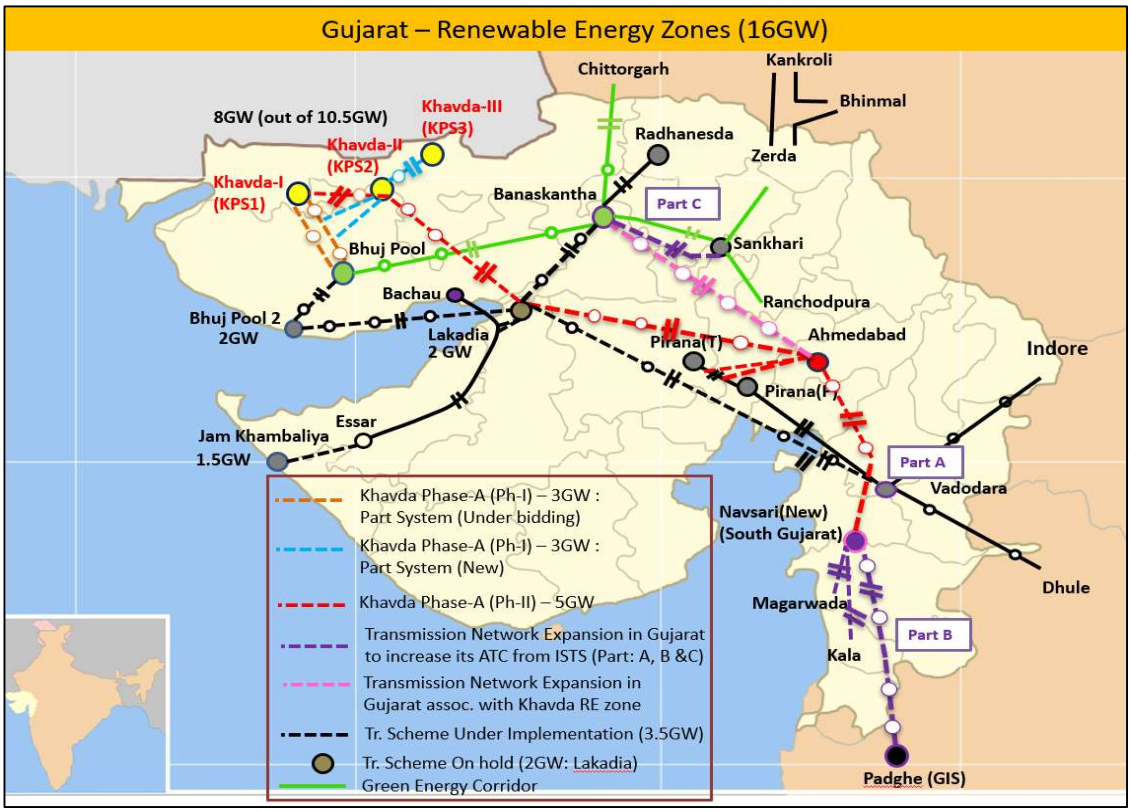



*Figure 5.3-2: Transmission system for RE in Madhya Pradesh, WR*

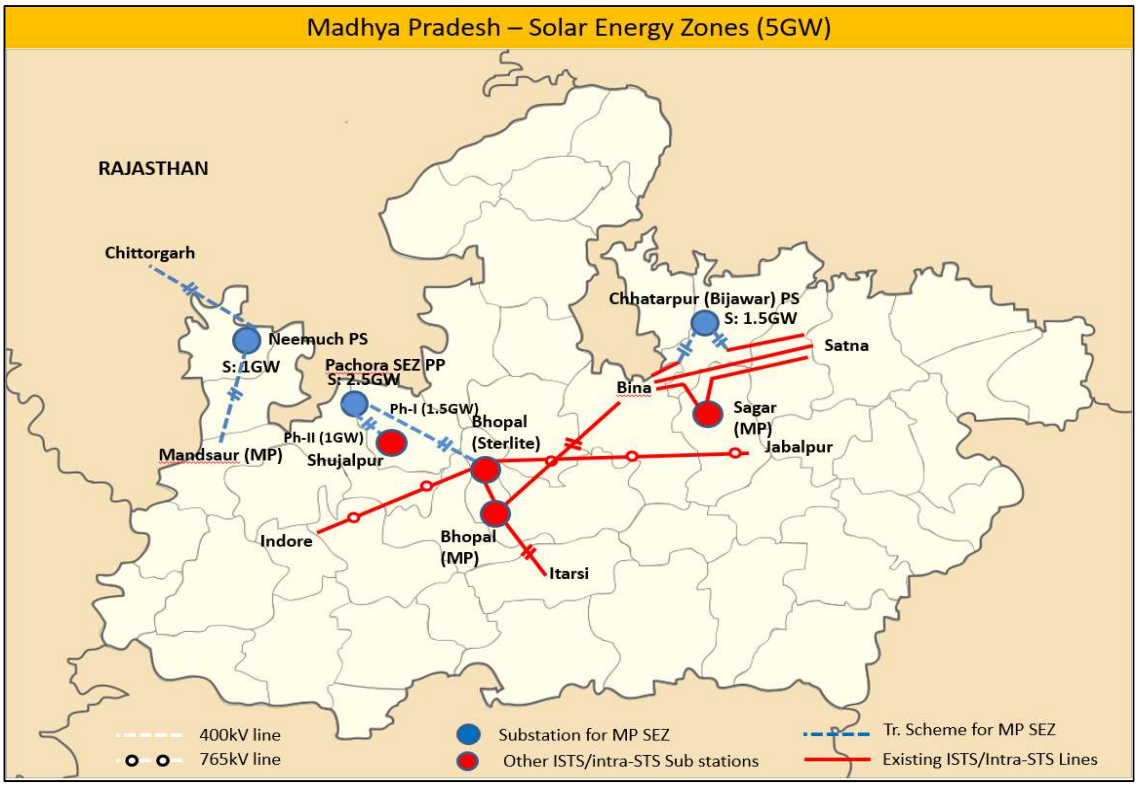
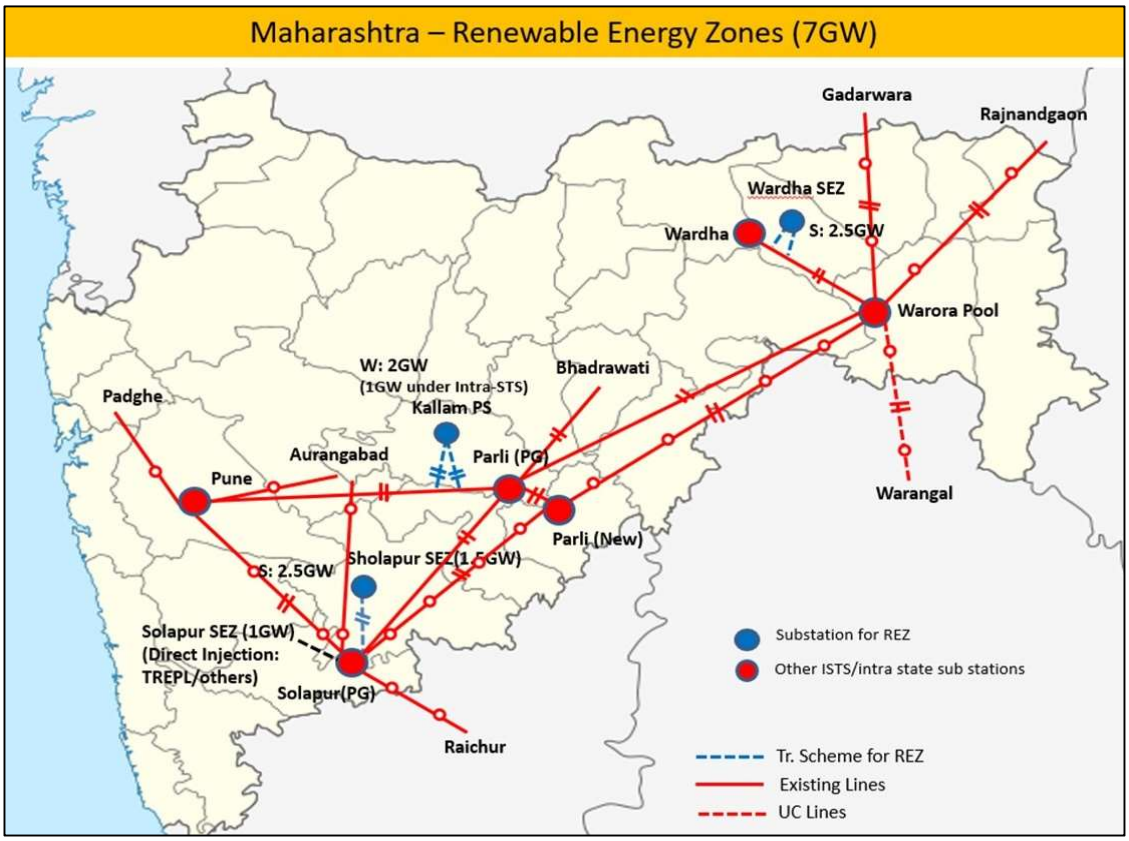


*Figure 5.3-3: Transmission system for RE in Maharashtra, WR*




## 5.4 Southern Region

A number of potential renewable energy zones were identified in the states of Karnataka, Andhra Pradesh and Tamil Nadu by MNRE/SECI having potential of 18.5 GW. The details of the same as per the area and phases are as below:

*Table 5.4-1:RE potential in SR*

| Region | Wind | Solar | Total |
|---|---|---|---|
| Tiruneveli (TN) | 0.5 | | 0.5 |
| Koppal (Kar) | 2.5 | | 2.5 |
| Karur (TN) | 2.5 | | 2.5 |
| Gadag (Kar) | | 2.5 | 2.5 |
| Bidar (Kar) | | 2.5 | 2.5 |
| Kurnool (AP) | 3.0 | 2.5 | 5.5 |
| Anantapur (AP) | | 2.5 | 2.5 |
| **Total** | **8.5** | **10.0** | **18.5** |

Transmission system for the integration and immediate evacuation of power from these potential REZ in Southern Region was evolved in consultation with CEA, POSOCO and SR

constituents in the 2nd SRSCT and 1st SRPC(TP) held on 10.06.2019 and 16.12.2019 respectively. The proposed transmission system was agreed to be implemented as ISTS in phased manner as per the visibility of generation in these potential areas.

Based on the progress of generation in the identified REZ, transmission system for 8 GW of REZ in Koppal, Gadag, Karur and Tuticorin REZ is already under implementation. Further, transmission system for integration and immediate evacuation of balance 10.5 GW of REZ in Bidar, Kurnool and Anantapur districts is on-hold and the same shall be implemented as per the visibility of the generation projects in these areas.

It is pertinent to mention that since a huge potential of REZ has been identified in Southern Region and more and more power in expected to be injected into ISTS as per the latest assessment done by MNRE/SECI, Southern Region is expected to export surplus power in high RE scenario in the months of May to October. In such a scenario, constraints are likely to be observed for export of this surplus power to beneficiaries in other regions particularly beyond Kolhapur in Western Region. It may be mentioned that looking into the requirement of export of surplus power, Raigarh-Pugalur HVDC link planned for facilitating import of power to Southern Region has been designed with reverse power flow provision upto 3000 MW and may be used for export of surplus RE power from Southern Region. Moreover, ISTS network expansion scheme between Western Region & Southern Region for export of surplus power during high RE is being planned by CTU in consultation with various stakeholders. The schematics of the proposed transmission system are given below.

*Figure 5.4-1: Transmission system for RE in Tamil Nadu, SR*

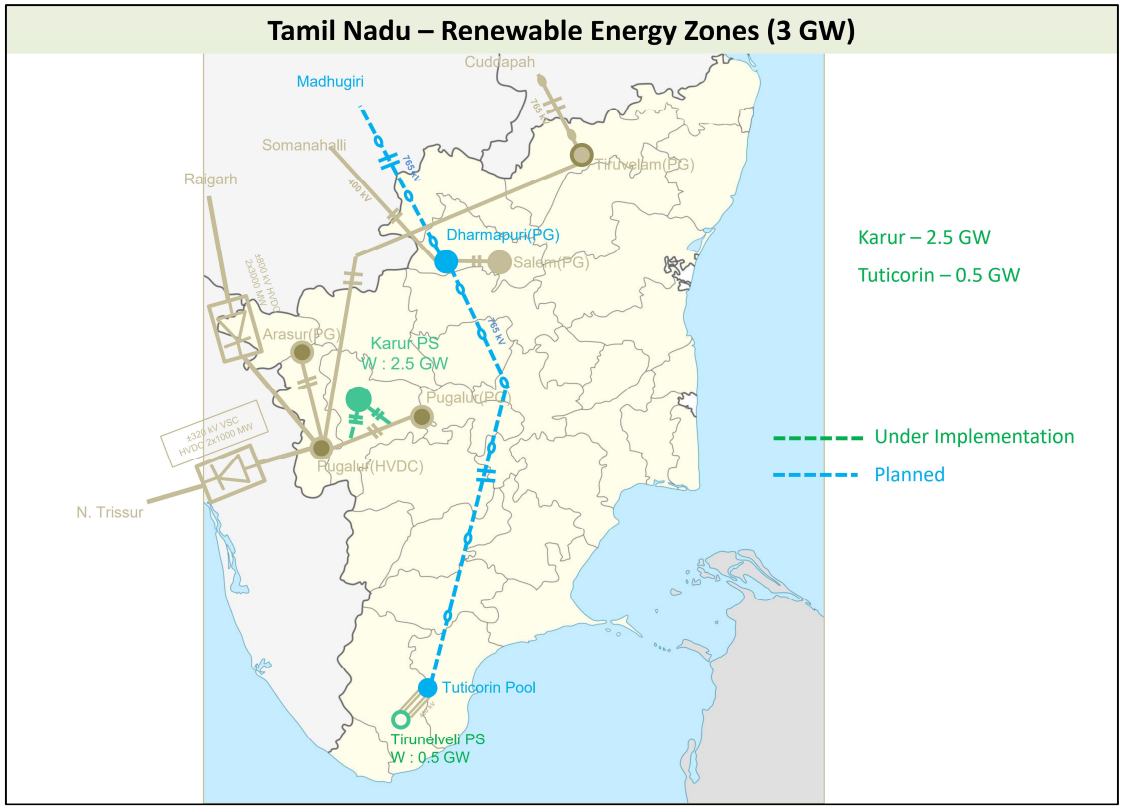


*Figure 5.4-2: Transmission system for RE in Karnataka, SR*

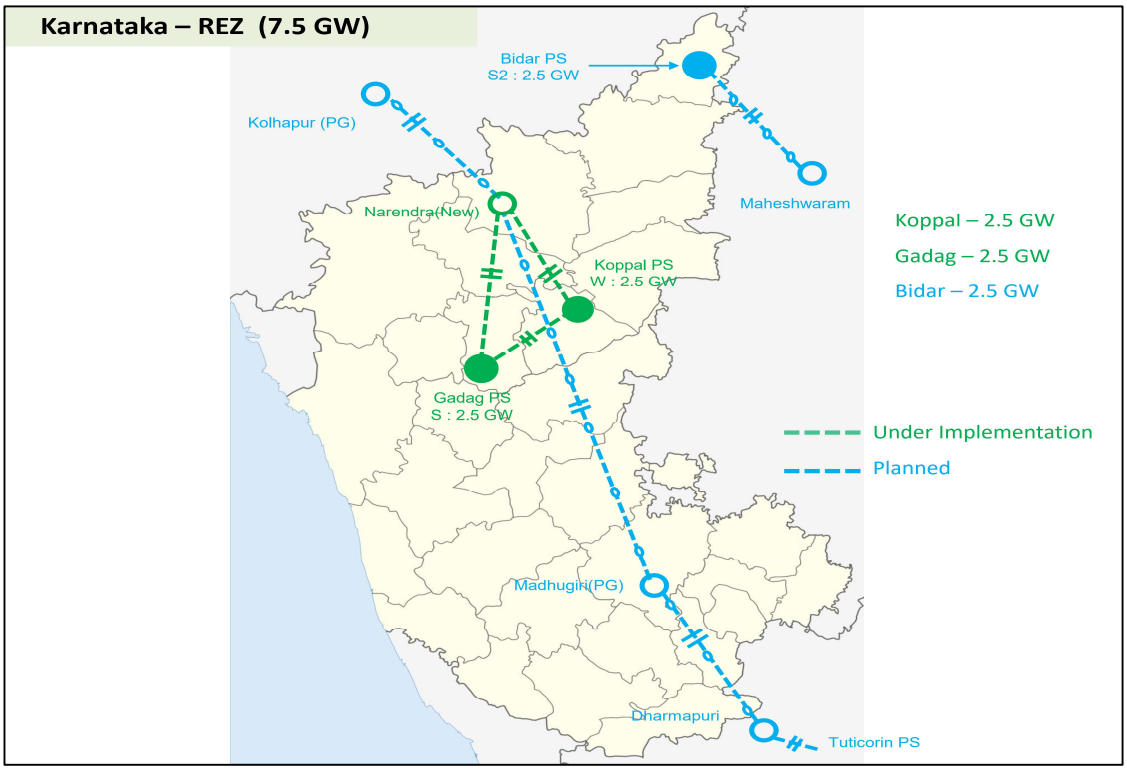
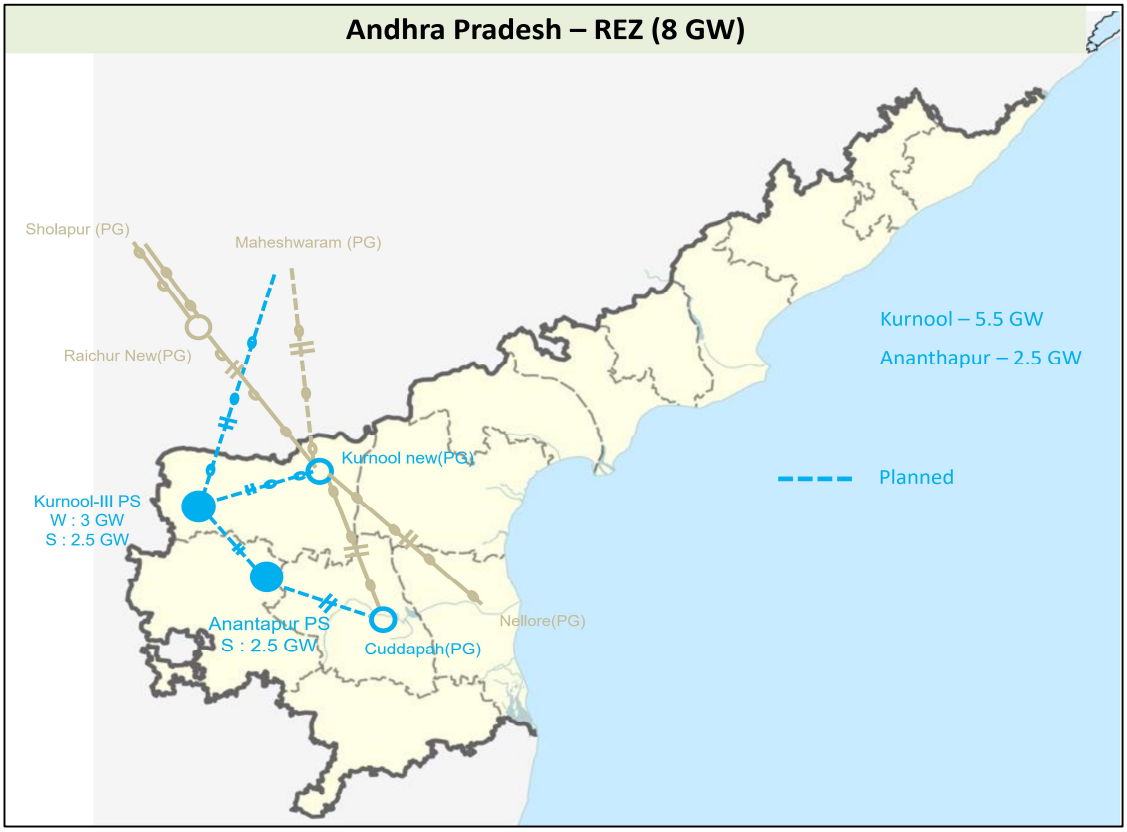



*Figure 5.4-3: Transmission system for RE in Andhra Pradesh, SR*



# Chapter 6: 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:

## 6.1 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.

## 6.2 India-Bhutan

(i) Present interconnection

- 2070MW is being transferred from Bhutan to India through following lines in synchronous mode of operation
  - *Kurichu HEP – Geylephu (Bhutan) – Salakati 132kV S/c*
  - *Deothang/Motonga – Rangia 132kV S/c*
  - *Chukha HEP – Birpara 220kV (3 circuits)*
  - *Tala HEP – Siliguri 400kV 2xD/c*
  - *Mangdechhu HEP – Alipurduar (via Punatsangchhu) 400kV D/c (Quad) line*

- *Jigmeling (Bhutan) – Alipurduar 400kV D/c (Quad) line*

(ii) Under Construction interconnection

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

### 6.3 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) Planned interconnection

- Imphal (India) - Tamu (Myanmar) high capacity AC line along with 2x500MW 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

### 6.4 India-Nepal

(i) Present interconnection

- 1000MW can be transferred from India to Nepal through following links in radial mode of operation:
  - *About 350MW through 132kV & below radial lines*
  - *About 650MW of power through the first high-capacity link i.e., 400kV D/c Dhalkebar (Nepal) – Muzaffarpur (India) line.*

(ii) Under Construction interconnection

- Additional 1800MW can be transferred from Nepal to India through following links:
  - Sitamarhi (POWERGRID) – Dhalkebar (Nepal) 400kV D/c (Quad) line (associated with Arun-3 HEP, Nepal): Expected by Apr 2023.
  - Gorakhpur (India) – New Butwal (Nepal) 400kV D/c (Quad) line: Requisite approvals are being obtained to take up implementation.

(iii) Planned interconnection

- New Purnea (India) - New Duhabi (Nepal) 400kV (Quad) D/c line

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

### 6.5 India-Sri Lanka

(i) Planned interconnection

- New Madurai – New Habarana 1000MW HVDC Bipole line

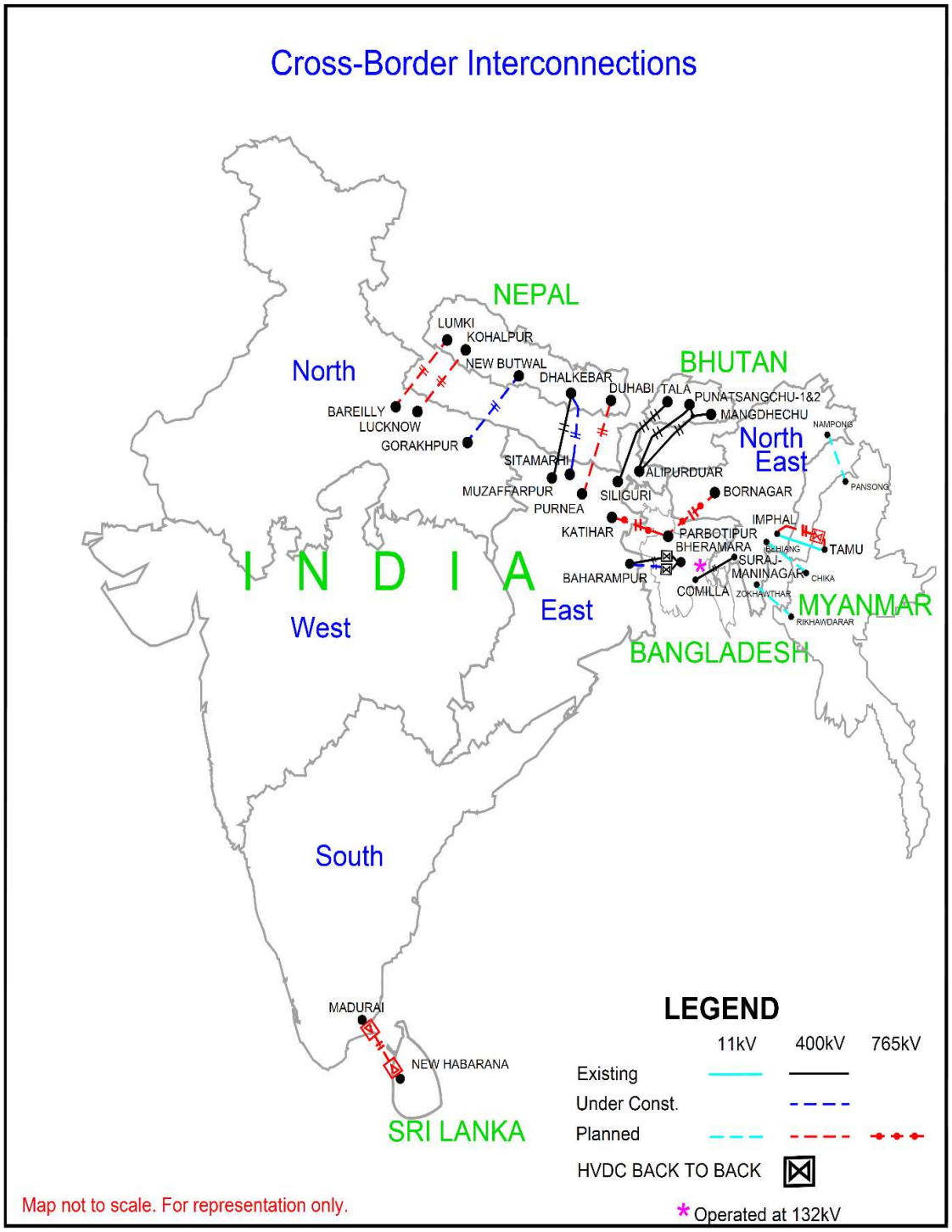
The cross-border transmission capacity of India with neighbouring countries in present time-frame and through under construction interconnections is summarized below:

*Table 6.5-1:Cross-border power transfer capacity*

| Country | Existing (MW) | Under Construction (MW) | Planned (MW) | Total (MW) |
|---|---|---|---|---|
| **India-Bangladesh** | 1160 | 0 | 1000 | 2160 |
| **India-Bhutan** | 2070 | 2220 | 0 | 4290 |
| **India-Myanmar** | 3 | 0 | 1000 | 1003 |
| **India-Nepal** | 1000 | 1800 | 4670 | 7470 |
| **India-Sri Lanka** | 0 | 0 | 1000 | 1000 |
| **Total** | **4233** | **4020** | **7670** | **15923** |

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

*Figure 6.5-1: Cross-Border interconnections*



# Chapter 7: Study Results

Based on the load-generation balance scenarios, studies have been carried in PSSE for identification of power flow patterns across various regions as per the various generations available to meet the load in the identified scenarios. Detailed analysis is explained in section below.

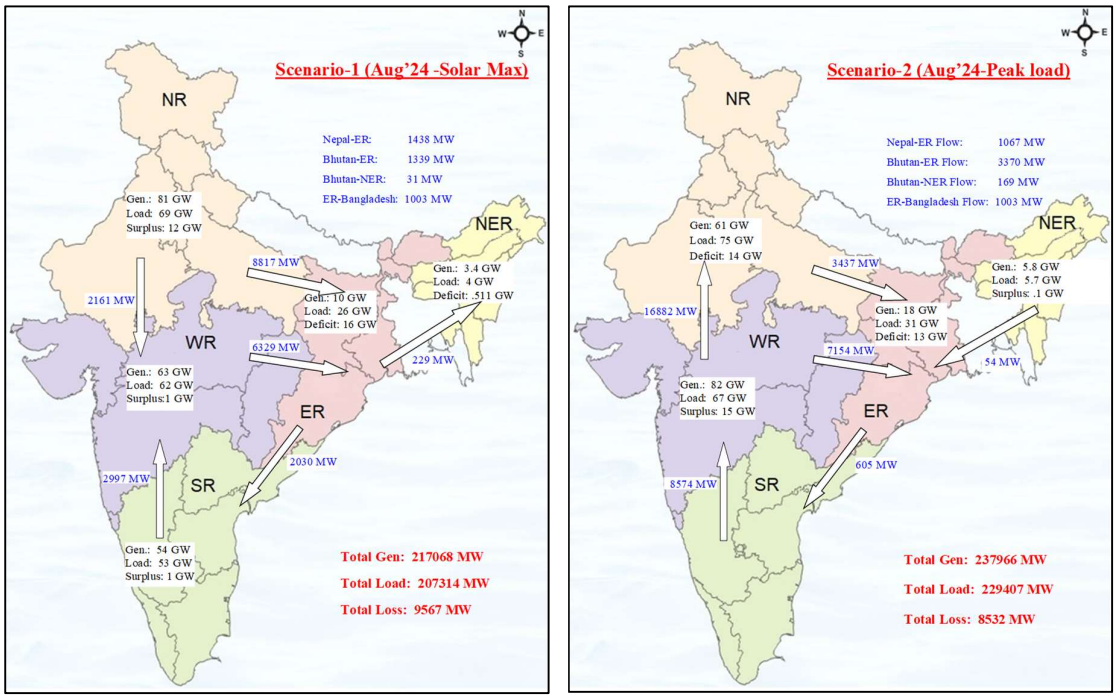
## 7.1 Inter-Regional system

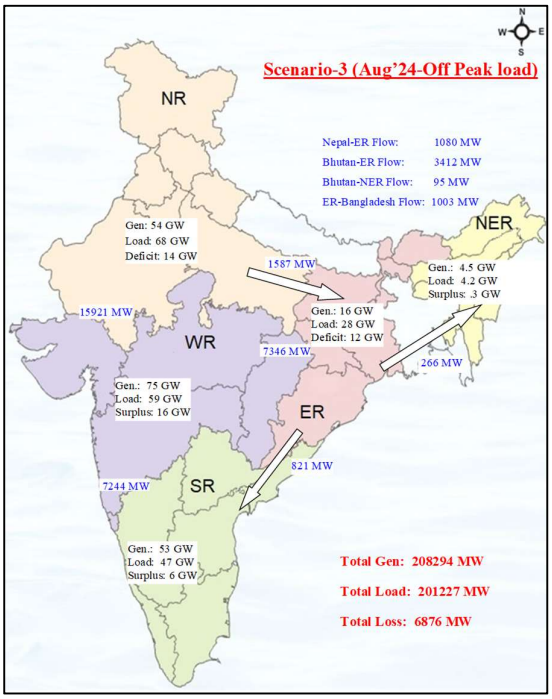
Inter-regional flows across various regions based on simulation studies are shown below in schematics at Figure 7.1-1 and the same are also summarised at Table 7.1-1 for all the nine scenarios. Max and Min flows in each IR corridor are highlighted in table below.

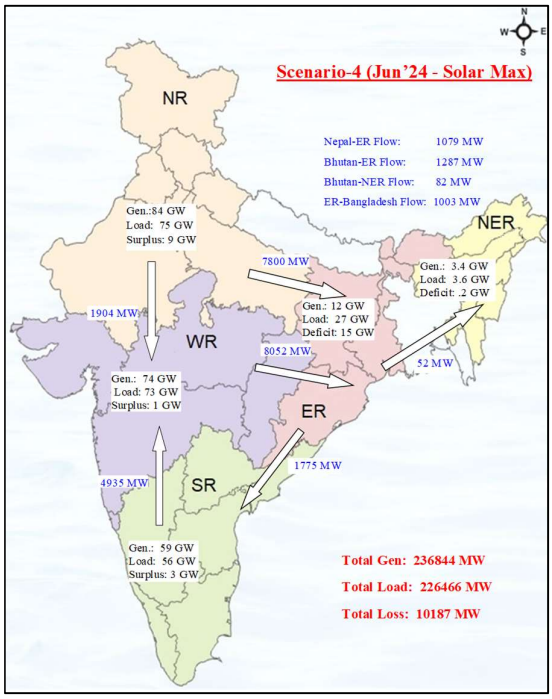
*Table 7.1-1:IR flow summary*

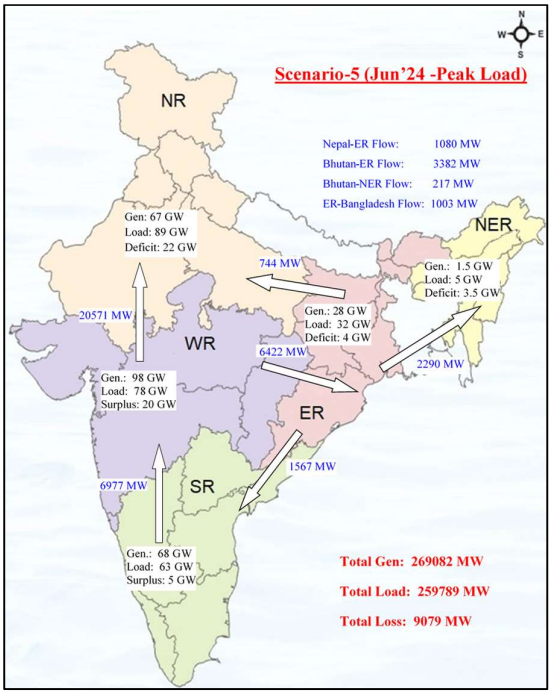
| IR Flows | Aug'24 | | | Jun'24 | | | Feb'25 | | |
|---|---|---|---|---|---|---|---|---|---|
| Scenario No. / Corridor | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| | Solar Max | Peak Load | Off Peak | Solar Max | Peak Load | Off Peak | Solar Max | Peak Load | Off Peak |
| WR-NR | -2161 | 16217 | 15585 | -2175 | **20143** | 15527 | **-18209** | 4124 | 209 |
| ER-NR | **-8817** | -2963 | -1362 | -7529 | 1028 | -665 | -5165 | **2254** | 1109 |
| ER-WR | -6329 | -6862 | -6793 | -7646 | -6351 | **-8200** | -3850 | -3556 | -3687 |
| ER-SR | 2030 | 592 | 852 | 1826 | 1554 | 1504 | **5208** | 3978 | 4368 |
| WR-SR | -2997 | **-8560** | -7276 | -5008 | -6964 | **-7126** | **8602** | 5177 | 8100 |
| NER-ER | -229 | 69 | -286 | -40 | **-2288** | 19 | -754 | -300 | -678 |

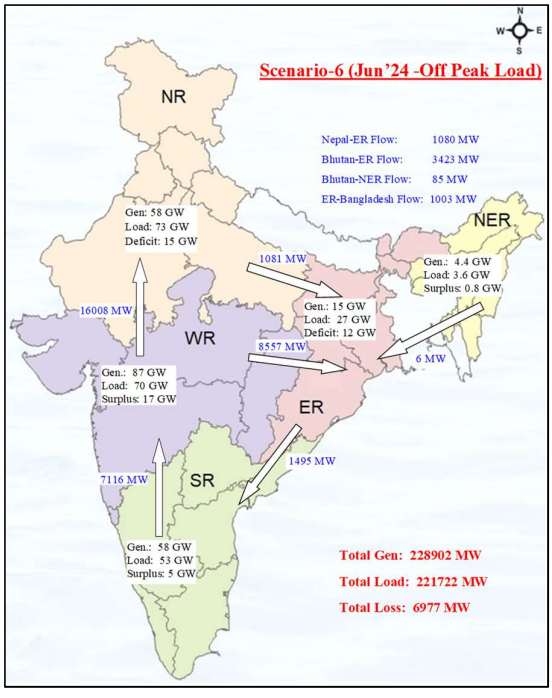
*Figure 7.1-1: Inter-regional flows in nine scenarios*

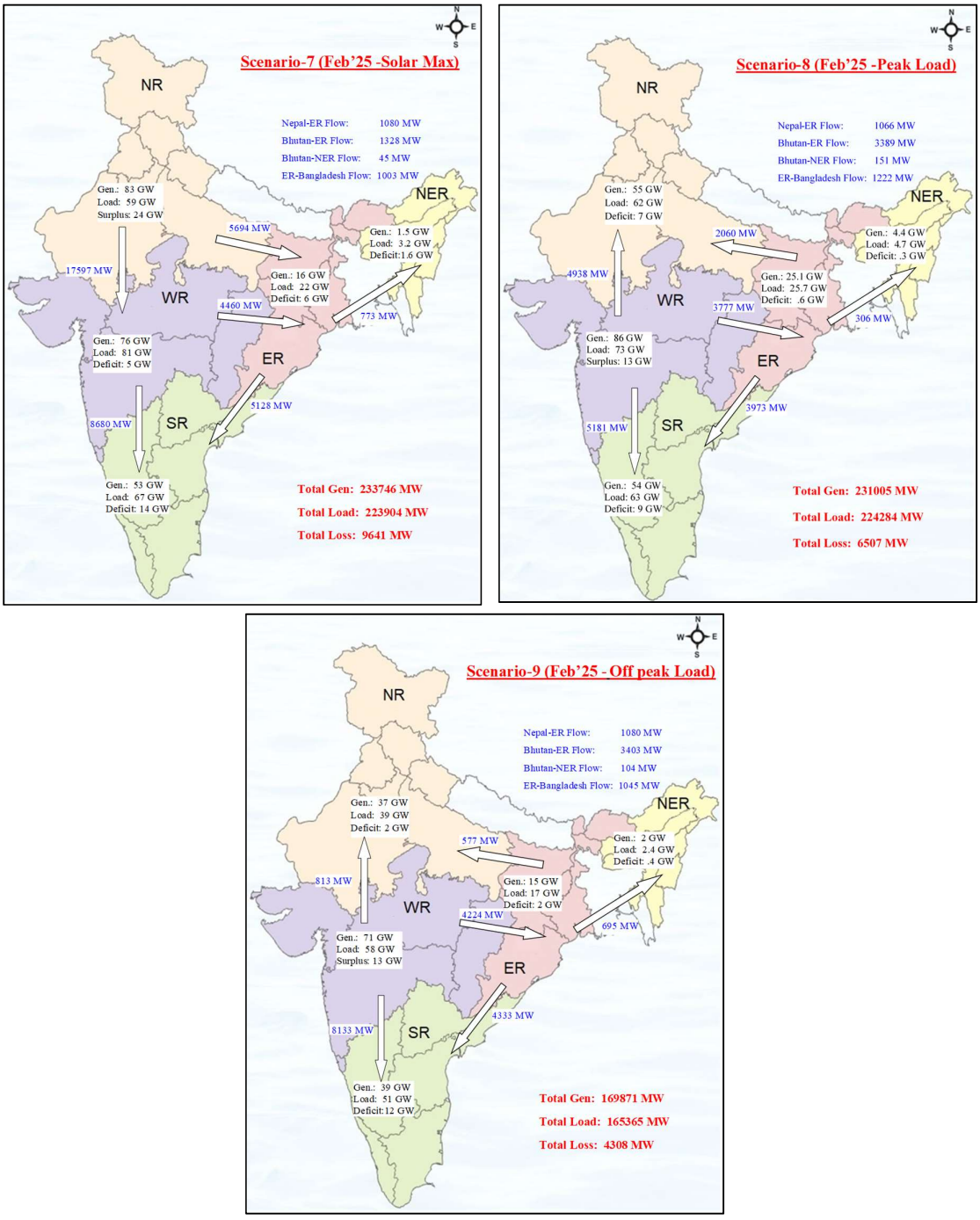



Scenario-3 (Aug'24-Off Peak load)
NR
NER
WR
ER
SR
Nepal-ER Flow: 1080 MW
Bhutan-ER Flow: 3412 MW
Bhutan-NER Flow: 95 MW
ER-Bangladesh Flow: 1003 MW
Gen: 54 GW
Load: 68 GW
Deficit: 14 GW
1587 MW
Gen.: 4.5 GW
Load: 4.2 GW
Surplus: .3 GW
15921 MW
Gen.: 16 GW
Load: 28 GW
Deficit: 12 GW
7346 MW
266 MW
Gen.: 75 GW
Load: 59 GW
Surplus: 16 GW
821 MW
7244 MW
Gen.: 53 GW
Load: 47 GW
Surplus: 6 GW
Total Gen: 208294 MW
Total Load: 201227 MW
Total Loss: 6876 MW


Scenario-4 (Jun'24 - Solar Max)
NR
NER
WR
ER
SR
Nepal-ER Flow: 1079 MW
Bhutan-ER Flow: 1287 MW
Bhutan-NER Flow: 82 MW
ER-Bangladesh Flow: 1003 MW
Gen.:84 GW
Load: 75 GW
Surplus: 9 GW
7800 MW
Gen.: 3.4 GW
Load: 3.6 GW
Deficit: .2 GW
1904 MW
Gen.: 12 GW
Load: 27 GW
Deficit: 15 GW
8052 MW
52 MW
Gen.: 74 GW
Load: 73 GW
Surplus: 1 GW
1775 MW
4935 MW
Gen.: 59 GW
Load: 56 GW
Surplus: 3 GW
Total Gen: 236844 MW
Total Load: 226466 MW
Total Loss: 10187 MW


Scenario-5 (Jun'24 -Peak Load)
NR
NER
WR
ER
SR
Nepal-ER Flow: 1080 MW
Bhutan-ER Flow: 3382 MW
Bhutan-NER Flow: 217 MW
ER-Bangladesh Flow: 1003 MW
Gen: 67 GW
Load: 89 GW
Deficit: 22 GW
744 MW
Gen.: 1.5 GW
Load: 5 GW
Deficit: 3.5 GW
20571 MW
Gen.: 28 GW
Load: 32 GW
Deficit: 4 GW
6422 MW
2290 MW
Gen.: 98 GW
Load: 78 GW
Surplus: 20 GW
1567 MW
6977 MW
Gen.: 68 GW
Load: 63 GW
Surplus: 5 GW
Total Gen: 269082 MW
Total Load: 259789 MW
Total Loss: 9079 MW


Scenario-6 (Jun'24 -Off Peak Load)
NR
NER
WR
ER
SR
Nepal-ER Flow: 1080 MW
Bhutan-ER Flow: 3423 MW
Bhutan-NER Flow: 85 MW
ER-Bangladesh Flow: 1003 MW
Gen: 58 GW
Load: 73 GW
Deficit: 15 GW
1081 MW
Gen.: 4.4 GW
Load: 3.6 GW
Surplus: 0.8 GW
16008 MW
Gen.: 15 GW
Load: 27 GW
Deficit: 12 GW
8557 MW
6 MW
Gen.: 87 GW
Load: 70 GW
Surplus: 17 GW
1495 MW
7116 MW
Gen.: 58 GW
Load: 53 GW
Surplus: 5 GW
Total Gen: 228902 MW
Total Load: 221722 MW
Total Loss: 6977 MW




From the above it can be observed that:

- Power on WR-NR corridor is flowing in both directions in different scenarios. Maximum power of the order of 20 GW is flowing from WR to NR in June evening peak scenario whereas maximum power flow of the order of 18 GW is flowing from NR to WR in February solar max scenario.
- Power on ER-NR corridor is flowing from NR to ER in solar max scenarios with maximum power of about 9 GW.

- Power on ER-WR corridor is always flowing from WR to ER with maximum flow of 8 GW and minimum flow of 3.5 GW.
- Power on ER-SR corridor is also flowing towards SR in all the scenarios with maximum flow of 5 GW and minimum flow of 0.6 GW.
- Power on WR-SR is flowing towards WR in Monsoon and summer season with a maximum flow of 8 GW whereas in winter season power is flowing towards SR with maximum flow of 8 GW.

Each IR corridor comprises of multiple 765 kV, 400 kV, 220 kV, HVDC transmission System between the regions and each tie line has power flow limit. Critical loading patterns of these tie lines under various scenarios are indicated in **Annex-7.1.1** Further to analyse the power flow violation on these tie lines two power ratings were considered. Power flow exceeding the thermal limit are highlighted in yellow in the said annexure. It is observed that the most of these ties are loaded well within their design limit except for few 400kV and 220kV lines emanating from Rajasthan towards Western Region which are critically loaded and the same are listed below. Detailed studies are being carried out to mitigate the same.

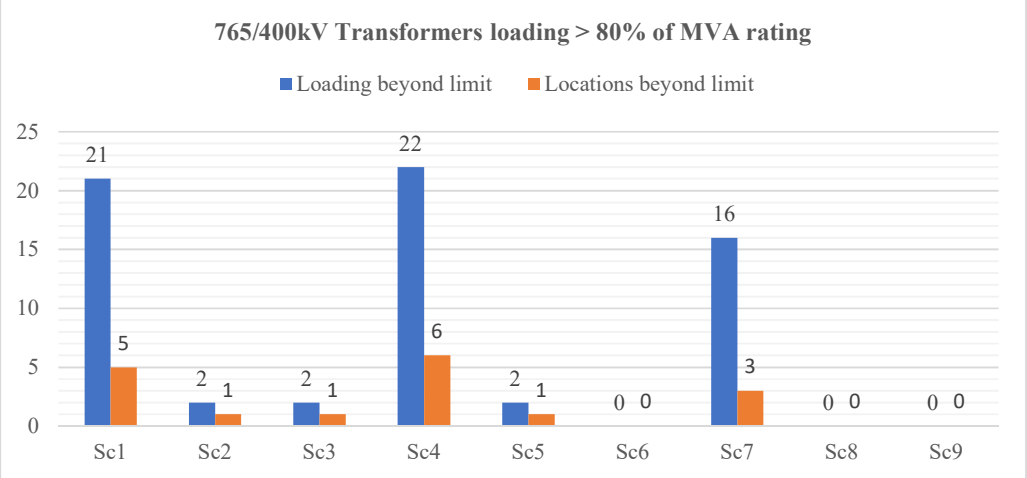
*Table 7.1-2: Critically loaded IR lines summary*

| 400kV | 220kV |
|---|---|
| Bhinmal - Zerda S/c | Modak - Bhanpura S/c |
| Kankroli - Zerda S/c | Sakatpur - Bhanpura S/c |
| RAPS - Shujalpur D/c | Sahupuri - Pausuali D/c |

## 7.2 Transformation Capacity

In the time frame under study, there would be about 300 nos. of 765/400 kV transformer at 108 nos. of 765/400 kV substations. From simulation studies loading patterns of these transformers are tabulated and loading more than 80% of their rating in any scenarios are highlighted in **Annex-7.2.** Number of ICT's along with substation locations of above analysis are depicted in figure 7.2-1.

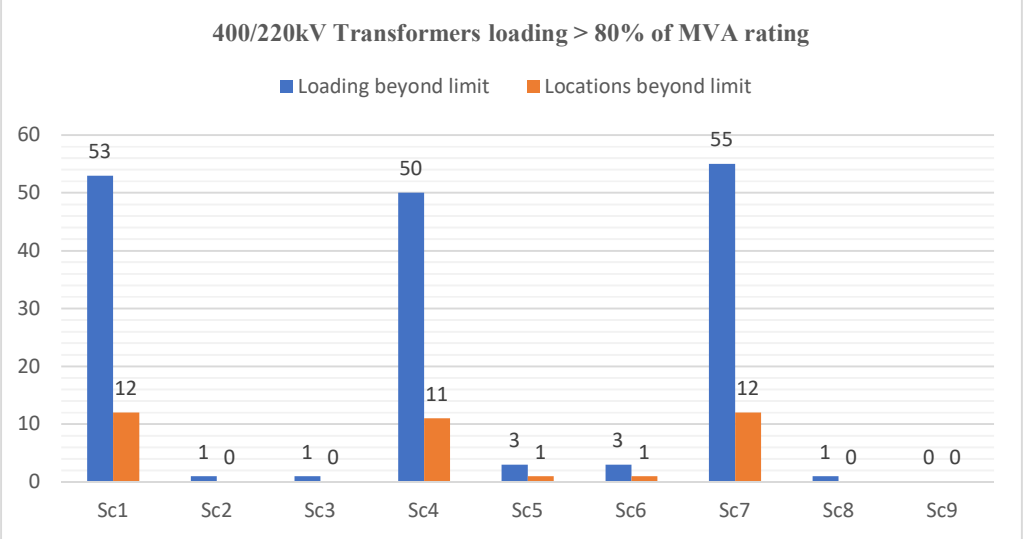
*Figure 7.2-1:765/400kV ICT Loading under base case*



Maximum number of transformers loaded above 80% of MVA rating are in solar max scenarios i.e. 1, 4 and 7 with 21, 22 and 16 transformers respectively located at 6 nos. of different substations.

Similar analysis was carried out for 400/220 kV transformers. There are 1841 nos. of transformer located at about 663 nos. of 400/220kV stations.

*Figure 7.2-2:400/220kV ICT loading under Base Case*




Under solar max scenarios viz. Scenarios 1, 4 and 7 about 53, 50 and 55 transformers respectively located at 11-12 nos. of different substations are 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.

### 7.3 765kV and 400kV Transmission System

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 number of scenarios. There are about 275 nos. of 765 kV lines and about 2217 nos. of 400 kV lines. Line flow pattern of these lines in all scenarios are tabulated and flows exceeding the 70% of thermal limit are highlighted at **Annex-7.3**. Summary of the results is shown below:

*Figure 7.3-1:765kV Tr. line flow > 70% of thermal limit under base case*

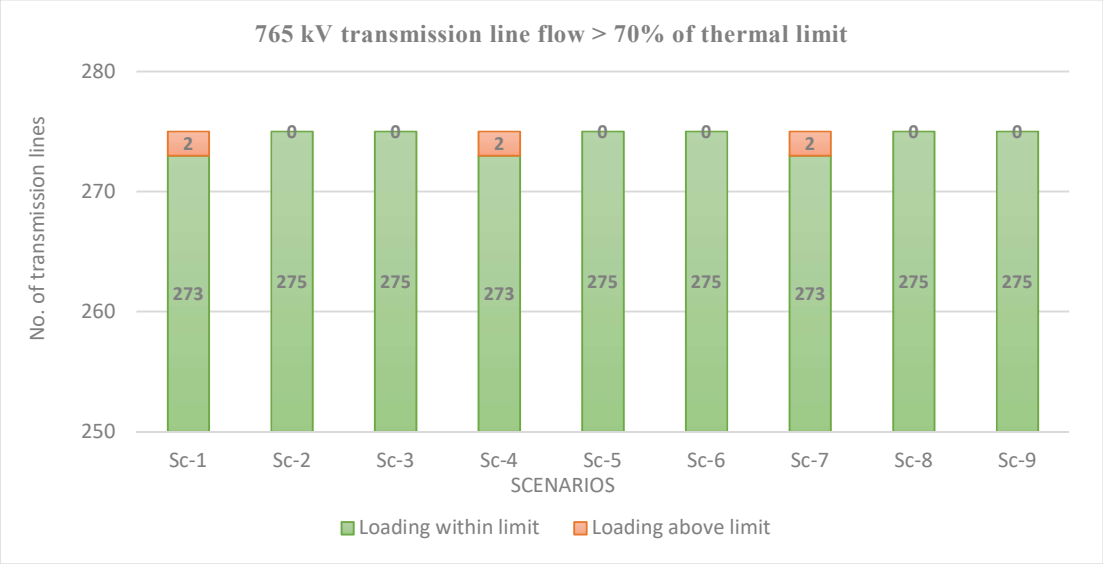
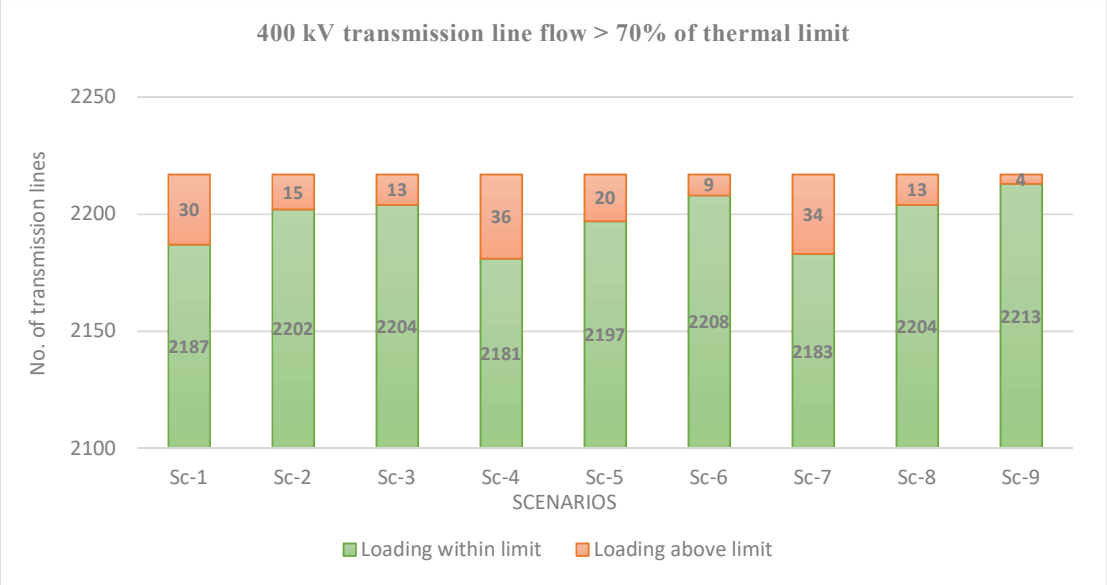



*Figure 7.3-2:400kV Tr. line flow > 70% of thermal limit under base case*




Power flow on two nos. of 765kV lines viz. Narela – Meerut and Sikar (New) – Bhadla-3 are greater than 70% of thermal limit in base case itself. About 30, 36 and 34 nos. of 400 kV lines in Scenarios-1, 4, and 7 (Solar max scenarios) respectively are loaded above 70% of the thermal limit. Accordingly, detailed contingency studies have been carried out in subsequent section.

### 7.4 Contingency Studies

N-1 Contingency analysis has been performed on all the 765 kV & 400kV transmission lines, and 765/400 kV & 400/220 kV transformers. Major observations are discussed below:

### 7.4.1 Transformers

Number of substations where ICTs are loaded above 90% and 100% of MVA rating under N-1 contingency are depicted below. Detailed results are attached at **Annex-7.4.1.**

*Figure 7.4-1:765/400kV ICT loading≥90% of MVA rating under N-1 Contingency*

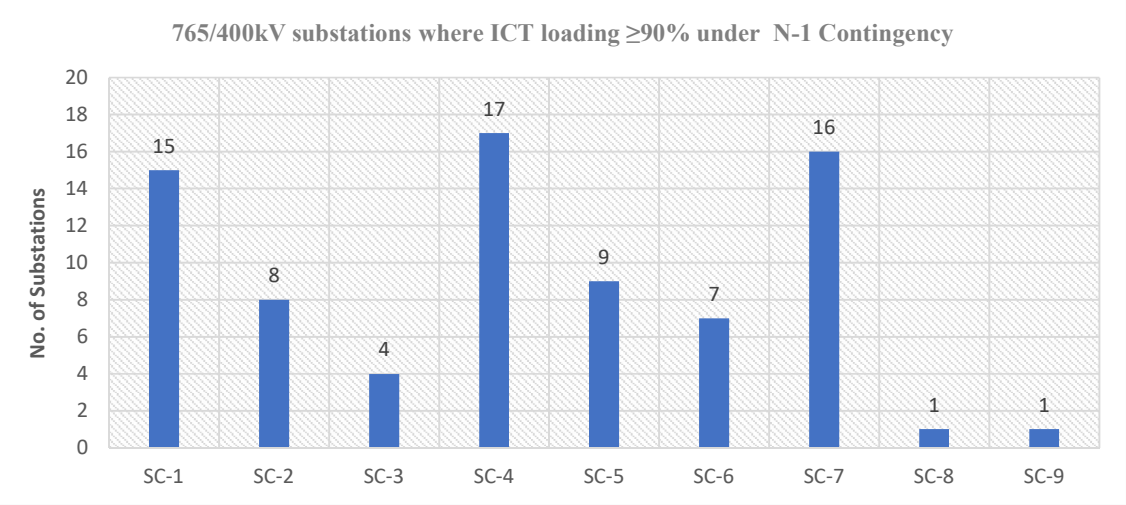
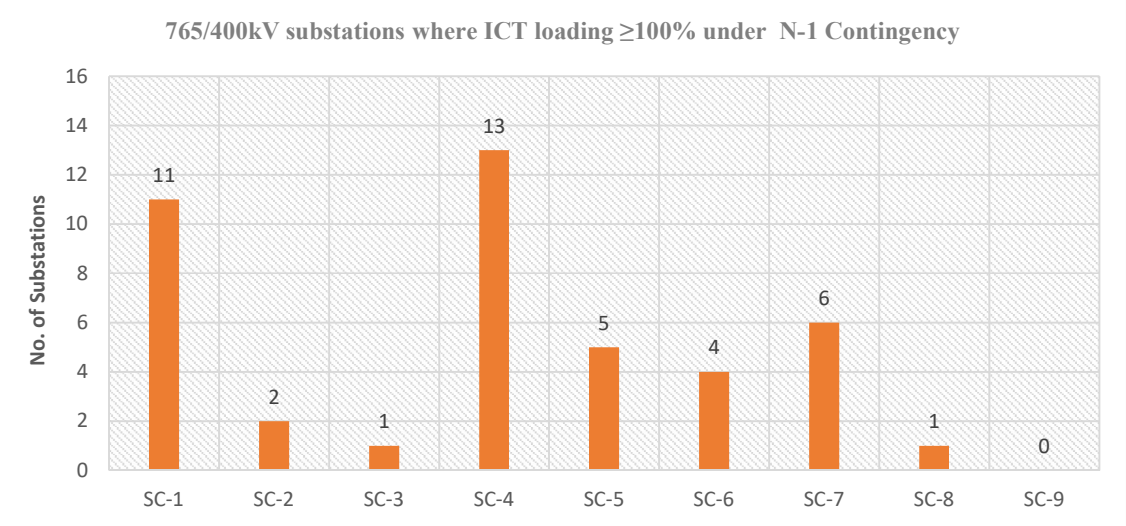



*Figure 7.4-2:765/400kV ICT loading≥100% of MVA rating under N-1 Contingency*




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

*Figure 7.4-3:400/220kV ICT loadings≥ 90% of MVA rating under N-1 Contingency*

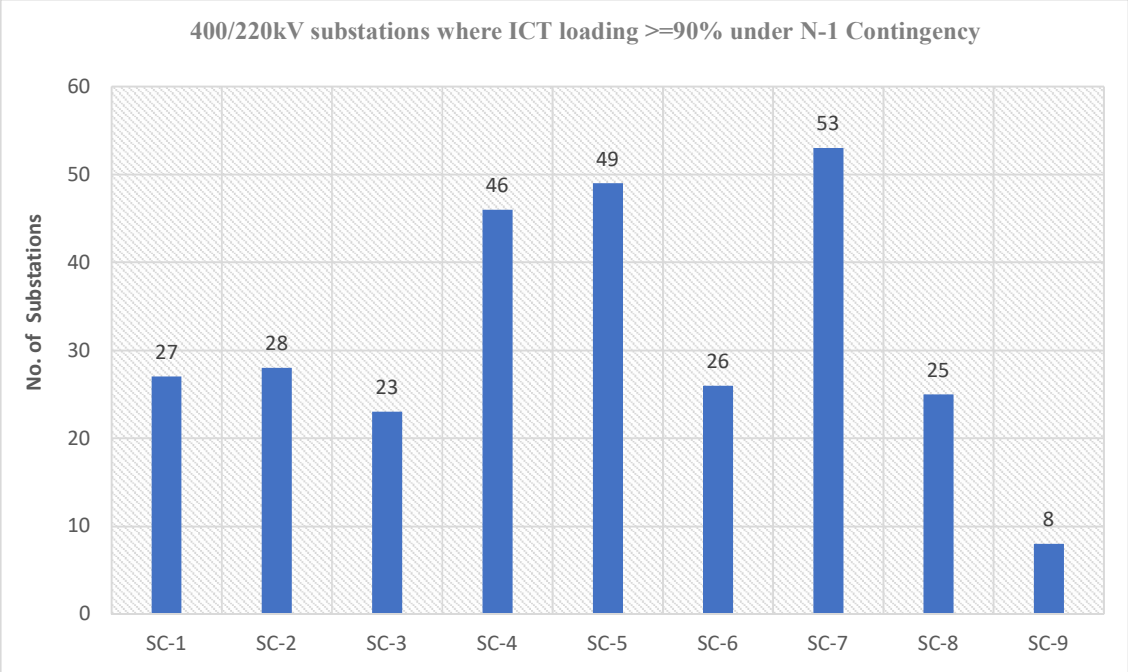
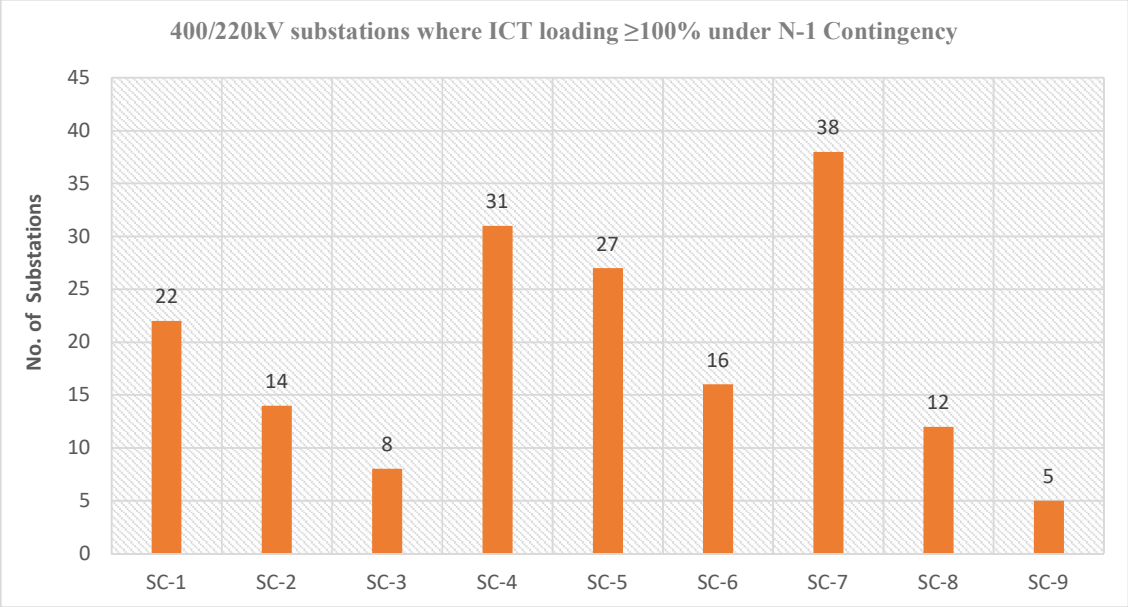



*Figure 7.4-4:400/220kV ICT loadings≥ 100% of MVA rating under N-1 Contingency*




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 38 no. of substations requires ICT augmentation, which are being studied.

### 7.4.2 Transmission Lines

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- 7.4.2** and the same has been summarise below.

*Figure 7.4-5: 765kV Tr. line loadings>3000MW under N-1 Contingency*

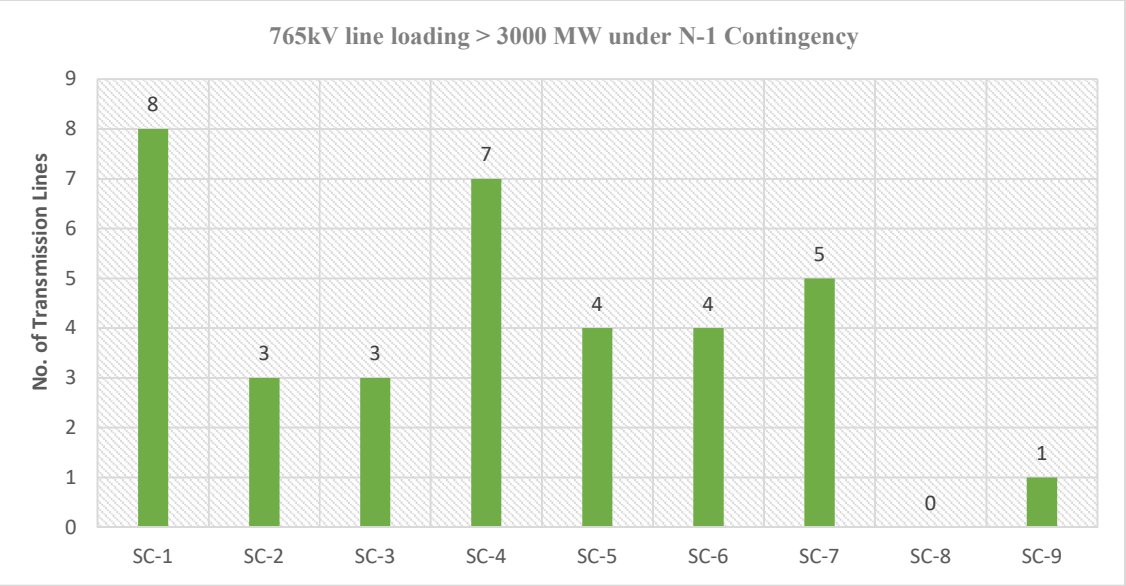



*Figure 7.4-6:765kV line loading>3200 MW under N-1 Contingency*

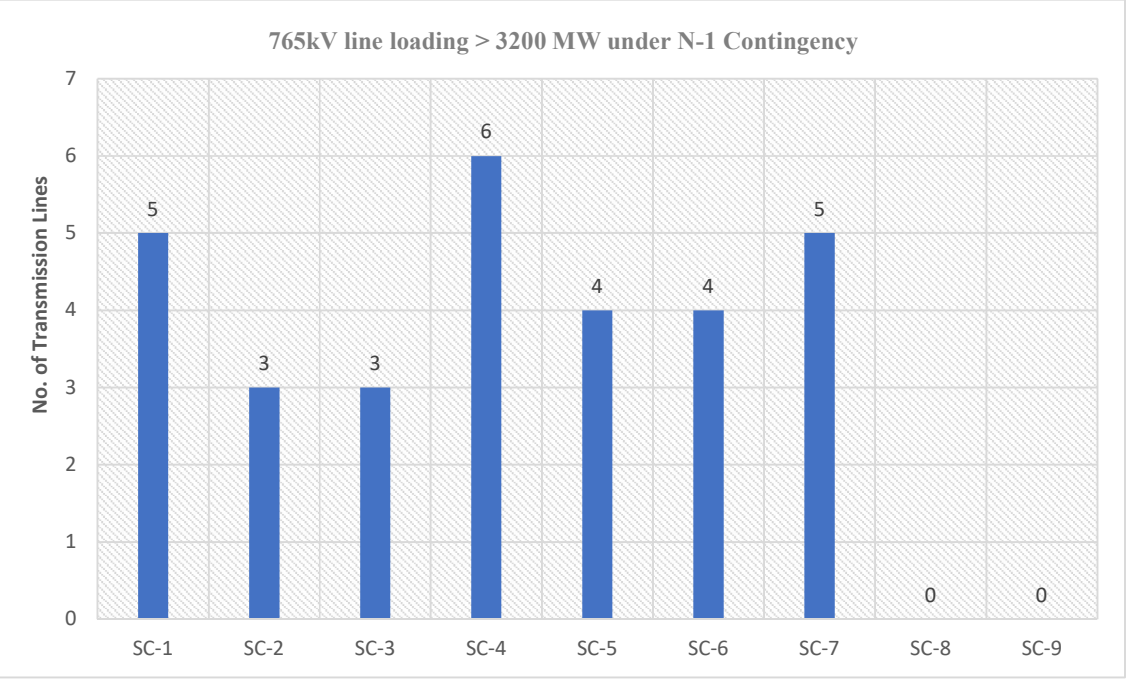
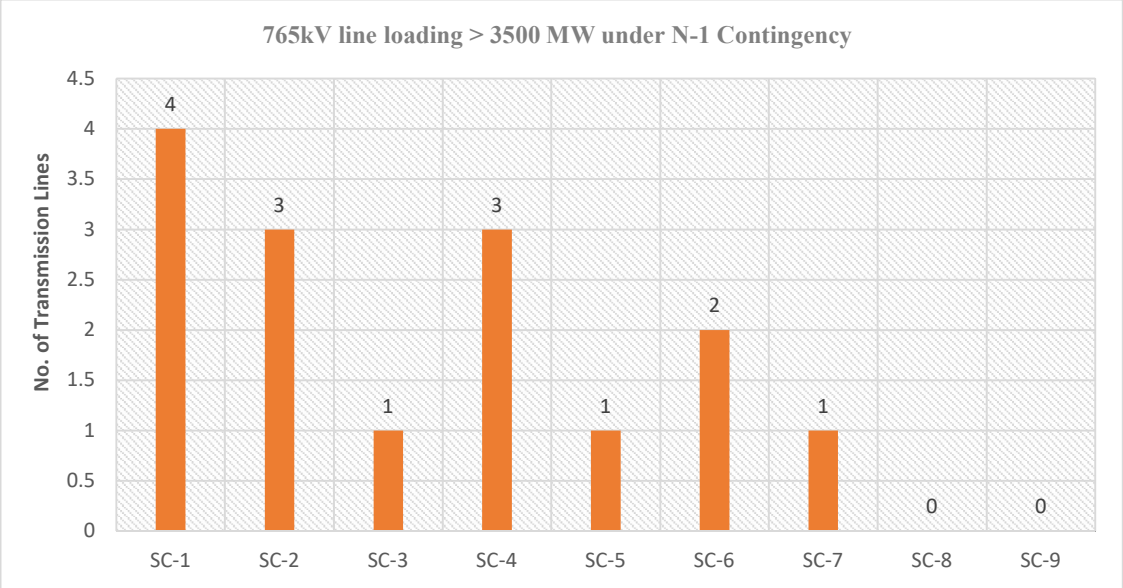


*Figure 7.4-7:765kV line loading>3500 MW under N-1 Contingency*




Max no. of 765kV lines on which loadings exceed limits of 3000 MW, 3200 MW and 3500 MW are 8, 6 and 4 respectively, which are Solar max scenarios. The most critical 765kV lines are Bhuj Pool – Khavda-I, Khavda-II – Lakadia, Jhatikara – Khetri, Bhadla-3 – Sikar New, which are being looked into in the further studies.

Further, for 400kV transmission lines, loading greater than 90% and 100% of thermal limit under N-1 Contingency has been assessed the results are at **Annex-7.4.2.** The results are summarised below.

*Figure 7.4-8:400kV line loading>90% of thermal limit*

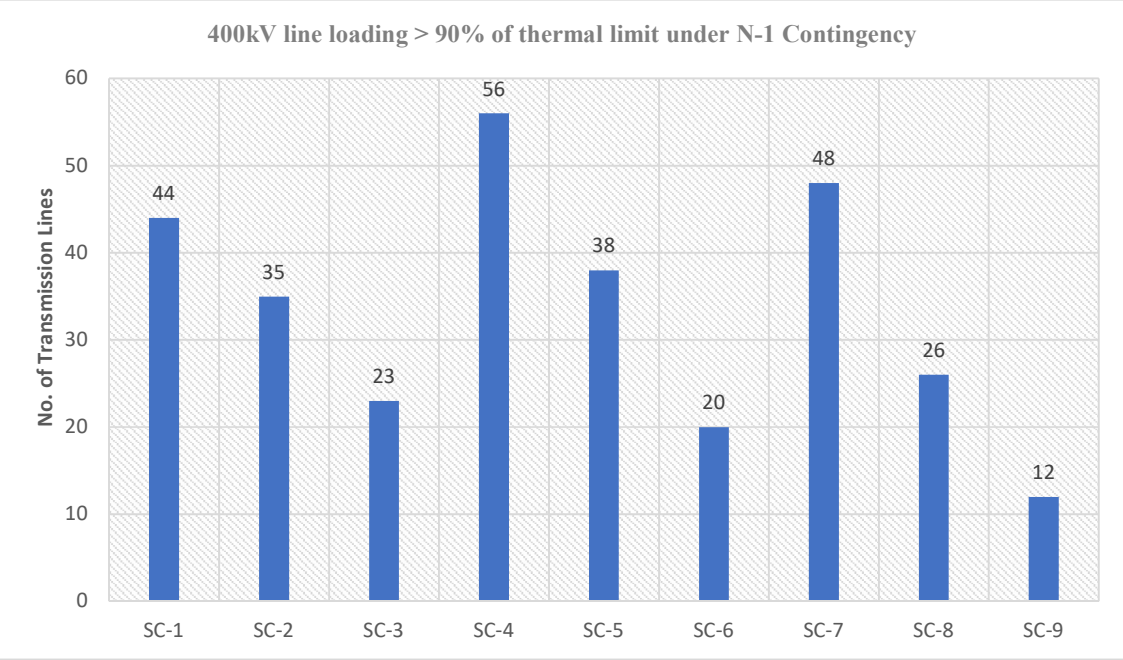
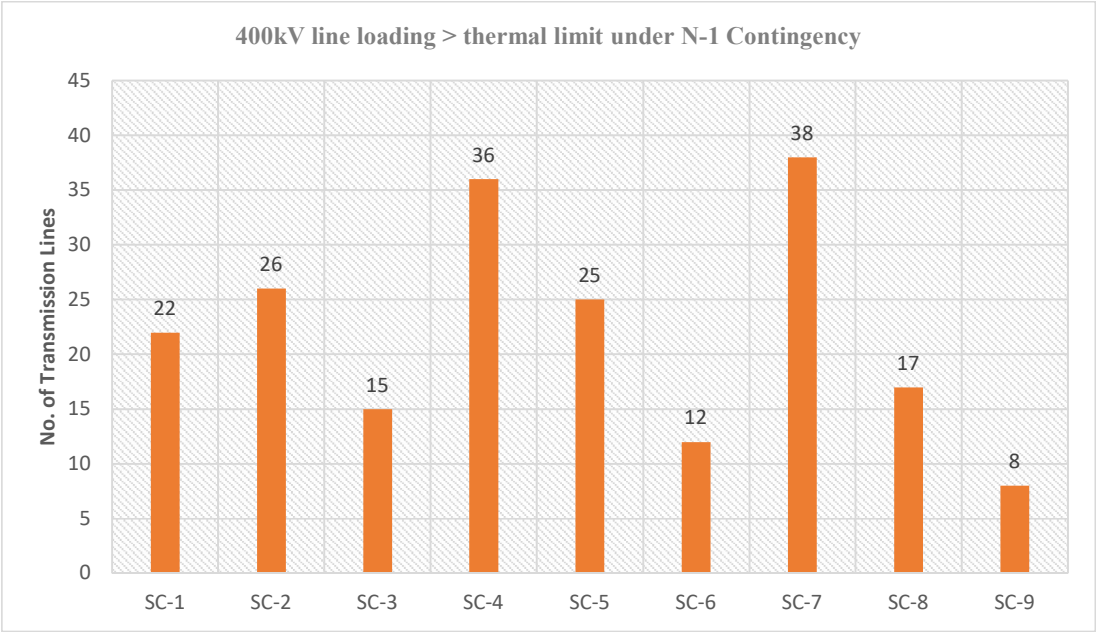


*Figure 7.4-9:400kV line loading>thermal limit under N-1 Contingency*



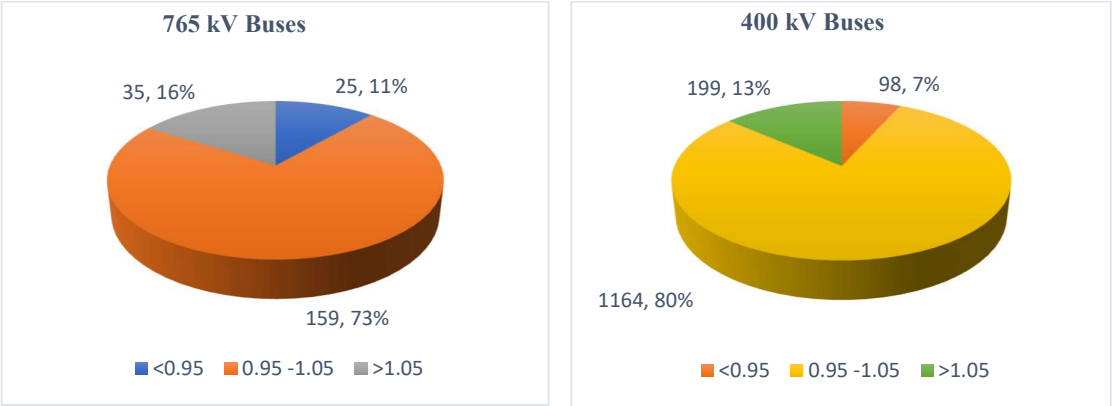

Max no. of 400kV lines on which loadings exceeds 90% and 100% of thermal limit are 56 and 38 respectively in Solar max scenarios. Further, detailed analysis and studies are being carried to plan additional systems, if any.

## 7.5 Reactive Compensation Studies

Injection of high quantum of RE into the grid is a challenge. It is expected that within the same day power flow on number of lines would change directions. Transmission lines associated with thermal and hydro generations would be generally lightly loaded during Solar max scenarios. Even 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 at all EHV nodes in all the scenarios have been analysed.

Voltages of all the 765 kV and 400 kV buses were observed in all the 9 scenarios. Maximum and minimum voltages of each node was identified from nine voltages observed from nine number of study scenarios. Voltage violation have been reported considering voltage regulation limit of ±0.05 p.u. from nominal voltage. Maximum and minimum voltage for each bus among all nine scenarios was identified. If the maximum voltage was found to be ≥1 p.u., the maximum voltage of the bus has been considered for that bus. For remaining buses, minimum voltage has been considered. Results of the analysis is plotted below:

*Figure 7.5-1: Bus voltages at 765kV and 400kV levels within and outside regulation limits*

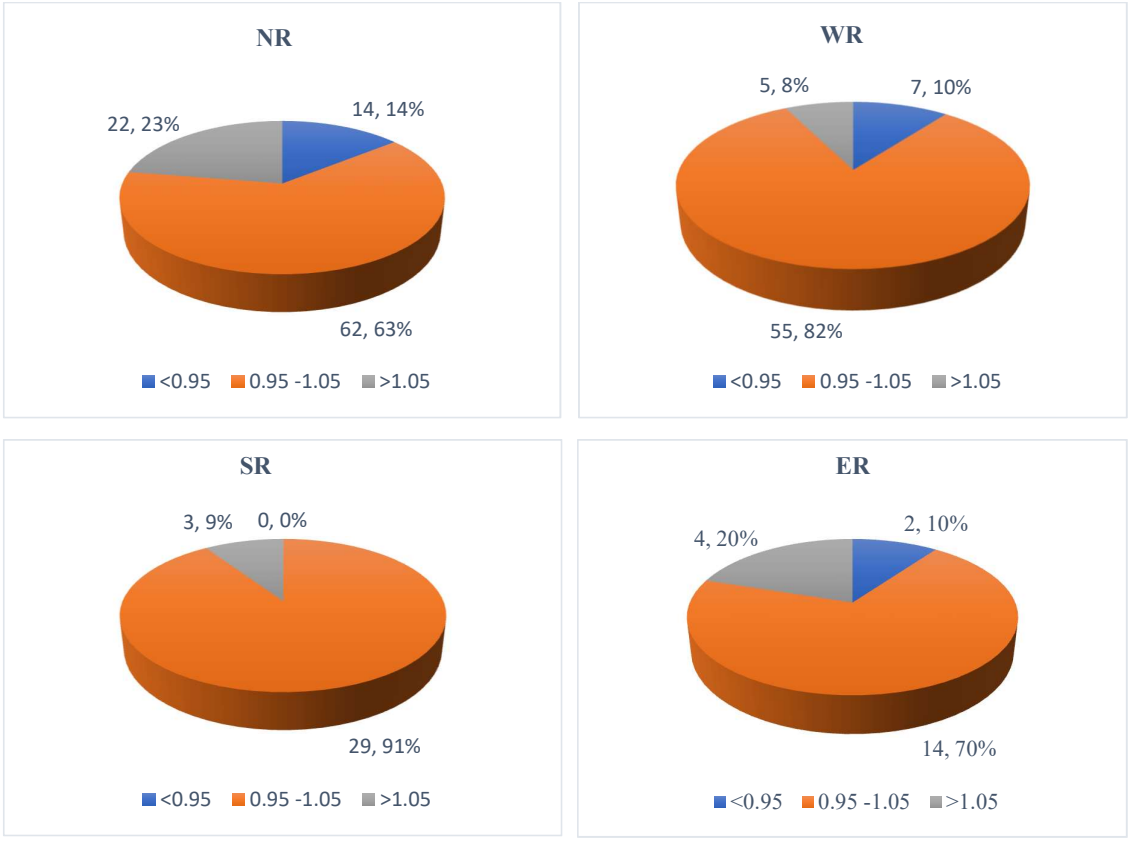



From the above voltage plots it can be observed that bus voltages at around 70-80% of the buses at 765 kV as well as at 400 kV levels are in the range of 0.95 to 1.05 p.u. on all India basis considering all the scenarios. There are around 35 nodes at 765 kV level and 199 nodes at 400 kV level having bus voltage beyond 1.05 p.u. in any one of the scenarios. Voltages under various study scenarios are at **Annex-7.5.**

### 7.5.1 765 kV Nodes

The above violations have further been analysed regions and the results are plotted below:

*Figure 7.5-2: Regions wise bus voltages at 765kV level within and outside regulation limits*

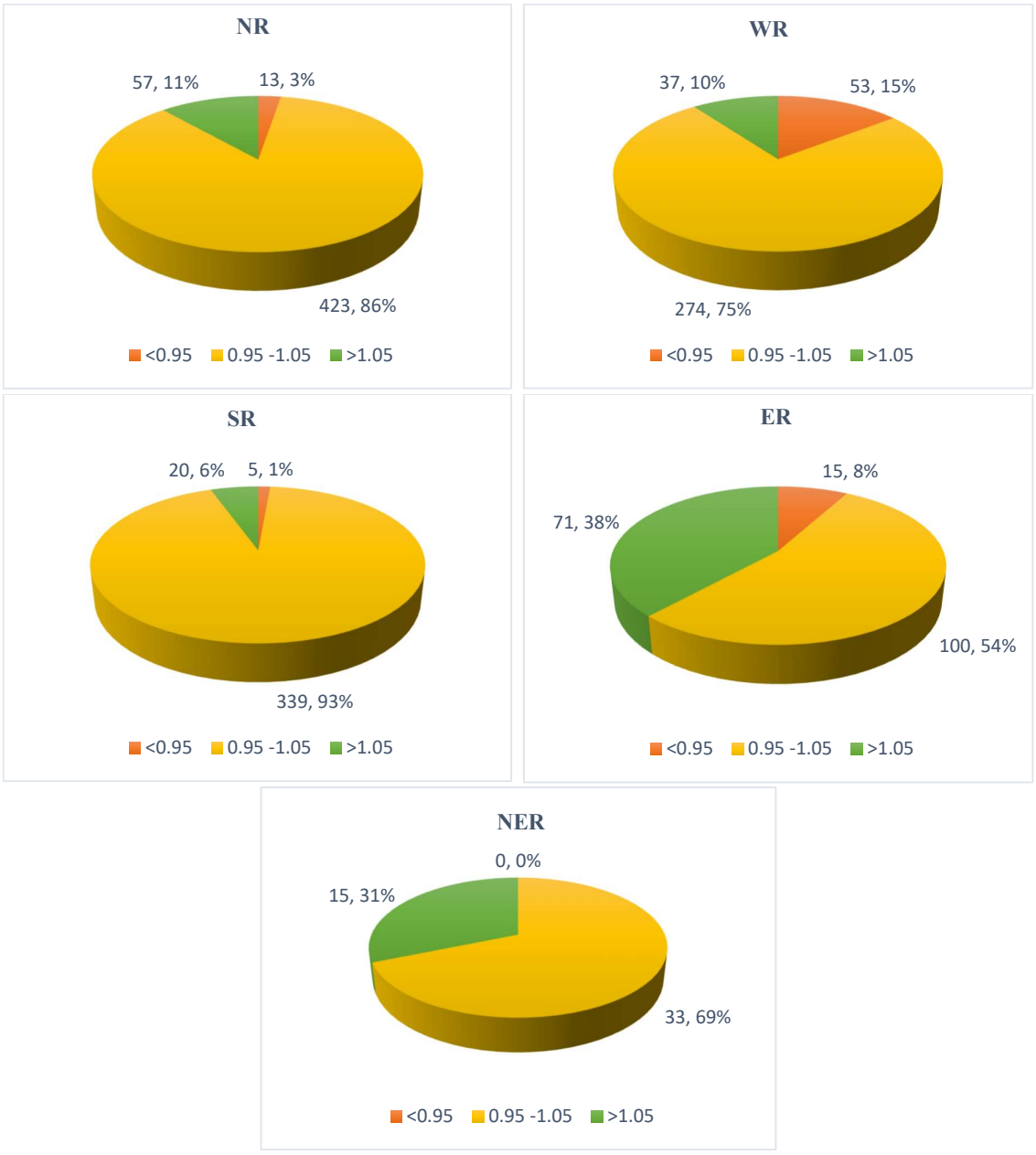


From the above 765kV regional voltage plots it can be observed that voltage of majority of buses are within 0.95 to 1.05 p.u. range. However, few buses viz. 22, 5, 3 and 4 nos. located in NR, WR, SR, and ER respectively are having bus voltages beyond 1.05 p.u. in any one of the scenarios. Similarly, around 14, 7, and 2 nos. buses located in NR, WR, and ER respectively are having voltages lower than 0.95 p.u. in any one of the scenarios.

### 7.5.2 400 kV Nodes

The above violations have further been analysed regions and the results are plotted below:

*Figure 7.5-3: Regions wise bus voltages at 400kV level within and outside regulation limits*




From the above 400kV regional voltage plots it can be observed that around 38% (71 nos.) buses are facing high voltage issue in ER followed by 31% (15 nos.) buses in NER.

About 75 to 80% of bus voltages are found to be within the range and with the opening of transmission lines emanating from non-generating power stations and few of the grid lines on case to case basis, the voltage control may be managed.

Based on the above, detailed analysis has been carried to ascertain the degree of reactive power compensation in the ISTS and identify the need for augmentation of the same, if any. In this regard, no load MVAr generated by 400kV and 765kV ISTS lines along with the compensation provided for present and for 2024-25 timeframe has been assessed region wise and the same is plotted at Figure 7.5-1 to 7.5-4 below:

*Figure 7.5-4:Compensation in 765kV Lines - Present time frame*

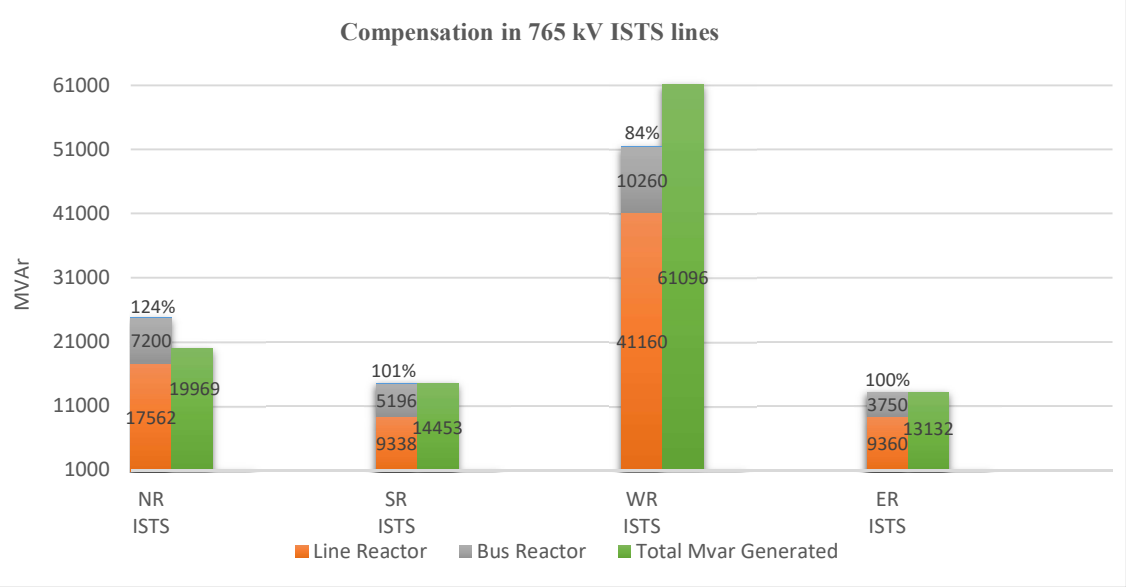



*Figure 7.5-2: Reactive Compensation in 765kV ISTS lines - 2024-25 time frame*

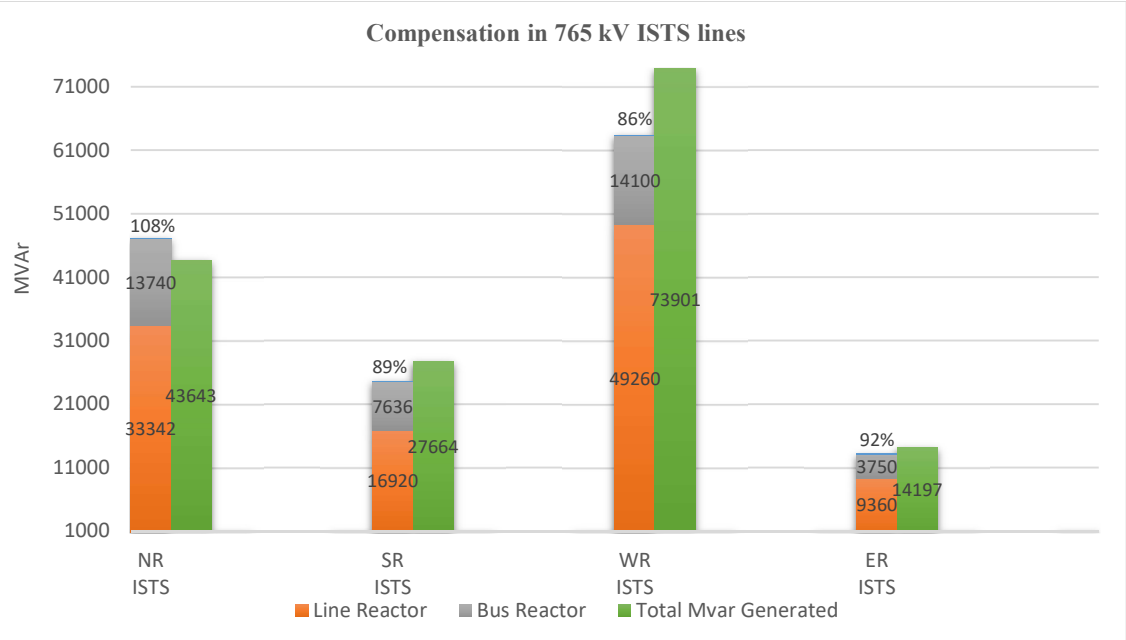


*Figure 7.5-3: Compensation in 400kV Lines - Present Time Frame*

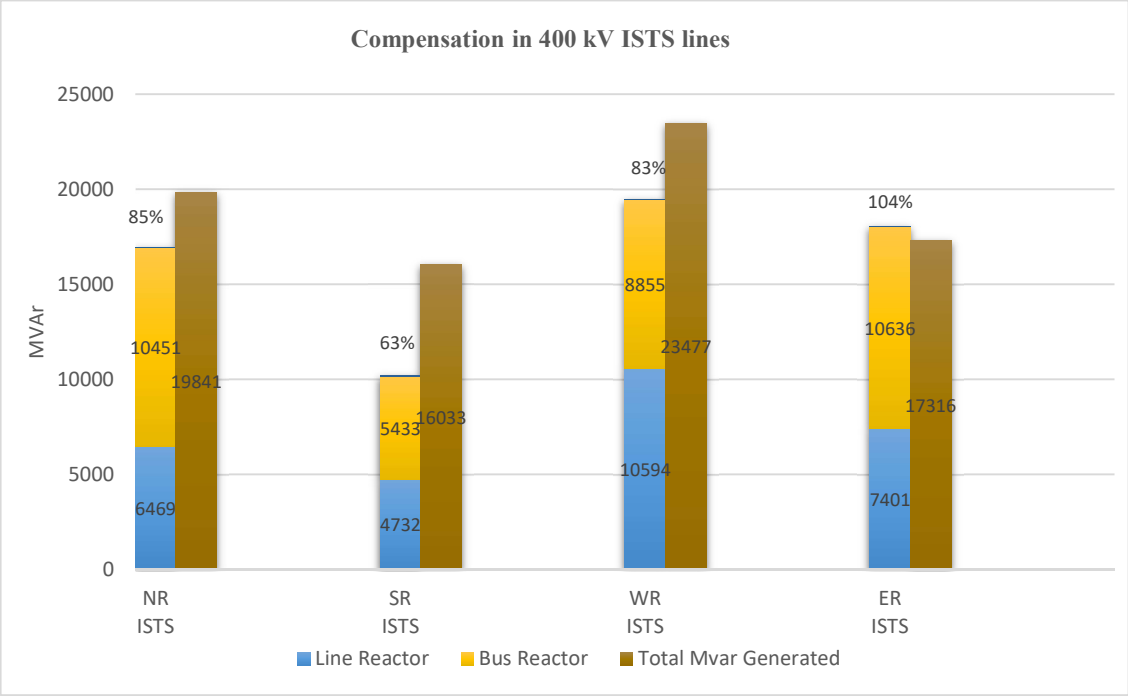
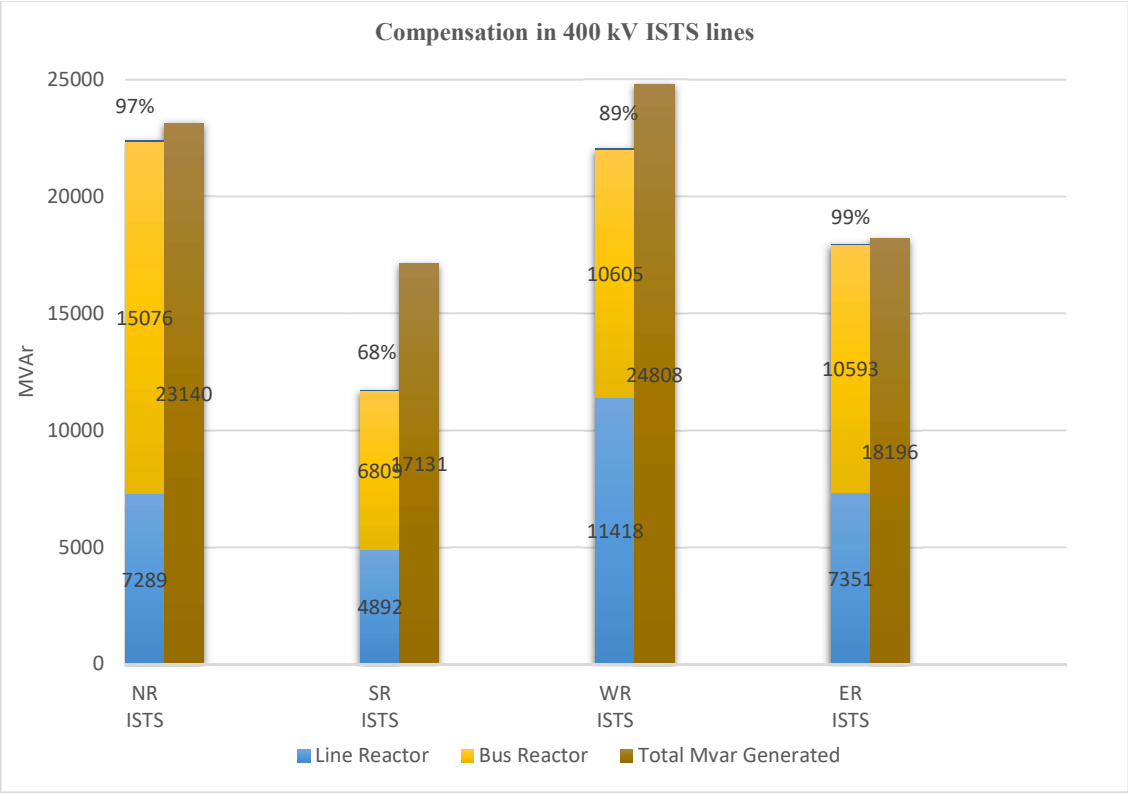



*Figure 7.5-4: Reactive Compensation in 400kV ISTS lines 2024-25 Time Frame*



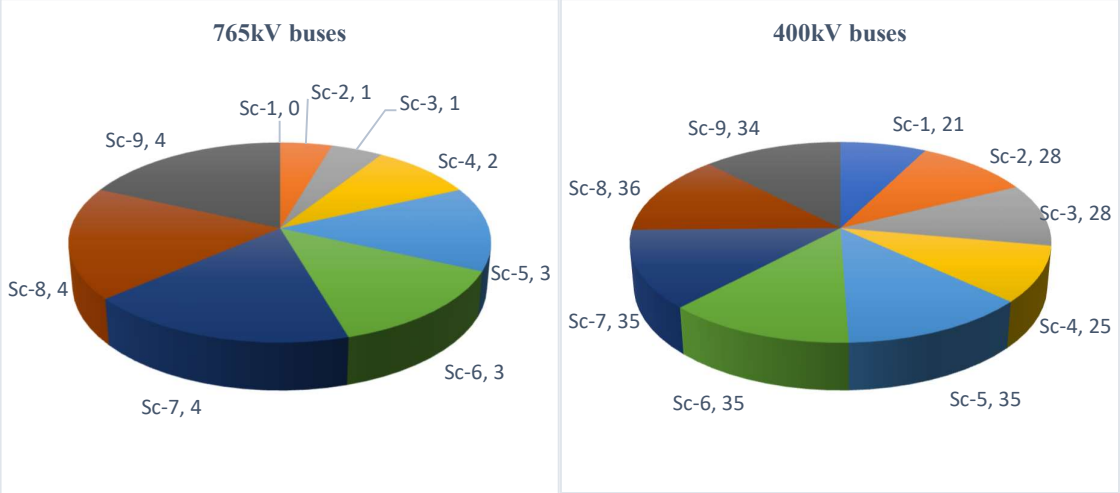
From the above, it may be observed that both in present and 2024-25 time-frame the degree of compensation in 765kV ISTS is beyond 85% in all regions, and even more than 100% in NR. At 400kV level, the degree of compensation in ISTS is more than 80-85% both in present and in 2024-25 time-frame in NR, WR, and ER, whereas the same in SR is about 60-65%. Accordingly, further studies are being carried out to plan additional reactive compensation, if any.

Similar analysis needs to be carried out for the EHV network of STUs as the ISTS and STU networks are integrated and affect each other.

### 7.6 Short Circuit Studies

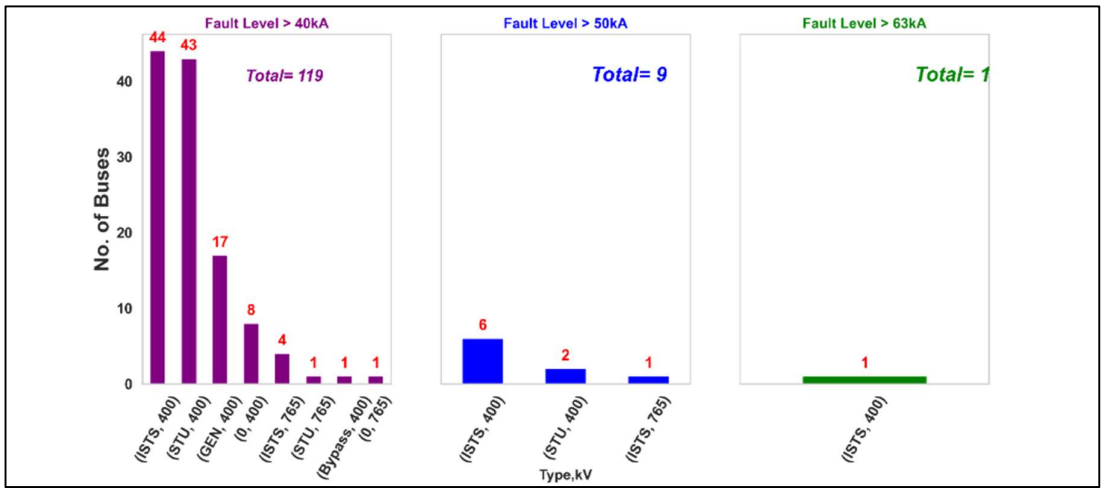
Short circuit level was calculated for all the 765 kV and 400 kV buses on all India basis. For conducting the short circuit studies, sub transient reactance ($X_d$") has been used for all thermal and hydro machines. Fault contribution from solar PV plants is limited to 1 p.u. as per various inverter capabilities during the studies. After finding the fault current for all buses comparison with design fault current level was done. The figures below show the number of 765 kV and 400 kV buses exceeding the design fault current rating under different scenarios. The details about the buses exceeding design fault current limit under various scenarios are attached at **Annex-7.6.1**.

*Figure 7.6-1:765kV and 400kV buses fault level violations*




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

*Figure 7.6-2: Fault level > Design level of Substations*




It may be observed that designed fault level is being violated at 6 and 44 number of 765kV and 400kV ISTS buses respectively. Details in this regard are attached at **Annex.7.6.2**.

Generally, the switchgears in Indian power system at EHV level are rated for 40kA, 50kA, and 63kA. ISTS and STU buses experiencing highest fault level among 40kA, 50kA, and 63kA rated systems are tabulated below:

*Table 7.6-1: Top fault level violations in ISTS and STU*

| | | ISTS | STU |
|---|---|---|---|
| **765kV** | **40kA** | Bilaspur, WR: 44kA | Jaipur, NR: 41kA |
| | **50kA** | Jabalpur Pool, WR: 51kA | - |
| **400kV** | **40kA** | Meerut, NR: 63kA | Kudus, WR: 55kA |
| | **50kA** | Padge GIS, WR: 53kA | Maheshwaram, SR: 63kA |
| | **63kA** | Maheswaram, SR: 63kA | - |

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# Chapter 8: Conclusion

Power scenario of the country is continuously changing as more and more RE is getting integrated into the grid. It is envisaged that RE is going to be the major source of energy in future. Govt of India is envisaging installed capacity of 500GW of non-fossil fuel based generations by 2030. Towards this, large RE complexes are expected to be established in Northern, Western, and Southern regions by 2024-25 timeframe. The transmission system for integrating the same into the grid has already been planned. In particular, large RE complexes are anticipated to be come up in two states viz. Rajasthan (20 GW) and Gujarat (15 GW).

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. Similar situations are also observed for other regions as well. To study such seasonal and diurnal variations of RE generations and demand, load generation balance was 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. Maximum and minimum all India demand of 266 GW and 179 GW have been considered while working out the LGBs. Out of these nine scenarios, three scenarios viz. highest RE generation (Scenario-1), highest all India demand (Scenario-5) and lowest all India demand (Scenario-9) are the most critical ones from transmission planning point of view.

While preparing the LGB it was observed that to dispatch maximum RE generation during the noon time, on bar thermal units are required to meet evening peak demand are to be operated below the present technical minimum of 55%. As per the analysis it was found that technical minimum of 27% and 28% during Monsoon and Summer seasons respectively 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 49 GW, 45 GW and 13 GW of surplus thermal generation would be available in Monsoon, Summer and Winter season respectively after meeting the all India demand in 2024-25 time-frame. If technical minimum of thermal units is reduced to 40%, then surplus generation reduces to 29 GW and 19 GW in Monsoon and Summer seasons respectively. This study also highlights the need for about 29 GW of energy storage in the grid to facilitate the RE integration of the order of 210 GW by 2024-25.

Presently, quantum of energy and peak demand met by RE as compared to total requirement is quite less. As the quantum of RE generation increases, the contribution of RE energy to total requirement would increase. However, with integration of large RE the challenge of operating the thermal units at lower technical minimum would also come to forefront. Solar PV generation shall reduce the energy output of thermal generation and during Solar max period thermal generation may be required to be used alternatively or plants may need to be run at low despatch. In order to absorb surplus energy in the grid during Solar max scenario, BESS would be required for grid operation.

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 are being taken care of in subsequent transmission planning exercise.

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 75 to 80% of bus voltages are found to be within the range and with the opening of transmission lines emanating from non-generating power stations and few of the grid lines on case to case basis, the voltage control may be managed. 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 beyond the 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 transmission network is found to be adequate for meeting the demand and integrating anticipated generation to be commissioned by 2024-25 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.

# Annexures

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**Annex-2.1**

## Retirement of Installed Capacity by 2025

| Sl. No. | Region | State | Fuel | Project Name | Unit | IC (MW) | To be Retired Capacity (MW) | Status (Ex/ UC) | Utility |
|---|---|---|---|---|---|---|---|---|---|
| 1 | WR | MP | T | Satpura-II | 1x200+1x210 | 410 | 410 | Ex | State |
| 2 | WR | Chhattisgarh | T | Korba (E) | 4x50+2x120 | 440 | 200 | Ex | State |
| 3 | WR | Chhattisgarh | T | Korba (W) | 4x210+1x500 | 1340 | 840 | Ex | State |
| 4 | WR | Maharashtra | T | Koradi | 2x210 | 420 | 420 | Ex | State |
| 5 | WR | Maharashtra | T | Gupta Energy ltd | 2x60 | 120 | 120 | Ex | State |
| 6 | ER | Odisha | T | IBEUL U-1 | (2x350) | 700 | 700 | Ex | IPP |
| 7 | ER | Bihar | T | Barauni | (2x110) | 220 | 220 | Ex | State |
| 8 | ER | Bihar | T | Muzaffarpur | (2x110) | 220 | 220 | Ex | State |
| 9 | ER | Jharkhand | T | Tenughat | (2x210) | 420 | 420 | Ex | State |
| 10 | ER | Jharkhand | T | Bokaro'B' | (1x210) | 210 | 210 | Ex | Central |
| 11 | ER | West Bengal | T | Bandel | (4x82.5+1x210) | 540 | 540 | Ex | State |
| 12 | ER | West Bengal | T | Bakreshwar | (5x210) | 1050 | 1050 | Ex | State |
| 13 | ER | West Bengal | T | Titagarh | (4x60) | 240 | 240 | Ex | State |
| 14 | SR | Andhra Pradesh | T | Vijayawada | 6 X 210 | 1260 | 1260 | Ex | State |
| 15 | SR | Telangana | T | Kothagudem A B C | 4 X 60 + 4 X 120 | 720 | 720 | Ex | State |
| 16 | SR | Telangana | T | Kothagudem D (V Stage) | 2 X 250 | 500 | 500 | Ex | State |
| 17 | SR | Telangana | T | Ramagundam B | 1 X 62.5 | 62.5 | 63 | Ex | State |
| 18 | SR | Karnataka | T | Raichur | 7 X 210 + 1 x 250 | 1720 | 1720 | Ex | State |
| 19 | SR | Tamil Nadu | T | Tuticorin | 5 X 210 | 1050 | 1050 | Ex | State |
| 20 | SR | Tamil Nadu | T | Mettur | 4 X 210 | 840 | 840 | Ex | State |
| 21 | SR | Tamil Nadu | T | Neyveli -I NLC | 6x50 + 3X100 | 600 | 600 | Ex | State |
| 22 | SR | Tamil Nadu | T | Neyveli Zero (STCMS) | 1 X 250 | 250 | 250 | Ex | State |
| 23 | SR | Tamil Nadu | T | North Chennai | 3x210 + 2 x 600 | 1830 | 630 | Ex | State |
| 24 | SR | Tamil Nadu | T | NLC TPS-I Exp. | 2X210 | 420 | 420 | Ex | Central |
| 25 | NR | UP | T | Tanda TPS | 4x110 | 440 | 440 | Ex | Central |

| Sl. No. | Region | State | Fuel | Project Name | Unit | IC (MW) | To be Retired Capacity (MW) | Status (Ex/ UC) | Utility |
|---|---|---|---|---|---|---|---|---|---|
| **26** | NR | Haryana | T | Panipat | 2x210+2x250 | 920 | 420 | Ex | State |
| **27** | NR | Punjab | T | Guru Gobind Singh TPS Ropar | 6x210 | 1260 | 1260 | Ex | State |
| **28** | NR | Punjab | T | Lehra Mohabbat TPS | 2x210 +2x250 | 920 | 420 | Ex | State |
| **29** | NR | Rajasthan | T | Kota TPS | 2x110+3x210+2x195 | 1240 | 850 | Ex | State |
| **30** | NR | UP | T | Obra A | 2x50+1X94 | 194 | 194 | Ex | State |
| **31** | NR | UP | T | Harduaganj - B | 1x60+1x105 | 165 | 165 | Ex | State |
| **32** | NR | UP | T | Paricha - A,B,C | 2x110+2x210+2x250 | 1140 | 220 | Ex | State |
| | | | | | **Total** | **21862** | **17612** | | |

**Annex-2.1**

# Load Generation Balance (LGB)

## Monsoon (Aug'24)

**Installed Capacity**

| Regi | rmal Cen | ermal Sta | rmal Priv | tal Therm | Hydro | Nuclear | Solar | lar Roofto | Wind | Other Re | Diesel | Gas | Total | EPS Peak | Peak Demand | | LTA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 11440 | 39616 | 0 | 51056 | 22576 | 4420 | 58641 | 4500 | 6401 | 1360 | 0 | 3956 | **152910** | **86778** | 81520 | | **0** |
| WR | 19000 | 35785 | 36985 | 91770 | 8168 | 3240 | 34022 | 4500 | 31068 | 0 | 0 | 10004 | **182772** | **84502** | 79382 | | **0** |
| SR | 11000 | 29775 | 6640 | 47415 | 11922 | 3320 | 28541 | 4500 | 32532 | 2864 | 1185 | 2985 | **135263** | **74666** | 70142 | | **0** |
| ER | 24440 | 12165 | 4500 | 41105 | 8182 | 0 | 250 | 400 | 0 | 0 | 0 | 0 | **49937** | **32319** | 30361 | | **0** |
| NER | 750 | 133 | 0 | 883 | 4816 | 0 | 100 | 100 | 0 | 0 | 0 | 1821 | **7720** | **5790** | 5439 | | **0** |
| | **66630** | **117474** | **48125** | **232229** | **55663** | **10980** | **121554** | **14000** | **70001** | **4224** | **1185** | **18765** | **528601** | **266844** | 266844 | | |
| | | **232229** | | | | | **209778** | | | | | | | 284055 | | 114755 | |

**Scenario 1 : Solar Max Aug 2024**

| Avai | rmal Cen | ermal Sta | rmal Priv | qd Therm | Hydro | Nuclear | Solar | lar rooft | Wind | Other Re | Diesel | Gas | | National | Regional DF | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 25% | 9% | 0% | 16% | 70% | 80% | 90% | 50% | 50% | 0% | 0% | 0% | | 82% | 77% | | |
| WR | 30% | 3% | 18% | 13% | 40% | 80% | 80% | 50% | 55% | 0% | 0% | 0% | | 76% | 72% | | |
| SR | 21% | 2% | 45% | 15% | 40% | 80% | 80% | 50% | 55% | 0% | 0% | 0% | | 74% | 70% | | |
| ER | 13% | 14% | 42% | 9% | 70% | 80% | 80% | 50% | 0% | 0% | 0% | 0% | | 83% | 78% | | |
| NER | 0% | 0% | 0% | 0% | 70% | 80% | 80% | 50% | 0% | 0% | 0% | 0% | | 69% | 65% | | |
| | 21% | 6% | 24% | 14% | | | | | | | | | | 83% | 221481 | | |
| Avai | Central | State | IPP | qd Therm | Hydro | Nuclear | Solar | lar rooft | Wind | RE RPO | Diesel | Gas | Total ava | Demand | Surplus/ | Net Avai | Net Dem |
| NR | 2888 | 3408 | 0 | 8334 | 15803 | 3536 | 52777 | 2250 | 3201 | 43170 | 0 | 0 | 83862 | 70843 | 13019 | 81612 | 68593 |
| WR | 5687 | 1238 | 6659 | 12207 | 3267 | 2592 | 27218 | 2250 | 17087 | 46440 | 0 | 0 | 65998 | 64506 | 1492 | 63748 | 62256 |
| SR | 2255 | 537 | 2992 | 7137 | 4769 | 2656 | 22832 | 2250 | 17893 | 40852 | 0 | 0 | 56184 | 55414 | 770 | 53934 | 53164 |
| ER | 3080 | 1690 | 1898 | 3793 | 5727 | 0 | 200 | 200 | 0 | 15612 | 0 | 0 | 12795 | 26727 | -13932 | 12595 | 26527 |
| NER | 0 | 0 | 0 | 0 | 3371 | 0 | 80 | 50 | 0 | 2213 | 0 | 0 | 3501 | 3990 | -489 | 3451 | 3940 |
| Tota | **13910** | **6873** | **11549** | **31471** | **32938** | **8784** | **103107** | **7000** | **38181** | **148288** | **0** | **0** | **370628** | **221481** | **860** | **215340** | **214481** |
| | | **32331** | | | | | **148287** | | | | | | | 208899 | | | |
| 21% | StateTh | | | | | | | | | | | | | | | | |

**Scenario 2 : Peak load Aug 2024**

| Avai | rmal Cen | ermal Sta | rmal Priv | qd Therm | Hydro | Nuclear | Solar | lar rooft | Wind | Other Re | Diesel | Gas | | National | Regional DF | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 69% | 53% | 0% | 65% | 95% | 80% | 0% | 0% | 70% | 0% | 0% | 85% | | 88% | 83% | | |
| WR | 59% | 37% | 50% | 37% | 70% | 80% | 0% | 0% | 75% | 0% | 0% | 85% | | 80% | 75% | | |
| SR | 21% | 73% | 45% | 62% | 70% | 80% | 0% | 0% | 75% | 0% | 0% | 85% | | 76% | 72% | | |
| ER | 18% | 62% | 67% | 42% | 90% | 80% | 0% | 0% | 0% | 0% | 0% | 85% | | 97% | 91% | | |
| NER | 0% | 0% | 0% | 0% | 90% | 80% | 0% | 0% | 0% | 0% | 0% | 85% | | 93% | 88% | | |
| | 39% | 54% | 51% | 49% | | | | | | | | | | **89%** | **237491** | | |
| Avai | rmal Cen | ermal Sta | rmal Priv | qd Therm | Hydro | Nuclear | Solar | lar rooft | Wind | RE RPO | Diesel | Gas | al availab | Demand | Surplus/ | Net Avai | Net Dem |
| NR | 7867 | 20972 | 0 | 32941 | 21447 | 3536 | 0 | 0 | 4481 | 15191 | 0 | 3363 | 61666 | 76477 | -14812 | 61666 | 76477 |
| WR | 11175 | 13161 | 18372 | 34139 | 5717 | 2592 | 0 | 0 | 23301 | 16342 | 0 | 8503 | 82822 | 67294 | 15529 | 82822 | 67294 |
| SR | 2255 | 21646 | 2992 | 29168 | 8345 | 2656 | 0 | 0 | 24399 | 14375 | 0 | 2537 | 64830 | 57082 | 7748 | 64830 | 57082 |
| ER | 4367 | 7535 | 3026 | 17120 | 7364 | 0 | 0 | 0 | 0 | 5494 | 0 | 0 | 22291 | 31228 | -8937 | 22291 | 31228 |
| NER | 0 | 0 | 0 | 0 | 4334 | 0 | 0 | 0 | 0 | 779 | 0 | 1548 | 5882 | 5410 | 472 | 5882 | 5410 |
| Tota | **25664** | **63314** | **24389** | **113368** | **47208** | **8784** | **0** | **0** | **52181** | **52181** | **0** | **15950** | **237491** | **237491** | **0** | **237491** | **237491** |
| | | **113368** | | | | | **52181** | | | | | | | 223667 | | | |
| 56% | StateTh | | | | | | | | | | | | | | | | |

**Scenario 3 : off peak load Aug 2024**

| Avai | rmal Cen | ermal Sta | rmal Priv | qd Therm | Hydro | Nuclear | Solar | lar rooft | Wind | Other Re | Diesel | Gas | | National | Regional DF | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 73% | 50% | 0% | 68% | 70% | 80% | 0% | 0% | 60% | 0% | 0% | 65% | | 80% | 75% | | |
| WR | 63% | 33% | 50% | 35% | 40% | 80% | 0% | 0% | 65% | 0% | 0% | 65% | | 70% | 65% | | |
| SR | 25% | 55% | 58% | 53% | 40% | 80% | 0% | 0% | 65% | 0% | 0% | 65% | | 63% | 59% | | |
| ER | 28% | 48% | 67% | 41% | 70% | 80% | 0% | 0% | 0% | 0% | 0% | 65% | | 88% | 82% | | |
| NER | 0% | 0% | 0% | 0% | 70% | 80% | 0% | 0% | 0% | 0% | 0% | 65% | | 72% | 67% | | |
| | 45% | 46% | 52% | 47% | | | | | | | | | | 78% | 208138 | | |
| Avai | rmal Cen | ermal Sta | rmal Priv | qd Therm | Hydro | Nuclear | Solar | lar rooft | Wind | RE RPO | Diesel | Gas | al availab | Demand | Surplus/ | Net Avai | Net Dem |
| NR | 8329 | 19848 | 0 | 34604 | 15803 | 3536 | 0 | 0 | 3841 | 13153 | 0 | 2571 | 53928 | 69667 | -15740 | 53928 | 69667 |
| WR | 11991 | 11959 | 18372 | 32284 | 3267 | 2592 | 0 | 0 | 20194 | 14149 | 0 | 6502 | 74877 | 58795 | 16082 | 74877 | 58795 |
| SR | 2705 | 16287 | 3867 | 25344 | 4769 | 2656 | 0 | 0 | 21146 | 12447 | 0 | 1940 | 53370 | 47156 | 6215 | 53370 | 47156 |
| ER | 6829 | 5827 | 3026 | 16807 | 5727 | 0 | 0 | 0 | 0 | 4757 | 0 | 0 | 21409 | 28368 | -6959 | 21409 | 28368 |
| NER | 0 | 0 | 0 | 0 | 3371 | 0 | 0 | 0 | 0 | 674 | 0 | 1183 | 4555 | 4153 | 402 | 4555 | 4153 |
| Tota | **29854** | **53920** | **25264** | **109039** | **32938** | **8784** | **0** | **0** | **45181** | **45181** | **0** | **12197** | **208138** | **208138** | **0** | **208138** | **208138** |
| | | **109039** | | | | | **45181** | | | | | | | 194444 | | | |
| 49% | StateTh | | | | | | | | | | | | | | | | |

## Summer (Jun'24)

Installed Capacity

| Regi | rmal Cen | ermal Sta | rmal Priv | tal Therm | Hydro | Nuclear | Solar | lar Roofte | Wind | Other Re | Diesel | Gas | Total | EPS Peak | Peak Demand | | LTA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 11440 | 39616 | 0 | 51056 | 22576 | 4420 | 58641 | 4500 | 6401 | 1360 | 0 | 3956 | **152910** | **86778** | 81520 | | **0** |
| WR | 19000 | 35785 | 36985 | 91770 | 8168 | 3240 | 34022 | 4500 | 31068 | 0 | 0 | 10004 | **182772** | **84502** | 79382 | | **0** |
| SR | 11000 | 29775 | 6640 | 47415 | 11922 | 3320 | 28541 | 4500 | 32532 | 2864 | 1185 | 2985 | **135263** | **74666** | 70142 | | **0** |
| ER | 24440 | 12165 | 4500 | 41105 | 8182 | 0 | 250 | 400 | 0 | 0 | 0 | 0 | **49937** | **32319** | 30361 | | **0** |
| NER | 750 | 133 | 0 | 883 | 4816 | 0 | 100 | 100 | 0 | 0 | 0 | 1821 | **7720** | **5790** | 5439 | | **0** |
| | **66630** | **117474** | **48125** | **232229** | **55663** | **10980** | **121554** | **14000** | **70001** | **4224** | **1185** | **18765** | **528601** | **266844** | 266844 | | |
| | | **232229** | | | | | **209778** | | | | | | | 284055 | | 114755 | |

Scenario 4 : Solar Max Jun 2024

| Avai | rmal Cen | ermal Sta | rmal Priv | qd Therm | Hydro | Nuclear | Solar | olar roofte | Wind | Other Re | Diesel | Gas | | National | Regional DF | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 26% | 16% | 0% | 25% | 70% | 80% | 90% | 60% | 50% | 0% | 0% | 0% | | 88% | 83% | | |
| WR | 40% | 4% | 36% | 24% | 40% | 80% | 85% | 60% | 55% | 0% | 0% | 0% | | 89% | 84% | | |
| SR | 49% | 4% | 55% | 21% | 40% | 80% | 85% | 60% | 55% | 0% | 0% | 0% | | 80% | 75% | | |
| ER | 13% | 15% | 42% | 8% | 70% | 80% | 85% | 60% | 0% | 0% | 0% | 0% | | 84% | 79% | | |
| NER | 0% | 0% | 0% | 0% | 70% | 80% | 85% | 60% | 0% | 0% | 0% | 0% | | 64% | 60% | | |
| | 29% | 9% | 39% | 21% | | | | | | | | | | 91% | 242828 | | |
| Avai | Central | ermal Sta | rmal Priv | qd Therm | Hydro | Nuclear | Solar | olar roofte | Wind | RE RPO | Diesel | Gas | Total ava | Demand | Surplus/ | Net Avai | Net Dem |
| NR | 3029 | 6188 | 0 | 12873 | 15803 | 3536 | 52777 | 2700 | 3201 | 44494 | 0 | 0 | 87233 | 76706 | 10527 | 84533 | 74006 |
| WR | 7568 | 1409 | 13280 | 21871 | 3267 | 2592 | 28919 | 2700 | 17087 | 47863 | 0 | 0 | 76822 | 75594 | 1228 | 74122 | 72894 |
| SR | 5367 | 1243 | 3652 | 10109 | 4769 | 2656 | 24260 | 2700 | 17893 | 42104 | 0 | 0 | 62539 | 59638 | 2901 | 59839 | 56938 |
| ER | 3080 | 1792 | 1898 | 3420 | 5727 | 0 | 213 | 240 | 0 | 16091 | 0 | 0 | 12949 | 27191 | -14242 | 12709 | 26951 |
| NER | 0 | 0 | 0 | 0 | 3371 | 0 | 85 | 60 | 0 | 2281 | 0 | 0 | 3516 | 3700 | -184 | 3456 | 3640 |
| Tota | **19044** | **10631** | **18829** | **48273** | **32938** | **8784** | **106253** | **8400** | **38181** | **152833** | **0** | **0** | **243059** | **242828** | **231** | **234659** | **234428** |
| | | **48505** | | | | | | **152833** | | | | | | 228013 | | | |
| 22% | StateTh | | | | | | | | | | | | | | | | |

Scenario 5 : Peak Load Jun 2024

| Avai | rmal Cen | ermal Sta | rmal Priv | qd Therm | Hydro | Nuclear | Solar | olar roofte | Wind | Other Re | Diesel | Gas | | National | Regional DF | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 73% | 68% | 0% | 92% | 95% | 80% | 0% | 0% | 70% | 0% | 0% | 85% | | 104% | 98% | | |
| WR | 71% | 52% | 72% | 46% | 70% | 80% | 0% | 0% | 75% | 0% | 0% | 85% | | 90% | 84% | | |
| SR | 55% | 72% | 62% | 75% | 70% | 80% | 0% | 0% | 75% | 0% | 0% | 85% | | 85% | 80% | | |
| ER | 28% | 62% | 67% | 42% | 90% | 80% | 0% | 0% | 0% | 0% | 0% | 85% | | 99% | 93% | | |
| NER | 0% | 0% | 0% | 0% | 90% | 80% | 0% | 0% | 0% | 0% | 0% | 85% | | 83% | 78% | | |
| | 52% | 63% | 70% | 61% | | | | | | | | | | **100%** | **266844** | | |
| Avai | rmal Cen | ermal Sta | rmal Priv | qd Therm | Hydro | Nuclear | Solar | olar roofte | Wind | RE RPO | Diesel | Gas | al availab | Demand | Surplus/ | Net Avai | Net Dem |
| NR | 8329 | 26804 | 0 | 47116 | 21447 | 3536 | 0 | 0 | 4481 | 15191 | 0 | 3363 | 67960 | 90653 | -22693 | 67960 | 90653 |
| WR | 13431 | 18505 | 26658 | 42510 | 5717 | 2592 | 0 | 0 | 23301 | 16342 | 0 | 8503 | 98708 | 75664 | 23044 | 98708 | 75664 |
| SR | 6050 | 21440 | 4114 | 35760 | 8345 | 2656 | 0 | 0 | 24399 | 14375 | 0 | 2537 | 69541 | 63673 | 5868 | 69541 | 63673 |
| ER | 6829 | 7535 | 3026 | 17335 | 7364 | 0 | 0 | 0 | 0 | 5494 | 0 | 0 | 24753 | 32040 | -7287 | 24753 | 32040 |
| NER | 0 | 0 | 0 | 0 | 4334 | 0 | 0 | 0 | 0 | 779 | 0 | 1548 | 5882 | 4814 | 1068 | 5882 | 4814 |
| Tota | **34639** | **74284** | **33798** | **142721** | **47208** | **8784** | **0** | **0** | **52181** | **52181** | **0** | **15950** | **266844** | **266844** | **0** | **266844** | **266844** |
| | | **142721** | | | | | | **52181** | | | | | | 250330 | | | |
| 52% | StateTh | | | | | | | | | | | | | | | | |

Scenario 6 : Off peak Load Jun 2024

| Avai | rmal Cen | ermal Sta | rmal Priv | qd Therm | Hydro | Nuclear | Solar | olar roofte | Wind | Other Re | Diesel | Gas | | National | Regional DF | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 69% | 63% | 0% | 79% | 70% | 80% | 0% | 0% | 60% | 0% | 0% | 60% | | 86% | 81% | | |
| WR | 68% | 47% | 69% | 48% | 40% | 80% | 0% | 0% | 65% | 0% | 0% | 60% | | 83% | 78% | | |
| SR | 55% | 61% | 62% | 67% | 40% | 80% | 0% | 0% | 65% | 0% | 0% | 60% | | 71% | 67% | | |
| ER | 27% | 43% | 67% | 37% | 70% | 80% | 0% | 0% | 0% | 0% | 0% | 60% | | 84% | 79% | | |
| NER | 0% | 0% | 0% | 0% | 70% | 80% | 0% | 0% | 0% | 0% | 0% | 60% | | 62% | 58% | | |
| | 50% | 56% | 68% | 57% | | | | | | | | | | 86% | 229486 | | |
| Avai | rmal Cen | ermal Sta | rmal Priv | qd Therm | Hydro | Nuclear | Solar | olar roofte | Wind | RE RPO | Diesel | Gas | al availab | Demand | Surplus/ | Net Avai | Net Dem |
| NR | 7867 | 24961 | 0 | 40119 | 15803 | 3536 | 0 | 0 | 3841 | 13153 | 0 | 2374 | 58382 | 74985 | -16603 | 58382 | 74985 |
| WR | 12871 | 16829 | 25572 | 44303 | 3267 | 2592 | 0 | 0 | 20194 | 14149 | 0 | 6002 | 87327 | 70314 | 17013 | 87327 | 70314 |
| SR | 6050 | 18199 | 4114 | 31705 | 4769 | 2656 | 0 | 0 | 21146 | 12447 | 0 | 1791 | 58724 | 53367 | 5357 | 58724 | 53367 |
| ER | 6577 | 5259 | 3026 | 15198 | 5727 | 0 | 0 | 0 | 0 | 4757 | 0 | 0 | 20589 | 27237 | -6648 | 20589 | 27237 |
| NER | 0 | 0 | 0 | | 3371 | 0 | 0 | 0 | 0 | 674 | 0 | 1092 | 4464 | 3582 | 881 | 4464 | 3582 |
| Tota | **33365** | **65248** | **32711** | **131325** | **32938** | **8784** | **0** | **0** | **45181** | **45181** | **0** | **11259** | **229486** | **229486** | **0** | **229486** | **229486** |
| | | **131325** | | | | | | **45181** | | | | | | 215118 | | | |
| 50% | StateTh | | | | | | | | | | | | | | | | |

## Winter (Feb'25)

Installed Capacity

| Regi | rmal Cen | ermal Sta | rmal Priv | tal Therm | Hydro | Nuclear | Solar | lar Roofto | Wind | Other Re | Diesel | Gas | Total | EPS Peak | Peak Demand | | LTA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 11440 | 39616 | 0 | 51056 | 22576 | 4420 | 58641 | 4500 | 6401 | 1360 | 0 | 3956 | **152910** | **86778** | 81520 | | **0** |
| WR | 19000 | 35785 | 36985 | 91770 | 8168 | 3240 | 34022 | 4500 | 31068 | 0 | 0 | 10004 | **182772** | **84502** | 79382 | | **0** |
| SR | 11000 | 29775 | 6640 | 47415 | 11922 | 3320 | 28541 | 4500 | 32532 | 2864 | 1185 | 2985 | **135263** | **74666** | 70142 | | **0** |
| ER | 24440 | 12165 | 4500 | 41105 | 8182 | 0 | 250 | 400 | 0 | 0 | 0 | 0 | **49937** | **32319** | 30361 | | **0** |
| NER | 750 | 133 | 0 | 883 | 4816 | 0 | 100 | 100 | 0 | 0 | 0 | 1821 | **7720** | **5790** | 5439 | | **0** |
| | **66630** | **117474** | **48125** | **232229** | **55663** | **10980** | **121554** | **14000** | **70001** | **4224** | **1185** | **18765** | **528601** | **266844** | 266844 | | |
| | | **232229** | | | | | **209778** | | | | | | | 284055 | | 114755 | |

Scenario 7 : Solar max Feb 2025

| Avai | rmal Cen | ermal Sta | rmal Priv | qd Therm | Hydro | Nuclear | Solar | lar roofto | Wind | Other Re | Diesel | Gas | | National | Regional DF | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 32% | 34% | 0% | 28% | 30% | 80% | 95% | 60% | 10% | 0% | 0% | 0% | | 70% | 66% | | |
| WR | 44% | 29% | 53% | 44% | 20% | 80% | 90% | 60% | 10% | 0% | 0% | 0% | | 99% | 93% | | |
| SR | 55% | 47% | 55% | 66% | 20% | 80% | 90% | 60% | 0% | 0% | 0% | 0% | | 94% | 89% | | |
| ER | 41% | 26% | 42% | 16% | 30% | 80% | 90% | 60% | 0% | 0% | 0% | 0% | | 69% | 65% | | |
| NER | 0% | 0% | 0% | 0% | 30% | 80% | 90% | 60% | 0% | 0% | 0% | 0% | | 55% | 52% | | |
| | 42% | 35% | 52% | 40% | | | | | | | | | | 90% | 240160 | | |

| Avai | rmal Cen | ermal Sta | rmal Priv | qd Therm | Hydro | Nuclear | Solar | lar roofto | Wind | RE RPO | Diesel | Gas | Total ava | Demand | Surplus/ | Net Avai | Net Dem |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 3614 | 13379 | 0 | 14225 | 6773 | 3536 | 55709 | 2700 | 640 | 36239 | 0 | 0 | 86350 | 60773 | 25577 | 83650 | 58073 |
| WR | 8448 | 10455 | 19616 | 40180 | 1634 | 2592 | 30620 | 2700 | 3107 | 38983 | 0 | 0 | 79171 | 83388 | -4217 | 76471 | 80688 |
| SR | 6050 | 13909 | 3652 | 31180 | 2384 | 2656 | 25687 | 2700 | 0 | 34293 | 0 | 0 | 57038 | 70513 | -13475 | 54338 | 67813 |
| ER | 10120 | 3107 | 1898 | 6623 | 2455 | 0 | 225 | 240 | 0 | 13105 | 0 | 0 | 18044 | 22291 | -4247 | 17804 | 22051 |
| NER | 0 | 0 | 0 | 0 | 1445 | 0 | 90 | 60 | 0 | 1858 | 0 | 0 | 1595 | 3195 | -1600 | 1535 | 3135 |
| Total | **28232** | **40850** | **25165** | **92208** | **14690** | **8784** | **112330** | **8400** | **3747** | **124477** | **0** | **0** | **242198** | **240160** | **2038** | **233798** | **231760** |
| | | **94247** | | | | | **124477** | | | | | | | 226331 | | | |
| 43% | StateTh | | | | | | | | | | | | | | | | |

Scenario 8 : Peak Load Feb 2025

| Avai | rmal Cen | ermal Sta | rmal Priv | qd Therm | Hydro | Nuclear | Solar | lar roofto | Wind | Other Re | Diesel | Gas | | National | Regional DF | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 73% | 62% | 0% | 77% | 60% | 80% | 0% | 0% | 35% | 0% | 0% | 85% | | 74% | 70% | | |
| WR | 71% | 59% | 85% | 59% | 40% | 80% | 0% | 0% | 20% | 0% | 0% | 85% | | 86% | 82% | | |
| SR | 59% | 89% | 76% | 106% | 40% | 80% | 0% | 0% | 20% | 0% | 0% | 85% | | 86% | 82% | | |
| ER | 65% | 62% | 67% | 48% | 60% | 80% | 0% | 0% | 0% | 0% | 0% | 85% | | 81% | 77% | | |
| NER | 0% | 0% | 0% | 0% | 60% | 80% | 0% | 0% | 0% | 0% | 0% | 85% | | 79% | 75% | | |
| | 66% | 68% | 82% | 70% | | | | | | | | | | **87%** | **232154** | | |

| Avai | rmal Cen | ermal Sta | rmal Priv | qd Therm | Hydro | Nuclear | Solar | lar roofto | Wind | RE RPO | Diesel | Gas | al availab | Demand | Surplus/ | Net Avai | Net Dem |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 8329 | 24428 | 0 | 39158 | 13545 | 3536 | 0 | 0 | 2240 | 4355 | 0 | 3363 | 55442 | 63958 | -8516 | 55442 | 63958 |
| WR | 13431 | 21198 | 31416 | 53910 | 3267 | 2592 | 0 | 0 | 6214 | 4685 | 0 | 8503 | 86621 | 72957 | 13664 | 86621 | 72957 |
| SR | 6500 | 26379 | 5056 | 50382 | 4769 | 2656 | 0 | 0 | 6506 | 4121 | 0 | 2537 | 54403 | 64465 | -10062 | 54403 | 64465 |
| ER | 15782 | 7535 | 3026 | 19630 | 4909 | 0 | 0 | 0 | 0 | 1575 | 0 | 0 | 31251 | 26202 | 5049 | 31251 | 26202 |
| NER | 0 | 0 | 0 | 0 | 2890 | 0 | 0 | 0 | 0 | 223 | 0 | 1548 | 4437 | 4572 | -135 | 4437 | 4572 |
| Total | **44042** | **79540** | **39497** | **163079** | **29380** | **8784** | **0** | **0** | **14960** | **14960** | **0** | **15950** | **232154** | **232154** | **0** | **232154** | **232154** |
| | | **163079** | | | | | **14960** | | | | | | | 220490 | | | |
| 49% | StateTh | | | | | | | | | | | | | | | | |

Scenario 9: Off peak Load Feb 2025

| Avai | rmal Cen | ermal Sta | rmal Priv | qd Therm | Hydro | Nuclear | Solar | lar roofto | Wind | Other Re | Diesel | Gas | | National | Regional DF | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 69% | 43% | 0% | 51% | 30% | 80% | 0% | 0% | 10% | 0% | 0% | 30% | | 46% | 43% | | |
| WR | 68% | 53% | 72% | 54% | 20% | 80% | 0% | 0% | 20% | 0% | 0% | 30% | | 70% | 66% | | |
| SR | 55% | 80% | 55% | 94% | 20% | 80% | 0% | 0% | 0% | 0% | 0% | 30% | | 70% | 66% | | |
| ER | 41% | 41% | 67% | 36% | 30% | 80% | 0% | 0% | 0% | 0% | 0% | 30% | | 54% | 51% | | |
| NER | 0% | 0% | 0% | 0% | 30% | 80% | 0% | 0% | 0% | 0% | 0% | 30% | | 42% | 40% | | |
| | 55% | 55% | 69% | 58% | | | | | | | | | | 64% | 170780 | | |

| Avai | rmal Cen | ermal Sta | rmal Priv | qd Therm | Hydro | Nuclear | Solar | lar roofto | Wind | RE RPO | Diesel | Gas | al availab | Demand | Surplus/ | Net Avai | Net Dem |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NR | 7867 | 16914 | 0 | 26050 | 6773 | 3536 | 0 | 0 | 640 | 1995 | 0 | 1187 | 36917 | 39541 | -2624 | 36917 | 39541 |
| WR | 12871 | 18937 | 26493 | 49726 | 1634 | 2592 | 0 | 0 | 6214 | 2146 | 0 | 3001 | 71742 | 59099 | 12643 | 71742 | 59099 |
| SR | 6050 | 23950 | 3652 | 44396 | 2384 | 2656 | 0 | 0 | 0 | 1888 | 0 | 895 | 39588 | 52220 | -12632 | 39588 | 52220 |
| ER | 10120 | 4943 | 3026 | 14651 | 2455 | 0 | 0 | 0 | 0 | 722 | 0 | 0 | 20543 | 17466 | 3077 | 20543 | 17466 |
| NER | 0 | 0 | 0 | 0 | 1445 | 0 | 0 | 0 | 0 | 102 | 0 | 546 | 1991 | 2454 | -463 | 1991 | 2454 |
| Total | **36908** | **64744** | **33171** | **134823** | **14690** | **8784** | **0** | **0** | **6854** | **6854** | **0** | **5630** | **170780** | **170780** | **0** | **170780** | **170780** |
| | | **134823** | | | | | **6854** | | | | | | | 161164 | | | |
| 48% | StateTh | | | | | | | | | | | | | | | | |

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**Annex 4.2**

## Inter-Regional Transmission Capacity (MW)

| Transmission Line | Present | Capacity at the End Of 13th Plan |
|---|---|---|
| **EAST - NORTH** | | |
| Dehri/Sasaram - Sahupuri 220kV S/c | 130 | 130 |
| Sasaram HVDC back-to-back | 500 | 500 |
| Muzaffarpur - Gorakhpur 400kV D/c (with Series Comp.+TCSC) | 2000 | 2000 |
| Patna - Balia 400kV D/c (Quad) | 1600 | 1600 |
| Biharshariff - Balia 400kV D/c (Quad) | 1600 | 1600 |
| Barh/Patna - Balia 400kV D/c (Quad) | 1600 | 1600 |
| Gaya - Balia 765kV S/c | 2100 | 2100 |
| Sasaram bypassing (additional capacity) | 500 | 500 |
| Sasaram - Fatehpur 765kV S/c | 2100 | 2100 |
| Barh-II/Motihari - Gorakhpur 400kV D/c (Quad) | 1600 | 1600 |
| Gaya-Varanasi 765kV 2xS/c | 4200 | 4200 |
| Biharsharif-Varanasi 400kV D/c (Quad) | 1600 | 1600 |
| LILO of Biswanath Chariali - Agra ±800kV HVDC Bipole at new pooling station in Alipurduar and addition of 3000MW module | 3000 | 3000 |
| **Sub-total** | **22,530** | **22,530** |
| **EAST - WEST** | | |
| Budhipadar-Korba 220kV S/c | 130 | 130 |
| Budhipadar-Korba 220kV D/c | 260 | 260 |
| Rourkela/Jharsuguda - Raigarh/Raipur 400kV D/c (with Series Comp.+TCSC) | 1400 | 1400 |
| Ranchi - Sipat 400 kV D/c with series comp. | 1200 | 1200 |
| Rourkela/Jharsuguda - Raigarh/Raipur 400kV (2nd) D/c (with Series Comp.) | 1400 | 1400 |
| Ranchi - Dharamjayagarh/WR Pooiling Station 765kV S/c | 2100 | 2100 |
| Ranchi - Dharamjaygarh 765kV (2nd) S/c | 2100 | 2100 |
| Jharsuguda - Dharamjaygarh 765kV D/c | 4200 | 4200 |
| Jharsuguda - Dharamjaygarh 765kV (2nd) D/c | 4200 | 4200 |
| Jharsuguda - Raipur Pool 765kV D/c | 4200 | 4200 |
| **Sub-total** | **21,190** | **21,190** |

| Transmission Line | Present | Capacity at the End Of 13th Plan |
|---|---|---|
| **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 |
| **Sub-total** | **36,720** | **36,720** |

| Transmission Line | Present | Capacity at the End Of 13th Plan |
|---|---|---|
| | | |
| **WEST - SOUTH** | | |
| Chandrapur HVDC back-to-back | 1000 | 1000 |
| Kolhapur - Belgaum 220kV D/c | 260 | 260 |
| Ponda - Nagajhari 220kV D/c | 260 | 260 |
| Raichur - Sholapur 765kV S/c | 2100 | 2100 |
| Raichur - Sholapur 765kV (2nd) S/c | 2100 | 2100 |
| Narendra - Kolhapur 765kV D/c (operated at 400kV) | 2200 | 2200 |
| Wardha - Nizamabad 765kV D/c | 4200 | 4200 |
| Warora Pool - Warangal (New) 765kV D/c | - | 4200 |
| Raigarh - Pugulur ±800kV HVDC Bipole | 6000 | 6000 |
| LILO of Narendra - Narendra (New) 400kV (Quad) line at Xeldam (Goa) | - | 1600 |
| **Sub-total** | **18,120** | **23,920** |
| **TOTAL** | **112,250** | **118,740** |
| * Barsur (WR) – L. Sileru (SR) 220kV HVDC Monopole of 200MW capacity is currently not in operation. | | |

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**Annex 4.1**

## ISTS Network Expansion Plan upto 2024-25

### Transmission lines

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c or M/c | Total line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 1. | 2021-22 | WR | Bhuj PS – Lakadia PS 765 kV D/c line (215ckm) | 765 | D/c | 214 | | |
| 2. | 2021-22 | WR | LILO of Bhachau – EPGL 400 kV D/c (triple) line at Lakadia PS (40ckm) | 400 | D/c | 76 | | |
| 3. | 2021-22 | WR | Lakadia – Vadodara 765 kV D/c line (658ckm) | 765 | D/c | 658 | 330 | 330 |
| 4. | 2021-22 | WR | Lakadia PS – Banaskantha PS 765 kV D/c line (352ckm) | 765 | D/c | 352 | | 240 |
| 5. | 2021-22 | WR | Reconfiguration of Bhuj PS – Lakadia PS 765 kV D/c line so as to establish Bhuj II – Lakadia 765 kV D/C line as well as Bhuj – Bhuj II 765 kV D/C line (80 ckm) | 765 | D/c | 212 | 240 | |
| 6. | 2021-22 | WR | Extension of Essar – Lakadia / Bhachau 400 kV D/c (triple snowbird) line upto Jam Khambhaliya PS (80 ckm) | 400 | D/c | 38 | 63 | 63 |
| 7. | 2021-22 | WR | Navsari (PG) – Bhestan 220 kV D/C line (with minimum capacity of 400MVA per circuit) (17ckm) | 220 | D/c | 34 | | |
| 8. | 2021-22 | WR | Dharamjaygarh Pool section B - Raigarh (Tamnar) Pool 765kV D/c line (140ckm) | 765 | D/c | 137 | | |
| 9. | 2021-22 | NR | LILO of both circuits of Bawana –Mandola 400kV D/c line at Maharanibagh on M/c tower with Twin HTLS conductor | 400 | M/c | 120 | | |
| 10. | 2021-22 | NR | LILO of one circuit of Bamnauli - Jattikalan 400kV line at Dwarka-I with Twin HTLS conductor | 400 | M/c | 17 | | |
| 11. | 2021-22 | NR | Mohindergarh – Bhiwani 400kV D/c Line | 400 | D/c | 122 | | |
| 12. | 2021-22 | NR | 220kV D/c line from UT Chandigarh to 400/220kV Panchkula(PG) substati | 220 | D/c | 50 | | |
| 13. | 2021-22 | NR | LILO of both ckt. of 400 kV Dhauliganga-Bareilly (PGCIL) line (presently charged at 220 kV) at 400kV Jauljivi | 400 | D/c | 6 | | |
| 14. | 2021-22 | NR | Diversion of Dhauliganga-Bareilly 400kV D/c line (operated at 220kV) at Bareilly end from CB Ganj to Bareilly (PGCIL) | 400 | D/c | 16 | | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c or M/c | Total line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 15. | 2021-22 | NR | Disconnection of 220kV LILO arrangement of Dhauliganga-Bareilly at Pithoragarh and connecting it to Jauljivi 400/220kV S/s | 220 | D/c | 24 | | |
| 16. | 2021-22 | NR | Koteshwar Pooling Station - Rishikesh 400kV D/C (twin) line | 400 | D/c | 83 | | |
| 17. | 2021-22 | NR | Babai (RRVPNL) – Bhiwani (PG) 400kV D/C line | 400 | D/c | 221 | | |
| 18. | 2021-22 | NER | Roing (POWERGRID) – Chapakhowa (AEGCL) 132kV D/c line along with asscoiated bays | 132 | D/c | 67 | | |
| 19. | 2021-22 | NER | LILO of Palatana – Surajmaninagar (ISTS) 400kV D/c line at 400/132kV Surajmaninagar (TSECL) S/ s along with associated 4 no. 400kV line bays – In matching timeframe of upgradation of 400/132kV Surajmaninagar (TSECL) substation | 400 | D/c | 12 | | |
| 20. | 2021-22 | ER | LILO of 2nd circuit of Teesta III – Kishanganj 400kV D/c (Quad) line at Rangpo (24ckm) | 400 | D/c | 24 | | |
| 21. | 2021-22 | ER | LILO of both circuits of Kishanganj (POWERGRID) – Darbhanga (DMTCL) 400kV D/c (Quad) line at Saharsa-New (POWERGRID) – 41 km | 400 | D/c | 82 | | |
| 22. | 2021-22 | ER | Bypassing of Farakka – Kahalgaon (ckt-3 & ckt-4) and Farakka – Durgapur 400kV D/c lines of POWERGRID so as to form Kahalgaon – Durgapur 400kV D/c line – 3.17 km | 400 | D/c | 6 | | |
| 23. | 2022-23 | WR | Warora pool (Maharshtra) – Warangal(New) (Telangana) 765 kV D/c line | 765 | D/c | 664 | | |
| 24. | 2022-23 | WR | LILO of one ckt. of Narendra (existing) – Narendra (New) 400kV D/c quad line at Xeldem - 240ckm | 400 | D/c | 187.35 | | |
| 25. | 2022-23 | WR | Xeldem – Mapusa 400kV D/c (quad) line -80ckm | 400 | D/c | 109.6 | | |
| 26. | 2022-23 | WR | Xeldem (existing) - Xeldem (new) 220kV D/c line | 220 | D/c | 40 | | |
| 27. | 2022-23 | WR | LILO of the second circuit of Zerda – Ranchodpura 400 kV D/c line at Banaskantha (PG) PS | 400 | D/c | 34.4 | | |
| 28. | 2022-23 | WR | Re-conductoring of Kolhapur (PG) – Kolhapur 400 kV D/c line with conductor of minimum capacity of 2100 MVA/Ckt at | 400 | D/c | 120 | | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c or M/c | Total line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| | | | nominal voltage along with bay up-gradation work at Kolhapur (MSETCL). -60KM | | | | | |
| 29. | 2022-23 | WR | LILO of Apta – Kalwa/Taloja 220kV D/c line (i.e. Apta – Kalwa and Apta – Taloja 220kV lines) at Navi Mumbai (PG)-2km | 220 | 2xD/c | 4 | | |
| 30. | 2022-23 | SR | Re-conductoring of the NP Kunta – Kolar 400 kV S/c line (twin Moose) section with high capacity conductors (like twin HTLS equivalent or Quad Moose). | 400 | S/c | 131 | | |
| 31. | 2022-23 | SR | Mangalore (Udupi PCL) – Kasargode 400kV (Quad) D/c line | 400 | D/c | 231 | | |
| 32. | 2022-23 | SR | Warangal (New) –Hyderabad 765 kV D/c line | 765 | D/c | 268 | 240 | 240 |
| 33. | 2022-23 | SR | Warangal (New) – Warangal (Existing) 400 kV (quad) D/c line | 400 | D/c | 96 | | |
| 34. | 2022-23 | SR | Hyderabad – Kurnool 765 kV D/c line. | 765 | D/c | 337 | 240 | 240 |
| 35. | 2022-23 | SR | Warangal (New) – Chilakaluripeta 765kV D/c line | 765 | D/c | 390 | 240 | 240 |
| 36. | 2022-23 | NR | Removal of LILO of one circuit of Bhadla-Bikaner (RVPN) 400kV D/C line at Bikaner (PG) & Extension of this LILO section from Bikaner (PG) to Bikaner-II PS to form Bikaner-II PS-Bikaner (PG) 400kV D/C line | 400 | D/c | 64 | | |
| 37. | 2022-23 | NR | Removal of LILO of Bawana – Mandola 400kV D/c (Quad) line at Maharani Bagh /Gopalpur S/s. Extension of above LILO section from Maharani Bagh/ Gopalpur upto Narela S/s so as to form Maharanibagh – Narela 400kV D/c(Quad) and Maharanibagh-Gopalpur-Narela 400kV D/c (Quad) lines | 400 | D/c | 28 | | |
| 38. | 2022-23 | NR | Fatehgarh-III - Fatehgarh-II 400kV D/c line (Twin HTLS) | 400 | D/c | 88 | | |
| 39. | 2022-23 | NR | Fatehgarh-III - Jaisalmer-II (RVPNL) 400kV D/c line (Twin HTLS) | 400 | D/c | 100 | | |
| 40. | 2022-23 | NR | Bikaner-II PS – Khetri 400kV 2xD/c line (Twin HTLS line on M/c tower) | 400 | D/c | 1088 | 80 | |
| 41. | 2022-23 | NR | Khetri - Bhiwadi 400kV D/c line (Twin HTLS) | 400 | D/c | 236 | | |
| 42. | 2022-23 | NR | Fatehgarh II - Bhadla II 765kV D/C Line (2nd) | 765 | D/c | 375 | 240 | 240 |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c or M/c | Total line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 43. | 2022-23 | NR | Bhadla II - Sikar II 765 kV D/C line | 765 | D/c | 612 | 240 | 330 |
| 44. | 2022-23 | NR | Sikar II - Neemrana 400kV D/c line (Twin HTLS) | 400 | D/c | 274 | | |
| 45. | 2022-23 | NR | Sikar-II - Aligarh 765kV D/C Line | 765 | D/c | 408 | 330 | 330 |
| 46. | 2022-23 | NR | Bhadla II - Sikar II 765 kV D/C line (2nd) | 765 | D/c | 620 | 240 | 330 |
| 47. | 2022-23 | NR | Khetri – Narela 765 kV D/c line | 765 | D/c | 180 | | 330 |
| 48. | 2022-23 | NR | LILO of 765 kV MeerutBhiwani S/c line at Narela | 765 | D/c | 50 | | |
| 49. | 2022-23 | NER | Installation of 400kV, 2x63MVAr switchable line reactors, one in each circuit of Silchar (POWERGRID) – Imphal (POWERGRID) 400kV D/c line at Imphal end | 400 | | | | 126 |
| 50. | 2022-23 | NER | Lower Subansiri – Biswanath Chariyali 400kV 2 x D/c (Twin Lapwing) line (341.5km): Matching with Lower Subansiri (2000MW) HEP | 400 | D/c | 683 | | |
| 51. | 2022-23 | NER | Pare HEP (NEEPCO, Ar. Pradesh) – North Lakhimpur (AEGCL) 132kV D/c line with one circuit via Nirjuli (POWERGRID) (with ACSR Zebra conductor) – (55km) | 132 | D/c | 110 | | |
| 52. | 2022-23 | ER | NKSTPP – Jharkhand Pool 400kV D/c (quad) line (50ckm) | 400 | D/c | 50 | | |
| 53. | 2023-24 | WR | Khavda PS 1(GIS) – Bhuj PS 765 kV D/c line (120ckm) | 765 | D/c | 120 | | |
| 54. | 2023-24 | WR | LILO of one ckt. of KPS1- Bhuj PS 765 kV D/c line at KPS2 | 765 | D/c | 2 | | |
| 55. | 2023-24 | WR | KPS3- KPS2 765 kV D/c line - 20km | 765 | D/c | 40 | | |
| 56. | 2023-24 | WR | KPS1-Khavda PS GIS (KPS2) 765 kV D/C line (to be established with bypassing of LILO of one ckt. of KPS1-Bhuj at KPS2 and utilisation of LILO section) -20Km | 765 | D/c | 40 | | |
| 57. | 2023-24 | WR | KPS2 (GIS) – Lakadia 765 kV D/C line with 330 MVAr switchable line reactors at KPS2 end - 159KM | 765 | D/c | 320 | 330 | |
| 58. | 2023-24 | WR | Banaskantha – Ahmedabad 765 kV D/c line (~200 km length) with 330MVAr, 765 kV Switchable line reactor on each ckt at Ahmedabad S/s end. | 765 | D/c | 400 | | 330 |
| 59. | 2023-24 | WR | Ahmedabad – South Gujarat/Navsari (new) 765 kV | 765 | D/c | 440 | 240 | 240 |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c or M/c | Total line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| | | | D/c line with 240 MVAr switchable line reactor at both ends (~line length 220 km) | | | | | |
| 60. | 2023-24 | WR | Lakadia PS – Ahmedabad 765kV D/c line with 240 MVAR switchable line reactors on both ends (500ckm) | 765 | D/c | 500 | 240 | 240 |
| 61. | 2023-24 | WR | LILO of Pirana (PG) – Pirana (T) 400kV D/c line at Ahmedabad S/s with twin HTLS along with reconductoring of Pirana (PG) – Pirana(T) line with twin HTLS conductor | 400 | D/c | 88 | | |
| 62. | 2023-24 | WR | Neemuch PS – Chhittorgarh (PG) S/s 400 kV D/C line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage) | 400 | D/c | 260 | | |
| 63. | 2023-24 | WR | Neemuch PS- Mandsaur S/stn 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage) | 400 | D/c | 240 | | |
| 64. | 2023-24 | WR | Pachora SEZ PP -Bhopal (Sterlite) 400 kV D/c line (Quad/HTLS) (320ckm) (with minimum capacity of 2100 MVA/ckt at nominal voltage) along with 80MVAr switchable line reactors on each circuit at Pachora end | 400 | D/c | 320 | 80 | |
| 65. | 2023-24 | WR | LILO of both circuits of Parli (PG) – Pune (GIS) 400kV D/c line at Kallam PS (40ckm) | 400 | 2xD/c | 40 | | |
| 66. | 2023-24 | WR | Provision of new 50MVAr switchable line reactor at Kallam PS end of Kallam – Pune(GIS) 400kV D/c line | 400 | | | 50 | |
| 67. | 2023-24 | WR | Conversion of 50MVAr fixed Line Reactors on each ckt of Parli (PG) – Pune (GIS) 400kV D/c line at Parli (PG) end into switchable. | 400 | | | 50 | |
| 68. | 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) (~110 km length) with 63MVAr switchable line reactor on each ckt at Kala (GIS) end | 400 | D/c | 220 | | 63 |
| 69. | 2023-24 | WR | Navsari (New) (South Gujarat) (GIS) – Magarwada (GIS) 400 kV D/c line (conductor with minimum capacity of 2100 | 400 | D/c | 160 | | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c or M/c | Total line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| | | | MVA/Ckt at nominal voltage) (~80 km length) | | | | | |
| 70. | 2023-24 | WR | Navsari (New) (South Gujarat) (GIS) – Padghe (GIS) 765 kV D/c line (~200 km length) with 330 MVAr, 765 kV Switchable line reactor on each ckt. at Navsari (New) (South Gujarat) end. | 765 | D/c | 400 | 330 | |
| 71. | 2023-24 | WR | LILO of KAPP – Vapi 400kV D/c line at Vapi-II | 400 | 2xD/c | 24 | | |
| 72. | 2023-24 | WR | Vapi II – Sayali 220kV D/c line | 220 | D/c | 44 | | |
| 73. | 2023-24 | WR | Padghe (PG) – Kharghar 400kV D/c (quad) line to be terminated into one ckt. of Kharghar – Ghatkopar 400kV D/c (quad) line (thus forming Padghe (PG) – Kharghar 400kV S/c (quad) line, Padghe (PG) – Ghatkopar 400kV S/c (quad) line) - 60km | 400 | D/c | 120 | | |
| 74. | 2023-24 | WR | LILO of Padghe (PG) – Ghatkopar 400kV S/c line at Navi Mumbai GIS (PG) (with quad conductor) - 10km | 400 | D/c | 20 | | |
| 75. | 2023-24 | SR | Pooling station (near Munirabad /suitable location in Koppal distt.) - Narendra (New) GIS 400 kV D/c Line (with Quad Moose ACSR conductor) | 400 | D/c | 250 | | |
| 76. | 2023-24 | SR | Gadag PS - Narendra (New) PS 400 kV (high capacity equivalent to quad moose) D/C Line | 400 | D/c | 200 | | |
| 77. | 2023-24 | SR | LILO of both circuits of Pugalur – Pugalur (HVDC) 400 kV D/c line (with Quad Moose ACSR Conductor) at Karur PS | 400 | D/c | 100 | | |
| 78. | 2023-24 | NER | Bongaigaon (POWERGRID) – Nangalbibra 400kV D/c line (initially operated at 220kV) – 280ckm | 400 | D/c | 280 | | |
| 79. | 2023-24 | NER | Hatsinghmari (Assam) – Ampati (Meghalaya) 132kV D/c line – 60 ckm | 132 | D/c | 60 | | |
| 80. | 2023-24 | ER | Sitamarhi (POWERGRID) - Dhalkebar (Nepal) 400kV D/c (Quad) line (Indian portion) – 80ckm | 400 | D/c | 80 | | |
| 81. | 2023-24 | ER | NKSTPP – Gaya 400kV D/c (quad) line (185ckm) | 400 | D/c | 185 | | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c or M/c | Total line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 82. | 2024-25 | WR | LILO of Satna - Bina 400 kV (1st) D/c line at Chhatarpur PS*~ 60 km<br><br>*out of Satna – Bina 2xD/c lines, one circuit of 2nd D/c line has been LILOed at Sagar (MPPTCL) substation. The proposed LILO is to be made on the other (1st) D/c line between Satna & Bina. | 400 | 2xD/c | 240 | | |
| 83. | 2024-25 | WR | Banaskantha – Sankhari 400 kV 2nd D/c line (~26 km length) | 400 | D/c | 52 | | |
| 84. | 2024-25 | SR | Kurnool-III Pooling station - Kurnool (new) 765 kV D/c Line | 765 | D/c | 200 | | |
| 85. | 2024-25 | SR | Kurnool-III Pooling station - Maheshwaram(PG) 765 kV D/c Line | 765 | D/c | 500 | 240 | 240 |
| 86. | 2024-25 | SR | Upgradation/charging of Narendra (new) - Kolhapur PG 765 kV D/c line (initially charged at 400 kV) to its rated voltage of 765 kV along with 1x330 MVAr switchable Line Reactor at Kolhapur end on both end of each circuit | 765 | D/c | | 330 | |
| 87. | 2024-25 | SR | Bidar PS – Maheshwaram (PG) 765kV D/C line | 765 | D/c | 320 | | |
| 88. | 2024-25 | SR | Ananthpuram PS - Kurnool-III PS 400 kV (High capacity equivalent to quad moose) D/c Line | 400 | D/c | 200 | | |
| 89. | 2024-25 | SR | Anantapuram PS - Cuddapah 400 kV (High capacity equivalent to quad moose) D/c Line with 80 MVAr switchable line reactor on Ananthapuram PS end of each circuit | 400 | D/c | 300 | | |
| 90. | 2024-25 | SR | Upgradation/charging of Tuticorin PS - Dharmapuri (Salem New) 765 kV D/c line (initially charged at 400 kV) to its rated voltage of 765 kV along with 1x330 MVAr switchable Line Reactor on both end of each circuit | 765 | D/c | | 330 | 330 |
| 91. | 2024-25 | SR | Upgradation/charging of Dharmapuri (Salem New) - Madhugiri (Tumkur) 765 kV 2xS/c line (initially charged at 400 kV) to its rated voltage of 765 kV along with 1x330 MVAr switchable Line Reactor on Dharampuri (Salem New) end of both ckts | 765 | D/c | | 330 | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c or M/c | Total line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 92. | 2024-25 | SR | Upgradation/charging of Tuticorin PS - Dharmapuri (Salem New) 765 kV D/c line (initially charged at 400 kV) to its rated voltage of 765 kV along with 1x330 MVAr switchable Line Reactor on both end of each circuit | 765 | D/c | | 330 | 330 |
| 93. | 2024-25 | SR | Upgradation/charging of Madhugiri (Tumkur) - Narendra New 765 kV D/c line (initially charged at 400 kV) to its rated voltage of 765 kV along with 1x330 MVAr switchable Line Reactor on both end of each circuit | 765 | D/c | | 330 | 330 |
| 94. | 2024-25 | NR | LILO of one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line | 400 | D/c | 20 | | |
| 95. | 2024-25 | NR | Stringing of 2nd circuit of Kishenpur – Dulhasti 400kV D/c line (Kishtwar – Kishenpur Section) | 400 | D/c | 130 | | |
| 96. | 2024-25 | NR | LILO of both 400 kV D/c Amargarh - Samba line at 400/220 kV Siot S/s | 400 | D/c | 30 | | |
| 97. | 2024-25 | NR | 400 kV D/c Khandukhal(Srinagar)-Rampura (Kashipur) line | 400 | D/c | 390 | | 80 |
| 98. | 2024-25 | NR | Nange GIS Pooling Station – Koldam 400 kV D/c line | 400 | D/c | 100 | | |
| 99. | 2024-25 | NR | Laying of cable about 15km provided between Minamarg and Zojila Top section of Alusteng – Drass 220kV section | 220 | S/c | 15 | | |
| 100. | 2024-25 | NR | Fatehgarh-4- Fatehgarh-3 400 kV D/c twin HLTS line | 400 | D/c | 100 | | |
| 101. | 2024-25 | NR | Fatehgarh 3- Bhadla-3 400kV D/c line(Quad) | 400 | D/c | 400 | 50 | 50 |
| 102. | 2024-25 | NR | Fatehgarh-2 – Bhadla-3 400kV D/c line (Quad) | 400 | D/c | 400 | 50 | 50 |
| 103. | 2024-25 | NR | Bhadla-3 – Sikar-II 765 kV D/c line | 765 | D/c | 760 | 330 | 330 |
| 104. | 2024-25 | NR | Ramgarh – Bhadla-3 765kV D/c line | 765 | D/c | 360 | 240 | |
| 105. | 2024-25 | NR | Sikar-II – Khetri 765 kV D/c line | 765 | D/c | 180 | | |
| 106. | 2024-25 | NR | Sikar-II – Narela 765 kV D/c line | 765 | D/c | 520 | 240 | 340 |
| 107. | 2024-25 | NR | Jhatikara – Dwarka 400kV D/c line | 400 | D/c | 40 | | |
| 108. | 2024-25 | NR | LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar | 765 | D/c | 180 | | |

| Sl. No. | Time Frame | Region | Transmission Line | Voltage level (kV) | S/c, D/c or M/c | Total line length (ckm) | From end reactor | To end reactor |
|---|---|---|---|---|---|---|---|---|
| 109. | 2024-25 | NR | LILO of 400kV Kota –Merta line at Beawar | 400 | S/c | 40 | | |
| 110. | 2024-25 | NR | Fatehgarh-3– Beawar 765 kV D/c | 765 | D/c | 350 | 330 | 330 |
| 111. | 2024-25 | NR | Fatehgarh-3– Beawar 765 kV D/c(2nd) | 765 | D/c | 700 | 330 | 330 |
| 112. | 2024-25 | NR | LILO of both circuits of Jaipur (Phagi)- Gwalior 765 kV D/c at Dausa | 765 | D/c | 160 | | 240 |
| 113. | 2024-25 | NR | LILO of both circuits of Agra – Jaipur (South) 400kV D/c at Dausa | 400 | D/c | 120 | | 50 |
| 114. | 2024-25 | NR | Beawar – Dausa 765 kV D/c line | 765 | D/c | 480 | 240 | 240 |
| 115. | 2024-25 | NER | Kathalguri (NEEPCO) – Namsai (POWERGRID) 220kV D/c line | 220 | D/c | 150 | | |

## Transformers

| Sl. No. | Time Frame | Region | Transformers | Voltage ratio (kV) | Nos. | MVA Rating | Total MVA Capacity |
|---|---|---|---|---|---|---|---|
| 1 | 2021-22 | WR | Establishment of 2x1500MVA, 765/400 kV Lakadia PS | 765/400 | 2 | 1500 | 3000 |
| 2 | 2021-22 | WR | Establishment of 2x1500 MVA (765/400 kV) Bhuj-II PS (GIS) | 765/400 | 2 | 1500 | 3000 |
| 3 | 2021-22 | WR | Establishment of 4x500 MVA (400/220 kV) Bhuj-II PS (GIS) | 400/220 | 4 | 500 | 2000 |
| 4 | 2021-22 | WR | Establishment of 4x500MVA, 400/220kV Jam Khambhaliya PS (GIS) | 400/220 | 4 | 500 | 2000 |
| 5 | 2021-22 | WR | 1x500 MVA, 400/220 ICT at CGPL Mundra switchyard | 400/220 | 1 | 500 | 500 |
| 6 | 2021-22 | SR | Augmentation of transformation capacity by 1X500 MVA, 3rd 400/230kV ICT along with associated 400kV GIS and 230kV GIS bays at Tuticorin-II (GIS) S/s | 400/230 | 1 | 500 | 500 |
| 7 | 2021-22 | NER | Kopili HEP 220/132kV : 60MVA replacement by 1x160MVA ICT | 220/132 | 1 | 100 | 100 |
| 8 | 2021-22 | NER | Installation of 3rd 220/132kV ICT of 30MVA (3x10MVA) single phase units at Mokokchung S/s along with associated bays | 220/132 | 3 | 10 | 30 |
| 9 | 2021-22 | NER | Replacement of existing 4x33.33MVA, 220/132kV Single phase unit transformers by 2x160 MVA, 220/132kV 3-phase unit at Dimapur Substation for capacity enhancement. Thus, the final transformation capacity would be 220/132kV, 1x100MVA + 2x160MVA | 220/132 | 1 | 100 | 100 |
| 10 | 2021-22 | NER | Replacement of existing 4x33.33MVA, 220/132kV Single phase unit transformers by 2x160 MVA, 220/132kV 3-phase unit at Dimapur Substation for capacity enhancement. Thus, the final transformation capacity would be 220/132kV, 1x100MVA + 2x160MVA | 220/133 | 1 | 160 | 160 |
| 11 | 2021-22 | ER | Farakka: Augmentation of 2nd 400/220kV 315MVA ICT | 400/220 | 1 | 315 | 1000 |
| 12 | 2021-22 | ER | Replacement of 2x315MVA with 2x500MVA ICT at 400/220kV Malda S/s | 400/220 | 2 | 500 | 1000 |
| 13 | 2021-22 | ER | Installation of 315MVA (3rd) ICT at 400/220kV New Siliguri S/s | 400/220 | 1 | 315 | 315 |
| 14 | 2021-22 | ER | Extension at Muzaffarpur (POWERGRID) 400/220kV S/s: 500MVA, 400/220kV transformer (4th ICT) along with ICT bays | 400/220 | 1 | 500 | 500 |
| 15 | 2021-22 | ER | Rangpo: 220/132kV, 4th 100MVA ICT | 220/132 | 1 | 100 | 100 |
| 16 | 2021-22 | ER | Shifting of 400kV side of 400/220kV, 315MVA ICT-l from Durgapur-A section to Durgapur-B section without physical shifting of ICT such that all three ICTs are on same 400kV bus section (if required, GIS bus duct could be used) | 400/220 | 0 | 0 | 0 |
| 17 | 2022-23 | WR | Establishment of 2x500MVA, 400/220kV substation at Xeldem | 400/220 | 2 | 500 | 1000 |

| Sl. No. | Time Frame | Region | Transformers | Voltage ratio (kV) | Nos. | MVA Rating | Total MVA Capacity |
|---|---|---|---|---|---|---|---|
| 18 | 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* *Out of the 2 nos. 400kV line bays already constructed by POWERGRID for DGEN – Vadodara line, 1no. line bay to be utilized for 765/400kV ICT (3rd) at Vadodara | 765/400 | 1 | 1500 | 1500 |
| 19 | 2022-23 | WR | 1x500MVA, 400/220kV ICT (3rd) at Indore S/s along with associated ICT bays (400kV AIS & 220kV Hybrid/MTS) with 220kV ICT bay on extended bus. | 400/220 | 1 | 500 | 500 |
| 20 | 2022-23 | SR | Augmentation of transformation capacity at Hiriyur and Kochi by 1x500 MVA, 400/220 kV ICT | 400/220 | 2 | 500 | 1000 |
| 21 | 2022-23 | SR | Establishment of 2x500MVA, 400/220 kV GIS substation at Kasargode | 400/220 | 2 | 500 | 1000 |
| 22 | 2022-23 | SR | Establishment of 765/400kV substations at Warangal (New) with 2x1500 MVA transformers | 765/400 | 2 | 1500 | 3000 |
| 23 | 2022-23 | NER | Installation of 1x100MVA, 220/132kV ICT (3rd) at Salakati alongwith associated bays at both levels | 220/132 | 1 | 100 | 100 |
| 24 | 2023-24 | WR | Establishment of Khavda PS1 (KPS1) 765/400, 3x1500MVA PS (GIS) | 765/400 | 3 | 1500 | 4500 |
| 25 | 2023-24 | WR | Establishment of 765/400 kV, 4x1500MVA, KPS2 (GIS) | 765/400 | 4 | 1500 | 6000 |
| 26 | 2023-24 | WR | Establishment of 765/400 kV, 3x1500 MVA, KPS3 (GIS) with 1x330 MVAR 765 kV bus reactor and 1x125 MVAR 400 kV bus reactor. | 765/400 | 3 | 1500 | 4500 |
| 27 | 2023-24 | WR | Augmentation of Khavda PS1 by 765/400 kV transformation capacity * (max. upto 4x1500 MVA) | 765/400 | 4 | 1500 | 6000 |
| 28 | 2023-24 | WR | Augmentation of transformation capacity at Navsari (New) (South Gujarat) 765/400 kV S/s by 1x1500 MVA ICT. along with corresponding bay, 765kV Bays at Banaskantha and Ahmedabad for Banaskantha – Ahmedabad 765 kV D/c line. | 765/400 | 1 | 1500 | 1500 |
| 29 | 2023-24 | WR | Establishment of 3x1500 MVA, 765/400 kV Ahmedabad S/s | 765/400 | 3 | 1500 | 4500 |
| 30 | 2023-24 | WR | Establishment of 2x500 MVA, 400/220 kV Pooling Station (AIS) at Neemuch | 400/220 | 2 | 500 | 1000 |
| 31 | 2023-24 | WR | Establishment of 400/220 kV, 3X500 MVA at Pachora SEZ PP | 400/220 | 3 | 500 | 1500 |
| 32 | 2023-24 | WR | Augmentation of Shujalpur S/s by 400/220kV, 1x500MVA ICT (3rd) | 400/220 | 1 | 1500 | 1500 |
| 33 | 2023-24 | WR | Establishment of 4x500MVA, 400/220kV at Kallam PS along with 4 nos. 220kV line bays at Kallam PS | 400/220 | 4 | 500 | 2000 |
| 34 | 2023-24 | WR | Establishment of 2x1500 MVA, 765/400 kV Navsari (New) (South Gujarat) S/s (GIS) with 1x500 MVA, 765/400 kV single phase spare transformer]. | 765/400 | 2 | 1500 | 3000 |

| Sl. No. | Time Frame | Region | Transformers | Voltage ratio (kV) | Nos. | MVA Rating | Total MVA Capacity |
|---|---|---|---|---|---|---|---|
| 35 | 2023-24 | WR | Establishment of 3x500 MVA, 400/220 kV at Navsari (New) (South Gujarat) S/s (GIS) | 400/220 | 3 | 500 | 1500 |
| 36 | 2023-24 | WR | Augmentation of transformation capacity at Padghe (GIS) 765/400 kV substation by 1x1500 MVA ICT. | 765/400 | 1 | 1500 | 1500 |
| 37 | 2023-24 | WR | Establishment of 2x500MVA, 400/220kV GIS S/s near Vapi / Ambheti (Vapi-II) | 400/220 | 2 | 500 | 1000 |
| 38 | 2023-24 | SR | Addition of 1x500 MVA, 400/230kV ICTs (4th) at Tuticorin-II GIS sub-station. | 400/230 | 1 | 500 | 500 |
| 39 | 2023-24 | SR | Establishment of 5x500 MVA, 400/220 kV pooling station near Munirabad /suitable location in Koppal distt | 400/220 | 5 | 500 | 2500 |
| 40 | 2023-24 | SR | Establishment of 400/220 kV, 2x500 MVA Gadag Pooling Station | 400/220 | 2 | 500 | 1000 |
| 41 | 2023-24 | SR | Augmentation of 400/220 kV, 3x500 MVA Gadag Pooling Station | 400/220 | 3 | 500 | 1500 |
| 42 | 2023-24 | SR | Establishment of 2x500 MVA, 400/230 kV Karur Pooling Station | 400/230 | 2 | 500 | 1000 |
| 43 | 2023-24 | SR | Augmentation of 3x500 MVA, 400/230 kV at Karur PS | 400/230 | 3 | 500 | 1500 |
| 44 | 2023-24 | SR | Augmentation with 400/220kV, 1x500 MVA Transformer (3rd) at Palakkad (PG) (2x 315 MVA already existing) | 400/220 | 1 | 500 | 500 |
| 45 | 2023-24 | SR | Augmentation with 400/220 kV, 1x500 MVA Transformer (3rd) at Kolar (PG) ( 2x 500 MVA already existing ) | 400/220 | 1 | 500 | 500 |
| 46 | 2023-24 | SR | Augmentation with 765/400 kV, 1x1500 MVA Transformer (3rd) at Nizamabad (PG) (2x 1500 MVA already existing) | 765/400 | 1 | 1500 | 1500 |
| 47 | 2023-24 | NER | Establishment of new 220/132kV, 2x160MVA substation at Nangalbibra | 220/132 | 2 | 160 | 320 |
| 48 | 2023-24 | ER | 400/220kV, 2x500MVA ICTs along with associated bays (220kV bays in GIS and 400kV bays in AIS) | 400/220 | 2 | 500 | 1000 |
| 49 | 2024-25 | WR | Establishment of 3x500 MVA, 400/220 kV Pooling Station at Chhatarpur | 400/220 | 3 | 500 | 1500 |
| 50 | 2024-25 | WR | Augmentation of transformation capacity at Banaskantha 765/400 kV S/s by 1x1500 MVA ICT along with corresponding bays and associated bays for Banaskantha – Sankhari 400 kV 2nd D/c line at Banaskantha and Sankhari. | 765/400 | 1 | 1500 | 1500 |
| 51 | 2024-25 | SR | Establishment of 2x1500 MVA, 765/400 KV Pooling station at suitable location in Kurnool Distt. (Kurnool-III) | 765/400 | 2 | 1500 | 3000 |
| 52 | 2024-25 | SR | Establishment of 5x500 MVA 400/220kV Pooling station at suitable location in Kurnool Distt. (Kurnool-III) | 400/220 | 5 | 500 | 2500 |
| 53 | 2024-25 | SR | Augmentation of transformation capacity by 1x1500 MVA, 765/400 KV at Kurnool-III Pooling Station (in matching time frame of Kurnool Part-B) | 765/400 | 1 | 1500 | 1500 |
| 54 | 2024-25 | SR | Augmentation of transformation capacity by 4x500 MVA 400/220kV at Kurnool-III Pooling Station (in matching time frame of Kurnool Part-B) | 765/400 | 1 | 1500 | 1500 |

| Sl. No. | Time Frame | Region | Transformers | Voltage ratio (kV) | Nos. | MVA Rating | Total MVA Capacity |
|---|---|---|---|---|---|---|---|
| 55 | 2024-25 | SR | Upgradation of Narendra New to its rated voltage of 765kV level alongwith 2x1500 MVA, 765/400kV ICTs and 1x330 MVAr Bus Reactor | 765/400 | 2 | 1500 | 3000 |
| 56 | 2024-25 | SR | Upgradation of Kolhapur (PG) to its rated voltage of 765kV level alongwith 2x1500 MVA transformer and 1x330 MVAr Bus Reactor | 765/400 | 2 | 1500 | 3000 |
| 57 | 2024-25 | SR | Establishment of 3x1500MVA (765/400kV) Bidar PS | 765/400 | 3 | 1500 | 4500 |
| 58 | 2024-25 | SR | Establishment of 5x500MVA (400/220kV) Bidar PS | 400/220 | 5 | 500 | 2500 |
| 59 | 2024-25 | SR | Establishment of 400/220 kV, 7x500 MVA, Ananthpuram pooling station at suitable border location between Anantapur & Kurnool Distt | 400/220 | 7 | 500 | 3500 |
| 60 | 2024-25 | SR | Upgradation of Tuticorin PS to its rated voltage of 765kV level alongwith 2x1500 MVA, 765/400kV ICTs and 1x330 MVAr Bus Reactor | 765/400 | 2 | 1500 | 3000 |
| 61 | 2024-25 | SR | Upgradation of Dharmapuri (Salem New) to its rated voltage of 765kV level alongwith 2x1500 MVA, 765/400kV ICTs and 1x240 MVAr Bus Reactor | 765/400 | 2 | 1500 | 3000 |
| 62 | 2024-25 | SR | Upgradation of Madhugiri (Tumkur) to its rated voltage of 765kV level alongwith 2x1500 MVA, 765/400kV ICTs and 1x240 MVAr Bus Reactor | 765/400 | 2 | 1500 | 3000 |
| 63 | 2024-25 | NER | Upgradation of existing 132kV Namsai (POWERGRID) S/s to 220kV (with 220kV side as GIS) | 220/132 | 2 | 160 | 320 |
| 64 | 2025-26 | WR | Establishment of 4x500MVA, 400/220kV ICTs at Lakadia (GIS) PS | 400/220 | 4 | 500 | 2000 |
| 65 | 2025-26 | WR | Additional 1x500MVA 400/220kV (9th) ICT, for injection from any additional RE project (other than 4000MW injection under SECI bids upto Tranche IV) in existing Bhuj PS with associated 400 kV GIS bay and 220kV AIS bay. | 400/220 | 1 | 500 | 500 |
| 66 | 2025-26 | WR | 400/220 kV, 2x500 MVA ICT augmentation at Pachora PS | 400/220 | 2 | 500 | 1000 |
| 67 | 2025-26 | WR | Establishment of 400/220 kV, 3x500 MVA at Solapur PP (near Mohol) | 400/220 | 3 | 500 | 1500 |
| 68 | 2025-26 | WR | Establishment of 400/220 kV, 5X500 MVA at Wardha SEZ PP | 400/220 | 5 | 500 | 2500 |
| 69 | 2025-26 | WR | Establishment of 3x1500MVA, 765/400kV at Dholera PS | 765/400 | 3 | 500 | 1500 |
| 70 | 2021-22 | NR | Augmentation with 765/400kV, 1x1500MVA transformer (4th) at Fatehgarh-II PS (1500MVA) | 765/400 | 1 | 1500 | 1500 |
| 71 | 2021-22 | NR | Installation of 400/220kV, 1x500MVA transformers at Fatehgarh-II PS (500MVA) | 400/220 | 1 | 500 | 500 |
| 72 | 2021-22 | NR | Augmentation with 765/400kV, 1x1500MVA transformer (3rd) at Bhadla-II PS (1500MVA) | 765/400 | 1 | 1500 | 1500 |
| 73 | 2021-22 | NR | Creation of 220 kV level at Bhadla-II PS with Installation of 400/220kV, 5x500MVA transformers at Bhadla-II PS (2500MVA) | 400/220 | 5 | 500 | 2500 |
| 74 | 2021-22 | NR | Creation of 220 kV level at Bikaner (PG) with Installation of 400/220kV, 1x500MVA transformers at Bikaner (PG) (1000MVA) | 400/220 | 1 | 500 | 500 |

| Sl. No. | Time Frame | Region | Transformers | Voltage ratio (kV) | Nos. | MVA Rating | Total MVA Capacity |
|---|---|---|---|---|---|---|---|
| 75 | 2021-22 | NR | 400/220kV ICT Augmentation at Sonepat (PG) along with 2 nos. of 220kV bays and 2 nos. of 220kV bays at Abdullapur | 400/220 | 1 | 500 | 500 |
| 76 | 2021-22 | NR | 4x500MVA, 400/220kV GIS at Dwarka-I (2000MVA) | 400/220 | 4 | 500 | 2000 |
| 77 | 2021-22 | NR | Creation of 2x160MVA, 220/66 kV GIS S/s at UT Chandigarh (320MVA) | 220/66 | 2 | 160 | 320 |
| 78 | 2021-22 | NR | Creation of 400/220kV, 2X315MVA GIS Substation in Jauljivi (630MVA) | 400/220 | 2 | 315 | 630 |
| 79 | 2022-23 | NR | Augmentation with 765/400 kV,1x1500 MVA Transformer (5th) at Fatehgarh-II PS (1500MVA) | 765/400 | 1 | 1500 | 1500 |
| 80 | 2022-23 | NR | Augmentation with 765/400 kV,1x1500 MVA Transformer (6th) at Fatehgarh-II PS (1500MVA) | 765/400 | 1 | 1500 | 1500 |
| 81 | 2022-23 | NR | Augmentation with 400/220 kV, 4x500 MVA Transformer (6th to 9th) at Fatehgarh-II PS with suitable Bus sectionalisation at 400 and 220 kV level and 7 nos. of 220 kV line bays (2000MVA) | 400/220 | 4 | 500 | 2000 |
| 82 | 2022-23 | NR | Augmentation with 400/220kV,3x500MVA Transformer (6th to 8th) at Bhadla-II PS with suitable Bus sectionalisation at 400 and 220 kV level and 5 nos. of 220 line bays (1500MVA) | 400/220 | 3 | 500 | 1500 |
| 83 | 2022-23 | NR | Augmentation with 765/400 kV ,1x1500 MVA transformer (4th) at Bhadla-II PS (1500MVA) | 765/400 | 1 | 1500 | 1500 |
| 84 | 2022-23 | NR | Establishment of 400/220 kV, 4x500 MVA at Ramgarh – II PS | 400/220 | 4 | 500 | 2000 |
| 85 | 2022-23 | NR | Establishment of 765/400 kV, 2x1500 MVA at Sikar – II | 765/400 | 2 | 1500 | 3000 |
| 86 | 2022-23 | NR | 2x500MVA, 400/220kV ICTs at Bikaner-II PS along with 4 nos. of 220kV line bays | 400/220 | 2 | 500 | 1000 |
| 87 | 2022-23 | NR | Replacement of 1x315 MVA, 400/220 kV ICT by 1x500 MVA, 400/220kV ICT at Ludhiana (PG) S/s | 400/220 | 1 | 185 | 185 |
| 88 | 2022-23 | NR | 1x 500 MVA, 400/220 kV ICT at Kurukshetra (PG) S/s | 400/220 | 1 | 500 | 500 |
| 89 | 2022-23 | NR | 1x 500 MVA, 400/220 kV ICT at Patiala (PG) S/s | 400/220 | 1 | 500 | 500 |
| 90 | 2024-25 | NR | Implementation of 2x200 MVA, 400/132 kV transformer at Kishtwar Pooling Station along with 4 no. of 132 kV line bays | 400/132 | 2 | 200 | 400 |
| 91 | 2024-25 | NR | Establishment of 2x315MVA, 400/220kV Siot(Rajouri) S/s with 1x125 MVAR (420 kV) bus reactors | 400/220 | 2 | 315 | 630 |
| 92 | 2024-25 | NR | Augmentation with 400/220kV, 1x315MVA Transformer (3rd) at Amargarh, J&K | 400/220 | 1 | 315 | 315 |
| 93 | 2024-25 | NR | Establishment of 7x105 MVA, 400/220kV Nange GIS Pooling Station | 400/220 | 7 | 105 | 735 |
| 94 | 2024-25 | NR | Augmentation with 400/220kV, 1x500 MVA Transformer (3rd)at Sohawal (PG) | 400/220 | 1 | 500 | 500 |
| 95 | 2024-25 | NR | Establishment of 2x500 MVA 400/220 kV pooling station at Fatehgarh-4 along with 2x125 MVAr Bus Reactor | 400/220 | 2 | 500 | 1000 |

| Sl. No. | Time Frame | Region | Transformers | Voltage ratio (kV) | Nos. | MVA Rating | Total MVA Capacity |
|---|---|---|---|---|---|---|---|
| 96 | 2024-25 | NR | Augmentation of 3x500 MVA400/220 kV pooling station at Fatehgarh-4 | 400/220 | 3 | 500 | 1500 |
| 97 | 2024-25 | NR | Establishment of 2x1500 MVA 765/400kV at Bhadla-3 | 765/400 | 2 | 1500 | 3000 |
| 98 | 2024-25 | NR | 3x500 MVA 400/220 kV pooling station at Bhadla-3 | 400/220 | 3 | 500 | 1500 |
| 99 | 2024-25 | NR | Augmentation of 7x500 MVA 400/220 kV transformation capacity at Bhadla-3 | 400/220 | 7 | 500 | 3500 |
| 100 | 2024-25 | NR | Establishment of 2x1500 MVA 765/400kV at Ramgarh | 765/400 | 2 | 1500 | 3000 |
| 101 | 2024-25 | NR | 2x500 MVA 400/220 kV pooling station at Ramgarh | 400/220 | 2 | 500 | 1000 |
| 102 | 2024-25 | NR | Augmentation of 1x1500 MVA 765/400kV at Ramgarh PS | 765/400 | 1 | 1500 | 1500 |
| 103 | 2024-25 | NR | Establishment of 3x1500 MVA 765/400kV at Fatehgarh-3(new section) | 765/400 | 3 | 1500 | 4500 |
| 104 | 2024-25 | NR | 3x500 MVA 400/220 kV pooling station at Fatehgarh-3(new section) | 400/220 | 3 | 500 | 1500 |
| 105 | 2024-25 | NR | Augmentation of 3x1500 MVA 765/400kV at Fatehgarh-3(new section) | 765/400 | 3 | 1500 | 4500 |
| 106 | 2024-25 | NR | 2x500 MVA 400/220 kV pooling station at Fatehgarh-3(new section) | 400/220 | 2 | 500 | 1000 |
| 107 | 2024-25 | NR | Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar | 765/400 | 2 | 1500 | 3000 |
| 108 | 2024-25 | NR | Establishment of 2x1500 MVA 765/400kV substation at suitable location near Dausa | 765/400 | 2 | 1500 | 3000 |
| 109 | 2024-25 | NR | Augmentation with 400/220kV, 1x500MVA Transformer (10th) at Fatehgarh-2 PS | 765/400 | 1 | 1500 | 1500 |
| 110 | 2024-25 | NR | Augmentation with 765/400kV, 1x1500MVA Transformer (5th) at Bhadla-2 PS | 765/400 | 1 | 1500 | 1500 |
| 111 | 2024-25 | NR | Augmentation with 765/400kV, 1x1500MVA Transformer (3rd) at Bikaner (PG) | 765/400 | 1 | 1500 | 1500 |
| 112 | 2024-25 | NR | Augmentation of 1x1500 MVA ICT (3rd), 765/400kV ICT at Jhatikara Substation (Bamnoli/Dwarka section) | 765/400 | 1 | 1500 | 1500 |

## Bus Reactors

| Sl. No. | Time Frame | Region | Bus Reactors | No of reactors | Rating of reactor | Total reactive compensation (MVAR) |
|---|---|---|---|---|---|---|
| 1 | 2021-22 | WR | Establishment of 765kV 330MVAR Bus Reactor at Lakadia PS | 1 | 330 | 330 |
| 2 | 2021-22 | WR | Establishment of 400kV 125MVAR Bus Reactor at Lakadia PS | 1 | 125 | 125 |
| 3 | 2021-22 | WR | Establishment of 765kV 330MVAR Bus Reactor at Lakadia PS | 1 | 330 | 330 |
| 4 | 2021-22 | WR | Establishment of 400kV 125MVAR Bus Reactor at Lakadia PS | 1 | 125 | 125 |
| 5 | 2021-22 | WR | Establishment of 400kV 125MVAR Bus Reactor at Jam Khambhaliya PS | 1 | 125 | 125 |
| 6 | 2021-22 | NR | 4x500MVA, 400/220kV GIS at Dwarka-I (2000MVA) | 1 | 125 | 125 |
| 7 | 2021-22 | NR | 500 MVAr TCR at Kurushetra | 1 | 500 | 500 |
| 8 | 2022-23 | WR | Establishment of 1x125MVAR Bus Reactor at Xeldem S/s | 1 | 125 | 125 |
| 9 | 2022-23 | SR | 2 nos. of bus reactors at Udupi Ss | 2 | 63 | 126 |
| 10 | 2022-23 | SR | Establishment of 765/400kV substations at Warangal (New) with 2x1500 MVA transformers | 2 | 240 | 480 |
| 11 | 2022-23 | NR | ± 600 MVAr STATCOM at Fatehgarh-II substation with 4x125 MVAr MSC, 2x125 MVAr MSR | 2 | 125 | 250 |
| 12 | 2022-23 | NR | ± 600 MVAr STATCOM at Bhadla–II substation with 4x125 MVAr MSC, 2x125 MVAr MSR | 2 | 125 | 250 |
| 13 | 2022-23 | NR | Establishment of 400/220 kV, 4x500 MVA at Ramgarh – II PS | 2 | 125 | 250 |
| 14 | 2022-23 | NR | Establishment of 400kV Pooling Station at Biakner-II | 2 | 125 | 250 |
| 15 | 2022-23 | NR | 1x125 MVAr(400 kV) Bus Reactor at Sikar-II | 1 | 125 | 125 |
| 16 | 2022-23 | NR | 2x330 MVAr(765 kV) Bus Reactor at Sikar-II | 2 | 330 | 660 |
| 17 | 2022-23 | NR | 2x330 MVAr(765 kV) Bus Reactor at Narela | 2 | 330 | 660 |
| 18 | 2022-23 | NR | 1x125 MVAr(400 kV) Bus Reactor at Narela | 1 | 125 | 125 |
| 19 | 2023-24 | WR | Establishment of 765kV 1x330MVAR Bus Reactor at Khavda PS1 (KPS1) | 1 | 330 | 330 |
| 20 | 2023-24 | WR | Establishment of 400kV 1x125MVAR Bus Reactor at Khavda PS1 (KPS1) | 1 | 125 | 125 |
| 21 | 2023-24 | WR | Establishment of 2x330 MVAR 765 kV bus reactor at KPS2 | 2 | 330 | 660 |
| 22 | 2023-24 | WR | Establishment of 2x125 MVAR 400 kV bus reactor. at KPS2 | 2 | 125 | 250 |
| 23 | 2023-24 | WR | Establishment of 1x330 MVAR 765 kV bus reactor at KPS3(GIS) | 1 | 330 | 330 |
| 24 | 2023-24 | WR | Establishment of 1x125 MVAR 400 kV bus reactor at KPS3(GIS) | 1 | 125 | 125 |
| 25 | 2023-24 | WR | Augmentation of Khavda PS1 with 1x330 MVAR 765 kV bus reactor on 2nd 765 kV bus section | 1 | 330 | 330 |
| 26 | 2023-24 | WR | Augmentation of Khavda PS1 with 1x125 MVAR 420 kV bus reactor on 2nd 400 kV bus section | 1 | 125 | 125 |

| Sl. No. | Time Frame | Region | Bus Reactors | No of reactors | Rating of reactor | Total reactive compensation (MVAR) |
|---|---|---|---|---|---|---|
| 27 | 2023-24 | WR | Establishment of 1x330 MVAR 765 kV bus reactor at Ahmedabad S/s | 1 | 330 | 330 |
| 28 | 2023-24 | WR | Establishment of 1x125 MVAR 400 kV bus reactor at Ahmedabad S/s | 1 | 400 | 400 |
| 29 | 2023-24 | WR | Establishment of 1x125 MVAr Bus Reactor at Neemuch PS | 1 | 125 | 125 |
| 30 | 2023-24 | WR | Establishment of 420kV 125 MVAR bus at reactor at Pachora SEZ PP | 1 | 125 | 125 |
| 31 | 2023-24 | WR | Establishment of 1x125MVAr bus reactor at Kallam PS | 1 | 125 | 125 |
| 32 | 2023-24 | WR | Establishment of 2x330 MVAr 765 kV Bus reactor. [with 110 MVAr 765 kV single phase reactor units (spare units for bus/line reactor) | 2 | 330 | 660 |
| 33 | 2023-24 | WR | Establishment of 1x125 MVAr 400 kV Bus reactor at Navsari (New) (South Gujarat) S/s (GIS) | 1 | 125 | 125 |
| 34 | 2023-24 | WR | Establishment of 125MVAR Bus reactor at Vapi / Ambheti (Vapi-II) | 1 | 125 | 125 |
| 35 | 2023-24 | SR | 2x125 MVAr, 400 kV bus reactor at Pooling station (near Munirabad /suitable location in Koppal Distt.) | 2 | 125 | 250 |
| 36 | 2023-24 | SR | 1x125 MVAr (400 kV) bus reactor at Gadag PS | 1 | 125 | 125 |
| 37 | 2023-24 | SR | 2x125 MVAr, 400 kV Bus reactors at Karur PS | 2 | 125 | 250 |
| 38 | 2023-24 | NER | 2 nos 31.5MVAr Bus reactor at Nangalbibra | 2 | 32 | 63 |
| 39 | 2024-25 | WR | Establishment of 1X125 MVAR, 420 kV bus reactor at Chhatarpur PS | 1 | 125 | 125 |
| 40 | 2024-25 | SR | 1x330 MVAr (765kV) bus reactor at Kurnool-III PS | 1 | 330 | 330 |
| 41 | 2024-25 | SR | 1x125MVAr (400kV) bus reactor at Kurnool-III PS | 1 | 125 | 125 |
| 42 | 2024-25 | SR | 1x330 MVAr Bus Reactor at Narendra New | 1 | 330 | 330 |
| 43 | 2024-25 | SR | 1x330 MVAr Bus Reactor at Kolhapur (PG) | 1 | 330 | 330 |
| 44 | 2024-25 | SR | 1x240 MVAr Bus Reactor at Bidar | 1 | 240 | 240 |
| 45 | 2024-25 | SR | 1x125 MVAr Bus Reactor at Bidar | 1 | 125 | 125 |
| 46 | 2024-25 | SR | 2x125 MVAr (400kV) bus reactor at Anantapur PS | 2 | 125 | 250 |
| 47 | 2024-25 | SR | 1x330 MVAr Bus Reactor at Tuticorin PS | 1 | 330 | 330 |
| 48 | 2024-25 | SR | 1x240 MVAr Bus Reactor at Dharmapuri (Salem New) | 1 | 240 | 240 |
| 49 | 2024-25 | SR | 1x240 MVAr Bus Reactor at Madhugiri (Tumkur) | 1 | 240 | 240 |
| 50 | 2024-25 | NR | Implementation of 2x200 MVA, 400/132 kV transformer at Kishtwar Pooling Station along with 4 no. of 132 kV line bays | 1 | 125 | 125 |
| 51 | 2024-25 | NR | Establishment of 2x315MVA, 400/220kV Siot(Rajouri) S/s with 1x125 MVAR (420 kV) bus reactors | 1 | 80 | 80 |
| 52 | 2024-25 | NR | 2x25 MVAR, 220kV bus reactors at 220/66kV Drass S/s | 2 | 25 | 50 |
| 53 | 2024-25 | NR | 1x25 MVAR, 220kV bus reactors at 220/66kV Aulsteng S/s | 1 | 25 | 25 |
| 54 | 2024-25 | NR | Establishment of 2x500 MVA 400/220 kV pooling station at Fatehgarh-4 along with 2x125 MVAr Bus Reactor | 2 | 125 | 250 |

| Sl. No. | Time Frame | Region | Bus Reactors | No of reactors | Rating of reactor | Total reactive compensation (MVAR) |
|---|---|---|---|---|---|---|
| 55 | 2024-25 | NR | 2x330 MVAr (765 kV) Bus Reactor at Bhadla-3 | 2 | 330 | 660 |
| 56 | 2024-25 | NR | 2x125 MVAr(400 kV) Bus Reactor at Bhadla-3 | 2 | 125 | 250 |
| 57 | 2024-25 | NR | 2x240 MVAr(765 kV) Bus Reactor at Ramgarh | 2 | 240 | 480 |
| 58 | 2024-25 | NR | 2x125 MVAr(400 kV) Bus Reactor at Ramgarh | 2 | 125 | 250 |
| 59 | 2024-25 | NR | STATCOM at Ramgarh S/s: ± 2x300 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR | 2 | 125 | 250 |
| 60 | 2024-25 | NR | STATCOM : ± 2x300 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR at Fatehgarh-III | 2 | 125 | 250 |
| 61 | 2024-25 | NR | 2x330 MVAr(765 kV) Bus Reactor at Beawar | 2 | 330 | 660 |
| 62 | 2024-25 | NR | 2x125 MVAr(400 kV) Bus Reactor at Beawar | 2 | 125 | 250 |
| 63 | 2024-25 | NR | 2x330 MVAr(765 kV) Bus Reactor at Dausa | 2 | 330 | 660 |
| 64 | 2024-25 | NR | 2x125 MVAr(400 kV) Bus Reactor at Dausa | 2 | 125 | 250 |
| 65 | 2024-25 | NER | 1 no 50MVAr Bus reactor at Namsai | 1 | 50 | 50 |

**Annex-5.1**

## Renewable Energy Integration plan

## Northern Region

**Transmission System for integration of 17GW REZ in NR**

Transmission System for evacuation of power from 8.9GW REZ in Western Rajasthan in Northern Region has been commissioned.

**Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II- Details of major elements which are under implementation are as follows:**

**Cost- Rs. 11920Cr.**

**Part A**

- Establishment of 400/220 kV, 4x500 MVA at Ramgarh – II PS with 420kV (2x125 MVAR) bus reactor
- Fatehgarh-III - Fatehgarh-II 400kV D/c line (Twin HTLS)
- Fatehgarh-III - Jaisalmer-II (RVPNL) 400kV D/c line (Twin HTLS)

**Part- A1**

- Augmentation with 765/400 kV,1x1500 MVA Transformer ($5^{th}$) at Fatehgarh-II PS (1500MVA)

**Part B**

- Fatehgarh II - Bhadla II 765kV D/C Line (2nd)

**Part- B1**

- Augmentation with 765/400 kV,1x1500 MVA Transformer (6th) at Fatehgarh-II PS (1500MVA)
- Augmentation with 400/220 kV, 4x500 MVA Transformer (6th to 9th) at Fatehgarh-II PS with suitable Bus sectionalisation at 400 and 220 kV level and 7 nos. of 220 kV line bays (2000MVA)
- Augmentation with 400/220kV,3x500MVA Transformer (6th to 8th) at Bhadla-II PS with suitable Bus sectionalisation at 400 and 220 kV level and 5 nos. of 220 line bays (1500MVA)
- Augmentation with 765/400 kV ,1x1500 MVA transformer (4th) at Bhadla-II PS (1500MVA)
- ± 600 MVAr STATCOM at Fatehgarh-II substation with 4x125 MVAr MSC, 2x125 MVAr MSR
- ± 600 MVAr STATCOM at Bhadla–II substation with 4x125 MVAr MSC, 2x125 MVAr MSR

**Part C**

- Establishment of 765/400 kV, 2x1500 MVA at Sikar – II
- Bhadla II - Sikar II 765 kV D/C line
- Sikar II - Neemrana 400kV D/c line (Twin HTLS)

**Part D**

- Sikar-II - Aligarh 765kV D/C Line

**Part E**

- Bhadla II - Sikar II 765 kV D/C line (2nd).

**Part F**

- Establishment of 400kV Pooling Station at Biakner-II
- Bikaner-II PS – Khetri 400kV 2xD/c line (Twin HTLS* line on M/c tower)
- Khetri - Bhiwadi 400kV D/c line (Twin HTLS)

**Part F1**

- Removal of LILO of one circuit of Bhadla - Bikaner (RVPN) 400kV D/C line at Bikaner (PG) & Extension of this LILO section from Bikaner (PG) to Bikaner-II PS to form Bikaner-II PS-Bikaner (PG) 400kV D/C line

**Part G**

- Establishment of 765/400 kV, 3X1500 MVA GIS substation at Narela
- Khetri – Narela 765 kV D/c line along with 1x330MVAr Switchable line reactor for each circuit at Narela end of Khetri – Narela 765kV D/c line
- LILO of 765 kV Meerut Bhiwani S/c line at Narela.

**Part G1**

- Removal of LILO of Bawana – Mandola 400kV D/c (Quad) line at Maharani Bagh /Gopalpur S/s. Extension of above LILO section from Maharani Bagh/ Gopalpur upto Narela S/s so as to form Maharanibagh – Narela 400kV D/c(Quad) and Maharanibagh-Gopalpur-Narela 400 kV D/c (Quad) lines.

- 2 no of line bays at Narela each for Maharanibagh – Narela 400 kV D/c (Quad) and Maharanibagh –Gopalpur-Narela 400 kV D/c (Quad) lines formed after removal of LILO of Bawana – Mandola 400kV D/c(Quad) line at Maharani Bagh/Gopalpur S/s and Extension of above LILO section from Maharani Bagh/Gopalpur uptoNarela S/s (2800ckm)

- Power reversal on ±500 KV, 2500 Balia- Bhiwadi HVDC line upto 2000 MW from Bhiwadi to Balia.

**Implementation of 220 kV bays for RE generators and 400/220kV ICTs at Bikaner-II PS**

**Cost: Rs. 70cr.**

- 2x500MVA, 400/220 kV ICT at Bikaner-II PS
- 4 nos. 220 kV line bays

**Transmission system for evacuation of power from REZ in Rajasthan (14GW) under Phase-III**

**Cost: Rs. 28130cr.**

**Part A1**

- Establishment of 2x500 MVA 400/220 kV pooling station at Fatehgarh-4 along with 2x125 MVAr Bus Reactor
- Fatehgarh-4- Fatehgarh-3 400 kV D/c twin HLTS* line (50 km)

**Part A2**

- Augmentation of 3 x500 MVA400/220 kV pooling station at Fatehgarh-4

**Part A3**

- Fatehgarh 3- Bhadla-3 400kV D/c line(Quad) along with 50 MVAr Switchable line reactor for each circuit at both ends of Fatehgarh 3- Bhadla3 400kV D/c line (200 km)

**Part B1**

- Establishment of 2x1500 MVA 765/400kV & 3x500 MVA 400/220 kV pooling station at Bhadla-3 along with 2x330 MVAr (765kV) Bus Reactor & 2x125 MVAr (420kV) Bus Reactor
- Fatehgarh-2 – Bhadla-3 400kV D/c line (Quad) along with 50 MVAr Switchable line reactor for each circuit at both ends of Fatehgarh 2- Bhadla3 400kV D/c line (200 km)
- Bhadla-3 – Sikar-II 765 kV D/c line along with 330 MVAr Switchable line reactor for each circuit at each end of Bhadla-3 – Sikar-II 765 kV D/c line

**Part B2**

- Augmentation of 7x500 MVA 400/220 kV transformation capacity at Bhadla-3

**Part C1**

- Establishment of 2x1500 MVA 765/400kV & 2x500 MVA 400/220 kV pooling station at Ramgarh along with 2x240 MVAr (765kV) Bus Reactor & 2x125 MVAr (420kV) Bus reactor
- Ramgarh – Bhadla-3 765kV D/c line(180 km) along with 240 MVAr switchable line reactor at each circuit at Ramgarh end of Ramgarh – Bhadla-3 765kV D/c line

**Part C2**

- Augmentation of 1x1500 MVA 765/400kV at Ramgarh PS

**Part C3**

- STATCOM at Ramgarh S/s: ± 2x300 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR

**Part D**

- Sikar-II – Khetri 765 kV D/c line
- Sikar-II – Narela 765 kV D/c line along with 240 MVAr Switchable line reactor for each circuit at each end of Sikar-II – Narela 765 kV D/c line
- Jhatikara – Dwarka 400kV D/c line (Quad)

**Part E1**

- Establishment of 3x1500 MVA 765/400kV & 3x500 MVA 400/220 kV pooling station at Fatehgarh-3 (new section*) (In addition to 4x500 MVA ICT proposed under Rajasthan SEZ Ph-II-of Section-1) along with 2x330 MVAr,765kV & 2x125 MVAr, 420kV Bus Reactors

**Part E2**

- Augmentation of 3x1500 MVA 765/400kV & 2x500 MVA 400/220 kV pooling station at Fatehgarh-3 (new section)

**Part E3**

- Fatehgarh – III S/s : STATCOM : ± 2x300 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR

**Part F**

- Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus Reactor
- LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar Length – 45km
- LILO of 400kV Kota –Merta line at Beawar Length – 20km
- Fatehgarh-3– Beawar 765 kV D/c along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line Length – 350km

**Part G**

- Fatehgarh-3– Beawar 765 kV D/c(2nd) along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line

**Part H**

- Establishment of 2x1500 MVA 765/400kV substation at suitable location near Dausa along with 2x330 MVAr, 765 kV Bus Reactor & 2x125 MVAr, 420 kV bus Reactor
- LILO of both circuits of Jaipur (Phagi)- Gwalior 765 kV D/c at Dausa along with 240 MVAr Switchable line reactor for each circuit at Dausa end of Dausa – Gwalior 765 kV D/c line Length – 40km
- LILO of both circuits of Agra – Jaipur (South) 400kV D/c at Dausa along with 50 MVAr Switchable line reactor for each circuit at Dausa end of Dausa – Agra 400kV D/c line Length – 30km
- Beawar – Dausa 765 kV D/c line (240 km) along with 240 MVAr Switchable line reactor for each circuit at each end

**Part J**

- Augmentation with 400/220kV, 1x500MVA Transformer (10th) at Fatehgarh-2 PS
- Augmentation with 765/400kV, 1x1500MVA Transformer (5th) at Bhadla-2 PS
- Augmentation with 765/400kV, 1x1500MVA Transformer (3rd) at Bikaner (PG)
- Augmentation of 1x1500 MVA ICT (3rd), 765/400kV ICT at Jhatikara Substation (Bamnoli/Dwarka section)

**Connectivity System for the Proposed Kaza Solar Park (880 MW)**

**Cost: 721 Cr.**

- Establishment of 1x315 MVA (4x105 MVA single phase units including one spare), 400/132kV substation at Kaza
- Kaza– Wangtoo (HPPTCL) 400 kV D/c line along with the associated 400 kV bays at both ends (Line capacity shall be 2500 MVA per circuit at nominal voltage)
- 1x80 MVAR switchable line reactor on each circuit at Kaza end of Kaza – Wangtoo 400 kV D/c line
- 1x125 MVAr (420kV) Bus Reactor at Kaza

**Transfer of Power from Kaza Solar Park (880 MW)- under ISTS**

**Cost: 751 Cr.**

- Augmentation of 2x315 MVA (6x105 MVA single phase units) 400/132 kV ICT at Kaza PS
- Wangtoo (HPPTCL) -Dehradun (PG) 400 kV D/c Line (Twin HTLS*) along with 80 MVAr switchable line reactor at Dehradun end at each circuit-220 Km
  ** with minimum capacity of 2100 MVA on each circuit at nominal voltage*

**Power Evacuation from proposed Renewable Energy Park in Pang (Ladakh)**

**Cost : Rs 26,967 Cr**

- **ISTS system for RE interconnection at Pang along with BESS (1GWh)**
  - 400kV PS-1 - Pang D/c (quad moose) line - 7km
  - 400kV PS-2 -Pang D/c (quad moose) line – 27km
  - 400kV PS-3 -Pang D/c (quad moose) line - 41km
  - 220kV line bay (1 no) for BESS (ISTS) interconnection at Pang
  - 220kV Pang – Leh (Phyang) S/c line (Deer conductor) (S/c line on D/c tower)*-151 km+7km cable
  - BESS at Pang (1GWh)

  ***Note:*** *400kV GIS line bays (2 nos) each at PS-1, PS-2 & PS-3 -under developer scope*

**HVDC System**

- Pooling point in Pang (Leh): ±350 kV, 2 nos. of 2500 MW HVDC terminal
- Future provisions: Space for
  - 400 kV line bays : 6 nos.
  - 400/220 kV ICTs along with bays: 2 nos.
  - 220 kV line bays : 4 nos
- Pooling point in Kaithal (Haryana): ±350 kV, 2 nos. of 2500 MW HVDC terminal
  Future provisions: Space for
  - 765/400kV ICTs along with bays: 1 no.
  - 765kV line bays along with switchable line reactor: 2 nos.
  - 400kV line bays along with switchable line reactor: 4 nos.
  - 400/220 kV ICTs along with bays: 2 nos.
  - 220 kV line bay: 4 nos.
- 4 Nos. of 400 kV converter (VSC) bays at Pang
- 4 Nos. of 400 kV converter (VSC) bays at Kaithal
- 2 Nos. of 400/220/33 kV, 315 MVA Transformers along with associated Bays at Pang
- 3 Nos. of 765/400/33 kV, 1500 MVA Transformers along with associated bays at Kaithal

**DC GIS/ AIS**

- DC GIS / AIS at Pang and DC AIS at Kaithal
- 4 nos. of transition stations with DC GIS/ AIS

**HVDC Line (OHL and UG Cable)**

- 480 kms of ±350kV HVDC line between Pang & Kaithal PS (combination of 465km overhead line (Quad) and 15 km underground cable).

**EHVAC System beyond Kaithal**

- Kaithal – Bahadurgarh (PG) 400 kV D/c Line (Twin HTLS) (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage) -170 km.
- Kaithal- Modipuram (Meerut) (UPPTCL) 765 kV D/c Line along with 1x240MVAr switchable line reactor on each ckt at Kaithal end -210 km.
- Augmentation of 765/400kV, 1500 MVA transformer of Bhiwani S/s (one section has 2x1000MVA ICT wherein 1500MVA augmentation will take place, whereas other has 1x1000MVA ICT split through series reactor) incl. 500MVA spare transformer unit (1-Phase).

## Western Region

**I. Transmission system for integration of 28 GW REZ in WR**

**Gujarat:**

**Western Region Strengthening Scheme-21 (WRSS-21) Part A - Transmission System strengthening for relieving over loadings observed in Gujarat Intra-state system due to RE injections in Bhuj PS**

- Establishment of 2x1500MVA, 765/400kV Lakadia PS with 765kV (1x330MVAR) & 400kV (125 MVAR) bus reactor
- LILO of Bhachau – EPGL 400kV D/c (triple) line at Lakadia PS
- Bhuj PS – Lakadia PS 765kV D/c line

**Cost: Rs. 856 Cr.**

**Western Region Strengthening Scheme-21 (WRSS-21) Part B - Transmission System strengthening for relieving over loadings observed in Gujarat Intra-state system due to RE injections in Bhuj PS**

- Lakadia – Vadodara 765kV D/c line along with 330MVAr switchable line reactors at both ends of Lakadia – Vadodara 765kV D/c line

**Cost: Rs. 1865 Cr.**

**Transmission System for providing connectivity to RE projects at Bhuj II (2000 MW) in Gujarat**

- Establishment of 2x1500MVA (765/400kV), 4x500MVA (400/220kV) Bhuj-II PS (GIS) with 765kV (1x330MVAR) and 400kV (125 MVAR) bus reactor
- Reconfiguration of Bhuj PS – Lakadia PS 765kV D/c line so as to establish Bhuj-II –Lakadia 765 kV D/C line as well as Bhuj-Bhuj-II 765kV D/C line
- 1X240MVAr switchable Line reactor for each circuit at Bhuj II PS end of Bhuj-II – Lakadia 765 kV D/c line

**Cost: Rs. 645 Cr.**

**Transmission System for Jam Khambaliya Pooling Station and Interconnection of Jam Khambaliya Pooling Station for Providing Connectivity to RE Projects (1500 MW) in Dwarka (Gujarat)**

- Establishment of 4x500MVA, 400/220kV Jam Khambhaliya PS (GIS) along with 1x125MVAr, 420kV Bus reactor at Jam Khabhaliya PS along with reactor bay
- 2 nos. of 400 kV line bays at Jam Khambhaliya PS for termination of Jam Khambhaliya PS-Lakadia 400kV D/c (triple) line
- 63MVAr switchable Line Reactor at both ends of Lakadia - Jam Khambhaliya 400kV D/c line
- Extension of Essar–Lakadia/Bhachau 400kV D/c (triple) line upto Jam Khambhaliya PS
- 1x500MVA, 400/220kV ICT at CGPL Mundra switchyard

**Cost: Rs. 435 Cr.**

**Transmission system associated with RE generations at Bhuj –II, Dwarka & Lakadia**

- Lakadia PS – Banaskantha PS 765kV D/c line
- 765kV Bays at Lakadia and Banaskantha for Lakadia PS – Banaskantha PS 765kV D/c line
- 240MVAr switchable Line reactor at Banaskantha end of Lakadia PS – Banaskantha PS

**Cost: Rs. 1075 Cr.**

**Transmission Scheme for evacuation of 3.0 GW RE injection at Khavda pooling station under Phase-I**

- Establishment of Khavda PS1 (KPS1) 765/400, 3x1500MVA, 400/220kV, 2x500MVA PS (GIS)
- Khavda PS 1(GIS) – Bhuj PS 765 kV D/c line (120ckm)

**Cost: Rs. 755 Cr.**

**Establishment of Khavda Pooling Station-2 (KPS2) in Khavda RE Park for evacuation of power from RE Projects in Khavda area**

- Establishment of 765/400 kV, 4x1500MVA, KPS2 (GIS) with 2x330 MVAR 765 kV bus reactor and 2x125 MVAR 400 kV bus reactor.
- LILO of one ckt. of KPS1- Bhuj PS 765 kV D/c line at KPS2

**Cost: Rs. 789 Cr.**

**Establishment of Khavda Pooling Station-3 (KPS3) in Khavda RE Park**

- Establishment of 765/400 kV, 3x1500 MVA, KPS3 (GIS) with 1x330 MVAR 765 kV bus reactor and 1x125 MVAR 400 kV bus reactor.
- KPS3- KPS2 765 kV D/c line - 20km
- 2 no. of 765 kV line bays at KPS2 765 kV S/s for KPS3-KPS2 765 kV D/c line

**Cost: Rs. 665 Cr.**

**Transmission scheme for injection beyond 3 GW RE power at Khavda PS1 (KPS1) for evacuation of power from RE Projects in Khavda area**

- Augmentation of Khavda PS1 by 765/400 kV transformation capacity * (max. upto 4x1500 MVA) with 1x330 MVAR 765 kV bus reactor and 1x125 MVAR 420 kV bus reactor on 2nd 765 kV and 400 kV bus section respectively
- KPS1-Khavda PS GIS (KPS2) 765 kV D/C line (to be established with bypassing of LILO of one ckt. of KPS1-Bhuj at KPS2 and utilisation of LILO section) -20Km

**Cost: Rs. 780 Cr.**

**Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part A**

- KPS2 (GIS) – Lakadia 765 kV D/C line with 330 MVAr switchable line reactors at KPS2 end - 159KM
- 330 MVAR switchable line reactors at KPS2 end of KPS2 (GIS) – Lakadia 765 kV D/C line
- 2 nos. of 765 kV line bays each at Lakadia PS & KPS2 (GIS) for Khavda PS2 (GIS) – Lakadia PS 765 kV D/c line

**Cost: Rs. 862 Cr.**

**Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part B**

- Lakadia PS – Ahmedabad 765kV D/c line with 240 MVAR switchable line reactors on both ends (500ckm)

**Cost: Rs. 1232 Cr.**

**Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part C**

- Establishment of 3x1500 MVA, 765/400 kV Ahmedabad S/s with 1x330 MVAR 765 kV bus reactor and 1x125 MVAR 420 kV bus reactor.
- Ahmedabad – South Gujarat/Navsari (new) 765 kV D/c line with 240 MVAr switchable line reactor at both ends (~line length 220 km)
- 2 nos. of 765 kV line bays at South Gujarat /Navsari (new) end for Ahmedabad – South Gujarat/ Navsari (new) 765 kV D/c line
- 240 MVAr switchable line reactor at both ends of Ahmedabad – South Gujarat /Navsari (new) 765 kV D/c line

**Cost: Rs. 1440 Cr.**

**Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part D**

- LILO of Pirana (PG) – Pirana (T) 400kV D/c line at Ahmedabad S/s with twin HTLS along with reconductoring of Pirana (PG) – Pirana(T) line with twin HTLS conductor
- Bay upgradation work at Pirana(PG) & Pirana(T)

**Cost: Rs. 118 Cr.**

**Transmission Network Expansion in Gujarat associated with integration of RE projects from Khavda potential RE zone (Matching with Khavda Phase-A (Ph-II) (5GW) scheme)**

- Banaskantha – Ahmedabad 765 kV D/c line (~200 km length) with 330MVAr, 765 kV Switchable line reactor on each ckt at Ahmedabad S/s end.
- Augmentation of transformation capacity at Navsari (New) (South Gujarat) 765/400 kV S/s by 1x1500 MVA ICT. along with corresponding bay, 765kV Bays at Banaskantha and Ahmedabad for Banaskantha – Ahmedabad 765 kV D/c line.

**Cost: Rs. 1207 Cr.**

**Transmission System for providing connectivity to RE projects in Gujarat [Lakadia (2000MW)]**

- Establishment of 4x500MVA, 400/220kV ICTs at Lakadia (GIS) PS

**Cost: Rs. 196 Cr.**

**Additional (9th) 400/220kV ICT at Bhuj PS (other than 4000MW injection under SECI bids upto Tranche-IV)**

- Additional 1x500MVA 400/220kV (9th) ICT, for injection from any additional RE project (other than 4000MW injection under SECI bids upto Tranche IV) in existing Bhuj PS with associated 400 kV GIS bay and 220kV AIS bay.

**Cost: Rs. 37 Cr.**

**Madhya Pradesh:**

**Transmission system for evacuation of power from RE projects in Rajgarh (2500 MW) SEZ in Madhya Pradesh - Phase-I: 1500**

- Establishment of 400/220 kV, 3X500 MVA at Pachora SEZ PP with 420kV (125 MVAR) bus reactor
- Pachora SEZ PP -Bhopal (Sterlite) 400 kV D/c line (Quad/HTLS) (320ckm) (with minimum capacity of 2100 MVA/ckt at nominal voltage) along with 80MVAr switchable line reactors on each circuit at Pachora end
- 2 no. of 400 kV line bays at Bhopal (Sterlite) for Pachora SEZ PP -Bhopal (Sterlite) 400 kV D/c line (Quad/HTLS) (with minimum capacity of 2100 MVA/ckt at nominal voltage)

**Cost: Rs. 387 Cr.**

**Planned Under Transmission system for evacuation of power from RE projects in Rajgarh (2500 MW) SEZ in Madhya Pradesh - Phase-II: 1000**

- 400/220 kV, 2x500 MVA ICT augmentation at Pachora PS
- Pachora SEZ PP – Shujalpur 400 kV D/c line (Quad/HTLS) (with minimum capacity of 2100 MVA/ckt at nominal voltage)- 80km
- 2 no. of 400 kV line bays at Shujalpur for Pachora – Shujalpur 400kV D/c line (Quad/ HTLS) (with minimum capacity of 2100 MVA/ckt at nominal voltage)

**Cost: Rs. 252.64 Cr.**

**ICT augmentation at 2x315MVA 400/220kV Shujalpur (PG) Substation**

- Augmentation of Shujalpur S/s by 400/220kV, 1x500MVA ICT (3rd)

**Cost: Rs. 32.75 Cr.**

**Transmission system for evacuation of power from Neemuch SEZ scheme**

- Establishment of 2x500 MVA, 400/220 kV Pooling Station (AIS) at Neemuch with 1x125 MVAr Bus Reactor
- Neemuch PS- Mandsaur S/stn 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage)

**Cost: Rs. 547 Cr.**

**Transmission system for evacuation of power from RE projects in Chhatarpur (1500 MW) in Madhya Pradesh**

- Establishment of 3x500 MVA, 400/220 kV Pooling Station at Chhatarpur along with 1X125 MVAR, 420 kV bus reactor at Chhatarpur PS
- LILO of Satna - Bina 400 kV (1st) D/c line at Chhatarpur PS*~ 60 km
  **out of Satna – Bina 2xD/c lines, one circuit of 2nd D/c line has been LILOed at Sagar (MPPTCL) substation. The proposed LILO is to be made on the other (1st) D/c line between Satna & Bina.*

**Cost: Rs. 238.37 Cr.**

**Maharashtra**

**Transmission system for evacuation of power from RE projects in Osmanabad area (1 GW) in Maharashtra.**

- Establishment of 4x500MVA, 400/220kV at Kallam PS along with 4 nos. 220kV line bays & 1x125MVAr bus reactor at Kallam PS
- LILO of both circuits of Parli (PG) – Pune (GIS) 400kV D/c line at Kallam PS (40ckm)
- Provision of new 50MVAr switchable line reactor at Kallam PS end of Kallam – Pune (GIS) 400kV D/c line
- Conversion of 50MVAr fixed Line Reactors on each ckt of Parli (PG) – Pune (GIS) 400kV D/c line at Parli (PG) end into switchable.

**Cost: Rs. 301 Cr.**

**400 kV line bay at Solapur PS for St-II connectivity to M/s Toramba (Solapur: S: 1000 MW)**

- 1 number of 400kV bay at Solapur (PG) for St-II connectivity to M/s Toramba

**Cost: Rs. 10 Cr.**

**Transmission system for evacuation of power from RE projects in Solapur (1000 MW under Ph-I+ 500 MW under Ph-II) SEZ in Maharashtra.**

- Establishment of 400/220 kV, 3x500 MVA at Solapur PP (near Mohol) alog with 125MVAR, 420kV Bus Reactor
- Solapur pooling point - Solapur (PG) 400 kV D/c line (twin HTLS) (with minimum capacity of 2100 MVA/ckt at nominal voltage) - 50KM

**Cost: Rs. 253 Cr.**

**Transmission system for evacuation of power from RE projects in Wardha (2500 MW) SEZ in Maharashtra**

- Establishment of 400/220 kV, 5X500 MVA at Wardha SEZ PP with 420kV 125 MVAR bus reactor
- LILO of Wardha - Warora Pool 400 kV D/c (Quad) line at Wardha SEZ PP - 85KM

**Cost: Rs. 466.84 Cr.**

**II. Transmission system for evacuation of 11 GW from potential REZ's in Gujarat i.e. 7 GW from Khavda & 4 GW from Dholera**

**Transmission scheme for evacuation of power from Dholera UMSP (2GW in Phase-I)**

- Establishment of 3x1500MVA, 765/400kV Dholera PS with 1x330MVAr, 765kV Bus reactor & 1x125 MVAr 400kV Bus reactor
- Dholera PS – Vataman switching station 765 kV D/C line – 40 km.
- 400kV line bays for termination of lines for solar park

**Cost: Rs. 747 Cr.**

**Transmission System for evacuation of additional 7 GW RE power from Khavda RE Park - Phase -B**

- Establishment of 765 kV Halvad switching station with 765 kV, 2x330 MVAr bus reactors (with 110 MVAr & 80 MVAr 765kV single phase reactor (spare unit for bus/line reactors at Halvad)
- KPS2- Halvad 765 kV D/c line (~220 km length) with 240 MVAr switchable line reactor at both ends and 80 MVAr single phase spare reactor unit at KPS2 end.
- LILO of Lakadia – Ahmedabad 765 kV D/c line at Halvad (LILO length~50 km)

- 240 MVAr 765 kV switchable line reactor on each ckt at Halvad end of Halvad – Ahmedabad 765 kV D/c line (~220 km length)
- Halvad – Vataman 765 kV D/c line (~170 km length) with 1x330 MVAr switchable line reactor at Vatman end on each ckt
- Establishment of 765 kV switching station near Vataman with 2x330MVAr, 765 kV bus reactor (with 110 MVAr 765 kV single phase reactor (spare unit for bus/line reactor)
- LILO of Lakadia – Vadodara 765 kV D/c line at Vataman 765 kV switching station (~10 km LILO length).
- Vataman switching station – Kosamba 765 kV D/c line (~200 km length) with 330 MVAr switchable line reactors on each ckt at Kosamba end.
- Conversion of 240 MVAr 765 kV switchable line reactor on each ckt at Lakadia end of Lakadia – Ahmedabad 765 kV D/c line (being LILOed at Halvad) into bus reactors with NGR bypassing arrangement
- Conversion of 330 MVAr 765 kV switchable line reactor on each ckt at Vadodara end of Lakadia – Vadodara 765 kV D/c line (being LILOed at Vataman) into bus reactors with NGR bypassing arrangement.

**Cost: Rs. 4080 Cr.**

## Southern Region

**Transmission system for integration of 18.5 GW REZ in SR**

Transmission system under implementation for 8 GW REZ

**Transmission Scheme for Evacuation of power from RE sources in Karur/ Tiruppur Wind Energy Zone (Tamil Nadu) (1000 MW) under Phase-I**

**Cost : Rs 245 Crs.**

- Establishment of 2x500 MVA, 400/230 kV Karur Pooling Station (at a location in between Karur Wind Zone and Tiruppur wind zone)
- LILO of both circuits of Pugalur – Pugalur (HVDC) 400 kV D/c line (with Quad Moose ACSR Conductor) at Karur PS
- 4 Nos. of 230 kV line bays for interconnection of wind projects
- 2x125 MVAr, 400 kV Bus reactors at Karur PS
- Space provision for Phase-II:
  - 400/230 kV ICTs along with bays: 3 nos.
  - 230 kV line bays: 5 nos.
  - 230 kV bus sectionalizer bays: 2 nos.
- Adequate space provision for future expansion for:
  - 400/230 kV ICTs along with bays: 3 nos.
  - 400 kV line bays: 6 nos.
  - 230 kV line bays: 7 nos

*The schedule of implementation would be matching with schedule of RE developers or 18 months from the date of transfer of SPV, whichever is later. – June 2023*

**Transmission Scheme for Evacuation of power from RE sources in Karur/ Tiruppur Wind Energy Zone (Tamil Nadu) (1500MW) under Phase-II**

**Cost : Rs 99 Crs.**

- Augmentation of 3x500 MVA, 400/230 kV at Karur PS
- 5 Nos. of 230 kV line bays for interconnection of wind projects

*Phase-II scheme to be taken up only after receipt of Connectivity/LTA applications beyond 1000 MW at Karur.*

**Transmission scheme for evacuation of 1000 MW from Gadag SEZ under Phase-I**

**Cost : Rs 338 Crs.**

- Establishment of 400/220 kV, 2x500 MVA Gadag Pooling Station
- Gadag PS - Narendra (New) PS 400 kV (high capacity equivalent to quad moose) D/C Line
- 400 kV line bays (GIS) at Narendra (New) for Gadag PS- Narendra (New) PS 400 kV D/c line
- 220 kV line bays for interconnection of solar projects (4 nos)
- 1x125 MVAr (400 kV) bus reactor at Gadag PS
- Future provisions:
  - Space for 400 kV Line bay with switchable line reactor: 8 nos.
  - 400/220 kV ICT along with associated bay: 4 nos.

  220 kV:
  - Bus sectionalizer bay: 2 nos. (One no. bay for each Main Bus)
  - Bus coupler bay: 2 nos.
  - Transfer Bus coupler bay: 2 nos.
  - Space for future 400/220kV ICT bay: 4 nos.
  - Space for future line bay: 8 nos.

*The schedule of implementation would be matching with schedule of RE developers or 18 months from the date of transfer of SPV, whichever is later – June 2023*

**Transmission scheme for evacuation of 1500 MW from Gadag SEZ under Phase-II**

**Cost : Rs 262 Crs.**

- Augmentation of 400/220 kV, 3x500 MVA Gadag Pooling Station
- Gadag PS - Koppal PS 400 kV (high capacity equivalent to quad moose) D/C Line
- 400 kV line bays at Koppal PS for Gadag PS- Koppal PS 400 kV D/c line
- 220 kV line bays for interconnection of solar projects (4 nos)

**Transmission scheme for Evacuation of power from RE sources in Koppal Wind Energy Zone (Karnataka) (2500MW)**

**Cost : Rs 647 Crs.**

- Establishment of 3x500 MVA, 400/220 kV pooling station near Munirabad /suitable location in Koppal distt.

- Pooling station (near Munirabad /suitable location in Koppal distt.) - Narendra (New) GIS 400 kV D/c Line (with Quad Moose ACSR conductor)
- 400 kV GIS line bays at Narendra (new) for Koppal PS- Narendra (New) GIS PS 400 kV D/c line
- 5 Nos of 220 kV line bays for interconnection of wind projects
- 2x125 MVAr, 400 kV bus reactor at Pooling station (near Munirabad /suitable location in Koppal Distt.)
- Space provision for additional future expansion
  - Space for future 400kV line bay with switchable line reactor: 6 nos.
  - Space for future 400/220kV ICT along with associated bay: 3 nos.
  - Space for future 220kv line bay: 7 nos.

*Commissioning schedule of 18 months – April 2023*

- Augmentation of 2x500 MVA, 400/220 kV ICTs at pooling station near Munirabad /suitable location in Koppal distt.
- 4 Nos of 220 kV line bays for interconnection of wind projects

*Commissioning schedule of 24 months – October 2023*

### Tirunelveli and Tuticorin Wind Energy Zone (Tamil Nadu) (500 MW)

**Cost : Rs 37 Crs.**

- Addition of 1x500 MVA, 400/230kV ICTs (4$^{th}$) at Tuticorin-II GIS sub-station.

*Commissioning schedule of 15 months matching with generation schedule – March 2023*

**Transmission system planned – 10.5 GW**

**Kurnool(AP) Wind Energy Zone (2500MW) Part A / Kurnool(AP) Wind Energy Zone (500MW) and Solar Energy Zone (1500MW) (Part B) / Ananthapur and Kurnool SEZ (Ananthapur-2500 MW & Kurnool-1000 MW)**

**Kurnool(AP) Wind Energy Zone (2500MW) Part A**

**Cost: Rs. 1101 Crs**

- Establishment of 2x1500 MVA, 765/400 KV and 5x500 MVA 400/220kV Pooling station at suitable location in Kurnool Distt. (Kurnool-III)
- Kurnool-III Pooling station - Kurnool(new) 765 kV D/c Line
- 220 kV line bays for interconnection of wind projects (9 nos)
- 1x330 MVAr (765kV) & 1x125MVAr (400kV) bus reactor at Kurnool-III PS
- Adequate space provision for future expansion for
  - 765/400kV ICTs along with bays: 2 nos.
  - 400/220kV ICTs along with bays: 4 nos.
  - 765kV line bays: 6 nos.
  - 400kV line bays: 4 nos.
  - 220kV line bays: 7 nos.
- Augmentation of transformation capacity by 1x1500 MVA, 765/400 KV and 4x500 MVA 400/220kV at Kurnool-III Pooling Station (in matching time frame of Kurnool Part-B)

- Spare ICTs & reactors
  - 1x500 MVA, 765/400 kV, 1-ph ICT
  - 1x110 MVAR, 765 kV, 1-ph. switchable reactor for 330 MVAr bus reactor
  - 1x80 MVAR, 765 kV; 1-ph. switchable reactor for 240 MVAr line reactor (in matching time frame of Kurnool Part-B)

**Kurnool(AP) Wind Energy Zone (500MW) and Solar Energy Zone (1500MW) (Part B)**

**Cost: Rs. 1604 Crs**

- Kurnool-III Pooling station - Maheshwaram(PG) 765 kV D/c Line
- 220 kV line bays for interconnection of wind projects (6 nos) at Kurnool-III Pooling Station
- 240 MVAr Switchable line reactors at both ends of Kurnool-III PS – Maheshwaram (PG) 765 kV D/c Line.

**Ananthapur and Kurnool SEZ (Ananthapur-2500 MW & Kurnool-1000 MW)**

**Cost: Rs. 823 Crs**

- Establishment of 400/220 kV, 7x500 MVA, Ananthpuram pooling station at suitable border location between Anantapur & Kurnool Distt
- Ananthpuram PS - Kurnool-III PS 400 kV (High capacity equivalent to quad moose) D/c Line
- Anantapuram PS - Cuddapah 400 kV (High capacity equivalent to quad moose) D/c Line with 80 MVAr switchable line reactor on Ananthapuram PS end of each circuit
- 220 kV line bays for interconnection of wind/solar projects (12 nos)
- 2x125 MVAr (400kV) bus reactor at Anantapur PS
- Adequate space provision for future expansion for
  - 400/220kV ICTs along with bays: 1 no.
  - 400kV line bays: 6 nos.
  - 220kV line bays: 4 nos

**Gadag Solar Energy Zone, Karnataka (2500MW) Part B**

**Cost: Rs. 554 Crs**

- Upgradation of Narendra New to its rated voltage of 765kV level along with 2x1500 MVA, 765/400kV ICTs and 1x330 MVAr Bus Reactor
- Upgradation of Kolhapur (PG) to its rated voltage of 765kV level along with 2x1500 MVA transformer and 1x330 MVAr Bus Reactor
- Upgradation/charging of Narendra new - Kolhapur (PG) 765 kV D/c line (initially charged at 400 kV) to its rated voltage of 765 kV along with 1x330 MVAr switchable Line Reactor on Kolhapur (PG) end of each circuit
- Spare ICTs & reactors
  Spare for Narendra New ss:
  - 500 MVA / 765/400 kV 1-phase ICT
  - 110 MVAR, 765 kV, 1 ph Reactor for both the bus reactors and 1X330 MVAr line reactor on Madhugiri (Tumkur) - Narendra New 765 kV D/c line

  Spare for Kolhapur (PG) ss:

- 500 MVA / 765/400 kV 1-phase ICT
- 110 MVAR, 765 kV, 1 ph Reactor for both the bus reactors and 1X330 MVAr line reactor on Narendra new- Kolhapur (PG) 765 kV D/c line

**Common Transmission System Strengthening in Southern Region for export of power from Solar & Wind Energy Zone in Southern Region**

**Cost: Rs. 1202 Crs**

- Upgradation of Tuticorin PS to its rated voltage of 765kV level alongwith 2x1500 MVA, 765/400kV ICTs and 1x330 MVAr Bus Reactor
- Upgradation of Dharmapuri (Salem New) to its rated voltage of 765kV level alongwith 2x1500 MVA, 765/400kV ICTs and 1x240 MVAr Bus Reactor
- Upgradation of Madhugiri (Tumkur) to its rated voltage of 765kV level alongwith 2x1500 MVA, 765/400kV ICTs and 1x240 MVAr Bus Reactor
- Upgradation/charging of Tuticorin PS - Dharmapuri (Salem New) 765 kV D/c line (initially charged at 400 kV) to its rated voltage of 765 kV along with 1x330 MVAr switchable Line Reactor on both end of each circuit.
- Upgradation/charging of Dharmapuri (Salem New) - Madhugiri (Tumkur) 765 kV 2xS/c line (initially charged at 400 kV) to its rated voltage of 765 kV along with 1x330 MVAr switchable Line Reactor on Dharampuri (Salem New) end of both ckts.
- Upgradation/charging of Madhugiri (Tumkur) - Narendra New 765 kV D/c line (initially charged at 400 kV) to its rated voltage of 765 kV along with 1x330 MVAr switchable Line Reactor on both end of each circuit.
- Conversion of 400 kV Line Reactors installed on the above 765 kV circuits/ lines (initially charged at 400 kV) mentioned into 400 kV bus Reactor with suitable arrangements at respective substations.
- Spare ICTs & reactors

  <u>Spare for Tuticorin PS</u>
  - 1x500 MVA, 765/400 kV, 1 ph ICT
  - 1x110 MVAR, 765 kV, 1 ph. Switchable reactor for 330 MVAr line/bus reactor

  <u>Spare for Dharmapuri (Salem New)</u>
  - 1x500 MVA, 765/400 kV, 1ph ICT
  - 1x110 MVAR, 765kV, 1 ph. Switchable reactor for 330 MVAr line reactor
  - 1x80 MVAR, 765 kV, 1 ph. Switchable reactor for 240 MVAr bus reactor

  <u>Spare for Madhugiri (Tumkur):</u>
  - 1x500 MVA, 765/400 kV, 1ph ICT
  - 1x110 MVAR, 765kV, 1 ph. Switchable reactor for 330 MVAr line reactor
  - 1x80 MVAR, 765 kV, 1 ph. Switchable reactor for 240 MVAr bus reactor

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**Annex-7.1.1**

## Inter-Regional AC transmission Lines Flow

| From Name | To Name | Voltage | Id | Thermal limit | P-Sc1 | P-Sc2 | P-Sc3 | P-Sc4 | P-Sc5 | P-Sc6 | P-Sc7 | P-Sc8 | P-Sc9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAKATPUR | BHANPURA-2 | 220 | 1 | 214 | 155 | -43 | -45 | 146 | -111 | -96 | 325 | 56 | 50 |
| MODAK | BHANPURA-2 | 220 | 1 | 214 | 217 | -3 | -12 | 261 | -30 | -12 | 674 | 288 | 235 |
| BHINMAL | ZERDA | 400 | 2 | 857 | 967 | -399 | -421 | 933 | -460 | -391 | 1553 | 23 | 186 |
| RAPS_C4 | SHUJALPR-4 | 400 | 1 | 857 | 658 | 155 | 141 | 629 | -11 | 6 | 981 | 303 | 272 |
| RAPS_C4 | SHUJALPR-4 | 400 | 2 | 857 | 658 | 155 | 141 | 629 | -11 | 6 | 981 | 303 | 272 |
| SAHUPU_N | PUSAULI BSPT | 220 | 1 | 214 | 380 | 318 | 143 | 386 | -10 | 164 | 188 | 62 | 112 |
| RANGIA | MOTANGA | 132 | 1 | 84 | -12 | -76 | -50 | -31 | -93 | -45 | -16 | -70 | -51 |
| SALAKATI | GELEPHU1 | 132 | 1 | 84 | -19 | -89 | -44 | -50 | -117 | -39 | -28 | -78 | -52 |

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

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**Annex-7.2**

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

| Area | From Name | Voltage | To Name | Voltage | Id | MVA Rating | P-Sc1 | P-Sc2 | P-Sc3 | P-Sc4 | P-Sc5 | P-Sc6 | P-Sc7 | P-Sc8 | P-Sc9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTH | BHIWN-PG | 400 | BHIWN-PG | 765 | 1 | 1000 | -941 | 98 | 256 | -1134 | -274 | 11 | -822 | 167 | 83 |
| NORTH | BHIWN-PG | 400 | BHIWN-PG | 765 | 2 | 1000 | -941 | 98 | 256 | -1134 | -274 | 11 | -822 | 167 | 83 |
| NORTH | BHIWANI SR | 400 | BHIWN-PG | 765 | 2 | 1000 | -652 | -32 | 49 | -845 | -240 | -58 | -575 | 88 | 85 |
| NORTH | FATEHG-2 | 400 | FATEH-2 | 765 | 1 | 1500 | 1527 | 179 | 156 | 1522 | 184 | 132 | 1464 | 42 | -17 |
| NORTH | FATEHG-2 | 400 | FATEH-2 | 765 | 2 | 1500 | 1527 | 179 | 156 | 1522 | 184 | 132 | 1464 | 42 | -17 |
| NORTH | FATEHG-2 | 400 | FATEH-2 | 765 | 3 | 1500 | 1527 | 179 | 156 | 1522 | 184 | 132 | 1464 | 42 | -17 |
| NORTH | FATEHG-2 | 400 | FATEH-2 | 765 | 4 | 1500 | 1527 | 179 | 156 | 1522 | 184 | 132 | 1464 | 42 | -17 |
| NORTH | FATEHG-2 | 400 | FATEH-2 | 765 | 5 | 1500 | 1527 | 179 | 156 | 1522 | 184 | 132 | 1464 | 42 | -17 |
| NORTH | FATEHG-2 | 400 | FATEH-2 | 765 | 6 | 1500 | 1527 | 179 | 156 | 1522 | 184 | 132 | 1464 | 42 | -17 |
| NORTH | FATEHG-3 | 400 | FATEHG-3 | 765 | 1 | 1500 | 1406 | -47 | -46 | 1380 | -62 | -48 | 1496 | 0 | 11 |
| NORTH | FATEHG-3 | 400 | FATEHG-3 | 765 | 2 | 1500 | 1406 | -47 | -46 | 1380 | -62 | -48 | 1496 | 0 | 11 |
| NORTH | FATEHG-3 | 400 | FATEHG-3 | 765 | 3 | 1500 | 1406 | -47 | -46 | 1380 | -62 | -48 | 1496 | 0 | 11 |
| NORTH | FATEHG-3 | 400 | FATEHG-3 | 765 | 4 | 1500 | 1406 | -47 | -46 | 1380 | -62 | -48 | 1496 | 0 | 11 |
| NORTH | FATEHG-3 | 400 | FATEHG-3 | 765 | 5 | 1500 | 1406 | -47 | -46 | 1380 | -62 | -48 | 1496 | 0 | 11 |
| NORTH | FATEHG-3 | 400 | FATEHG-3 | 765 | 6 | 1500 | 1406 | -47 | -46 | 1380 | -62 | -48 | 1496 | 0 | 11 |
| NORTH | BHADLA-3 | 400 | BHADLA-3 | 765 | 6 | 1500 | 1746 | 205 | 196 | 1749 | 234 | 182 | 1700 | 18 | -42 |
| NORTH | BHADLA-3 | 400 | BHADLA-3 | 765 | 7 | 1500 | 1746 | 205 | 196 | 1749 | 234 | 182 | 1700 | 18 | -42 |
| NORTH | ORAI | 400 | ORAI | 765 | 1 | 1000 | -125 | -643 | -643 | -262 | -853 | -679 | 471 | -164 | 2 |
| NORTH | ORAI | 400 | ORAI | 765 | 2 | 1000 | -125 | -643 | -643 | -262 | -853 | -679 | 471 | -164 | 2 |
| EAST | BEGUNIA | 400 | BEGUNIA | 765 | 2 | 1500 | -935 | -1214 | -1255 | -975 | -1116 | -1100 | -436 | -637 | -379 |
| EAST | BEGUNIA | 400 | BEGUNIA | 765 | 3 | 1500 | -935 | -1214 | -1255 | -975 | -1116 | -1100 | -436 | -637 | -379 |

| Area | From Name | Voltage | To Name | Voltage | Id | MVA Rating | P-Sc1 | P-Sc2 | P-Sc3 | P-Sc4 | P-Sc5 | P-Sc6 | P-Sc7 | P-Sc8 | P-Sc9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SOUTH | ADONI | 400 | ADONI | 765 | 1 | 1500 | 1350 | 859 | 765 | 1335 | 812 | 749 | 740 | 305 | 90 |
| SOUTH | ADONI | 400 | ADONI | 765 | 2 | 1500 | 1350 | 859 | 765 | 1335 | 812 | 749 | 740 | 305 | 90 |
| SOUTH | ADONI | 400 | ADONI | 765 | 3 | 1500 | 1350 | 859 | 765 | 1335 | 812 | 749 | 740 | 305 | 90 |
| SOUTH | NARDR-NW | 400 | NARENDERA NW | 765 | 1 | 1500 | 1244 | 840 | 723 | 1485 | 1138 | 1058 | 1130 | 494 | 306 |
| SOUTH | NARDR-NW | 400 | NARENDERA NW | 765 | 2 | 1500 | 1244 | 840 | 723 | 1485 | 1138 | 1058 | 1130 | 494 | 306 |

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

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

| Area | From Name | Voltage | To Name | Voltage | Id | MVA rating | P-Sc1 | P-Sc2 | P-Sc3 | P-Sc4 | P-Sc5 | P-Sc6 | P-Sc7 | P-Sc8 | P-Sc9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTH | BHADLA-S | 220 | BHADLA | 400 | 1 | 500 | 410 | -25 | -32 | 397 | -49 | -80 | 375 | -90 | -86 |
| NORTH | BHADLA-S | 220 | BHADLA | 400 | 2 | 500 | 410 | -25 | -32 | 397 | -49 | -80 | 375 | -90 | -86 |
| NORTH | BHADLA-S | 220 | BHADLA | 400 | 3 | 500 | 410 | -25 | -32 | 397 | -49 | -80 | 375 | -90 | -86 |
| NORTH | BHADLA-S | 220 | BHADLA | 400 | 4 | 500 | 410 | -25 | -32 | 397 | -49 | -80 | 375 | -90 | -86 |
| NORTH | BHADLA-PG | 220 | BHADLA PG | 400 | 1 | 500 | 433 | 0 | 0 | 428 | 0 | 0 | 453 | 0 | 0 |
| NORTH | BHADLA-PG | 220 | BHADLA PG | 400 | 2 | 500 | 433 | 0 | 0 | 428 | 0 | 0 | 453 | 0 | 0 |
| NORTH | BHADLA-PG | 220 | BHADLA PG | 400 | 3 | 500 | 433 | 0 | 0 | 428 | 0 | 0 | 453 | 0 | 0 |
| NORTH | BHADLA-PG | 220 | BHADLA PG | 400 | 4 | 500 | 433 | 0 | 0 | 428 | 0 | 0 | 453 | 0 | 0 |
| NORTH | BHADLA-PG | 220 | BHADLA PG | 400 | 5 | 500 | 433 | 0 | 0 | 428 | 0 | 0 | 453 | 0 | 0 |
| NORTH | BHADLA-PG | 220 | BHADLA PG | 400 | 6 | 500 | 433 | 0 | 0 | 428 | 0 | 0 | 453 | 0 | 0 |
| NORTH | RAMG-II | 220 | FATEHG-3 SPL | 400 | 1 | 500 | 420 | 0 | 0 | 415 | 0 | 0 | 439 | 0 | 0 |
| NORTH | RAMG-II | 220 | FATEHG-3 SPL | 400 | 2 | 500 | 420 | 0 | 0 | 415 | 0 | 0 | 439 | 0 | 0 |
| NORTH | RAMG-II | 220 | FATEHG-3 SPL | 400 | 3 | 500 | 420 | 0 | 0 | 415 | 0 | 0 | 439 | 0 | 0 |
| NORTH | RAMG-II | 220 | FATEHG-3 SPL | 400 | 4 | 500 | 420 | 0 | 0 | 415 | 0 | 0 | 439 | 0 | 0 |

| Area | From Name | Voltage | To Name | Voltage | Id | MVA rating | P-Sc1 | P-Sc2 | P-Sc3 | P-Sc4 | P-Sc5 | P-Sc6 | P-Sc7 | P-Sc8 | P-Sc9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTH | RAMG-II | 220 | FATEHG-3 SPL | 400 | 5 | 500 | 420 | 0 | 0 | 415 | 0 | 0 | 439 | 0 | 0 |
| NORTH | RAMGARH-I | 220 | RAMG-I | 400 | 1 | 500 | 414 | 0 | 0 | 410 | 0 | 0 | 434 | 0 | 0 |
| NORTH | RAMGARH-I | 220 | RAMG-I | 400 | 2 | 500 | 414 | 0 | 0 | 410 | 0 | 0 | 434 | 0 | 0 |
| NORTH | FATEH-2 | 220 | FATEHG-2 | 400 | 1 | 500 | 459 | 0 | 0 | 454 | 0 | 0 | 480 | 0 | 0 |
| NORTH | FATEH-2 | 220 | FATEHG-2 | 400 | 2 | 500 | 459 | 0 | 0 | 454 | 0 | 0 | 480 | 0 | 0 |
| NORTH | FATEH-2 | 220 | FATEHG-2 | 400 | 3 | 500 | 459 | 0 | 0 | 454 | 0 | 0 | 480 | 0 | 0 |
| NORTH | FATEH-2 | 220 | FATEHG-2 | 400 | 4 | 500 | 459 | 0 | 0 | 454 | 0 | 0 | 480 | 0 | 0 |
| NORTH | FATEH-2 | 220 | FATEHG-2 | 400 | 5 | 500 | 459 | 0 | 0 | 454 | 0 | 0 | 480 | 0 | 0 |
| NORTH | FATEHG-3 | 220 | FATEHG-3 | 400 | 1 | 500 | 446 | 0 | 0 | 441 | 0 | 0 | 466 | 0 | 0 |
| NORTH | FATEHG-3 | 220 | FATEHG-3 | 400 | 2 | 500 | 446 | 0 | 0 | 441 | 0 | 0 | 466 | 0 | 0 |
| NORTH | FATEHG-3 | 220 | FATEHG-3 | 400 | 3 | 500 | 446 | 0 | 0 | 441 | 0 | 0 | 466 | 0 | 0 |
| NORTH | FATEHG-3 | 220 | FATEHG-3 | 400 | 4 | 500 | 446 | 0 | 0 | 441 | 0 | 0 | 466 | 0 | 0 |
| NORTH | FATEHG-3 | 220 | FATEHG-3 | 400 | 5 | 500 | 446 | 0 | 0 | 441 | 0 | 0 | 466 | 0 | 0 |
| NORTH | FATEHG-4 | 220 | FATEHG-4 | 400 | 1 | 500 | 387 | 0 | 0 | 383 | 0 | 0 | 405 | 0 | 0 |
| NORTH | FATEHG-4 | 220 | FATEHG-4 | 400 | 2 | 500 | 387 | 0 | 0 | 383 | 0 | 0 | 405 | 0 | 0 |
| NORTH | FATEHG-4 | 220 | FATEHG-4 | 400 | 3 | 500 | 387 | 0 | 0 | 383 | 0 | 0 | 405 | 0 | 0 |
| NORTH | FATEHG-4 | 220 | FATEHG-4 | 400 | 4 | 500 | 387 | 0 | 0 | 383 | 0 | 0 | 405 | 0 | 0 |
| NORTH | FATEHG-4 | 220 | FATEHG-4 | 400 | 5 | 500 | 387 | 0 | 0 | 383 | 0 | 0 | 405 | 0 | 0 |
| NORTH | BHADLA-3 | 220 | BHADLA-3 | 400 | 1 | 500 | 414 | 0 | 0 | 410 | 0 | 0 | 434 | 0 | 0 |
| NORTH | BHADLA-3 | 220 | BHADLA-3 | 400 | 2 | 500 | 414 | 0 | 0 | 410 | 0 | 0 | 434 | 0 | 0 |
| NORTH | BHADLA-3 | 220 | BHADLA-3 | 400 | 3 | 500 | 414 | 0 | 0 | 410 | 0 | 0 | 434 | 0 | 0 |
| NORTH | BHADLA-3 | 220 | BHADLA-3 | 400 | 4 | 500 | 414 | 0 | 0 | 410 | 0 | 0 | 434 | 0 | 0 |
| NORTH | BHADLA-3 | 220 | BHADLA-3 | 400 | 5 | 500 | 414 | 0 | 0 | 410 | 0 | 0 | 434 | 0 | 0 |
| NORTH | BHADLA-2 | 220 | BHADLA-2 | 400 | 1 | 500 | 448 | 0 | 0 | 443 | 0 | 0 | 468 | 0 | 0 |

| Area | From Name | Voltage | To Name | Voltage | Id | MVA rating | P-Sc1 | P-Sc2 | P-Sc3 | P-Sc4 | P-Sc5 | P-Sc6 | P-Sc7 | P-Sc8 | P-Sc9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTH | BHADLA-2 | 220 | BHADLA-2 | 400 | 2 | 500 | 448 | 0 | 0 | 443 | 0 | 0 | 468 | 0 | 0 |
| NORTH | BHADLA-2 | 220 | BHADLA-2 | 400 | 3 | 500 | 448 | 0 | 0 | 443 | 0 | 0 | 468 | 0 | 0 |
| NORTH | BHADLA-2 | 220 | BHADLA-2 | 400 | 4 | 500 | 448 | 0 | 0 | 443 | 0 | 0 | 468 | 0 | 0 |
| NORTH | BHADLA-2 | 220 | BHADLA-2 | 400 | 5 | 500 | 448 | 0 | 0 | 443 | 0 | 0 | 468 | 0 | 0 |
| NORTH | BHAD-2 SPLT | 220 | BHADLA-2 | 400 | 1 | 1500 | 1308 | 0 | 0 | 1293 | 0 | 0 | 1368 | 0 | 0 |
| NORTH | POKARAN-S | 220 | POKARAN | 400 | 1 | 500 | 443 | 76 | 55 | 429 | 56 | 24 | 381 | 0 | -38 |
| NORTH | POKARAN-S | 220 | POKARAN | 400 | 2 | 500 | 443 | 76 | 55 | 429 | 56 | 24 | 381 | 0 | -38 |
| NORTH | KOTA | 220 | KOTA | 400 | 1 | 315 | -167 | -198 | -195 | -197 | -237 | -268 | -232 | -250 | -196 |
| NORTH | KOTA | 220 | KOTA | 400 | 2 | 315 | -167 | -198 | -195 | -197 | -237 | -268 | -232 | -250 | -196 |
| NORTH | FATEH-SPL 2 | 220 | FATEHG-2 | 400 | 1 | 500 | 455 | 0 | 0 | 450 | 0 | 0 | 476 | 0 | 0 |
| NORTH | FATEH-SPL 2 | 220 | FATEHG-2 | 400 | 2 | 500 | 455 | 0 | 0 | 450 | 0 | 0 | 476 | 0 | 0 |
| NORTH | FATEH-SPL 2 | 220 | FATEHG-2 | 400 | 3 | 500 | 455 | 0 | 0 | 450 | 0 | 0 | 476 | 0 | 0 |
| NORTH | FATEH-SPL 2 | 220 | FATEHG-2 | 400 | 4 | 500 | 455 | 0 | 0 | 450 | 0 | 0 | 476 | 0 | 0 |
| NORTH | FATEH-SPL 2 | 220 | FATEHG-2 | 400 | 5 | 500 | 455 | 0 | 0 | 450 | 0 | 0 | 476 | 0 | 0 |
| NORTH | BHADLA3-SPL | 220 | BHADLA-3 | 400 | 1 | 0 | 414 | 0 | 0 | 410 | 0 | 0 | 434 | 0 | 0 |
| NORTH | BHADLA3-SPL | 220 | BHADLA-3 | 400 | 2 | 0 | 414 | 0 | 0 | 410 | 0 | 0 | 434 | 0 | 0 |
| NORTH | BHADLA3-SPL | 220 | BHADLA-3 | 400 | 3 | 0 | 414 | 0 | 0 | 410 | 0 | 0 | 434 | 0 | 0 |
| NORTH | BHADLA3-SPL | 220 | BHADLA-3 | 400 | 4 | 0 | 414 | 0 | 0 | 410 | 0 | 0 | 434 | 0 | 0 |
| NORTH | BHADLA3-SPL | 220 | BHADLA-3 | 400 | 5 | 0 | 414 | 0 | 0 | 410 | 0 | 0 | 434 | 0 | 0 |
| NORTH | REWAROAD | 220 | REWA | 400 | 1 | 315 | -211 | -261 | -258 | -244 | -303 | -259 | -218 | -243 | -137 |
| NORTH | AGRA-PG | 220 | AGRA | 400 | 1 | 315 | -155 | -222 | -234 | -236 | -262 | -246 | -121 | -194 | -133 |
| NORTH | AGRA-PG | 220 | AGRA | 400 | 2 | 315 | -155 | -222 | -234 | -236 | -262 | -246 | -121 | -194 | -133 |
| NORTH | GURUSARAI2 | 220 | GURUSARAI400 | 400 | 1 | 500 | 429 | 0 | 0 | 424 | 0 | 0 | 448 | 0 | 0 |
| NORTH | GURUSARAI2 | 220 | GURUSARAI400 | 400 | 2 | 500 | 429 | 0 | 0 | 424 | 0 | 0 | 448 | 0 | 0 |

| Area | From Name | Voltage | To Name | Voltage | Id | MVA rating | P-Sc1 | P-Sc2 | P-Sc3 | P-Sc4 | P-Sc5 | P-Sc6 | P-Sc7 | P-Sc8 | P-Sc9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTH | GURUSARAI2 | 220 | GURUSARAI400 | 400 | 3 | 500 | 429 | 0 | 0 | 424 | 0 | 0 | 448 | 0 | 0 |
| NORTH | MAHEBA2 | 220 | MAHEBA | 400 | 1 | 500 | 389 | 0 | 0 | 385 | 0 | 0 | 407 | 0 | 0 |
| NORTH | MAHEBA2 | 220 | MAHEBA | 400 | 2 | 500 | 389 | 0 | 0 | 385 | 0 | 0 | 407 | 0 | 0 |
| WEST | SOLPR-PG22 | 220 | SOLAPUR-PG | 400 | 1 | 315 | -202 | -201 | -216 | -261 | -236 | -244 | -331 | -288 | -232 |

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

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**Annex-7.3**

## 765kV Transmission Line loadings above 70% of thermal limit

| Area | From Name | To Name | Id | Thermal limit | P-Sc1 | P-Sc2 | P-Sc3 | P-Sc4 | P-Sc5 | P-Sc6 | P-Sc7 | P-Sc8 | P-Sc9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTH | NARELA ISTS | MERUT-PG | 2 | 3802 | 2975 | 477 | 575 | 3079 | 520 | 417 | 2816 | 81 | -41 |
| NORTH | BHADLA-3 | SIKAR NEW | 1 | 4363 | 3073 | 204 | 196 | 3062 | 233 | 182 | 3089 | 18 | -42 |
| NORTH | BHADLA-3 | SIKAR NEW | 2 | 4363 | 3073 | 204 | 196 | 3062 | 233 | 182 | 3089 | 18 | -42 |

- **Note: Highlighted cell indicates Power flow > Thermal Limit**

## 400kV Transmission Line loadings above 70% of thermal limit

| Area | From Name | To Name | Id | Thermal limit | P-Sc1 | P-Sc2 | P-Sc3 | P-Sc4 | P-Sc5 | P-Sc6 | P-Sc7 | P-Sc8 | P-Sc9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WEST | ASOJ-BYP-KOS | ASOJ4 | 1 | 857 | -551 | -40 | -74 | -626 | -168 | -199 | -724 | -158 | -301 |
| WEST | ASOJ-BYP-KOS | KOSAMBA | 1 | 857 | 551 | 40 | 74 | 626 | 168 | 199 | 724 | 158 | 301 |
| WEST | DGM-BYP-NICL | RANCHODPURA | 2 | 857 | -543 | -490 | -431 | -608 | -519 | -457 | -598 | -490 | -435 |
| WEST | DGM-BYP-NICL | NICOL TORREN | 2 | 857 | 543 | 490 | 431 | 608 | 519 | 457 | 598 | 490 | 435 |
| NORTH | KISHENPUR | SAMBA | 1 | 857 | 776 | 544 | 326 | 814 | 660 | 396 | 428 | 284 | 129 |
| NORTH | MALKANA | TALWANDISABO | 1 | 857 | -268 | -793 | -528 | -348 | -873 | -683 | -549 | -681 | -389 |
| NORTH | BHIWANI | BHIWN-PG | 1 | 857 | -675 | -64 | 76 | -733 | -361 | -43 | -505 | 2 | -7 |
| NORTH | GOPAL PUR | NARELA ISTS | 1 | 857 | -974 | -413 | -421 | -994 | -458 | -455 | -736 | -132 | -6 |
| NORTH | GOPAL PUR | NARELA ISTS | 2 | 857 | -974 | -413 | -421 | -994 | -458 | -455 | -736 | -132 | -6 |
| NORTH | JAISALMER-2 | AKAL-4 | 1 | 857 | 342 | -654 | -579 | 318 | -663 | -530 | 763 | -288 | -58 |
| NORTH | JAISALMER-2 | BARMER-4 | 1 | 857 | 688 | -190 | -179 | 679 | -178 | -115 | 858 | -3 | 56 |
| NORTH | JAISALMER-2 | BARMER-4 | 2 | 857 | 668 | -184 | -174 | 659 | -173 | -112 | 833 | -3 | 54 |
| NORTH | JAISALMER-2 | JODH KANKANI | 1 | 857 | 865 | 155 | 140 | 847 | 141 | 135 | 847 | 102 | 47 |

| Area | From Name | To Name | Id | Thermal limit | P-Sc1 | P-Sc2 | P-Sc3 | P-Sc4 | P-Sc5 | P-Sc6 | P-Sc7 | P-Sc8 | P-Sc9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTH | JAISALMER-2 | JODH KANKANI | 2 | 857 | 865 | 155 | 140 | 847 | 141 | 135 | 847 | 102 | 47 |
| NORTH | JAISALMER-2 | JODH KANKANI | 3 | 857 | 772 | 138 | 125 | 756 | 126 | 120 | 756 | 91 | 42 |
| NORTH | MERTA | JODH KANKANI | 1 | 857 | -715 | -287 | -249 | -712 | -233 | -184 | -579 | -91 | 2 |
| NORTH | AKAL-4 | JODH KANKANI | 1 | 857 | 633 | 306 | 273 | 624 | 295 | 254 | 510 | 163 | 55 |
| NORTH | BARMER-4 | BHINMAL | 1 | 857 | 742 | 11 | -2 | 725 | 1 | 39 | 987 | 183 | 189 |
| NORTH | BARMER-4 | BHINMAL | 2 | 857 | 742 | 11 | -2 | 725 | 1 | 39 | 987 | 183 | 189 |
| NORTH | KANKROLI | JODH SURPURA | 1 | 857 | -680 | 80 | 88 | -655 | 109 | 69 | -891 | -83 | -82 |
| NORTH | KOTA | ANTA-4 | 1 | 857 | 169 | -390 | -347 | -92 | -494 | -486 | -540 | -682 | -499 |
| NORTH | BASSI | AGRA | 1 | 857 | 612 | 89 | 82 | 466 | 19 | -36 | 453 | -126 | -176 |
| NORTH | NEEMR-PG | SIKAR NEW | 1 | 857 | -875 | -79 | -56 | -918 | -195 | -101 | -833 | -25 | 12 |
| NORTH | NEEMR-PG | SIKAR NEW | 2 | 857 | -875 | -79 | -56 | -918 | -195 | -101 | -833 | -25 | 12 |
| NORTH | FATEHG-2 | BHADLA-3 | 1 | 857 | -657 | 65 | 57 | -658 | 49 | 38 | -736 | 20 | -10 |
| NORTH | FATEHG-2 | BHADLA-3 | 2 | 857 | -657 | 65 | 57 | -658 | 49 | 38 | -736 | 20 | -10 |
| NORTH | BIKANER-II | KHETRI | 1 | 857 | 711 | 50 | 47 | 707 | 54 | 40 | 694 | 11 | -9 |
| NORTH | BIKANER-II | KHETRI | 2 | 857 | 711 | 50 | 47 | 707 | 54 | 40 | 694 | 11 | -9 |
| NORTH | BIKANER-II | KHETRI | 3 | 857 | 711 | 50 | 47 | 707 | 54 | 40 | 694 | 11 | -9 |
| NORTH | BIKANER-II | KHETRI | 4 | 857 | 711 | 50 | 47 | 707 | 54 | 40 | 694 | 11 | -9 |
| NORTH | KHETRI | BHIWADI | 1 | 857 | 1239 | -50 | -11 | 1274 | 159 | 46 | 1172 | -27 | -78 |
| NORTH | KHETRI | BHIWADI | 2 | 857 | 1239 | -50 | -11 | 1274 | 159 | 46 | 1172 | -27 | -78 |
| NORTH | DAUSA | AGRA | 1 | 857 | 674 | 163 | 157 | 558 | 138 | 76 | 486 | -62 | -132 |
| NORTH | DAUSA | AGRA | 2 | 857 | 674 | 163 | 157 | 558 | 138 | 76 | 486 | -62 | -132 |
| NORTH | MEJA | BARA | 1 | 857 | -370 | -615 | -581 | -520 | -420 | -326 | -392 | -386 | -151 |
| NORTH | MEJA | BARA | 2 | 857 | -370 | -615 | -581 | -520 | -420 | -326 | -392 | -386 | -151 |
| NORTH | MEJA | ALLAHABA | 1 | 857 | 294 | 478 | 439 | 419 | 710 | 552 | 601 | 729 | 318 |

| Area | From Name | To Name | Id | Thermal limit | P-Sc1 | P-Sc2 | P-Sc3 | P-Sc4 | P-Sc5 | P-Sc6 | P-Sc7 | P-Sc8 | P-Sc9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTH | MEJA | ALLAHABA | 2 | 857 | 294 | 478 | 439 | 419 | 710 | 552 | 601 | 729 | 318 |
| NORTH | ORAI | ORAI | 1 | 857 | -430 | -527 | -524 | -548 | -654 | -523 | 25 | -126 | 6 |
| NORTH | ORAI | ORAI | 2 | 857 | -430 | -527 | -524 | -548 | -654 | -523 | 25 | -126 | 6 |
| NORTH | GAZIABAD | MUZAFRN4 | 1 | 857 | -470 | -646 | -608 | -393 | -475 | -406 | -197 | -341 | -109 |
| NORTH | AGRAUP4 | AGRA | 2 | 857 | -820 | -1031 | -1082 | -1358 | -1068 | -936 | -387 | -578 | -343 |
| NORTH | AGRANEW | AGRA | 2 | 857 | -422 | -579 | -611 | -752 | -596 | -520 | -166 | -317 | -190 |
| NORTH | RIHAND-G | RIHAN-HV | 1 | 857 | 754 | 754 | 754 | 754 | 754 | 250 | 754 | 754 | 250 |
| NORTH | RIHAND-G | RIHAN-HV | 2 | 857 | 754 | 754 | 754 | 754 | 754 | 250 | 754 | 754 | 250 |
| NORTH | DADR-NCR | DADR-HVD | 1 | 857 | -722 | -722 | -722 | -722 | -722 | -247 | -722 | -722 | -247 |
| NORTH | DADR-NCR | DADR-HVD | 2 | 857 | -722 | -722 | -722 | -722 | -722 | -247 | -722 | -722 | -247 |
| NORTH | LUCK4-PG | LUCK74-P | 1 | 857 | -560 | -384 | -330 | -674 | -349 | -290 | -249 | -52 | 35 |
| NORTH | LUCK4-PG | LUCK74-P | 2 | 857 | -560 | -384 | -330 | -674 | -349 | -290 | -249 | -52 | 35 |
| NORTH | DADRI_SPLT | MURADNAG-2 | 1 | 857 | 239 | 586 | 685 | 128 | 350 | 396 | 234 | 461 | 289 |
| NORTH | ANPARA4 | SINGRL4 | 1 | 857 | -496 | -682 | -554 | -466 | -548 | -1077 | -337 | -489 | -1115 |
| NRTHEAST | BALIPARA-PG | BON-BAL-FSC1 | 1 | 857 | 412 | -668 | 29 | -415 | -1153 | 108 | 87 | -516 | -172 |
| NRTHEAST | BALIPARA-PG | BON-BAL-FSC2 | 1 | 857 | 412 | -668 | 29 | -415 | -1153 | 108 | 87 | -516 | -172 |
| WEST | KNTPC | KORBA-WEST | 1 | 857 | 821 | 749 | 805 | 623 | 544 | 507 | 621 | 458 | 629 |
| WEST | GANCS4 | DEHGM4 | 1 | 857 | -530 | -53 | -90 | -572 | -173 | -192 | -694 | -258 | -353 |
| WEST | GANCS4 | DEHGM4 | 2 | 857 | -530 | -53 | -90 | -572 | -173 | -192 | -694 | -258 | -353 |
| WEST | GANCS4 | GPEC4 | 1 | 857 | -682 | -377 | -332 | -775 | -439 | -403 | -750 | -289 | -398 |
| WEST | GPEC4 | KASOR4 | 1 | 857 | -683 | -378 | -333 | -777 | -440 | -403 | -752 | -290 | -399 |
| WEST | PIRANA_T | AHMDABAD PG | 1 | 857 | -813 | -461 | -392 | -918 | -559 | -544 | -902 | -413 | -509 |
| WEST | PIRANA_T | AHMDABAD PG | 2 | 857 | -813 | -461 | -392 | -918 | -559 | -544 | -902 | -413 | -509 |
| WEST | KOSAMBA | VAV4 | 1 | 857 | 586 | 328 | 350 | 569 | 314 | 293 | 633 | 298 | 357 |

| Area | From Name | To Name | Id | Thermal limit | P-Sc1 | P-Sc2 | P-Sc3 | P-Sc4 | P-Sc5 | P-Sc6 | P-Sc7 | P-Sc8 | P-Sc9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WEST | PRANTIJ | SANKHARI | 1 | 857 | -560 | -314 | -259 | -616 | -215 | -204 | -606 | -125 | -142 |
| WEST | PRANTIJ | SANKHARI | 2 | 857 | -560 | -314 | -259 | -616 | -215 | -204 | -606 | -125 | -142 |
| WEST | SATPURA | KORADI-I | 1 | 857 | 674 | 266 | 299 | 667 | 121 | 76 | 596 | 185 | 300 |
| WEST | NAGDA-4 | MANDSAUR-4 | 1 | 857 | -617 | 37 | 39 | -611 | 168 | 141 | -786 | -9 | -46 |
| WEST | NAGDA-4 | MANDSAUR-4 | 2 | 857 | -617 | 37 | 39 | -611 | 168 | 141 | -786 | -9 | -46 |
| WEST | MALWA | MALWA_II | 1 | 857 | -267 | -90 | -81 | -212 | 278 | 256 | -235 | -646 | -539 |
| WEST | KHARGAR | PADGHEGIS | 1 | 1714 | -918 | -727 | -810 | -1032 | -826 | -856 | -1242 | -926 | -866 |
| WEST | LONIKAND I | PUNE-PG-AIS | 1 | 857 | -337 | -99 | -233 | -367 | -127 | -189 | -725 | -481 | -554 |
| WEST | KARAD4 | KOLHAPUR | 1 | 857 | -518 | -379 | -405 | -612 | -429 | -524 | -297 | -80 | -18 |
| WEST | KARAD4 | KOLHAPUR | 2 | 857 | -518 | -379 | -405 | -612 | -429 | -524 | -297 | -80 | -18 |
| WEST | KARAD4 | KESURDI400 | 1 | 857 | 525 | 761 | 650 | 586 | 786 | 698 | 364 | 484 | 241 |
| WEST | DHULE4 | BABLESWAR | 1 | 857 | 485 | 212 | 249 | 556 | 255 | 233 | 631 | 327 | 363 |
| WEST | DHULE4 | BABLESWAR | 2 | 857 | 485 | 212 | 249 | 556 | 255 | 233 | 631 | 327 | 363 |
| WEST | TAPS4 | VELGAON4 | 2 | 857 | 610 | 535 | 604 | 597 | 535 | 544 | 738 | 654 | 612 |
| WEST | RGPPL | NAGOTHANE | 1 | 857 | 272 | 597 | 425 | 321 | 636 | 493 | -3 | 326 | 47 |
| WEST | RGPPL | NAGOTHANE | 2 | 857 | 272 | 597 | 425 | 321 | 636 | 493 | -3 | 326 | 47 |
| WEST | CHAKAN | PUNE-PG-AIS | 1 | 857 | -491 | -301 | -412 | -552 | -354 | -398 | -881 | -643 | -667 |
| WEST | SOLAPUR-PG | ALKUD | 1 | 857 | -23 | -405 | -255 | 82 | -319 | -208 | 640 | 246 | 378 |
| WEST | PUNE-PG-AIS | PUNE-PG-GIS | 1 | 857 | -378 | -261 | -319 | -462 | -334 | -368 | -635 | -457 | -462 |
| WEST | PUNE-PG-AIS | PUNE-PG-GIS | 2 | 857 | -378 | -261 | -319 | -462 | -334 | -368 | -635 | -457 | -462 |
| WEST | PUNE-PG-AIS | PUNE-PG-GIS | 3 | 857 | -378 | -261 | -319 | -462 | -334 | -368 | -635 | -457 | -462 |
| WEST | PUNE-PG-AIS | PUNE-PG-GIS | 4 | 857 | -373 | -257 | -314 | -455 | -329 | -363 | -625 | -451 | -455 |
| WEST | PADGHEGIS | NAVI-MUM | 1 | 1714 | 889 | 701 | 784 | 996 | 793 | 822 | 1207 | 900 | 842 |
| EAST | PANDIABILI | BEGUNIA | 1 | 1093 | -799 | -1028 | -1036 | -852 | -956 | -937 | -313 | -505 | -277 |

| Area | From Name | To Name | Id | Thermal limit | P-Sc1 | P-Sc2 | P-Sc3 | P-Sc4 | P-Sc5 | P-Sc6 | P-Sc7 | P-Sc8 | P-Sc9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EAST | PANDIABILI | BEGUNIA | 2 | 1093 | -799 | -1028 | -1036 | -852 | -956 | -937 | -313 | -505 | -277 |
| EAST | BARIPADA | KHARAGPR-WB | 1 | 850 | 547 | 606 | 572 | 774 | 755 | 883 | -75 | 130 | 85 |
| EAST | SAGARDIGHI_4 | FARAKKA | 1 | 1093 | -584 | -494 | -643 | -538 | -431 | -601 | -776 | -518 | -449 |
| EAST | SAGARDIGHI_4 | FARAKKA | 2 | 1093 | -584 | -494 | -643 | -538 | -431 | -601 | -776 | -518 | -449 |
| EAST | RANCHI | RNC-SIPT FSC | 2 | 850 | -442 | -607 | -567 | -554 | -592 | -656 | 21 | -153 | -108 |
| EAST | RANCHI | RNC-SIPT FSC | 1 | 850 | -442 | -607 | -567 | -554 | -592 | -656 | 21 | -153 | -108 |
| SOUTH | CUDP | CHITOR | 1 | 852 | 517 | 53 | 40 | 666 | 94 | 56 | 866 | 221 | 336 |
| SOUTH | KURNOOL4 | SSLBPH4 | 1 | 852 | 623 | 197 | 250 | 544 | 301 | 309 | 316 | 19 | -88 |
| SOUTH | RAMGUNDM STP | GAJWEL4 | 1 | 852 | 625 | 575 | 607 | 589 | 531 | 508 | 517 | 525 | 584 |
| SOUTH | HYDERABAD | GAJWEL4 | 1 | 852 | 937 | 834 | 944 | 833 | 708 | 819 | 563 | 631 | 677 |
| SOUTH | MAILARM4 | NARSAPUR | 1 | 852 | 801 | 562 | 704 | 732 | 518 | 636 | 516 | 439 | 533 |
| SOUTH | MAILARM4 | NARSAPUR | 2 | 852 | 801 | 562 | 704 | 732 | 518 | 636 | 516 | 439 | 533 |
| SOUTH | RAIC | BELLARY TPP | 1 | 850 | -359 | -792 | -641 | -295 | -756 | -666 | -246 | -251 | -75 |
| SOUTH | GULBRG | YERAMRS TPP | 1 | 948 | 110 | -583 | -456 | 44 | -675 | -556 | -506 | -714 | -662 |
| SOUTH | GULBRG | YERAMRS TPP | 3 | 948 | 110 | -583 | -456 | 44 | -675 | -556 | -506 | -714 | -662 |

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

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**Annex-7.4.1**

## N-1 Contingency of 765/400 kV Transformers

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 1. | 354292 KHAVDA-IIS 400.00 358202 KHAVDA-II 765.00 1 | OPEN LINE FROM BUS 354292 [KHAVDA-IIS 400.00] TO BUS 358202 [KHAVDA-II 765.00] CKT 3 | 1109.87 | 2205.17 | 1500 | 147.01 | SC-1 |
| 2. | 524015 NARDR-NW 400.00 528002 NARENDERA NW765.00 1 | OPEN LINE FROM BUS 524015 [NARDR-NW 400.00] TO BUS 528002 [NARENDERA NW765.00] CKT 2 | 1257.03 | 2151.47 | 1500 | 143.43 | SC-1 |
| 3. | 144469 BHIWN-PG 400.00 147704 BHIWN-PG 765.00 1 | OPEN LINE FROM BUS 144469 [BHIWN-PG 400.00] TO BUS 147704 [BHIWN-PG 765.00] CKT 2 | 991.03 | 1301.48 | 1000 | 130.15 | SC-1 |
| 4. | 504049 ADONI 400.00 508049 ADONI 765.00 1 | OPEN LINE FROM BUS 504049 [ADONI 400.00] TO BUS 508049 [ADONI 765.00] CKT 2 | 1369.15 | 1949.22 | 1500 | 129.95 | SC-1 |
| 5. | 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 | 1560.7 | 1837.11 | 1500 | 122.47 | SC-1 |
| 6. | 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 | 1431.28 | 1698.65 | 1500 | 113.24 | SC-1 |
| 7. | 354203 KHAVDA-III 400.00 358203 KHAVDA-III 765.00 1 | OPEN LINE FROM BUS 354203 [KHAVDA-III 400.00] TO BUS 358203 [KHAVDA-III 765.00] CKT 2 | 1101.96 | 1651.14 | 1500 | 110.08 | SC-1 |
| 8. | 354201 KHAVDA2 400.00 358299 KHAVDA2 765.00 1 | OPEN LINE FROM BUS 354201 [KHAVDA2 400.00] TO BUS 358299 [KHAVDA2 765.00] CKT 2 | 1096.77 | 1644.95 | 1500 | 109.66 | SC-1 |
| 9. | 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 | 1114.29 | 1539.42 | 1500 | 102.63 | SC-1 |
| 10 | 164497 SIKAR NEW 400.00 167497 SIKAR NEW 765.00 1 | OPEN LINE FROM BUS 164497 [SIKAR NEW 400.00] TO BUS 167497 [SIKAR NEW 765.00] CKT 2 | 913.61 | 1515.82 | 1500 | 101.05 | SC-1 |
| 11 | 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 | 1143.68 | 1500.86 | 1500 | 100.06 | SC-1 |
| 12 | 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 | 1231.64 | 1471.98 | 1500 | 98.13 | SC-1 |
| 13 | 374050 KOLHAPURPG 400.00 378050 KOLHAPURPG 765.00 1 | OPEN LINE FROM BUS 374050 [KOLHAPURPG 400.00] TO BUS 378050 [KOLHAPURPG 765.00] CKT 2 | 853.54 | 1467.61 | 1500 | 97.84 | SC-1 |
| 14 | 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 | 927.78 | 1391.49 | 1500 | 92.77 | SC-1 |
| 15 | 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 | 815.96 | 1363.54 | 1500 | 90.9 | SC-1 |
| 16 | 374050 KOLHAPURPG 400.00 378050 KOLHAPURPG 765.00 1 | OPEN LINE FROM BUS 374050 [KOLHAPURPG 400.00] TO BUS 378050 [KOLHAPURPG 765.00] CKT 2 | 920.13 | 1590.35 | 1500 | 106.02 | SC-2 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 17 | 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 | 641.2 | 1027.34 | 1000 | 102.73 | SC-2 |
| 18 | 524013 RAIC-NEW 400.00 528003 RAIC800 765.00 1 | OPEN LINE FROM BUS 524013 [RAIC-NEW 400.00] TO BUS 528003 [RAIC800 765.00] CKT 2 | 962 | 1457.74 | 1500 | 97.18 | SC-2 |
| 19 | 524015 NARDR-NW 400.00 528002 NARENDERA NW765.00 1 | OPEN LINE FROM BUS 524015 [NARDR-NW 400.00] TO BUS 528002 [NARENDERA NW765.00] CKT 2 | 841.23 | 1438.1 | 1500 | 95.87 | SC-2 |
| 20 | 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 | 838.18 | 1407.09 | 1500 | 93.81 | SC-2 |
| 21 | 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 | 617.63 | 925.35 | 1000 | 92.53 | SC-2 |
| 22 | 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 | 645.21 | 922.69 | 1000 | 92.27 | SC-2 |
| 23 | 174475 BAL74-PG 400.00 177701 BALI7-PG 765.00 1 | OPEN LINE FROM BUS 174475 [BAL74-PG 400.00] TO BUS 177701 [BALI7-PG 765.00] CKT 3 | 926.09 | 1357.95 | 1500 | 90.53 | SC-2 |
| 24 | 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 | 643.35 | 1027.76 | 1000 | 102.78 | SC-3 |
| 25 | 374050 KOLHAPURPG 400.00 378050 KOLHAPURPG 765.00 1 | OPEN LINE FROM BUS 374050 [KOLHAPURPG 400.00] TO BUS 378050 [KOLHAPURPG 765.00] CKT 2 | 863.62 | 1485.05 | 1500 | 99 | SC-3 |
| 26 | 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 | 835.71 | 1391.7 | 1500 | 92.78 | SC-3 |
| 27 | 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 | 644.98 | 922.45 | 1000 | 92.24 | SC-3 |
| 28 | 524015 NARDR-NW 400.00 528002 NARENDERA NW765.00 1 | OPEN LINE FROM BUS 524015 [NARDR-NW 400.00] TO BUS 528002 [NARENDERA NW765.00] CKT 2 | 1488.98 | 2545.15 | 1500 | 169.68 | SC-4 |
| 29 | 144469 BHIWN-PG 400.00 147704 BHIWN-PG 765.00 1 | OPEN LINE FROM BUS 144469 [BHIWN-PG 400.00] TO BUS 147704 [BHIWN-PG 765.00] CKT 2 | 1187.82 | 1561.41 | 1000 | 156.14 | SC-4 |
| 30 | 354292 KHAVDA-IIS 400.00 358202 KHAVDA-II 765.00 1 | OPEN LINE FROM BUS 354292 [KHAVDA-IIS 400.00] TO BUS 358202 [KHAVDA-II 765.00] CKT 3 | 1155.88 | 2300.77 | 1500 | 153.38 | SC-4 |
| 31 | 504049 ADONI 400.00 508049 ADONI 765.00 1 | OPEN LINE FROM BUS 504049 [ADONI 400.00] TO BUS 508049 [ADONI 765.00] CKT 2 | 1351.27 | 1924.44 | 1500 | 128.3 | SC-4 |
| 32 | 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 | 1558.33 | 1834.22 | 1500 | 122.28 | SC-4 |
| 33 | 354201 KHAVDA2 400.00 358299 KHAVDA2 765.00 1 | OPEN LINE FROM BUS 354201 [KHAVDA2 400.00] TO BUS 358299 [KHAVDA2 765.00] CKT 2 | 1153.51 | 1723.84 | 1500 | 114.92 | SC-4 |
| 34 | 354203 KHAVDA-III 400.00 358203 KHAVDA-III 765.00 1 | OPEN LINE FROM BUS 354203 [KHAVDA-III 400.00] TO BUS 358203 [KHAVDA-III 765.00] CKT 2 | 1146.35 | 1719.81 | 1500 | 114.65 | SC-4 |
| 35 | 374050 KOLHAPURPG 400.00 378050 KOLHAPURPG 765.00 1 | OPEN LINE FROM BUS 374050 [KOLHAPURPG 400.00] TO BUS 378050 [KOLHAPURPG 765.00] CKT 2 | 980.07 | 1686.88 | 1500 | 112.46 | SC-4 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 36 | 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 | 1405.74 | 1669.01 | 1500 | 111.27 | SC-4 |
| 37 | 164497 SIKAR NEW 400.00 167497 SIKAR NEW 765.00 1 | OPEN LINE FROM BUS 164497 [SIKAR NEW 400.00] TO BUS 167497 [SIKAR NEW 765.00] CKT 2 | 955.37 | 1584.7 | 1500 | 105.65 | SC-4 |
| 38 | 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 | 931.83 | 1556.24 | 1500 | 103.75 | SC-4 |
| 39 | 134423 MOGA 400.00 137703 MOGA-PG 765.00 1 | OPEN LINE FROM BUS 134423 [MOGA 400.00] TO BUS 137703 [MOGA-PG 765.00] CKT 2 | 899.41 | 1541.61 | 1500 | 102.77 | SC-4 |
| 40 | 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 | 1165.48 | 1529.82 | 1500 | 101.99 | SC-4 |
| 41 | 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 | 1059.88 | 1464.59 | 1500 | 97.64 | SC-4 |
| 42 | 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 | 1221.74 | 1460.05 | 1500 | 97.34 | SC-4 |
| 43 | 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 | 646.6 | 968.55 | 1000 | 96.85 | SC-4 |
| 44 | 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 | 917.57 | 1376.18 | 1500 | 91.74 | SC-4 |
| 45 | 524015 NARDR-NW 400.00 528002 NARENDERA NW765.00 1 | OPEN LINE FROM BUS 524015 [NARDR-NW 400.00] TO BUS 528002 [NARENDERA NW765.00] CKT 2 | 1141 | 1947.43 | 1500 | 129.83 | SC-5 |
| 46 | 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 | 859.68 | 1234.98 | 1000 | 123.5 | SC-5 |
| 47 | 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 | 739.71 | 1185.86 | 1000 | 118.59 | SC-5 |
| 48 | 374050 KOLHAPURPG 400.00 378050 KOLHAPURPG 765.00 1 | OPEN LINE FROM BUS 374050 [KOLHAPURPG 400.00] TO BUS 378050 [KOLHAPURPG 765.00] CKT 2 | 994.44 | 1713.99 | 1500 | 114.27 | SC-5 |
| 49 | 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 | 906.44 | 1507.78 | 1500 | 100.52 | SC-5 |
| 50 | 544095 TUTI-POOL 400.00 548095 TUTI-POL 765.00 1 | OPEN LINE FROM BUS 544095 [TUTI-POOL 400.00] TO BUS 548095 [TUTI-POL 765.00] CKT 2 | 871.12 | 1490.87 | 1500 | 99.39 | SC-5 |
| 51 | 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 | 635.69 | 951.77 | 1000 | 95.18 | SC-5 |
| 52 | 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 | 624.97 | 909.92 | 1000 | 90.99 | SC-5 |
| 53 | 414201 KATIHAR4 400.00 418201 KATIHAR8 765.00 1 | OPEN LINE FROM BUS 414201 [KATIHAR4 400.00] TO BUS 418201 [KATIHAR8 765.00] CKT 4 | 761.49 | 1355.29 | 1500 | 90.35 | SC-5 |
| 54 | 524015 NARDR-NW 400.00 528002 NARENDERA NW765.00 1 | OPEN LINE FROM BUS 524015 [NARDR-NW 400.00] TO BUS 528002 [NARENDERA NW765.00] CKT 2 | 1067.04 | 1820.82 | 1500 | 121.39 | SC-6 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 55 | 374050 KOLHAPURPG 400.00 378050 KOLHAPURPG 765.00 1 | OPEN LINE FROM BUS 374050 [KOLHAPURPG 400.00] TO BUS 378050 [KOLHAPURPG 765.00] CKT 2 | 1019.13 | 1750.62 | 1500 | 116.71 | SC-6 |
| 56 | 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 | 675.92 | 1078.69 | 1000 | 107.87 | SC-6 |
| 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 | 903.01 | 1500.76 | 1500 | 100.05 | SC-6 |
| 58 | 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 | 665.1 | 996.44 | 1000 | 99.64 | SC-6 |
| 59 | 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 | 679.97 | 971.69 | 1000 | 97.17 | SC-6 |
| 60 | 544095 TUTI-POOL 400.00 548095 TUTI-POL 765.00 1 | OPEN LINE FROM BUS 544095 [TUTI-POOL 400.00] TO BUS 548095 [TUTI-POL 765.00] CKT 2 | 796.32 | 1361.49 | 1500 | 90.77 | SC-6 |
| 61 | 524015 NARDR-NW 400.00 528002 NARENDERA NW765.00 1 | OPEN LINE FROM BUS 524015 [NARDR-NW 400.00] TO BUS 528002 [NARENDERA NW765.00] CKT 2 | 1132.62 | 1929.31 | 1500 | 128.62 | SC-7 |
| 62 | 354292 KHAVDA-IIS 400.00 358202 KHAVDA-II 765.00 1 | OPEN LINE FROM BUS 354292 [KHAVDA-IIS 400.00] TO BUS 358202 [KHAVDA-II 765.00] CKT 3 | 948.45 | 1878.14 | 1500 | 125.21 | SC-7 |
| 63 | 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 | 1533.91 | 1818.1 | 1500 | 121.21 | SC-7 |
| 64 | 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 | 1488.95 | 1752.73 | 1500 | 116.85 | SC-7 |
| 65 | 144469 BHIWN-PG 400.00 147704 BHIWN-PG 765.00 1 | OPEN LINE FROM BUS 144469 [BHIWN-PG 400.00] TO BUS 147704 [BHIWN-PG 765.00] CKT 2 | 855.85 | 1122.03 | 1000 | 112.2 | SC-7 |
| 66 | 134423 MOGA 400.00 137703 MOGA-PG 765.00 1 | OPEN LINE FROM BUS 134423 [MOGA 400.00] TO BUS 137703 [MOGA-PG 765.00] CKT 2 | 928.27 | 1578.95 | 1500 | 105.26 | SC-7 |
| 67 | 364007 GWALIOR-4 400.00 368007 GWALIOR 765.00 1 | OPEN LINE FROM BUS 364007 [GWALIOR-4 400.00] TO BUS 368007 [GWALIOR 765.00] CKT 2 | 816.86 | 1493.47 | 1500 | 99.56 | SC-7 |
| 68 | 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 | 965.4 | 1450.32 | 1500 | 96.69 | SC-7 |
| 69 | 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 | 1213.31 | 1449.73 | 1500 | 96.65 | SC-7 |
| 70 | 514101 MAHESWRM 400.00 518051 HYDR_800 765.00 1 | OPEN LINE FROM BUS 514101 [MAHESWRM 400.00] TO BUS 518051 [HYDR_800 765.00] CKT 2 | 1076.64 | 1447.21 | 1500 | 96.48 | SC-7 |
| 71 | 164497 SIKAR NEW 400.00 167497 SIKAR NEW 765.00 1 | OPEN LINE FROM BUS 164497 [SIKAR NEW 400.00] TO BUS 167497 [SIKAR NEW 765.00] CKT 2 | 867.43 | 1436.23 | 1500 | 95.75 | SC-7 |
| 72 | 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 | 1118.67 | 1434.87 | 1500 | 95.66 | SC-7 |
| 73 | 544127 ARIYALUR4 400.00 548127 ARIYALUR7 765.00 1 | OPEN LINE FROM BUS 544127 [ARIYALUR4 400.00] TO BUS 548127 [ARIYALUR7 765.00] CKT 2 | 936.99 | 1409.8 | 1500 | 93.99 | SC-7 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 74 | 514061 NIZAMABAD 400.00 518062 NIZAMABAD 765.00 1 | OPEN LINE FROM BUS 514061 [NIZAMABAD 400.00] TO BUS 518062 [NIZAMABAD 765.00] CKT 3 | 1039.12 | 1406.34 | 1500 | 93.76 | SC-7 |
| 75 | 354203 KHAVDA-III 400.00 358203 KHAVDA-III 765.00 1 | OPEN LINE FROM BUS 354203 [KHAVDA-III 400.00] TO BUS 358203 [KHAVDA-III 765.00] CKT 2 | 937.07 | 1405.54 | 1500 | 93.7 | SC-7 |
| 76 | 354201 KHAVDA2 400.00 358299 KHAVDA2 765.00 1 | OPEN LINE FROM BUS 354201 [KHAVDA2 400.00] TO BUS 358299 [KHAVDA2 765.00] CKT 2 | 927.39 | 1391.04 | 1500 | 92.74 | SC-7 |
| 77 | 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 | 720.76 | 1154.96 | 1000 | 115.5 | SC-8 |
| 78 | 544127 ARIYALUR4 400.00 548127 ARIYALUR7 765.00 1 | OPEN LINE FROM BUS 544127 [ARIYALUR4 400.00] TO BUS 548127 [ARIYALUR7 765.00] CKT 2 | 923.81 | 1386.97 | 1500 | 92.46 | SC-9 |

## N-1 Contingency of 400/220 kV Transformers

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 1. | 164422 RAMG-I 400.00 162422 RAMGARH-I 220.00 1 | OPEN LINE FROM BUS 164422 [RAMG-I 400.00] TO BUS 162422 [RAMGARH-I 220.00] CKT 2 | 436.3 | 872.54 | 500 | 174.51 | SC-1 |
| 2. | 174959 MAHEBA 400.00 172303 MAHEBA2 220.00 1 | OPEN LINE FROM BUS 174959 [MAHEBA 400.00] TO BUS 172303 [MAHEBA2 220.00] CKT 2 | 390.28 | 782.97 | 500 | 156.59 | SC-1 |
| 3. | 164458 BIKANER-NW 400.00 162458 BIKANER 220.00 1 | OPEN LINE FROM BUS 164458 [BIKANER-NW 400.00] TO BUS 162458 [BIKANER 220.00] CKT 2 | 397.23 | 782.39 | 500 | 156.48 | SC-1 |
| 4. | 164757 POKARAN 400.00 162757 POKARAN-S 220.00 1 | OPEN LINE FROM BUS 164757 [POKARAN 400.00] TO BUS 162757 [POKARAN-S 220.00] CKT 2 | 452.55 | 724.19 | 500 | 144.84 | SC-1 |
| 5. | 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 | 353.89 | 707.81 | 500 | 141.56 | SC-1 |
| 6. | 144006 SONAROAD 400.00 142212 SOHNAROAD 220.00 1 | OPEN LINE FROM BUS 144006 [SONAROAD 400.00] TO BUS 142212 [SOHNAROAD 220.00] CKT 2 | 454.23 | 662.05 | 500 | 132.41 | SC-1 |
| 7. | 174964 GURUSARAI400400.00 172301 GURUSARAI2 220.00 1 | OPEN LINE FROM BUS 174964 [GURUSARAI400400.00] TO BUS 172301 [GURUSARAI2 220.00] CKT 2 | 433.6 | 649.97 | 500 | 129.99 | SC-1 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 8. | 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 | 260.01 | 407.95 | 315 | 129.51 | SC-1 |
| 9. | 354022 HAZIRA4 400.00 352022 HAZIRA2 220.00 1 | OPEN LINE FROM BUS 354022 [ HAZIRA4 400.00] TO BUS 352022 [ HAZIRA2 220.00] CKT 2 | 301.21 | 629.58 | 500 | 125.92 | SC-1 |
| 10. | 164481 FATEHG-3 400.00 162481 FATEHG-3 220.00 1 | OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 162481 [FATEHG-3 220.00] CKT 2 | 469.27 | 586.58 | 500 | 117.32 | SC-1 |
| 11. | 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 | 468.02 | 584.52 | 500 | 116.9 | SC-1 |
| 12. | 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 | 464.33 | 579.87 | 500 | 115.97 | SC-1 |
| 13. | 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 | 463.03 | 577.09 | 500 | 115.42 | SC-1 |
| 14. | 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 | 187.57 | 215.5 | 190 | 113.42 | SC-1 |
| 15. | 324002 MAGARWADA-DD400.00 322002 MAGARWADA 220.00 1 | OPEN LINE FROM BUS 324002 [MAGARWADA-DD400.00] TO BUS 322002 [MAGARWADA 220.00] CKT 2 | 192.8 | 345.74 | 315 | 109.76 | SC-1 |
| 16. | 314006 RAIG4 400.00 312006 RAIGPG2 220.00 1 | OPEN LINE FROM BUS 314006 [RAIG4 400.00] TO BUS 312006 [RAIGPG2 220.00] CKT 2 | 232.44 | 340.66 | 315 | 108.15 | SC-1 |
| 17. | 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 | 425.19 | 532.08 | 500 | 106.42 | SC-1 |
| 18. | 164461 FATEHG-3 SPL400.00 162361 RAMG-II 220.00 1 | OPEN LINE FROM BUS 164461 [FATEHG-3 SPL400.00] TO BUS 162361 [RAMG-II 220.00] CKT 2 | 424.4 | 530.57 | 500 | 106.11 | SC-1 |
| 19. | 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 | 438.14 | 525.91 | 500 | 105.18 | SC-1 |
| 20. | 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 | 415.05 | 519.05 | 500 | 103.81 | SC-1 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 21. | 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 | 407.22 | 509.02 | 500 | 101.8 | SC-1 |
| 22. | 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 | 328.72 | 502.85 | 500 | 100.57 | SC-1 |
| 23. | 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 | 206.72 | 311.29 | 315 | 98.82 | SC-1 |
| 24. | 364012 SATNA-74 400.00 362022 SATNAPG-742 220.00 1 | OPEN LINE FROM BUS 364012 [SATNA-74 400.00] TO BUS 362022 [SATNAPG-742 220.00] CKT 3 | 203.32 | 295.95 | 315 | 93.95 | SC-1 |
| 25. | 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 | 201.05 | 293.01 | 315 | 93.02 | SC-1 |
| 26. | 164498 BHADLA-2 400.00 162499 BHAD-2 SPLT 220.00 1 | OPEN LINE FROM BUS 164484 [BHADLA-3 400.00] TO BUS 167484 [BHADLA-3 765.00] CKT 6 | 1354.25 | 1371.13 | 1500 | 91.41 | SC-1 |
| 27. | 364021 SHUJALPR-4 400.00 362068 SHUJALP-42 220.00 1 | OPEN LINE FROM BUS 364021 [SHUJALPR-4 400.00] TO BUS 362068 [SHUJALP-42 220.00] CKT 2 | 198.32 | 284.03 | 315 | 90.17 | SC-1 |
| 28. | 134917 LUDHIANA 400.00 132913 LUDHIANA 220.00 1 | OPEN LINE FROM BUS 134917 [LUDHIANA 400.00] TO BUS 132913 [LUDHIANA 220.00] CKT 4 | 231.65 | 282.97 | 315 | 89.83 | SC-1 |
| 29. | 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 | 449.08 | 821.96 | 500 | 164.39 | SC-2 |
| 30. | 354022 HAZIRA4 400.00 352022 HAZIRA2 220.00 1 | OPEN LINE FROM BUS 354022 [ HAZIRA4 400.00] TO BUS 352022 [ HAZIRA2 220.00] CKT 2 | 327.57 | 685.89 | 500 | 137.18 | SC-2 |
| 31. | 144006 SONAROAD 400.00 142212 SOHNAROAD 220.00 1 | OPEN LINE FROM BUS 144006 [SONAROAD 400.00] TO BUS 142212 [SOHNAROAD 220.00] CKT 2 | 462.09 | 673.21 | 500 | 134.64 | SC-2 |
| 32. | 324002 MAGARWADA-DD400.00 322002 MAGARWADA 220.00 1 | OPEN LINE FROM BUS 324002 [MAGARWADA-DD400.00] TO BUS 322002 [MAGARWADA 220.00] CKT 2 | 206.41 | 370.79 | 315 | 117.71 | SC-2 |
| 33. | 504033 ASPIRI 400.00 502090 ASPIRI 220.00 1 | OPEN LINE FROM BUS 504033 [ASPIRI 400.00] TO BUS 502090 [ASPIRI 220.00] CKT 2 | 238.5 | 358 | 315 | 113.65 | SC-2 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 34. | 374038 KORADI-II 400.00 372393 KORADI-II 220.00 1 | OPEN LINE FROM BUS 374038 [KORADI-II 400.00] TO BUS 372393 [KORADI-II 220.00] CKT 2 | 384.59 | 556.44 | 500 | 111.29 | SC-2 |
| 35. | 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 | 410.9 | 554.75 | 500 | 110.95 | SC-2 |
| 36. | 314013 JINDAL-B2 400.00 312013 JINDAL-B2 220.00 1 | OPEN LINE FROM BUS 314013 [JINDAL-B2 400.00] TO BUS 312013 [JINDAL-B2 220.00] CKT 2 | 221.14 | 345.9 | 315 | 109.81 | SC-2 |
| 37. | 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 | 225.26 | 330.48 | 315 | 104.92 | SC-2 |
| 38. | 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 | 216.62 | 326.22 | 315 | 103.56 | SC-2 |
| 39. | 174497 JAUNPUR 400.00 172497 JAUNPUR 220.00 1 | OPEN LINE FROM BUS 174497 [JAUNPUR 400.00] TO BUS 172497 [JAUNPUR 220.00] CKT 2 | 340.38 | 515.96 | 500 | 103.19 | SC-2 |
| 40. | 314054 DHARDEHI 400.00 312053 DHARDEHI 220.00 1 | OPEN LINE FROM BUS 314054 [DHARDEHI 400.00] TO BUS 312053 [DHARDEHI 220.00] CKT 2 | 241.78 | 320.74 | 315 | 101.82 | SC-2 |
| 41. | 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 | 213.24 | 315.7 | 315 | 100.22 | SC-2 |
| 42. | 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 | 398.12 | 497.06 | 500 | 99.41 | SC-2 |
| 43. | 374012 PADGH4 400.00 372163 PADGHE22 220.00 1 | OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 372163 [PADGHE22 220.00] CKT 5 | 515.5 | 594.53 | 600 | 99.09 | SC-2 |
| 44. | 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 | 277.01 | 306.04 | 315 | 97.16 | SC-2 |
| 45. | 374057 DOLVI 400.00 372244 NDIL 220.00 1 | OPEN LINE FROM BUS 374028 [NAGOTHANE 400.00] TO BUS 372150 [NAGOTHA2 220.00] CKT 2 | 477.95 | 483.49 | 500 | 96.7 | SC-2 |
| 46. | 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 | 159.77 | 183.48 | 190 | 96.57 | SC-2 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 47. | 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 | 230.51 | 296.17 | 315 | 94.02 | SC-2 |
| 48. | 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 | 223.33 | 291.6 | 315 | 92.57 | SC-2 |
| 49. | 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 | 223.1 | 289.75 | 315 | 91.99 | SC-2 |
| 50. | 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 | 208.51 | 288.67 | 315 | 91.64 | SC-2 |
| 51. | 174995 NOIDA-SEC123400.00 172582 NOIDA-SEC123220.00 1 | OPEN LINE FROM BUS 174995 [NOIDA-SEC123400.00] TO BUS 172582 [NOIDA-SEC123220.00] CKT 2 | 139.14 | 182.31 | 200 | 91.16 | SC-2 |
| 52. | 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 2 | 206.56 | 285.51 | 315 | 90.64 | SC-2 |
| 53. | 134323 DHANANSU 400.00 132324 DHANANSU 220.00 1 | OPEN LINE FROM BUS 134323 [DHANANSU 400.00] TO BUS 132324 [DHANANSU 220.00] CKT 2 | 228.71 | 285.3 | 315 | 90.57 | SC-2 |
| 54. | 124419 DEHAR 400.00 122218 DEHAR 220.00 1 | OPEN LINE FROM BUS 124419 [DEHAR 400.00] TO BUS 144460 [PANCH-PG 400.00] CKT 1 | 169.09 | 283.95 | 315 | 90.14 | SC-2 |
| 55. | 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 | 357.51 | 446.71 | 500 | 89.34 | SC-2 |
| 56. | 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 | 334.16 | 609.93 | 500 | 121.99 | SC-3 |
| 57. | 144006 SONAROAD 400.00 142212 SOHNAROAD 220.00 1 | OPEN LINE FROM BUS 144006 [SONAROAD 400.00] TO BUS 142212 [SOHNAROAD 220.00] CKT 2 | 408.95 | 596.39 | 500 | 119.28 | SC-3 |
| 58. | 314013 JINDAL-B2 400.00 312013 JINDAL-B2 220.00 1 | OPEN LINE FROM BUS 314013 [JINDAL-B2 400.00] TO BUS 312013 [JINDAL-B2 220.00] CKT 2 | 221.2 | 345.98 | 315 | 109.83 | SC-3 |
| 59. | 374038 KORADI-II 400.00 372393 KORADI-II 220.00 1 | OPEN LINE FROM BUS 374038 [KORADI-II 400.00] TO BUS 372393 [KORADI-II 220.00] CKT 2 | 376.58 | 545.46 | 500 | 109.09 | SC-3 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 60. | 174497 JAUNPUR 400.00 172497 JAUNPUR 220.00 1 | OPEN LINE FROM BUS 174497 [JAUNPUR 400.00] TO BUS 172497 [JAUNPUR 220.00] CKT 2 | 350.97 | 534.84 | 500 | 106.97 | SC-3 |
| 61. | 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 | 375.94 | 508.77 | 500 | 101.75 | SC-3 |
| 62. | 314054 DHARDEHI 400.00 312053 DHARDEHI 220.00 1 | OPEN LINE FROM BUS 314054 [DHARDEHI 400.00] TO BUS 312053 [DHARDEHI 220.00] CKT 2 | 240.53 | 319.18 | 315 | 101.33 | SC-3 |
| 63. | 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 | 370.55 | 504.95 | 500 | 100.99 | SC-3 |
| 64. | 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 | 217.07 | 314.77 | 315 | 99.93 | SC-3 |
| 65. | 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 | 208.78 | 314.36 | 315 | 99.8 | SC-3 |
| 66. | 174995 NOIDA-SEC123400.00 172582 NOIDA-SEC123220.00 1 | OPEN LINE FROM BUS 174995 [NOIDA-SEC123400.00] TO BUS 172582 [NOIDA-SEC123220.00] CKT 2 | 151.04 | 198.03 | 200 | 99.02 | SC-3 |
| 67. | 504033 ASPIRI 400.00 502090 ASPIRI 220.00 1 | OPEN LINE FROM BUS 504033 [ASPIRI 400.00] TO BUS 502090 [ASPIRI 220.00] CKT 2 | 207.38 | 311.24 | 315 | 98.81 | SC-3 |
| 68. | 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 | 162.61 | 186.87 | 190 | 98.35 | SC-3 |
| 69. | 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 | 236.92 | 309.78 | 315 | 98.34 | SC-3 |
| 70. | 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 2 | 218.16 | 301.99 | 315 | 95.87 | SC-3 |
| 71. | 374057 DOLVI 400.00 372244 NDIL 220.00 1 | OPEN LINE FROM BUS 374028 [NAGOTHANE 400.00] TO BUS 372150 [NAGOTHA2 220.00] CKT 2 | 472.54 | 478.33 | 500 | 95.67 | SC-3 |
| 72. | 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 | 200.33 | 298.95 | 315 | 94.9 | SC-3 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 73. | 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 | 163.32 | 296.72 | 315 | 94.2 | SC-3 |
| 74. | 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 | 266 | 295.94 | 315 | 93.95 | SC-3 |
| 75. | 514005 ANNARAM-LI 400.00 512005 ANNARAM -LI2220.00 1 | OPEN LINE FROM BUS 514005 [ANNARAM-LI 400.00] TO BUS 512005 [ANNARAM -LI2220.00] CKT 2 | 361.62 | 469.72 | 500 | 93.94 | SC-3 |
| 76. | 374012 PADGH4 400.00 372163 PADGHE22 220.00 1 | OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 372163 [PADGHE22 220.00] CKT 5 | 479.11 | 553.48 | 600 | 92.25 | SC-3 |
| 77. | 354022 HAZIRA4 400.00 352022 HAZIRA2 220.00 1 | OPEN LINE FROM BUS 354022 [ HAZIRA4 400.00] TO BUS 352022 [ HAZIRA2 220.00] CKT 2 | 221.76 | 454.1 | 500 | 90.82 | SC-3 |
| 78. | 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 | 219.98 | 283.19 | 315 | 89.9 | SC-3 |
| 79. | 354022 HAZIRA4 400.00 352022 HAZIRA2 220.00 1 | OPEN LINE FROM BUS 354022 [ HAZIRA4 400.00] TO BUS 352022 [ HAZIRA2 220.00] CKT 2 | 402.17 | 911.81 | 500 | 182.36 | SC-4 |
| 80. | 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 | 431.48 | 862.89 | 500 | 172.58 | SC-4 |
| 81. | 164458 BIKANER-NW 400.00 162458 BIKANER 220.00 1 | OPEN LINE FROM BUS 164458 [BIKANER-NW 400.00] TO BUS 162458 [BIKANER 220.00] CKT 2 | 395.52 | 778.62 | 500 | 155.72 | SC-4 |
| 82. | 174959 MAHEBA 400.00 172303 MAHEBA2 220.00 1 | OPEN LINE FROM BUS 174959 [MAHEBA 400.00] TO BUS 172303 [MAHEBA2 220.00] CKT 2 | 385.43 | 773.4 | 500 | 154.68 | SC-4 |
| 83. | 164757 POKARAN 400.00 162757 POKARAN-S 220.00 1 | OPEN LINE FROM BUS 164757 [POKARAN 400.00] TO BUS 162757 [POKARAN-S 220.00] CKT 2 | 439.42 | 703.04 | 500 | 140.61 | SC-4 |
| 84. | 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 | 349.98 | 699.98 | 500 | 140 | SC-4 |
| 85. | 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 | 275.9 | 434.83 | 315 | 138.04 | SC-4 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 86. | 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 | 223.07 | 256.58 | 190 | 135.04 | SC-4 |
| 87. | 144006 SONAROAD 400.00 142212 SOHNAROAD 220.00 1 | OPEN LINE FROM BUS 144006 [SONAROAD 400.00] TO BUS 142212 [SOHNAROAD 220.00] CKT 2 | 457.95 | 667.53 | 500 | 133.51 | SC-4 |
| 88. | 174964 GURUSARAI400400.00 172301 GURUSARAI2 220.00 1 | OPEN LINE FROM BUS 174964 [GURUSARAI400400.00] TO BUS 172301 [GURUSARAI2 220.00] CKT 2 | 427.41 | 641.18 | 500 | 128.24 | SC-4 |
| 89. | 374012 PADGH4 400.00 372163 PADGHE22 220.00 1 | OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 372163 [PADGHE22 220.00] CKT 5 | 610.69 | 711.92 | 600 | 118.65 | SC-4 |
| 90. | 164481 FATEHG-3 400.00 162481 FATEHG-3 220.00 1 | OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 162481 [FATEHG-3 220.00] CKT 2 | 464.08 | 580.09 | 500 | 116.02 | SC-4 |
| 91. | 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 | 464.15 | 578.91 | 500 | 115.78 | SC-4 |
| 92. | 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 2 | 263.03 | 363.78 | 315 | 115.48 | SC-4 |
| 93. | 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 | 202.12 | 362.48 | 315 | 115.07 | SC-4 |
| 94. | 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 | 460.5 | 574.32 | 500 | 114.86 | SC-4 |
| 95. | 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 | 460.62 | 572.84 | 500 | 114.57 | SC-4 |
| 96. | 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 | 235.87 | 355.51 | 315 | 112.86 | SC-4 |
| 97. | 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 | 404.6 | 553.07 | 500 | 110.61 | SC-4 |
| 98. | 504084 KAKINADA SEZ400.00 502284 KAKINADASEZ 220.00 1 | OPEN LINE FROM BUS 504084 [KAKINADA SEZ400.00] TO BUS 502284 [KAKINADASEZ 220.00] CKT 2 | 331.81 | 551 | 500 | 110.2 | SC-4 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 99. | 164461 FATEHG-3 SPL400.00 162361 RAMG-II 220.00 1 | OPEN LINE FROM BUS 164461 [FATEHG-3 SPL400.00] TO BUS 162361 [RAMG-II 220.00] CKT 2 | 420.15 | 525.18 | 500 | 105.04 | SC-4 |
| 100. | 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 | 434.1 | 520.84 | 500 | 104.17 | SC-4 |
| 101. | 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 | 415.24 | 518.38 | 500 | 103.68 | SC-4 |
| 102. | 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 | 261.72 | 325.7 | 315 | 103.4 | SC-4 |
| 103. | 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 | 410.45 | 513.29 | 500 | 102.66 | SC-4 |
| 104. | 174922 AGRA 400.00 172115 AGRA-PG 220.00 1 | OPEN LINE FROM BUS 174400 [AGRAUP4 400.00] TO BUS 174922 [AGRA 400.00] CKT 2 | 242.69 | 321.74 | 315 | 102.14 | SC-4 |
| 105. | 134917 LUDHIANA 400.00 132913 LUDHIANA 220.00 1 | OPEN LINE FROM BUS 134917 [LUDHIANA 400.00] TO BUS 132913 [LUDHIANA 220.00] CKT 4 | 262.61 | 320.41 | 315 | 101.72 | SC-4 |
| 106. | 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 | 223.87 | 319.47 | 315 | 101.42 | SC-4 |
| 107. | 314054 DHARDEHI 400.00 312053 DHARDEHI 220.00 1 | OPEN LINE FROM BUS 314054 [DHARDEHI 400.00] TO BUS 312053 [DHARDEHI 220.00] CKT 2 | 240.94 | 319.27 | 315 | 101.36 | SC-4 |
| 108. | 374029 CHAKAN 400.00 372234 CHAKNII2 220.00 1 | OPEN LINE FROM BUS 374029 [CHAKAN 400.00] TO BUS 372234 [CHAKNII2 220.00] CKT 2 | 235.78 | 316.92 | 315 | 100.61 | SC-4 |
| 109. | 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 | 402.61 | 502.53 | 500 | 100.51 | SC-4 |
| 110. | 374052 KUDUS 400.00 372254 KUDUS220 220.00 1 | OPEN LINE FROM BUS 374052 [KUDUS 400.00] TO BUS 372254 [KUDUS220 220.00] CKT 2 | 407.69 | 490.51 | 500 | 98.1 | SC-4 |
| 111. | 364012 SATNA-74 400.00 362022 SATNAPG-742 220.00 1 | OPEN LINE FROM BUS 364012 [SATNA-74 400.00] TO BUS 362022 [SATNAPG-742 220.00] CKT 3 | 212.2 | 308.49 | 315 | 97.93 | SC-4 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 112. | 364021 SHUJALPR-4 400.00 362068 SHUJALP-42 220.00 1 | OPEN LINE FROM BUS 364021 [SHUJALPR-4 400.00] TO BUS 362068 [SHUJALP-42 220.00] CKT 2 | 214.81 | 307.52 | 315 | 97.62 | SC-4 |
| 113. | 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 | 209.1 | 305.54 | 315 | 97 | SC-4 |
| 114. | 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 | 234.54 | 303.88 | 315 | 96.47 | SC-4 |
| 115. | 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 | 242.33 | 301.86 | 315 | 95.83 | SC-4 |
| 116. | 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 | 238.88 | 295.49 | 315 | 93.81 | SC-4 |
| 117. | 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 | 195.75 | 294.71 | 315 | 93.56 | SC-4 |
| 118. | 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 | 312.08 | 466.55 | 500 | 93.31 | SC-4 |
| 119. | 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 | 303.5 | 465.25 | 500 | 93.05 | SC-4 |
| 120. | 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 | 308.29 | 462.04 | 500 | 92.41 | SC-4 |
| 121. | 174497 JAUNPUR 400.00 172497 JAUNPUR 220.00 1 | OPEN LINE FROM BUS 174497 [JAUNPUR 400.00] TO BUS 172497 [JAUNPUR 220.00] CKT 2 | 304.62 | 461.97 | 500 | 92.39 | SC-4 |
| 122. | 364009 JABALPUR-4 400.00 362067 JABALPUR-42 220.00 1 | OPEN LINE FROM BUS 364009 [JABALPUR-4 400.00] TO BUS 362067 [JABALPUR-42 220.00] CKT 3 | 201.68 | 290.18 | 315 | 92.12 | SC-4 |
| 123. | 164498 BHADLA-2 400.00 162499 BHAD-2 SPLT 220.00 1 | OPEN LINE FROM BUS 164404 [BHADLA 400.00] TO BUS 164456 [BIKANE-4 400.00] CKT 1 | 1347.53 | 1363.75 | 1500 | 90.92 | SC-4 |
| 124. | 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 | 240.84 | 284.58 | 315 | 90.34 | SC-4 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 125. | 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 | 183.3 | 282 | 315 | 89.52 | SC-4 |
| 126. | 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 | 377.18 | 446.41 | 500 | 89.28 | SC-4 |
| 127. | 354022 HAZIRA4 400.00 352022 HAZIRA2 220.00 1 | OPEN LINE FROM BUS 354022 [ HAZIRA4 400.00] TO BUS 352022 [ HAZIRA2 220.00] CKT 2 | 424.1 | 915.6 | 500 | 183.12 | SC-5 |
| 128. | 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 | 496.77 | 909.64 | 500 | 181.93 | SC-5 |
| 129. | 374038 KORADI-II 400.00 372393 KORADI-II 220.00 1 | OPEN LINE FROM BUS 374038 [KORADI-II 400.00] TO BUS 372393 [KORADI-II 220.00] CKT 2 | 531.03 | 768.73 | 500 | 153.75 | SC-5 |
| 130. | 144006 SONAROAD 400.00 142212 SOHNAROAD 220.00 1 | OPEN LINE FROM BUS 144006 [SONAROAD 400.00] TO BUS 142212 [SOHNAROAD 220.00] CKT 2 | 512.08 | 746.7 | 500 | 149.34 | SC-5 |
| 131. | 504084 KAKINADA SEZ400.00 502284 KAKINADASEZ 220.00 1 | OPEN LINE FROM BUS 504084 [KAKINADA SEZ400.00] TO BUS 502284 [KAKINADASEZ 220.00] CKT 2 | 370.28 | 622.8 | 500 | 124.56 | SC-5 |
| 132. | 174497 JAUNPUR 400.00 172497 JAUNPUR 220.00 1 | OPEN LINE FROM BUS 174497 [JAUNPUR 400.00] TO BUS 172497 [JAUNPUR 220.00] CKT 2 | 402 | 610.55 | 500 | 122.11 | SC-5 |
| 133. | 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 | 249.24 | 375.91 | 315 | 119.34 | SC-5 |
| 134. | 374012 PADGH4 400.00 372163 PADGHE22 220.00 1 | OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 372163 [PADGHE22 220.00] CKT 5 | 612.84 | 711.58 | 600 | 118.6 | SC-5 |
| 135. | 324002 MAGARWADA-DD400.00 322002 MAGARWADA 220.00 1 | OPEN LINE FROM BUS 324002 [MAGARWADA-DD400.00] TO BUS 322002 [MAGARWADA 220.00] CKT 2 | 206.01 | 369.95 | 315 | 117.44 | SC-5 |
| 136. | 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 | 189.36 | 217.69 | 190 | 114.57 | SC-5 |
| 137. | 174265 REWA 400.00 172112 REWAROAD 220.00 1 | OPEN LINE FROM BUS 174000 [MEJA 400.00] TO BUS 174474 [ALLAHABA 400.00] CKT 1 | 324.39 | 359.81 | 315 | 114.23 | SC-5 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 138. | 174995 NOIDA-SEC123400.00 172582 NOIDA-SEC123220.00 1 | OPEN LINE FROM BUS 174995 [NOIDA-SEC123400.00] TO BUS 172582 [NOIDA-SEC123220.00] CKT 2 | 173.71 | 227.63 | 200 | 113.81 | SC-5 |
| 139. | 314054 DHARDEHI 400.00 312053 DHARDEHI 220.00 1 | OPEN LINE FROM BUS 314054 [DHARDEHI 400.00] TO BUS 312053 [DHARDEHI 220.00] CKT 2 | 268.76 | 356.43 | 315 | 113.15 | SC-5 |
| 140. | 134323 DHANANSU 400.00 132324 DHANANSU 220.00 1 | OPEN LINE FROM BUS 134323 [DHANANSU 400.00] TO BUS 132324 [DHANANSU 220.00] CKT 2 | 281.98 | 352.57 | 315 | 111.93 | SC-5 |
| 141. | 134917 LUDHIANA 400.00 132913 LUDHIANA 220.00 1 | OPEN LINE FROM BUS 134917 [LUDHIANA 400.00] TO BUS 132913 [LUDHIANA 220.00] CKT 4 | 286.11 | 351.77 | 315 | 111.67 | SC-5 |
| 142. | 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 | 277.66 | 351.1 | 315 | 111.46 | SC-5 |
| 143. | 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 | 268.28 | 350.08 | 315 | 111.14 | SC-5 |
| 144. | 504033 ASPIRI 400.00 502090 ASPIRI 220.00 1 | OPEN LINE FROM BUS 504033 [ASPIRI 400.00] TO BUS 502090 [ASPIRI 220.00] CKT 2 | 232.95 | 349.22 | 315 | 110.86 | SC-5 |
| 145. | 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 | 407.92 | 550.46 | 500 | 110.09 | SC-5 |
| 146. | 164428 CHITTOR4 400.00 162228 CHITTOR-42 220.00 1 | OPEN LINE FROM BUS 164428 [CHITTOR4 400.00] TO BUS 162228 [CHITTOR-42 220.00] CKT 2 | 243.23 | 346.44 | 315 | 109.98 | SC-5 |
| 147. | 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 | 232.05 | 344.78 | 315 | 109.45 | SC-5 |
| 148. | 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 2 | 242.28 | 334.85 | 315 | 106.3 | SC-5 |
| 149. | 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 | 223.74 | 332.95 | 315 | 105.7 | SC-5 |
| 150. | 314013 JINDAL-B2 400.00 312013 JINDAL-B2 220.00 1 | OPEN LINE FROM BUS 314013 [JINDAL-B2 400.00] TO BUS 312013 [JINDAL-B2 220.00] CKT 2 | 211.64 | 331.35 | 315 | 105.19 | SC-5 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 151. | 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 | 238.49 | 329.21 | 315 | 104.51 | SC-5 |
| 152. | 374057 DOLVI 400.00 372244 NDIL 220.00 1 | OPEN LINE FROM BUS 374028 [NAGOTHANE 400.00] TO BUS 372150 [NAGOTHA2 220.00] CKT 2 | 483.44 | 490.12 | 500 | 98.02 | SC-5 |
| 153. | 374029 CHAKAN 400.00 372234 CHAKNII2 220.00 1 | OPEN LINE FROM BUS 374029 [CHAKAN 400.00] TO BUS 372234 [CHAKNII2 220.00] CKT 2 | 228.44 | 308.32 | 315 | 97.88 | SC-5 |
| 154. | 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 | 238.66 | 307.11 | 315 | 97.5 | SC-5 |
| 155. | 504035 RACHAGUNNERI400.00 502029 RACHAGUNNERI220.00 1 | OPEN LINE FROM BUS 504035 [RACHAGUNNERI400.00] TO BUS 502029 [RACHAGUNNERI220.00] CKT 2 | 224.63 | 304.43 | 315 | 96.65 | SC-5 |
| 156. | 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 | 336.65 | 480.43 | 500 | 96.09 | SC-5 |
| 157. | 374052 KUDUS 400.00 372254 KUDUS220 220.00 1 | OPEN LINE FROM BUS 374052 [KUDUS 400.00] TO BUS 372254 [KUDUS220 220.00] CKT 2 | 398.65 | 480.27 | 500 | 96.05 | SC-5 |
| 158. | 174462 MAINPURI 400.00 172099 MAINPURI-PG 220.00 1 | OPEN LINE FROM BUS 174462 [MAINPURI 400.00] TO BUS 172099 [MAINPURI-PG 220.00] CKT 3 | 213.38 | 301.85 | 315 | 95.82 | SC-5 |
| 159. | 174408 PARICHHA 400.00 172054 PARICHA2 220.00 1 | OPEN LINE FROM BUS 174408 [PARICHHA 400.00] TO BUS 172054 [PARICHA2 220.00] CKT 2 | 205.47 | 300.08 | 315 | 95.26 | SC-5 |
| 160. | 534049 KASRGODE4 400.00 532956 KASRGODE2 220.00 1 | OPEN LINE FROM BUS 534049 [KASRGODE4 400.00] TO BUS 532956 [KASRGODE2 220.00] CKT 2 | 183.13 | 298.92 | 315 | 94.89 | SC-5 |
| 161. | 124419 DEHAR 400.00 122218 DEHAR 220.00 1 | OPEN LINE FROM BUS 124419 [DEHAR 400.00] TO BUS 144460 [PANCH-PG 400.00] CKT 1 | 250.79 | 297.12 | 315 | 94.32 | SC-5 |
| 162. | 354004 WANAKBORI 400.00 352004 WANAKBORI 220.00 1 | OPEN LINE FROM BUS 354001 [ASOJ4 400.00] TO BUS 354004 [WANAKBORI 400.00] CKT 1 | 267.28 | 296.18 | 315 | 94.03 | SC-5 |
| 163. | 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 | 228.01 | 293.41 | 315 | 93.15 | SC-5 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 164. | 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 | 251.93 | 292.92 | 315 | 92.99 | SC-5 |
| 165. | 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 | 372.22 | 464.51 | 500 | 92.9 | SC-5 |
| 166. | 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 | 190.48 | 291.56 | 315 | 92.56 | SC-5 |
| 167. | 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 | 209.75 | 291.55 | 315 | 92.55 | SC-5 |
| 168. | 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 | 235.56 | 290.64 | 315 | 92.27 | SC-5 |
| 169. | 134405 NAKODAR 400.00 132214 NAKODARPG 220.00 1 | OPEN LINE FROM BUS 134405 [NAKODAR 400.00] TO BUS 132214 [NAKODARPG 220.00] CKT 2 | 228.47 | 289.13 | 315 | 91.79 | SC-5 |
| 170. | 524011 KOLAR 400.00 522011 KOLR 220.00 1 | OPEN LINE FROM BUS 524011 [KOLAR 400.00] TO BUS 522011 [KOLR 220.00] CKT 2 | 227.71 | 458.2 | 500 | 91.64 | SC-5 |
| 171. | 164405 BHINMAL 400.00 162914 BHINM-PG 220.00 1 | OPEN LINE FROM BUS 164405 [BHINMAL 400.00] TO BUS 162914 [BHINM-PG 220.00] CKT 2 | 185.29 | 286.28 | 315 | 90.88 | SC-5 |
| 172. | 134918 JALANDHA 400.00 132918 JALAN-PG 220.00 1 | OPEN LINE FROM BUS 134918 [JALANDHA 400.00] TO BUS 132918 [JALAN-PG 220.00] CKT 3 | 223.93 | 285.43 | 315 | 90.61 | SC-5 |
| 173. | 154928 MAHARANIBAGH400.00 152234 MAHARANIBAGH220.00 1 | OPEN LINE FROM BUS 154928 [MAHARANIBAGH400.00] TO BUS 152234 [MAHARANIBAGH220.00] CKT 2 | 237.66 | 284.13 | 315 | 90.2 | SC-5 |
| 174. | 314021 RAITA 400.00 312021 RAITA 220.00 1 | OPEN LINE FROM BUS 314021 [RAITA 400.00] TO BUS 312021 [RAITA 220.00] CKT 3 | 228.79 | 282.9 | 315 | 89.81 | SC-5 |
| 175. | 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 | 240.57 | 280.59 | 315 | 89.08 | SC-5 |
| 176. | 354022 HAZIRA4 400.00 352022 HAZIRA2 220.00 1 | OPEN LINE FROM BUS 354022 [ HAZIRA4 400.00] TO BUS 352022 [ HAZIRA2 220.00] CKT 2 | 366.46 | 773.23 | 500 | 154.65 | SC-6 |
| 177. | 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 | 393.13 | 716.27 | 500 | 143.25 | SC-6 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 178. | 374038 KORADI-II 400.00 372393 KORADI-II 220.00 1 | OPEN LINE FROM BUS 374038 [KORADI-II 400.00] TO BUS 372393 [KORADI-II 220.00] CKT 2 | 490.27 | 709.02 | 500 | 141.8 | SC-6 |
| 179. | 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 | 276.45 | 394.47 | 315 | 125.23 | SC-6 |
| 180. | 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 | 252.08 | 381.02 | 315 | 120.96 | SC-6 |
| 181. | 144006 SONAROAD 400.00 142212 SOHNAROAD 220.00 1 | OPEN LINE FROM BUS 144006 [SONAROAD 400.00] TO BUS 142212 [SOHNAROAD 220.00] CKT 2 | 390.42 | 569.06 | 500 | 113.81 | SC-6 |
| 182. | 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 | 182.65 | 209.86 | 190 | 110.45 | SC-6 |
| 183. | 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 | 268.43 | 345.75 | 315 | 109.76 | SC-6 |
| 184. | 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 2 | 246.21 | 340.39 | 315 | 108.06 | SC-6 |
| 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 | 254.26 | 331.82 | 315 | 105.34 | SC-6 |
| 186. | 314013 JINDAL-B2 400.00 312013 JINDAL-B2 220.00 1 | OPEN LINE FROM BUS 314013 [JINDAL-B2 400.00] TO BUS 312013 [JINDAL-B2 220.00] CKT 2 | 211.04 | 329.82 | 315 | 104.7 | SC-6 |
| 187. | 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 | 237.3 | 329.82 | 315 | 104.7 | SC-6 |
| 188. | 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 | 237.33 | 326.85 | 315 | 103.76 | SC-6 |
| 189. | 374012 PADGH4 400.00 372163 PADGHE22 220.00 1 | OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 372163 [PADGHE22 220.00] CKT 5 | 535.13 | 618.54 | 600 | 103.09 | SC-6 |
| 190. | 174497 JAUNPUR 400.00 172497 JAUNPUR 220.00 1 | OPEN LINE FROM BUS 174497 [JAUNPUR 400.00] TO BUS 172497 [JAUNPUR 220.00] CKT 2 | 336.08 | 509.14 | 500 | 101.83 | SC-6 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 191. | 314054 DHARDEHI 400.00 312053 DHARDEHI 220.00 1 | OPEN LINE FROM BUS 314054 [DHARDEHI 400.00] TO BUS 312053 [DHARDEHI 220.00] CKT 2 | 239.3 | 317.27 | 315 | 100.72 | SC-6 |
| 192. | 164405 BHINMAL 400.00 162914 BHINM-PG 220.00 1 | OPEN LINE FROM BUS 164405 [BHINMAL 400.00] TO BUS 162914 [BHINM-PG 220.00] CKT 2 | 199.93 | 309.21 | 315 | 98.16 | SC-6 |
| 193. | 504033 ASPIRI 400.00 502090 ASPIRI 220.00 1 | OPEN LINE FROM BUS 504033 [ASPIRI 400.00] TO BUS 502090 [ASPIRI 220.00] CKT 2 | 204.01 | 305.87 | 315 | 97.1 | SC-6 |
| 194. | 174995 NOIDA-SEC123400.00 172582 NOIDA-SEC123220.00 1 | OPEN LINE FROM BUS 174995 [NOIDA-SEC123400.00] TO BUS 172582 [NOIDA-SEC123220.00] CKT 2 | 147.41 | 193.15 | 200 | 96.57 | SC-6 |
| 195. | 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 | 196.69 | 301.73 | 315 | 95.79 | SC-6 |
| 196. | 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 | 265.89 | 296.02 | 315 | 93.98 | SC-6 |
| 197. | 374029 CHAKAN 400.00 372234 CHAKNII2 220.00 1 | OPEN LINE FROM BUS 374029 [CHAKAN 400.00] TO BUS 372234 [CHAKNII2 220.00] CKT 2 | 218.15 | 293.54 | 315 | 93.19 | SC-6 |
| 198. | 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 | 216.89 | 288.19 | 315 | 91.49 | SC-6 |
| 199. | 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 | 228.9 | 286.2 | 315 | 90.86 | SC-6 |
| 200. | 374057 DOLVI 400.00 372244 NDIL 220.00 1 | OPEN LINE FROM BUS 374028 [NAGOTHANE 400.00] TO BUS 372150 [NAGOTHA2 220.00] CKT 2 | 444.75 | 448.64 | 500 | 89.73 | SC-6 |
| 201. | 374052 KUDUS 400.00 372254 KUDUS220 220.00 1 | OPEN LINE FROM BUS 374052 [KUDUS 400.00] TO BUS 372254 [KUDUS220 220.00] CKT 2 | 372.99 | 448.64 | 500 | 89.73 | SC-6 |
| 202. | 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 | 448.27 | 897.66 | 500 | 179.53 | SC-7 |
| 203. | 504084 KAKINADA SEZ400.00 502284 KAKINADASEZ 220.00 1 | OPEN LINE FROM BUS 504084 [KAKINADA SEZ400.00] TO BUS 502284 [KAKINADASEZ 220.00] CKT 2 | 525.36 | 891.67 | 500 | 178.33 | SC-7 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 204. | 174959 MAHEBA 400.00 172303 MAHEBA2 220.00 1 | OPEN LINE FROM BUS 174959 [MAHEBA 400.00] TO BUS 172303 [MAHEBA2 220.00] CKT 2 | 408.99 | 820.33 | 500 | 164.07 | SC-7 |
| 205. | 364012 SATNA-74 400.00 362022 SATNAPG-742 220.00 1 | OPEN LINE FROM BUS 364012 [SATNA-74 400.00] TO BUS 362022 [SATNAPG-742 220.00] CKT 3 | 354.41 | 516.35 | 315 | 163.92 | SC-7 |
| 206. | 164458 BIKANER-NW 400.00 162458 BIKANER 220.00 1 | OPEN LINE FROM BUS 164458 [BIKANER-NW 400.00] TO BUS 162458 [BIKANER 220.00] CKT 2 | 402.21 | 805.63 | 500 | 161.13 | SC-7 |
| 207. | 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 | 370.26 | 740.55 | 500 | 148.11 | SC-7 |
| 208. | 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 2 | 333.22 | 460.86 | 315 | 146.3 | SC-7 |
| 209. | 364021 SHUJALPR-4 400.00 362068 SHUJALP-42 220.00 1 | OPEN LINE FROM BUS 364021 [SHUJALPR-4 400.00] TO BUS 362068 [SHUJALP-42 220.00] CKT 2 | 317.92 | 455.22 | 315 | 144.52 | SC-7 |
| 210. | 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 | 238.68 | 274.16 | 190 | 144.3 | SC-7 |
| 211. | 354022 HAZIRA4 400.00 352022 HAZIRA2 220.00 1 | OPEN LINE FROM BUS 354022 [ HAZIRA4 400.00] TO BUS 352022 [ HAZIRA2 220.00] CKT 2 | 341.1 | 705.41 | 500 | 141.08 | SC-7 |
| 212. | 174964 GURUSARAI400400.00 172301 GURUSARAI2 220.00 1 | OPEN LINE FROM BUS 174964 [GURUSARAI400400.00] TO BUS 172301 [GURUSARAI2 220.00] CKT 2 | 450.69 | 678.01 | 500 | 135.6 | SC-7 |
| 213. | 364039 MANDSAUR-4 400.00 362113 MANDSOUR-42 220.00 1 | OPEN LINE FROM BUS 364039 [MANDSAUR-4 400.00] TO BUS 362113 [MANDSOUR-42 220.00] CKT 2 | 294.77 | 417.6 | 315 | 132.57 | SC-7 |
| 214. | 534049 KASRGODE4 400.00 532956 KASRGODE2 220.00 1 | OPEN LINE FROM BUS 534049 [KASRGODE4 400.00] TO BUS 532956 [KASRGODE2 220.00] CKT 2 | 252.85 | 412.9 | 315 | 131.08 | SC-7 |
| 215. | 364009 JABALPUR-4 400.00 362067 JABALPUR-42 220.00 1 | OPEN LINE FROM BUS 364009 [JABALPUR-4 400.00] TO BUS 362067 [JABALPUR-42 220.00] CKT 3 | 278.4 | 399.56 | 315 | 126.84 | SC-7 |
| 216. | 164757 POKARAN 400.00 162757 POKARAN-S 220.00 1 | OPEN LINE FROM BUS 164757 [POKARAN 400.00] TO BUS 162757 [POKARAN-S 220.00] CKT 2 | 385.21 | 616.27 | 500 | 123.25 | SC-7 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 217. | 164481 FATEHG-3 400.00 162481 FATEHG-3 220.00 1 | OPEN LINE FROM BUS 164481 [FATEHG-3 400.00] TO BUS 162481 [FATEHG-3 220.00] CKT 2 | 490.98 | 613.7 | 500 | 122.74 | SC-7 |
| 218. | 364042 SAGAR-4 400.00 362053 SAGAR-2 220.00 1 | OPEN LINE FROM BUS 364042 [SAGAR-4 400.00] TO BUS 362053 [SAGAR-2 220.00] CKT 2 | 268.21 | 382.48 | 315 | 121.42 | SC-7 |
| 219. | 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 | 484.38 | 605.45 | 500 | 121.09 | SC-7 |
| 220. | 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 | 480.5 | 600.58 | 500 | 120.12 | SC-7 |
| 221. | 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 | 475.66 | 594.21 | 500 | 118.84 | SC-7 |
| 222. | 374038 KORADI-II 400.00 372393 KORADI-II 220.00 1 | OPEN LINE FROM BUS 374038 [KORADI-II 400.00] TO BUS 372393 [KORADI-II 220.00] CKT 2 | 408.46 | 591.78 | 500 | 118.36 | SC-7 |
| 223. | 364007 GWALIOR-4 400.00 362009 GWALIOR-742 220.00 1 | OPEN LINE FROM BUS 364007 [GWALIOR-4 400.00] TO BUS 362009 [GWALIOR-742 220.00] CKT 2 | 290.07 | 366.68 | 315 | 116.41 | SC-7 |
| 224. | 374029 CHAKAN 400.00 372234 CHAKNII2 220.00 1 | OPEN LINE FROM BUS 374029 [CHAKAN 400.00] TO BUS 372234 [CHAKNII2 220.00] CKT 2 | 273.56 | 366.31 | 315 | 116.29 | SC-7 |
| 225. | 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 | 241.8 | 365.22 | 315 | 115.94 | SC-7 |
| 226. | 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 | 247.74 | 356.58 | 315 | 113.2 | SC-7 |
| 227. | 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 | 376.03 | 563.44 | 500 | 112.69 | SC-7 |
| 228. | 164461 FATEHG-3 SPL400.00 162361 RAMG-II 220.00 1 | OPEN LINE FROM BUS 164461 [FATEHG-3 SPL400.00] TO BUS 162361 [RAMG-II 220.00] CKT 2 | 441.28 | 551.96 | 500 | 110.39 | SC-7 |
| 229. | 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 | 192.89 | 345.15 | 315 | 109.57 | SC-7 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 230. | 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 | 455.94 | 547.24 | 500 | 109.45 | SC-7 |
| 231. | 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 | 434.3 | 543.16 | 500 | 108.63 | SC-7 |
| 232. | 504007 CUDP 400.00 502216 CHINAKAMPALL220.00 1 | OPEN LINE FROM BUS 504007 [CUDP 400.00] TO BUS 502216 [CHINAKAMPALL220.00] CKT 3 | 240.25 | 340.04 | 315 | 107.95 | SC-7 |
| 233. | 374012 PADGH4 400.00 372163 PADGHE22 220.00 1 | OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 372163 [PADGHE22 220.00] CKT 5 | 557.52 | 644.7 | 600 | 107.45 | SC-7 |
| 234. | 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 | 392.88 | 537.04 | 500 | 107.41 | SC-7 |
| 235. | 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 | 425.88 | 531.99 | 500 | 106.4 | SC-7 |
| 236. | 374052 KUDUS 400.00 372254 KUDUS220 220.00 1 | OPEN LINE FROM BUS 374052 [KUDUS 400.00] TO BUS 372254 [KUDUS220 220.00] CKT 2 | 436.56 | 524.48 | 500 | 104.9 | SC-7 |
| 237. | 364032 JULWNIA-4 400.00 362085 JULWANIA-42 220.00 1 | OPEN LINE FROM BUS 364032 [JULWNIA-4 400.00] TO BUS 362085 [JULWANIA-42 220.00] CKT 2 | 213.19 | 327.98 | 315 | 104.12 | SC-7 |
| 238. | 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 | 277.2 | 327.12 | 315 | 103.85 | SC-7 |
| 239. | 354019 ZERDA 400.00 352019 ZERDA2 220.00 1 | OPEN LINE FROM BUS 354019 [ZERDA 400.00] TO BUS 352019 [ZERDA2 220.00] CKT 2 | 251.22 | 311.65 | 315 | 98.94 | SC-7 |
| 240. | 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 | 318.52 | 494.39 | 500 | 98.88 | SC-7 |
| 241. | 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 | 412.19 | 486.64 | 500 | 97.33 | SC-7 |
| 242. | 354012 SUGEN 400.00 352012 SUGEN 220.00 1 | OPEN LINE FROM BUS 354010 [VAPI4 400.00] TO BUS 354012 [SUGEN 400.00] CKT 1 | 246.11 | 306.13 | 315 | 97.18 | SC-7 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 243. | 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 | 234.56 | 302.75 | 315 | 96.11 | SC-7 |
| 244. | 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 | 195.75 | 301.5 | 315 | 95.71 | SC-7 |
| 245. | 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 | 381.57 | 478.44 | 500 | 95.69 | SC-7 |
| 246. | 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 | 233.36 | 301.06 | 315 | 95.58 | SC-7 |
| 247. | 374042 PUNE-PG-AIS 400.00 372275 PUNEPG22 220.00 1 | OPEN LINE FROM BUS 374042 [PUNE-PG-AIS 400.00] TO BUS 372275 [PUNEPG22 220.00] CKT 2 | 241.5 | 300.23 | 315 | 95.31 | SC-7 |
| 248. | 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 | 325.93 | 469.2 | 500 | 93.84 | SC-7 |
| 249. | 364084 MORENA-4 400.00 362106 MORENA-42 220.00 1 | OPEN LINE FROM BUS 364084 [MORENA-4 400.00] TO BUS 362106 [MORENA-42 220.00] CKT 3 | 204.15 | 295.05 | 315 | 93.67 | SC-7 |
| 250. | 164498 BHADLA-2 400.00 162499 BHAD-2 SPLT 220.00 1 | OPEN LINE FROM BUS 164405 [BHINMAL 400.00] TO BUS 354019 [ZERDA 400.00] CKT 2 | 1390.18 | 1403.14 | 1500 | 93.54 | SC-7 |
| 251. | 314054 DHARDEHI 400.00 312053 DHARDEHI 220.00 1 | OPEN LINE FROM BUS 314054 [DHARDEHI 400.00] TO BUS 312053 [DHARDEHI 220.00] CKT 2 | 220.42 | 292.3 | 315 | 92.79 | SC-7 |
| 252. | 144006 SONAROAD 400.00 142212 SOHNAROAD 220.00 1 | OPEN LINE FROM BUS 144006 [SONAROAD 400.00] TO BUS 142212 [SOHNAROAD 220.00] CKT 2 | 318.07 | 463.16 | 500 | 92.63 | SC-7 |
| 253. | 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 | 230.91 | 287.66 | 315 | 91.32 | SC-7 |
| 254. | 364004 BINA-4 400.00 362001 BINA-42 220.00 1 | OPEN LINE FROM BUS 364004 [BINA-4 400.00] TO BUS 362001 [BINA-42 220.00] CKT 2 | 237.06 | 282.19 | 315 | 89.59 | SC-7 |
| 255. | 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 | 174.41 | 281.31 | 315 | 89.31 | SC-7 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 256. | 374038 KORADI-II 400.00 372393 KORADI-II 220.00 1 | OPEN LINE FROM BUS 374038 [KORADI-II 400.00] TO BUS 372393 [KORADI-II 220.00] CKT 2 | 567.43 | 820.56 | 500 | 164.11 | SC-8 |
| 257. | 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 | 409.11 | 758.73 | 500 | 151.75 | SC-8 |
| 258. | 354022 HAZIRA4 400.00 352022 HAZIRA2 220.00 1 | OPEN LINE FROM BUS 354022 [ HAZIRA4 400.00] TO BUS 352022 [ HAZIRA2 220.00] CKT 2 | 323.09 | 675.76 | 500 | 135.15 | SC-8 |
| 259. | 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 2 | 296.73 | 410.48 | 315 | 130.31 | SC-8 |
| 260. | 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 | 189.47 | 217.7 | 190 | 114.58 | SC-8 |
| 261. | 364012 SATNA-74 400.00 362022 SATNAPG-742 220.00 1 | OPEN LINE FROM BUS 364012 [SATNA-74 400.00] TO BUS 362022 [SATNAPG-742 220.00] CKT 3 | 248.18 | 360.36 | 315 | 114.4 | SC-8 |
| 262. | 374012 PADGH4 400.00 372163 PADGHE22 220.00 1 | OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 372163 [PADGHE22 220.00] CKT 5 | 560.01 | 648.42 | 600 | 108.07 | SC-8 |
| 263. | 364032 JULWNIA-4 400.00 362085 JULWANIA-42 220.00 1 | OPEN LINE FROM BUS 364032 [JULWNIA-4 400.00] TO BUS 362085 [JULWANIA-42 220.00] CKT 2 | 218.37 | 335.27 | 315 | 106.43 | SC-8 |
| 264. | 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 | 239.94 | 332.54 | 315 | 105.57 | SC-8 |
| 265. | 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 | 256.34 | 330.69 | 315 | 104.98 | SC-8 |
| 266. | 374029 CHAKAN 400.00 372234 CHAKNII2 220.00 1 | OPEN LINE FROM BUS 374029 [CHAKAN 400.00] TO BUS 372234 [CHAKNII2 220.00] CKT 2 | 245.59 | 330.26 | 315 | 104.84 | SC-8 |
| 267. | 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 | 215.32 | 324.72 | 315 | 103.08 | SC-8 |
| 268. | 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 | 172.39 | 309.22 | 315 | 98.16 | SC-8 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 269. | 374057 DOLVI 400.00 372244 NDIL 220.00 1 | OPEN LINE FROM BUS 374028 [NAGOTHANE 400.00] TO BUS 372150 [NAGOTHA2 220.00] CKT 2 | 483.71 | 489.79 | 500 | 97.96 | SC-8 |
| 270. | 524011 KOLAR 400.00 522011 KOLR 220.00 1 | OPEN LINE FROM BUS 524011 [KOLAR 400.00] TO BUS 522011 [KOLR 220.00] CKT 2 | 237.94 | 479.03 | 500 | 95.81 | SC-8 |
| 271. | 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 | 210.48 | 300.53 | 315 | 95.41 | SC-8 |
| 272. | 364009 JABALPUR-4 400.00 362067 JABALPUR-42 220.00 1 | OPEN LINE FROM BUS 364009 [JABALPUR-4 400.00] TO BUS 362067 [JABALPUR-42 220.00] CKT 3 | 207.9 | 297.96 | 315 | 94.59 | SC-8 |
| 273. | 374052 KUDUS 400.00 372254 KUDUS220 220.00 1 | OPEN LINE FROM BUS 374052 [KUDUS 400.00] TO BUS 372254 [KUDUS220 220.00] CKT 2 | 392.09 | 471.92 | 500 | 94.38 | SC-8 |
| 274. | 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 | 313.4 | 469.77 | 500 | 93.95 | SC-8 |
| 275. | 354004 WANAKBORI 400.00 352004 WANAKBORI 220.00 1 | OPEN LINE FROM BUS 354001 [ASOJ4 400.00] TO BUS 354004 [WANAKBORI 400.00] CKT 1 | 243.55 | 293.95 | 315 | 93.32 | SC-8 |
| 276. | 364031 PITHAMPUR-4 400.00 362029 PITHAMPUR-42220.00 1 | OPEN LINE FROM BUS 364031 [PITHAMPUR-4 400.00] TO BUS 362029 [PITHAMPUR-42220.00] CKT 2 | 218.48 | 291.52 | 315 | 92.55 | SC-8 |
| 277. | 374062 NANDED40 400.00 372325 KUMBHARGAON2220.00 1 | OPEN LINE FROM BUS 374062 [NANDED40 400.00] TO BUS 372325 [KUMBHARGAON2220.00] CKT 2 | 290.54 | 457.57 | 500 | 91.51 | SC-8 |
| 278. | 174265 REWA 400.00 172112 REWAROAD 220.00 1 | OPEN LINE FROM BUS 174000 [MEJA 400.00] TO BUS 174474 [ALLAHABA 400.00] CKT 1 | 251.68 | 287.97 | 315 | 91.42 | SC-8 |
| 279. | 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 | 242.83 | 286.9 | 315 | 91.08 | SC-8 |
| 280. | 144006 SONAROAD 400.00 142212 SOHNAROAD 220.00 1 | OPEN LINE FROM BUS 144006 [SONAROAD 400.00] TO BUS 142212 [SOHNAROAD 220.00] CKT 2 | 309.38 | 450.61 | 500 | 90.12 | SC-8 |
| 281. | 364042 SAGAR-4 400.00 362053 SAGAR-2 220.00 1 | OPEN LINE FROM BUS 364042 [SAGAR-4 400.00] TO BUS 362053 [SAGAR-2 220.00] CKT 2 | 197.72 | 282.67 | 315 | 89.74 | SC-8 |

| S.No | Monitored Element | Contingency | Base Flow | Flow under Contingency | MVA rating | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 282. | 374038 KORADI-II 400.00 372393 KORADI-II 220.00 1 | OPEN LINE FROM BUS 374038 [KORADI-II 400.00] TO BUS 372393 [KORADI-II 220.00] CKT 2 | 442.92 | 641.76 | 500 | 128.35 | SC-9 |
| 283. | 354022 HAZIRA4 400.00 352022 HAZIRA2 220.00 1 | OPEN LINE FROM BUS 354022 [ HAZIRA4 400.00] TO BUS 352022 [ HAZIRA2 220.00] CKT 2 | 292.06 | 605.95 | 500 | 121.19 | SC-9 |
| 284. | 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 | 280.46 | 520.03 | 500 | 104.01 | SC-9 |
| 285. | 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 2 | 232.98 | 322.53 | 315 | 102.39 | SC-9 |
| 286. | 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 | 167.76 | 192.71 | 190 | 101.42 | SC-9 |
| 287. | 364012 SATNA-74 400.00 362022 SATNAPG-742 220.00 1 | OPEN LINE FROM BUS 364012 [SATNA-74 400.00] TO BUS 362022 [SATNAPG-742 220.00] CKT 3 | 207.72 | 301.92 | 315 | 95.85 | SC-9 |
| 288. | 534049 KASRGODE4 400.00 532956 KASRGODE2 220.00 1 | OPEN LINE FROM BUS 534049 [KASRGODE4 400.00] TO BUS 532956 [KASRGODE2 220.00] CKT 2 | 183.96 | 299.58 | 315 | 95.11 | SC-9 |
| 289. | 354004 WANAKBORI 400.00 352004 WANAKBORI 220.00 1 | OPEN LINE FROM BUS 354001 [ASOJ4 400.00] TO BUS 354004 [WANAKBORI 400.00] CKT 1 | 239.4 | 285.1 | 315 | 90.51 | SC-9 |
| 290. | 374029 CHAKAN 400.00 372234 CHAKNII2 220.00 1 | OPEN LINE FROM BUS 374029 [CHAKAN 400.00] TO BUS 372234 [CHAKNII2 220.00] CKT 2 | 208.57 | 280.4 | 315 | 89.02 | SC-9 |

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**Annex-7.4.2**

## N-1 Contingency of 765 kV Transmission Lines

| S.No | Monitored Element | Contingency | Maximum Flow | Flow under Contingency | Rate | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 1. | 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 | 4224.54 | 4390.18 | 3500 | 125.43 | SC-1 |
| 2. | 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 | 4010.85 | 4189.59 | 3500 | 119.7 | SC-1 |
| 3. | 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 | 3511.42 | 3826.45 | 3500 | 109.33 | SC-1 |
| 4. | 358200 KHAVDA 765 765.00 358299 KHAVDA2 765.00 1 | OPEN LINE FROM BUS 358147 [LAKADIA 765 765.00] TO BUS 358202 [KHAVDA-II 765.00] CKT 1 | 3512.4 | 3670.72 | 3500 | 104.88 | SC-1 |
| 5. | 167484 BHADLA-3 765.00 167497 SIKAR NEW 765.00 1 | OPEN LINE FROM BUS 167481 [FATEHG-3 765.00] TO BUS 167502 [BEAWAR 765.00] CKT 1 | 3330.81 | 3665.22 | 3500 | 104.72 | SC-1 |
| 6. | 167458 BIKANER-NW 765.00 167459 BHADLA PG 765.00 1 | OPEN LINE FROM BUS 167458 [BIKANER-NW 765.00] TO BUS 167459 [BHADLA PG 765.00] CKT 2 | 3101.99 | 3303.05 | 3500 | 94.37 | SC-1 |
| 7. | 358202 KHAVDA-II 765.00 358203 KHAVDA-III 765.00 1 | OPEN LINE FROM BUS 358202 [KHAVDA-II 765.00] TO BUS 358203 [KHAVDA-III 765.00] CKT 2 | 3185.59 | 3276.06 | 3500 | 93.6 | SC-1 |
| 8. | 167999 DAUSA 765.00 368007 GWALIOR 765.00 1 | OPEN LINE FROM BUS 167999 [DAUSA 765.00] TO BUS 368007 [GWALIOR 765.00] CKT 2 | 3108.05 | 3236.91 | 3500 | 92.48 | SC-1 |
| 9. | 548087 TIRUVLM 765.00 548127 ARIYALUR7 765.00 1 | OPEN LINE FROM BUS 548087 [TIRUVLM 765.00] TO BUS 548127 [ARIYALUR7 765.00] CKT 2 | 3997.43 | 3956.05 | 3500 | 113.03 | SC-2 |
| 10. | 177000 VARNASI8 765.00 368025 VIN-POOL 765.00 1 | OPEN LINE FROM BUS 177000 [VARNASI8 765.00] TO BUS 368025 [VIN-POOL 765.00] CKT 2 | 3662.59 | 3644.14 | 3500 | 104.12 | SC-2 |
| 11. | 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 | 3816.26 | 3625.89 | 3500 | 103.6 | SC-2 |

| S.No | Monitored Element | Contingency | Maximum Flow | Flow under Contingency | Rate | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 12. | 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 | 3654.05 | 3654.05 | 3500 | 104.4 | SC-3 |
| 13. | 548087 TIRUVLM 765.00 548127 ARIYALUR7 765.00 1 | OPEN LINE FROM BUS 548087 [TIRUVLM 765.00] TO BUS 548127 [ARIYALUR7 765.00] CKT 2 | 3427 | 3414.4 | 3500 | 97.55 | SC-3 |
| 14. | 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 | 3270.65 | 3318.23 | 3500 | 94.81 | SC-3 |
| 15. | 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 | 4417.19 | 4533.92 | 3000 | 151.13 | SC-4 |
| 16. | 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 | 4353.82 | 4491.91 | 3000 | 149.73 | SC-4 |
| 17. | 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 | 3470.07 | 3812.22 | 3000 | 127.07 | SC-4 |
| 18. | 358200 KHAVDA 765 765.00 358299 KHAVDA2 765.00 1 | OPEN LINE FROM BUS 358147 [LAKADIA 765 765.00] TO BUS 358202 [KHAVDA-II 765.00] CKT 1 | 3681.13 | 3801.32 | 3000 | 126.71 | SC-4 |
| 19. | 167484 BHADLA-3 765.00 167497 SIKAR NEW 765.00 1 | OPEN LINE FROM BUS 167481 [FATEHG-3 765.00] TO BUS 167502 [BEAWAR 765.00] CKT 1 | 3207.71 | 3671.22 | 3000 | 122.37 | SC-4 |
| 20. | 358202 KHAVDA-II 765.00 358203 KHAVDA-III 765.00 1 | OPEN LINE FROM BUS 358202 [KHAVDA-II 765.00] TO BUS 358203 [KHAVDA-III 765.00] CKT 2 | 3363.2 | 3445.45 | 3000 | 114.85 | SC-4 |
| 21. | 167458 BIKANER-NW 765.00 167459 BHADLA PG 765.00 1 | OPEN LINE FROM BUS 167458 [BIKANER-NW 765.00] TO BUS 167459 [BHADLA PG 765.00] CKT 2 | 3128.02 | 3354.77 | 3000 | 111.83 | SC-4 |
| 22. | 548087 TIRUVLM 765.00 548127 ARIYALUR7 765.00 1 | OPEN LINE FROM BUS 548087 [TIRUVLM 765.00] TO BUS 548127 [ARIYALUR7 765.00] CKT 2 | 3698.55 | 3685.04 | 3500 | 105.29 | SC-5 |
| 23. | 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 | 3499.7 | 3323.75 | 3500 | 94.96 | SC-5 |
| 24. | 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 | 3328.94 | 3288.65 | 3500 | 93.96 | SC-5 |

| S.No | Monitored Element | Contingency | Maximum Flow | Flow under Contingency | Rate | % loading | Scenario |
|---|---|---|---|---|---|---|---|
| 25. | 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 | 3206.32 | 3175.91 | 3500 | 90.74 | SC-5 |
| 26. | 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 | 3513.67 | 3565.7 | 3500 | 101.88 | SC-6 |
| 27. | 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 | 3494.41 | 3519.02 | 3500 | 100.54 | SC-6 |
| 28. | 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 | 3516.37 | 3516.36 | 3500 | 100.47 | SC-6 |
| 29. | 548087 TIRUVLM 765.00 548127 ARIYALUR7 765.00 1 | OPEN LINE FROM BUS 548087 [TIRUVLM 765.00] TO BUS 548127 [ARIYALUR7 765.00] CKT 2 | 3492.36 | 3503.76 | 3500 | 100.11 | SC-6 |
| 30. | 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 | 3747.02 | 3899.25 | 3500 | 111.41 | SC-7 |
| 31. | 167429 CHIT-NEW 765.00 167502 BEAWAR 765.00 1 | OPEN LINE FROM BUS 167429 [CHIT-NEW 765.00] TO BUS 167502 [BEAWAR 765.00] CKT 2 | 3492.11 | 3749.79 | 3500 | 107.14 | SC-7 |
| 32. | 167484 BHADLA-3 765.00 167497 SIKAR NEW 765.00 1 | OPEN LINE FROM BUS 167481 [FATEHG-3 765.00] TO BUS 167502 [BEAWAR 765.00] CKT 1 | 3361.23 | 3651.87 | 3500 | 104.34 | SC-7 |
| 33. | 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 | 3396.65 | 3575.63 | 3500 | 102.16 | SC-7 |
| 34. | 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 | 3250.94 | 3380.59 | 3500 | 96.59 | SC-7 |
| 35. | 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 | 3037.19 | 3037.19 | 3500 | 86.78 | SC-9 |

## N-1 Contingency of 400 kV Transmission Lines

| S.No | Monitored Element | Contingency | Flow under Contingency | Rate | % loading | Scenario |
|---|---|---|---|---|---|---|
| 1. | 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 | 2533.21 | 857 | 295.59 | SC-1 |
| 2. | 164774 KHETRI 400.00 164921 BHIWADI 400.00 1 | OPEN LINE FROM BUS 164774 [KHETRI 400.00] TO BUS 164921 [BHIWADI 400.00] CKT 2 | 1650.66 | 857 | 192.61 | SC-1 |
| 3. | 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 | 1643.56 | 857 | 191.78 | SC-1 |
| 4. | 154496 GOPAL PUR 400.00 154501 NARELA ISTS 400.00 1 | OPEN LINE FROM BUS 154496 [GOPAL PUR 400.00] TO BUS 154501 [NARELA ISTS 400.00] CKT 2 | 1586.41 | 857 | 185.11 | SC-1 |
| 5. | 174417 RIHAND-G 400.00 174433 RIHAN-HV 400.00 1 | OPEN LINE FROM BUS 174417 [RIHAND-G 400.00] TO BUS 174433 [RIHAN-HV 400.00] CKT 2 | 1514.53 | 857 | 176.72 | SC-1 |
| 6. | 164445 NEEMR-PG 400.00 164497 SIKAR NEW 400.00 1 | OPEN LINE FROM BUS 164445 [NEEMR-PG 400.00] TO BUS 164497 [SIKAR NEW 400.00] CKT 2 | 1271.11 | 857 | 148.32 | SC-1 |
| 7. | 514051 MAILARM4 400.00 514100 NARSAPUR 400.00 1 | OPEN LINE FROM BUS 514051 [MAILARM4 400.00] TO BUS 514100 [NARSAPUR 400.00] CKT 2 | 1180.98 | 852 | 138.61 | SC-1 |
| 8. | 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 | 1142.01 | 857 | 133.26 | SC-1 |
| 9. | 374012 PADGH4 400.00 374052 KUDUS 400.00 1 | OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 374052 [KUDUS 400.00] CKT 2 | 1112.71 | 857 | 129.84 | SC-1 |
| 10. | 164402 BARMER-4 400.00 164405 BHINMAL 400.00 1 | OPEN LINE FROM BUS 164402 [BARMER-4 400.00] TO BUS 164405 [BHINMAL 400.00] CKT 2 | 1101.51 | 857 | 128.53 | SC-1 |
| 11. | 514002 HYDERABAD 400.00 514022 GAJWEL4 400.00 1 | OPEN LINE FROM BUS 514001 [RAMGUNDM STP400.00] TO BUS 514022 [GAJWEL4 400.00] CKT 1 | 1094.28 | 852 | 128.44 | SC-1 |
| 12. | 424033 PANDIABILI 400.00 424038 BEGUNIA 400.00 1 | OPEN LINE FROM BUS 424033 [PANDIABILI 400.00] TO BUS 424038 [BEGUNIA 400.00] CKT 2 | 1394.63 | 1093 | 127.6 | SC-1 |
| 13. | 164458 BIKANER-NW 400.00 164495 BIKANER-II 400.00 1 | OPEN LINE FROM BUS 164458 [BIKANER-NW 400.00] TO BUS 164495 [BIKANER-II 400.00] CKT 2 | 1042.28 | 857 | 121.62 | SC-1 |
| 14. | 164110 JAISALMER-2 400.00 164434 JODH KANKANI400.00 1 | OPEN LINE FROM BUS 164110 [JAISALMER-2 400.00] TO BUS 164434 [JODH KANKANI400.00] CKT 2 | 1032.57 | 857 | 120.49 | 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 | 992.61 | 850 | 116.78 | SC-1 |
| 16. | 314001 KNTPC 400.00 314003 KORBA-WEST 400.00 1 | OPEN LINE FROM BUS 314001 [KNTPC 400.00] TO BUS 314005 [BHATP4 400.00] CKT 1 | 964.39 | 857 | 112.53 | SC-1 |
| 17. | 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 | 927.38 | 857 | 108.21 | SC-1 |
| 18. | 114422 KISHENPUR 400.00 114447 SAMBA 400.00 1 | OPEN LINE FROM BUS 114422 [KISHENPUR 400.00] TO BUS 114447 [SAMBA 400.00] CKT 2 | 922.19 | 857 | 107.61 | SC-1 |

| S.No | Monitored Element | Contingency | Flow under Contingency | Rate | % loading | Scenario |
|---|---|---|---|---|---|---|
| 19. | 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 | 914.72 | 857 | 106.74 | SC-1 |
| 20. | 164110 JAISALMER-2 400.00 164402 BARMER-4 400.00 1 | OPEN LINE FROM BUS 164110 [JAISALMER-2 400.00] TO BUS 164402 [BARMER-4 400.00] CKT 2 | 911.42 | 857 | 106.35 | SC-1 |
| 21. | 164480 FATEHG-2 400.00 164484 BHADLA-3 400.00 1 | OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 164484 [BHADLA-3 400.00] CKT 2 | 909.2 | 857 | 106.09 | SC-1 |
| 22. | 144469 BHIWN-PG 400.00 144669 BHIWANI SR 400.00 1 | OPEN LINE FROM BUS 144469 [BHIWN-PG 400.00] TO BUS 147704 [BHIWN-PG 765.00] CKT 1 | 866.64 | 857 | 101.12 | SC-1 |
| 23. | 354003 DEHGM4 400.00 354005 SOJA4 400.00 1 | OPEN LINE FROM BUS 354003 [DEHGM4 400.00] TO BUS 354005 [SOJA4 400.00] CKT 2 | 846.31 | 857 | 98.75 | SC-1 |
| 24. | 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 | 845.03 | 857 | 98.6 | SC-1 |
| 25. | 164495 BIKANER-II 400.00 164774 KHETRI 400.00 1 | OPEN LINE FROM BUS 164495 [BIKANER-II 400.00] TO BUS 164774 [KHETRI 400.00] CKT 2 | 842.34 | 857 | 98.29 | SC-1 |
| 26. | 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 | 826.79 | 857 | 96.47 | SC-1 |
| 27. | 504082 MAILAVARAM 400.00 504132 KONDPRM 400.00 1 | OPEN LINE FROM BUS 504082 [MAILAVARAM 400.00] TO BUS 504132 [KONDPRM 400.00] CKT 2 | 812.02 | 857 | 94.75 | SC-1 |
| 28. | 164418 KANKROLI 400.00 164433 JODH SURPURA400.00 1 | OPEN LINE FROM BUS 167773 [JAIPUR 765.00] TO BUS 167799 [JODH KANKANI765.00] CKT 1 | 811.92 | 857 | 94.74 | SC-1 |
| 29. | 514029 KAKTIA-G 400.00 514079 WARN4 400.00 1 | OPEN LINE FROM BUS 514029 [KAKTIA-G 400.00] TO BUS 514079 [WARN4 400.00] CKT 2 | 803.67 | 852 | 94.33 | SC-1 |
| 30. | 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 | 805.42 | 857 | 93.98 | SC-1 |
| 31. | 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 | 805.17 | 857 | 93.95 | SC-1 |
| 32. | 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 | 2045.97 | 2186 | 93.59 | SC-1 |
| 33. | 514006 KACHAPU-A LI400.00 514007 KACAHPU-B LI400.00 1 | OPEN LINE FROM BUS 514007 [KACAHPU-B LI400.00] TO BUS 514100 [NARSAPUR 400.00] CKT 1 | 802.05 | 857 | 93.59 | SC-1 |
| 34. | 514001 RAMGUNDM STP400.00 514009 CHANDRAPR-SR400.00 1 | OPEN LINE FROM BUS 514001 [RAMGUNDM STP400.00] TO BUS 514009 [CHANDRAPR-SR400.00] CKT 2 | 794.15 | 852 | 93.21 | SC-1 |
| 35. | 164999 DAUSA 400.00 174922 AGRA 400.00 1 | OPEN LINE FROM BUS 164999 [DAUSA 400.00] TO BUS 174922 [AGRA 400.00] CKT 2 | 797.24 | 857 | 93.03 | SC-1 |
| 36. | 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 | 2026.65 | 2186 | 92.71 | SC-1 |
| 37. | 144420 BHIWANI 400.00 144469 BHIWN-PG 400.00 1 | OPEN LINE FROM BUS 144469 [BHIWN-PG 400.00] TO BUS 144480 [JINDPG 400.00] CKT 1 | 792.76 | 857 | 92.5 | SC-1 |

| S.No | Monitored Element | Contingency | Flow under Contingency | Rate | % loading | Scenario |
|---|---|---|---|---|---|---|
| 38. | 144404 JHAJAR_N 400.00 144408 DHANONDA 400.00 1 | OPEN LINE FROM BUS 144404 [JHAJAR_N 400.00] TO BUS 144408 [DHANONDA 400.00] CKT 2 | 789.95 | 857 | 92.18 | SC-1 |
| 39. | 354050 PRANTIJ 400.00 354137 SANKHARI 400.00 1 | OPEN LINE FROM BUS 354050 [PRANTIJ 400.00] TO BUS 354137 [SANKHARI 400.00] CKT 2 | 789.01 | 857 | 92.07 | SC-1 |
| 40. | 144408 DHANONDA 400.00 144599 MOH-DHA SR 400.00 1 | OPEN LINE FROM BUS 144408 [DHANONDA 400.00] TO BUS 144598 [MOH-DHA SR1 400.00] CKT 2 | 786.3 | 857 | 91.75 | SC-1 |
| 41. | 144459 MAHIN_HV 400.00 144599 MOH-DHA SR 400.00 1 | OPEN LINE FROM BUS 144408 [DHANONDA 400.00] TO BUS 144598 [MOH-DHA SR1 400.00] CKT 2 | 785.02 | 857 | 91.6 | SC-1 |
| 42. | 174058 ORAI 400.00 174258 ORAI 400.00 1 | OPEN LINE FROM BUS 174058 [ORAI 400.00] TO BUS 174258 [ORAI 400.00] CKT 2 | 772.82 | 857 | 90.18 | SC-1 |
| 43. | 174468 ANPARA4 400.00 174472 OBRA4 400.00 1 | OPEN LINE FROM BUS 177406 [ANPARA-D 765.00] TO BUS 177712 [OBRAC 765.00] CKT 1 | 771.32 | 857 | 90 | 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 | 1515.08 | 857 | 176.79 | SC-2 |
| 45. | 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 | 1460.74 | 857 | 170.45 | SC-2 |
| 46. | 424033 PANDIABILI 400.00 424038 BEGUNIA 400.00 1 | OPEN LINE FROM BUS 424033 [PANDIABILI 400.00] TO BUS 424038 [BEGUNIA 400.00] CKT 2 | 1815.1 | 1093 | 166.07 | SC-2 |
| 47. | 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 | 1260.35 | 857 | 147.07 | SC-2 |
| 48. | 174468 ANPARA4 400.00 174923 SINGRL4 400.00 1 | OPEN LINE FROM BUS 174437 [LUCKN_UP 400.00] TO BUS 174923 [SINGRL4 400.00] CKT 1 | 1097.6 | 857 | 128.07 | SC-2 |
| 49. | 314023 KWPCL 400.00 314029 RAIGARH_POOL400.00 1 | OPEN LINE FROM BUS 314023 [KWPCL 400.00] TO BUS 314029 [RAIGARH_POOL400.00] CKT 2 | 1080.54 | 857 | 126.08 | SC-2 |
| 50. | 134406 RAJPURA_TH 400.00 134407 RAJPURA 400.00 1 | OPEN LINE FROM BUS 134406 [RAJPURA_TH 400.00] TO BUS 134407 [RAJPURA 400.00] CKT 2 | 1030.11 | 857 | 120.2 | SC-2 |
| 51. | 514001 RAMGUNDM STP400.00 514009 CHANDRAPR-SR400.00 1 | OPEN LINE FROM BUS 514001 [RAMGUNDM STP400.00] TO BUS 514009 [CHANDRAPR-SR400.00] CKT 2 | 994.26 | 852 | 116.7 | SC-2 |
| 52. | 174000 MEJA 400.00 174263 BARA 400.00 1 | OPEN LINE FROM BUS 174000 [MEJA 400.00] TO BUS 174263 [BARA 400.00] CKT 2 | 976.08 | 857 | 113.89 | SC-2 |
| 53. | 514002 HYDERABAD 400.00 514022 GAJWEL4 400.00 1 | OPEN LINE FROM BUS 514001 [RAMGUNDM STP400.00] TO BUS 514022 [GAJWEL4 400.00] CKT 1 | 940.51 | 852 | 110.39 | SC-2 |
| 54. | 374004 KARAD4 400.00 374065 KESURDI400 400.00 1 | OPEN LINE FROM BUS 374015 [JEJ4 400.00] TO BUS 374026 [KOY4-4 400.00] CKT 1 | 940.42 | 857 | 109.73 | SC-2 |
| 55. | 214030 BALIPARA-PG 400.00 214195 BON-BAL-FSC1400.00 1 | OPEN LINE FROM BUS 214180 [BORNAGAR 400.00] TO BUS 214196 [BON-BAL-FSC2400.00] CKT 4 | 938.57 | 857 | 109.52 | SC-2 |
| 56. | 214030 BALIPARA-PG 400.00 214196 BON-BAL-FSC2400.00 1 | OPEN LINE FROM BUS 214180 [BORNAGAR 400.00] TO BUS 214195 [BON-BAL-FSC1400.00] CKT 3 | 938.57 | 857 | 109.52 | SC-2 |

| S.No | Monitored Element | Contingency | Flow under Contingency | Rate | % loading | Scenario |
|---|---|---|---|---|---|---|
| 57. | 174468 ANPARA4 400.00 174472 OBRA4 400.00 1 | OPEN LINE FROM BUS 177406 [ANPARA-D 765.00] TO BUS 177712 [OBRAC 765.00] CKT 1 | 937.89 | 857 | 109.44 | SC-2 |
| 58. | 194001 KANPRAYAG 400.00 194054 PIPALKOTI SW400.00 1 | OPEN LINE FROM BUS 194001 [KANPRAYAG 400.00] TO BUS 194054 [PIPALKOTI SW400.00] CKT 2 | 934.94 | 857 | 109.09 | SC-2 |
| 59. | 194001 KANPRAYAG 400.00 194052 SRINAGAR_PT 400.00 1 | OPEN LINE FROM BUS 194001 [KANPRAYAG 400.00] TO BUS 194052 [SRINAGAR_PT 400.00] CKT 2 | 933.12 | 857 | 108.88 | SC-2 |
| 60. | 174058 ORAI 400.00 174258 ORAI 400.00 1 | OPEN LINE FROM BUS 174058 [ORAI 400.00] TO BUS 174258 [ORAI 400.00] CKT 2 | 915.14 | 857 | 106.78 | SC-2 |
| 61. | 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 | 898.85 | 857 | 104.88 | SC-2 |
| 62. | 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 | 890.13 | 857 | 103.87 | SC-2 |
| 63. | 314001 KNTPC 400.00 314003 KORBA-WEST 400.00 1 | OPEN LINE FROM BUS 314001 [KNTPC 400.00] TO BUS 314005 [BHATP4 400.00] CKT 1 | 882.36 | 857 | 102.96 | SC-2 |
| 64. | 214560 SILCHAR-PG 400.00 274001 PKBARI-ISTS 400.00 1 | OPEN LINE FROM BUS 214560 [SILCHAR-PG 400.00] TO BUS 274001 [PKBARI-ISTS 400.00] CKT 2 | 1114.24 | 1089 | 102.32 | SC-2 |
| 65. | 424044 BARIPADA 400.00 444018 KHARAGPR-WB 400.00 1 | OPEN LINE FROM BUS 448001 [MEDINIPUR7 765.00] TO BUS 478046 [RANCHI-NEW 765.00] CKT 1 | 866.57 | 850 | 101.95 | SC-2 |
| 66. | 524003 RAIC 400.00 524082 BELLARY TPP 400.00 1 | OPEN LINE FROM BUS 524002 [MNRB 400.00] TO BUS 524003 [RAIC 400.00] CKT 1 | 859.77 | 850 | 101.15 | SC-2 |
| 67. | 174264 KARCHNA 400.00 174265 REWA 400.00 1 | OPEN LINE FROM BUS 174264 [KARCHNA 400.00] TO BUS 174265 [REWA 400.00] CKT 2 | 861.76 | 857 | 100.56 | SC-2 |
| 68. | 134325 MALKANA 400.00 134401 TALWANDISABO400.00 1 | OPEN LINE FROM BUS 134401 [TALWANDISABO400.00] TO BUS 134404 [MUKATSAR 400.00] CKT 1 | 858.95 | 857 | 100.23 | SC-2 |
| 69. | 154426 BAWANA-G 400.00 154427 BAWANA 400.00 1 | OPEN LINE FROM BUS 154426 [BAWANA-G 400.00] TO BUS 154427 [BAWANA 400.00] CKT 2 | 856.23 | 857 | 99.91 | SC-2 |
| 70. | 274001 PKBARI-ISTS 400.00 274160 PURBANOAGAON400.00 1 | OPEN LINE FROM BUS 274001 [PKBARI-ISTS 400.00] TO BUS 274160 [PURBANOAGAON400.00] CKT 2 | 1088.87 | 1093 | 99.62 | SC-2 |
| 71. | 274002 SURAJMANI NG400.00 274160 PURBANOAGAON400.00 1 | OPEN LINE FROM BUS 274002 [SURAJMANI NG400.00] TO BUS 274160 [PURBANOAGAON400.00] CKT 2 | 1078.62 | 1093 | 98.68 | SC-2 |
| 72. | 444030 ARAMBAGH 400.00 444074 PPSP_NEW 400.00 1 | OPEN LINE FROM BUS 444030 [ARAMBAGH 400.00] TO BUS 444074 [PPSP_NEW 400.00] CKT 2 | 833.99 | 850 | 98.12 | SC-2 |
| 73. | 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 | 823.45 | 857 | 96.09 | SC-2 |
| 74. | 174268 GAZIABAD 400.00 174445 MUZAFRN4 400.00 1 | OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 174436 [GNOIDA4 400.00] CKT 1 | 812.73 | 857 | 94.83 | SC-2 |
| 75. | 514051 MAILARM4 400.00 514100 NARSAPUR 400.00 1 | OPEN LINE FROM BUS 514051 [MAILARM4 400.00] TO BUS 514100 [NARSAPUR 400.00] CKT 2 | 790.18 | 852 | 92.74 | SC-2 |

| S.No | Monitored Element | Contingency | Flow under Contingency | Rate | % loading | Scenario |
|---|---|---|---|---|---|---|
| 76. | 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 | 1007.08 | 1093 | 92.14 | SC-2 |
| 77. | 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 | 872.57 | 948 | 92.04 | SC-2 |
| 78. | 174417 RIHAND-G 400.00 174433 RIHAN-HV 400.00 1 | OPEN LINE FROM BUS 174417 [RIHAND-G 400.00] TO BUS 174433 [RIHAN-HV 400.00] CKT 2 | 1514.56 | 857 | 176.73 | SC-3 |
| 79. | 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 | 1500.24 | 857 | 175.06 | SC-3 |
| 80. | 424033 PANDIABILI 400.00 424038 BEGUNIA 400.00 1 | OPEN LINE FROM BUS 424033 [PANDIABILI 400.00] TO BUS 424038 [BEGUNIA 400.00] CKT 2 | 1839.55 | 1093 | 168.3 | SC-3 |
| 81. | 514002 HYDERABAD 400.00 514022 GAJWEL4 400.00 1 | OPEN LINE FROM BUS 514001 [RAMGUNDM STP400.00] TO BUS 514022 [GAJWEL4 400.00] CKT 1 | 1090.35 | 852 | 127.98 | SC-3 |
| 82. | 314023 KWPCL 400.00 314029 RAIGARH_POOL400.00 1 | OPEN LINE FROM BUS 314023 [KWPCL 400.00] TO BUS 314029 [RAIGARH_POOL400.00] CKT 2 | 1079.79 | 857 | 126 | SC-3 |
| 83. | 514051 MAILARM4 400.00 514100 NARSAPUR 400.00 1 | OPEN LINE FROM BUS 514051 [MAILARM4 400.00] TO BUS 514100 [NARSAPUR 400.00] CKT 2 | 1032.83 | 852 | 121.22 | SC-3 |
| 84. | 174468 ANPARA4 400.00 174472 OBRA4 400.00 1 | OPEN LINE FROM BUS 177406 [ANPARA-D 765.00] TO BUS 177712 [OBRAC 765.00] CKT 1 | 950.92 | 857 | 110.96 | SC-3 |
| 85. | 174058 ORAI 400.00 174258 ORAI 400.00 1 | OPEN LINE FROM BUS 174058 [ORAI 400.00] TO BUS 174258 [ORAI 400.00] CKT 2 | 950.79 | 857 | 110.94 | SC-3 |
| 86. | 174000 MEJA 400.00 174263 BARA 400.00 1 | OPEN LINE FROM BUS 174000 [MEJA 400.00] TO BUS 174263 [BARA 400.00] CKT 2 | 945.03 | 857 | 110.27 | SC-3 |
| 87. | 314001 KNTPC 400.00 314003 KORBA-WEST 400.00 1 | OPEN LINE FROM BUS 314001 [KNTPC 400.00] TO BUS 314005 [BHATP4 400.00] CKT 1 | 940.14 | 857 | 109.7 | SC-3 |
| 88. | 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 | 936.42 | 857 | 109.27 | SC-3 |
| 89. | 144404 JHAJAR_N 400.00 144408 DHANONDA 400.00 1 | OPEN LINE FROM BUS 144404 [JHAJAR_N 400.00] TO BUS 144408 [DHANONDA 400.00] CKT 2 | 883 | 857 | 103.03 | SC-3 |
| 90. | 174264 KARCHNA 400.00 174265 REWA 400.00 1 | OPEN LINE FROM BUS 174264 [KARCHNA 400.00] TO BUS 174265 [REWA 400.00] CKT 2 | 879.72 | 857 | 102.65 | SC-3 |
| 91. | 174439 DADRI_SPLT 400.00 174488 MURADNAG-2 400.00 1 | OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 174436 [GNOIDA4 400.00] CKT 1 | 875.87 | 857 | 102.2 | SC-3 |
| 92. | 134406 RAJPURA_TH 400.00 134407 RAJPURA 400.00 1 | OPEN LINE FROM BUS 134406 [RAJPURA_TH 400.00] TO BUS 134407 [RAJPURA 400.00] CKT 2 | 830.72 | 857 | 96.93 | SC-3 |
| 93. | 514001 RAMGUNDM STP400.00 514009 CHANDRAPR-SR400.00 1 | OPEN LINE FROM BUS 514001 [RAMGUNDM STP400.00] TO BUS 514009 [CHANDRAPR-SR400.00] CKT 2 | 797.32 | 852 | 93.58 | SC-3 |
| 94. | 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 | 1019.83 | 1093 | 93.31 | SC-3 |

| S.No | Monitored Element | Contingency | Flow under Contingency | Rate | % loading | Scenario |
|---|---|---|---|---|---|---|
| 95. | 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 | 798.66 | 857 | 93.19 | SC-3 |
| 96. | 174268 GAZIABAD 400.00 174445 MUZAFRN4 400.00 1 | OPEN LINE FROM BUS 174424 [DADR-NCR 400.00] TO BUS 174436 [GNOIDA4 400.00] CKT 1 | 790.21 | 857 | 92.21 | SC-3 |
| 97. | 154427 BAWANA 400.00 184498 TIKRI KHURD 400.00 1 | OPEN LINE FROM BUS 154427 [BAWANA 400.00] TO BUS 184498 [TIKRI KHURD 400.00] CKT 2 | 788.8 | 857 | 92.04 | SC-3 |
| 98. | 514006 KACHAPU-A LI400.00 514007 KACAHPU-B LI400.00 1 | OPEN LINE FROM BUS 514007 [KACAHPU-B LI400.00] TO BUS 514100 [NARSAPUR 400.00] CKT 1 | 788.54 | 857 | 92.01 | SC-3 |
| 99. | 374004 KARAD4 400.00 374065 KESURDI400 400.00 1 | OPEN LINE FROM BUS 374015 [JEJ4 400.00] TO BUS 374026 [KOY4-4 400.00] CKT 1 | 784.47 | 857 | 91.54 | SC-3 |
| 100. | 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 | 2834.57 | 857 | 330.76 | SC-4 |
| 101. | 374012 PADGH4 400.00 374052 KUDUS 400.00 1 | OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 374052 [KUDUS 400.00] CKT 2 | 2032.61 | 857 | 237.18 | SC-4 |
| 102. | 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 | 2006.27 | 857 | 234.1 | SC-4 |
| 103. | 164774 KHETRI 400.00 164921 BHIWADI 400.00 1 | OPEN LINE FROM BUS 164774 [KHETRI 400.00] TO BUS 164921 [BHIWADI 400.00] CKT 2 | 1712.13 | 857 | 199.78 | SC-4 |
| 104. | 154496 GOPAL PUR 400.00 154501 NARELA ISTS 400.00 1 | OPEN LINE FROM BUS 154496 [GOPAL PUR 400.00] TO BUS 154501 [NARELA ISTS 400.00] CKT 2 | 1631.22 | 857 | 190.34 | SC-4 |
| 105. | 174417 RIHAND-G 400.00 174433 RIHAN-HV 400.00 1 | OPEN LINE FROM BUS 174417 [RIHAND-G 400.00] TO BUS 174433 [RIHAN-HV 400.00] CKT 2 | 1514.53 | 857 | 176.72 | SC-4 |
| 106. | 164445 NEEMR-PG 400.00 164497 SIKAR NEW 400.00 1 | OPEN LINE FROM BUS 164445 [NEEMR-PG 400.00] TO BUS 164497 [SIKAR NEW 400.00] CKT 2 | 1340.57 | 857 | 156.43 | SC-4 |
| 107. | 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 | 1333.86 | 857 | 155.64 | SC-4 |
| 108. | 424033 PANDIABILI 400.00 424038 BEGUNIA 400.00 1 | OPEN LINE FROM BUS 424033 [PANDIABILI 400.00] TO BUS 424038 [BEGUNIA 400.00] CKT 2 | 1483.6 | 1093 | 135.74 | SC-4 |
| 109. | 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 | 1136.61 | 857 | 132.63 | SC-4 |
| 110. | 164402 BARMER-4 400.00 164405 BHINMAL 400.00 1 | OPEN LINE FROM BUS 164402 [BARMER-4 400.00] TO BUS 164405 [BHINMAL 400.00] CKT 2 | 1083.61 | 857 | 126.44 | SC-4 |
| 111. | 514051 MAILARM4 400.00 514100 NARSAPUR 400.00 1 | OPEN LINE FROM BUS 514051 [MAILARM4 400.00] TO BUS 514100 [NARSAPUR 400.00] CKT 2 | 1066.96 | 852 | 125.23 | SC-4 |
| 112. | 164458 BIKANER-NW 400.00 164495 BIKANER-II 400.00 1 | OPEN LINE FROM BUS 164458 [BIKANER-NW 400.00] TO BUS 164495 [BIKANER-II 400.00] CKT 2 | 1066.67 | 857 | 124.47 | SC-4 |
| 113. | 424044 BARIPADA 400.00 444018 KHARAGPR-WB 400.00 1 | OPEN LINE FROM BUS 444018 [KHARAGPR-WB 400.00] TO BUS 474062 [CHAIBASA 400.00] CKT 1 | 1024.33 | 850 | 120.51 | SC-4 |

| S.No | Monitored Element | Contingency | Flow under Contingency | Rate | % loading | Scenario |
|---|---|---|---|---|---|---|
| 114. | 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 | 1020.74 | 857 | 119.11 | SC-4 |
| 115. | 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 | 1019.62 | 857 | 118.98 | SC-4 |
| 116. | 164110 JAISALMER-2 400.00 164434 JODH KANKANI400.00 1 | OPEN LINE FROM BUS 164110 [JAISALMER-2 400.00] TO BUS 164434 [JODH KANKANI400.00] CKT 2 | 1013.09 | 857 | 118.21 | SC-4 |
| 117. | 174058 ORAI 400.00 174258 ORAI 400.00 1 | OPEN LINE FROM BUS 174058 [ORAI 400.00] TO BUS 174258 [ORAI 400.00] CKT 2 | 982.2 | 857 | 114.61 | SC-4 |
| 118. | 514002 HYDERABAD 400.00 514022 GAJWEL4 400.00 1 | OPEN LINE FROM BUS 514001 [RAMGUNDM STP400.00] TO BUS 514022 [GAJWEL4 400.00] CKT 1 | 969.99 | 852 | 113.85 | SC-4 |
| 119. | 114422 KISHENPUR 400.00 114447 SAMBA 400.00 1 | OPEN LINE FROM BUS 114422 [KISHENPUR 400.00] TO BUS 114447 [SAMBA 400.00] CKT 2 | 969.8 | 857 | 113.16 | SC-4 |
| 120. | 144469 BHIWN-PG 400.00 144669 BHIWANI SR 400.00 1 | OPEN LINE FROM BUS 144469 [BHIWN-PG 400.00] TO BUS 147704 [BHIWN-PG 765.00] CKT 1 | 942.46 | 857 | 109.97 | SC-4 |
| 121. | 354050 PRANTIJ 400.00 354137 SANKHARI 400.00 1 | OPEN LINE FROM BUS 354050 [PRANTIJ 400.00] TO BUS 354137 [SANKHARI 400.00] CKT 2 | 931.21 | 857 | 108.66 | SC-4 |
| 122. | 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 | 927.3 | 857 | 108.2 | SC-4 |
| 123. | 374001 KALWA4 400.00 374012 PADGH4 400.00 1 | OPEN LINE FROM BUS 374001 [KALWA4 400.00] TO BUS 374012 [PADGH4 400.00] CKT 2 | 918.73 | 857 | 107.2 | SC-4 |
| 124. | 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 | 917.97 | 857 | 107.11 | SC-4 |
| 125. | 164480 FATEHG-2 400.00 164484 BHADLA-3 400.00 1 | OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 164484 [BHADLA-3 400.00] CKT 2 | 910.94 | 857 | 106.29 | SC-4 |
| 126. | 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 | 910.16 | 857 | 106.2 | SC-4 |
| 127. | 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 | 909.17 | 857 | 106.09 | SC-4 |
| 128. | 164110 JAISALMER-2 400.00 164402 BARMER-4 400.00 1 | OPEN LINE FROM BUS 164110 [JAISALMER-2 400.00] TO BUS 164402 [BARMER-4 400.00] CKT 2 | 901.36 | 857 | 105.18 | SC-4 |
| 129. | 374004 KARAD4 400.00 374013 KOLHAPUR 400.00 1 | OPEN LINE FROM BUS 374004 [KARAD4 400.00] TO BUS 374013 [KOLHAPUR 400.00] CKT 2 | 887.33 | 857 | 103.54 | SC-4 |
| 130. | 354029 KOSAMBA 400.00 354153 SAYAKHA 400.00 1 | OPEN LINE FROM BUS 354029 [KOSAMBA 400.00] TO BUS 354153 [SAYAKHA 400.00] CKT 2 | 879.15 | 850 | 103.43 | SC-4 |
| 131. | 144420 BHIWANI 400.00 144469 BHIWN-PG 400.00 1 | OPEN LINE FROM BUS 144469 [BHIWN-PG 400.00] TO BUS 144480 [JINDPG 400.00] CKT 1 | 881.89 | 857 | 102.9 | SC-4 |
| 132. | 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 | 881.61 | 857 | 102.87 | SC-4 |

| S.No | Monitored Element | Contingency | Flow under Contingency | Rate | % loading | Scenario |
|---|---|---|---|---|---|---|
| 133. | 144469 BHIWN-PG 400.00 144480 JINDPG 400.00 1 | OPEN LINE FROM BUS 144469 [BHIWN-PG 400.00] TO BUS 144480 [JINDPG 400.00] CKT 2 | 871.3 | 857 | 101.67 | SC-4 |
| 134. | 354003 DEHGM4 400.00 354005 SOJA4 400.00 1 | OPEN LINE FROM BUS 354003 [DEHGM4 400.00] TO BUS 354005 [SOJA4 400.00] CKT 2 | 858.84 | 857 | 100.21 | SC-4 |
| 135. | 504082 MAILAVARAM 400.00 504132 KONDPRM 400.00 1 | OPEN LINE FROM BUS 504082 [MAILAVARAM 400.00] TO BUS 504132 [KONDPRM 400.00] CKT 2 | 856.51 | 857 | 99.94 | SC-4 |
| 136. | 174000 MEJA 400.00 174263 BARA 400.00 1 | OPEN LINE FROM BUS 174000 [MEJA 400.00] TO BUS 174263 [BARA 400.00] CKT 2 | 850.02 | 857 | 99.19 | SC-4 |
| 137. | 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 | 843.18 | 852 | 98.96 | SC-4 |
| 138. | 144404 JHAJAR_N 400.00 144408 DHANONDA 400.00 1 | OPEN LINE FROM BUS 144404 [JHAJAR_N 400.00] TO BUS 144408 [DHANONDA 400.00] CKT 2 | 845.72 | 857 | 98.68 | SC-4 |
| 139. | 164495 BIKANER-II 400.00 164774 KHETRI 400.00 1 | OPEN LINE FROM BUS 164495 [BIKANER-II 400.00] TO BUS 164774 [KHETRI 400.00] CKT 2 | 842.74 | 857 | 98.34 | SC-4 |
| 140. | 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 | 833.49 | 857 | 97.26 | SC-4 |
| 141. | 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 | 1642.79 | 1714 | 95.85 | SC-4 |
| 142. | 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 | 809.63 | 857 | 94.47 | SC-4 |
| 143. | 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 | 1610.28 | 1714 | 93.95 | SC-4 |
| 144. | 444030 ARAMBAGH 400.00 444074 PPSP_NEW 400.00 1 | OPEN LINE FROM BUS 444030 [ARAMBAGH 400.00] TO BUS 444074 [PPSP_NEW 400.00] CKT 2 | 794.81 | 850 | 93.51 | SC-4 |
| 145. | 514001 RAMGUNDM STP400.00 514009 CHANDRAPR-SR400.00 1 | OPEN LINE FROM BUS 514001 [RAMGUNDM STP400.00] TO BUS 514009 [CHANDRAPR-SR400.00] CKT 2 | 794.15 | 852 | 93.21 | SC-4 |
| 146. | 374003 LONIKAND I 400.00 374042 PUNE-PG-AIS 400.00 1 | OPEN LINE FROM BUS 374029 [CHAKAN 400.00] TO BUS 374042 [PUNE-PG-AIS 400.00] CKT 1 | 798.57 | 857 | 93.18 | SC-4 |
| 147. | 3 ASOJ-BYP-KOS400.00 354029 KOSAMBA 400.00 1 | OPEN LINE FROM BUS 358044 [AHMDABAD PG 765.00] TO BUS 358208 [NAVSARI-NEW 765.00] CKT 2 | 794.73 | 857 | 92.73 | SC-4 |
| 148. | 354052 FEDRA 400.00 354153 SAYAKHA 400.00 1 | OPEN LINE FROM BUS 354052 [FEDRA 400.00] TO BUS 354153 [SAYAKHA 400.00] CKT 2 | 784.95 | 850 | 92.35 | 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 | 781.1 | 850 | 91.89 | SC-4 |
| 150. | 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 | 1999.57 | 2186 | 91.47 | SC-4 |
| 151. | 164418 KANKROLI 400.00 164433 JODH SURPURA400.00 1 | OPEN LINE FROM BUS 167773 [JAIPUR 765.00] TO BUS 167799 [JODH KANKANI765.00] CKT 1 | 783.55 | 857 | 91.43 | SC-4 |

| S.No | Monitored Element | Contingency | Flow under Contingency | Rate | % loading | Scenario |
|---|---|---|---|---|---|---|
| 152. | 354029 KOSAMBA 400.00 354047 VAV4 400.00 1 | OPEN LINE FROM BUS 354002 [GANCS4 400.00] TO BUS 354009 [GPEC4 400.00] CKT 1 | 777.97 | 857 | 90.78 | SC-4 |
| 153. | 514006 KACHAPU-A LI400.00 514007 KACAHPU-B LI400.00 1 | OPEN LINE FROM BUS 514007 [KACAHPU-B LI400.00] TO BUS 514100 [NARSAPUR 400.00] CKT 1 | 773.01 | 857 | 90.2 | SC-4 |
| 154. | 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 | 768.01 | 852 | 90.14 | SC-4 |
| 155. | 214030 BALIPARA-PG 400.00 214196 BON-BAL-FSC2400.00 1 | OPEN LINE FROM BUS 214180 [BORNAGAR 400.00] TO BUS 214195 [BON-BAL-FSC1400.00] CKT 3 | 1847.44 | 857 | 215.57 | SC-5 |
| 156. | 214030 BALIPARA-PG 400.00 214195 BON-BAL-FSC1400.00 1 | OPEN LINE FROM BUS 214180 [BORNAGAR 400.00] TO BUS 214196 [BON-BAL-FSC2400.00] CKT 4 | 1847.44 | 857 | 215.57 | SC-5 |
| 157. | 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 | 1516.03 | 857 | 176.9 | SC-5 |
| 158. | 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 | 1446.36 | 857 | 168.77 | SC-5 |
| 159. | 424033 PANDIABILI 400.00 424038 BEGUNIA 400.00 1 | OPEN LINE FROM BUS 424033 [PANDIABILI 400.00] TO BUS 424038 [BEGUNIA 400.00] CKT 2 | 1666.28 | 1093 | 152.45 | SC-5 |
| 160. | 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 | 1177.82 | 857 | 137.44 | SC-5 |
| 161. | 174058 ORAI 400.00 174258 ORAI 400.00 1 | OPEN LINE FROM BUS 174058 [ORAI 400.00] TO BUS 174258 [ORAI 400.00] CKT 2 | 1122.54 | 857 | 130.98 | SC-5 |
| 162. | 314023 KWPCL 400.00 314029 RAIGARH_POOL400.00 1 | OPEN LINE FROM BUS 314023 [KWPCL 400.00] TO BUS 314029 [RAIGARH_POOL400.00] CKT 2 | 1084.19 | 857 | 126.51 | SC-5 |
| 163. | 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 | 1083.41 | 857 | 126.42 | SC-5 |
| 164. | 374012 PADGH4 400.00 374052 KUDUS 400.00 1 | OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 374052 [KUDUS 400.00] CKT 2 | 1082.83 | 857 | 126.35 | SC-5 |
| 165. | 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 | 1065 | 857 | 124.27 | SC-5 |
| 166. | 314019 BALCO-CPP 400.00 314032 DHARAMJAIGAR400.00 1 | OPEN LINE FROM BUS 314019 [BALCO-CPP 400.00] TO BUS 314032 [DHARAMJAIGAR400.00] CKT 2 | 1051.04 | 857 | 122.64 | SC-5 |
| 167. | 174468 ANPARA4 400.00 174923 SINGRL4 400.00 1 | OPEN LINE FROM BUS 174437 [LUCKN_UP 400.00] TO BUS 174923 [SINGRL4 400.00] CKT 1 | 1012.08 | 857 | 118.1 | SC-5 |
| 168. | 374004 KARAD4 400.00 374065 KESURDI400 400.00 1 | OPEN LINE FROM BUS 374015 [JEJ4 400.00] TO BUS 374026 [KOY4-4 400.00] CKT 1 | 1009.14 | 857 | 117.75 | SC-5 |
| 169. | 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 | 984.1 | 857 | 114.83 | SC-5 |
| 170. | 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 | 963.52 | 857 | 112.43 | SC-5 |

| S.No | Monitored Element | Contingency | Flow under Contingency | Rate | % loading | Scenario |
|---|---|---|---|---|---|---|
| 171. | 134406 RAJPURA_TH 400.00 134407 RAJPURA 400.00 1 | OPEN LINE FROM BUS 134406 [RAJPURA_TH 400.00] TO BUS 134407 [RAJPURA 400.00] CKT 2 | 957.92 | 857 | 111.78 | SC-5 |
| 172. | 174468 ANPARA4 400.00 174472 OBRA4 400.00 1 | OPEN LINE FROM BUS 177406 [ANPARA-D 765.00] TO BUS 177712 [OBRAC 765.00] CKT 1 | 957.02 | 857 | 111.67 | SC-5 |
| 173. | 134325 MALKANA 400.00 134401 TALWANDISABO400.00 1 | OPEN LINE FROM BUS 134401 [TALWANDISABO400.00] TO BUS 134404 [MUKATSAR 400.00] CKT 1 | 951.67 | 857 | 111.05 | SC-5 |
| 174. | 424044 BARIPADA 400.00 444018 KHARAGPR-WB 400.00 1 | OPEN LINE FROM BUS 444018 [KHARAGPR-WB 400.00] TO BUS 474062 [CHAIBASA 400.00] CKT 1 | 925.34 | 850 | 108.86 | SC-5 |
| 175. | 194001 KANPRAYAG 400.00 194054 PIPALKOTI SW400.00 1 | OPEN LINE FROM BUS 194001 [KANPRAYAG 400.00] TO BUS 194054 [PIPALKOTI SW400.00] CKT 2 | 919.43 | 857 | 107.28 | SC-5 |
| 176. | 194001 KANPRAYAG 400.00 194052 SRINAGAR_PT 400.00 1 | OPEN LINE FROM BUS 194001 [KANPRAYAG 400.00] TO BUS 194052 [SRINAGAR_PT 400.00] CKT 2 | 917.25 | 857 | 107.03 | SC-5 |
| 177. | 524016 GULBRG 400.00 524083 YERAMRS TPP 400.00 1 | OPEN LINE FROM BUS 524016 [GULBRG 400.00] TO BUS 524083 [YERAMRS TPP 400.00] CKT 3 | 981 | 948 | 103.48 | SC-5 |
| 178. | 174264 KARCHNA 400.00 174265 REWA 400.00 1 | OPEN LINE FROM BUS 174264 [KARCHNA 400.00] TO BUS 174265 [REWA 400.00] CKT 2 | 868.84 | 857 | 101.38 | SC-5 |
| 179. | 374001 KALWA4 400.00 374012 PADGH4 400.00 1 | OPEN LINE FROM BUS 374001 [KALWA4 400.00] TO BUS 374012 [PADGH4 400.00] CKT 2 | 854.21 | 857 | 99.67 | SC-5 |
| 180. | 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 | 835.13 | 852 | 98.02 | SC-5 |
| 181. | 524003 RAIC 400.00 524082 BELLARY TPP 400.00 1 | OPEN LINE FROM BUS 524002 [MNRB 400.00] TO BUS 524003 [RAIC 400.00] CKT 1 | 825.96 | 850 | 97.17 | SC-5 |
| 182. | 374015 JEJ4 400.00 374026 KOY4-4 400.00 1 | OPEN LINE FROM BUS 374004 [KARAD4 400.00] TO BUS 374065 [KESURDI400 400.00] CKT 1 | 812.63 | 857 | 94.82 | SC-5 |
| 183. | 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 | 811.92 | 857 | 94.74 | SC-5 |
| 184. | 514002 HYDERABAD 400.00 514022 GAJWEL4 400.00 1 | OPEN LINE FROM BUS 514001 [RAMGUNDM STP400.00] TO BUS 514022 [GAJWEL4 400.00] CKT 1 | 797.53 | 852 | 93.61 | SC-5 |
| 185. | 514001 RAMGUNDM STP400.00 514009 CHANDRAPR-SR400.00 1 | OPEN LINE FROM BUS 514001 [RAMGUNDM STP400.00] TO BUS 514009 [CHANDRAPR-SR400.00] CKT 2 | 793.81 | 852 | 93.17 | SC-5 |
| 186. | 114422 KISHENPUR 400.00 114447 SAMBA 400.00 1 | OPEN LINE FROM BUS 114422 [KISHENPUR 400.00] TO BUS 114447 [SAMBA 400.00] CKT 2 | 791.01 | 857 | 92.3 | SC-5 |
| 187. | 374003 LONIKAND I 400.00 374026 KOY4-4 400.00 1 | OPEN LINE FROM BUS 374015 [JEJ4 400.00] TO BUS 374026 [KOY4-4 400.00] CKT 1 | 791.01 | 857 | 92.3 | SC-5 |
| 188. | 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 | 786.65 | 857 | 91.79 | SC-5 |
| 189. | 444030 ARAMBAGH 400.00 444074 PPSP_NEW 400.00 1 | OPEN LINE FROM BUS 444030 [ARAMBAGH 400.00] TO BUS 444074 [PPSP_NEW 400.00] CKT 2 | 770.34 | 850 | 90.63 | SC-5 |

| S.No | Monitored Element | Contingency | Flow under Contingency | Rate | % loading | Scenario |
|---|---|---|---|---|---|---|
| 190. | 164110 JAISALMER-2 400.00 164401 AKAL-4 400.00 1 | OPEN LINE FROM BUS 164403 [RAMGARH 400.00] TO BUS 164404 [BHADLA 400.00] CKT 1 | 775.02 | 857 | 90.43 | SC-5 |
| 191. | 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 | 986.21 | 1093 | 90.23 | SC-5 |
| 192. | 174468 ANPARA4 400.00 174923 SINGRL4 400.00 1 | OPEN LINE FROM BUS 174465 [FATEH-PG 400.00] TO BUS 174923 [SINGRL4 400.00] CKT 1 | 1299.11 | 857 | 151.59 | SC-6 |
| 193. | 424033 PANDIABILI 400.00 424038 BEGUNIA 400.00 1 | OPEN LINE FROM BUS 424033 [PANDIABILI 400.00] TO BUS 424038 [BEGUNIA 400.00] CKT 2 | 1607.79 | 1093 | 147.1 | SC-6 |
| 194. | 314023 KWPCL 400.00 314029 RAIGARH_POOL400.00 1 | OPEN LINE FROM BUS 314023 [KWPCL 400.00] TO BUS 314029 [RAIGARH_POOL400.00] CKT 2 | 1084.09 | 857 | 126.5 | SC-6 |
| 195. | 424044 BARIPADA 400.00 444018 KHARAGPR-WB 400.00 1 | OPEN LINE FROM BUS 444018 [KHARAGPR-WB 400.00] TO BUS 474062 [CHAIBASA 400.00] CKT 1 | 1062.07 | 850 | 124.95 | SC-6 |
| 196. | 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 | 1035.05 | 857 | 120.78 | SC-6 |
| 197. | 174468 ANPARA4 400.00 174472 OBRA4 400.00 1 | OPEN LINE FROM BUS 177406 [ANPARA-D 765.00] TO BUS 177712 [OBRAC 765.00] CKT 1 | 1024.24 | 857 | 119.51 | SC-6 |
| 198. | 174058 ORAI 400.00 174258 ORAI 400.00 1 | OPEN LINE FROM BUS 174058 [ORAI 400.00] TO BUS 174258 [ORAI 400.00] CKT 2 | 940.99 | 857 | 109.8 | SC-6 |
| 199. | 134406 RAJPURA_TH 400.00 134407 RAJPURA 400.00 1 | OPEN LINE FROM BUS 134406 [RAJPURA_TH 400.00] TO BUS 134407 [RAJPURA 400.00] CKT 2 | 922.57 | 857 | 107.65 | SC-6 |
| 200. | 514002 HYDERABAD 400.00 514022 GAJWEL4 400.00 1 | OPEN LINE FROM BUS 514001 [RAMGUNDM STP400.00] TO BUS 514022 [GAJWEL4 400.00] CKT 1 | 912.21 | 852 | 107.07 | SC-6 |
| 201. | 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 | 916.19 | 857 | 106.91 | SC-6 |
| 202. | 514051 MAILARM4 400.00 514100 NARSAPUR 400.00 1 | OPEN LINE FROM BUS 514051 [MAILARM4 400.00] TO BUS 514100 [NARSAPUR 400.00] CKT 2 | 897.9 | 852 | 105.39 | SC-6 |
| 203. | 374004 KARAD4 400.00 374065 KESURDI400 400.00 1 | OPEN LINE FROM BUS 374015 [JEJ4 400.00] TO BUS 374026 [KOY4-4 400.00] CKT 1 | 859.57 | 857 | 100.3 | SC-6 |
| 204. | 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 | 825.55 | 857 | 96.33 | SC-6 |
| 205. | 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 | 803.6 | 857 | 93.77 | SC-6 |
| 206. | 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 | 788.41 | 850 | 92.75 | SC-6 |
| 207. | 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 | 792.95 | 857 | 92.53 | SC-6 |
| 208. | 174264 KARCHNA 400.00 174265 REWA 400.00 1 | OPEN LINE FROM BUS 174264 [KARCHNA 400.00] TO BUS 174265 [REWA 400.00] CKT 2 | 784.42 | 857 | 91.53 | SC-6 |

| S.No | Monitored Element | Contingency | Flow under Contingency | Rate | % loading | Scenario |
|---|---|---|---|---|---|---|
| 209. | 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 | 781.74 | 857 | 91.22 | SC-6 |
| 210. | 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 | 778.16 | 857 | 90.8 | SC-6 |
| 211. | 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 | 1837.31 | 857 | 214.39 | SC-7 |
| 212. | 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 | 1611.93 | 857 | 188.09 | SC-7 |
| 213. | 164774 KHETRI 400.00 164921 BHIWADI 400.00 1 | OPEN LINE FROM BUS 164774 [KHETRI 400.00] TO BUS 164921 [BHIWADI 400.00] CKT 2 | 1515.19 | 857 | 176.8 | SC-7 |
| 214. | 174417 RIHAND-G 400.00 174433 RIHAN-HV 400.00 1 | OPEN LINE FROM BUS 174417 [RIHAND-G 400.00] TO BUS 174433 [RIHAN-HV 400.00] CKT 2 | 1514.53 | 857 | 176.72 | SC-7 |
| 215. | 164402 BARMER-4 400.00 164405 BHINMAL 400.00 1 | OPEN LINE FROM BUS 164402 [BARMER-4 400.00] TO BUS 164405 [BHINMAL 400.00] CKT 2 | 1496.35 | 857 | 174.6 | SC-7 |
| 216. | 374012 PADGH4 400.00 374052 KUDUS 400.00 1 | OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 374052 [KUDUS 400.00] CKT 2 | 1464.61 | 857 | 170.9 | SC-7 |
| 217. | 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 | 1369.56 | 857 | 159.81 | SC-7 |
| 218. | 374003 LONIKAND I 400.00 374042 PUNE-PG-AIS 400.00 1 | OPEN LINE FROM BUS 374029 [CHAKAN 400.00] TO BUS 374042 [PUNE-PG-AIS 400.00] CKT 1 | 1308.22 | 857 | 152.65 | SC-7 |
| 219. | 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 | 1275.61 | 857 | 148.85 | SC-7 |
| 220. | 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 | 1219.8 | 857 | 142.33 | SC-7 |
| 221. | 154496 GOPAL PUR 400.00 154501 NARELA ISTS 400.00 1 | OPEN LINE FROM BUS 154496 [GOPAL PUR 400.00] TO BUS 154501 [NARELA ISTS 400.00] CKT 2 | 1194.1 | 857 | 139.33 | SC-7 |
| 222. | 164445 NEEMR-PG 400.00 164497 SIKAR NEW 400.00 1 | OPEN LINE FROM BUS 164445 [NEEMR-PG 400.00] TO BUS 164497 [SIKAR NEW 400.00] CKT 2 | 1172.18 | 857 | 136.78 | SC-7 |
| 223. | 164110 JAISALMER-2 400.00 164402 BARMER-4 400.00 1 | OPEN LINE FROM BUS 164110 [JAISALMER-2 400.00] TO BUS 164402 [BARMER-4 400.00] CKT 2 | 1138.88 | 857 | 132.89 | SC-7 |
| 224. | 364009 JABALPUR-4 400.00 364026 JABALPR-POOL400.00 1 | OPEN LINE FROM BUS 364009 [JABALPUR-4 400.00] TO BUS 364026 [JABALPR-POOL400.00] CKT 2 | 1073.2 | 857 | 125.23 | SC-7 |
| 225. | 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 | 1052.44 | 850 | 123.82 | SC-7 |
| 226. | 164418 KANKROLI 400.00 354019 ZERDA 400.00 1 | OPEN LINE FROM BUS 164405 [BHINMAL 400.00] TO BUS 354019 [ZERDA 400.00] CKT 2 | 1035.57 | 857 | 120.84 | SC-7 |
| 227. | 164480 FATEHG-2 400.00 164484 BHADLA-3 400.00 1 | OPEN LINE FROM BUS 164480 [FATEHG-2 400.00] TO BUS 164484 [BHADLA-3 400.00] CKT 2 | 1021.39 | 857 | 119.18 | SC-7 |

| S.No | Monitored Element | Contingency | Flow under Contingency | Rate | % loading | Scenario |
|---|---|---|---|---|---|---|
| 228. | 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 | 1016.6 | 857 | 118.62 | SC-7 |
| 229. | 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 | 1008.42 | 852 | 118.36 | SC-7 |
| 230. | 164418 KANKROLI 400.00 164433 JODH SURPURA400.00 1 | OPEN LINE FROM BUS 164405 [BHINMAL 400.00] TO BUS 164418 [KANKROLI 400.00] CKT 1 | 1009.98 | 857 | 117.85 | SC-7 |
| 231. | 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 | 1007 | 857 | 117.5 | SC-7 |
| 232. | 164110 JAISALMER-2 400.00 164434 JODH KANKANI400.00 1 | OPEN LINE FROM BUS 164110 [JAISALMER-2 400.00] TO BUS 164434 [JODH KANKANI400.00] CKT 2 | 1001.05 | 857 | 116.81 | SC-7 |
| 233. | 524001 SMNH 400.00 524077 BIDADI 400.00 1 | OPEN LINE FROM BUS 524001 [SMNH 400.00] TO BUS 524077 [BIDADI 400.00] CKT 2 | 995.08 | 852 | 116.79 | SC-7 |
| 234. | 164110 JAISALMER-2 400.00 164401 AKAL-4 400.00 1 | OPEN LINE FROM BUS 164110 [JAISALMER-2 400.00] TO BUS 164402 [BARMER-4 400.00] CKT 1 | 969.47 | 857 | 113.12 | SC-7 |
| 235. | 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 | 959.08 | 857 | 111.91 | SC-7 |
| 236. | 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 | 1865.88 | 1714 | 108.86 | SC-7 |
| 237. | 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 | 927.62 | 857 | 108.24 | SC-7 |
| 238. | 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 | 924.73 | 857 | 107.9 | SC-7 |
| 239. | 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 | 1832.54 | 1714 | 106.92 | SC-7 |
| 240. | 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 | 905.78 | 857 | 105.69 | SC-7 |
| 241. | 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 | 905.75 | 857 | 105.69 | SC-7 |
| 242. | 364039 MANDSAUR-4 400.00 364097 NEEMUCH PS 400.00 1 | OPEN LINE FROM BUS 364039 [MANDSAUR-4 400.00] TO BUS 364097 [NEEMUCH PS 400.00] CKT 2 | 1811.05 | 1714 | 105.66 | SC-7 |
| 243. | 354003 DEHGM4 400.00 354005 SOJA4 400.00 1 | OPEN LINE FROM BUS 354003 [DEHGM4 400.00] TO BUS 354005 [SOJA4 400.00] CKT 2 | 877.35 | 857 | 102.37 | SC-7 |
| 244. | 504082 MAILAVARAM 400.00 504132 KONDPRM 400.00 1 | OPEN LINE FROM BUS 504082 [MAILAVARAM 400.00] TO BUS 504132 [KONDPRM 400.00] CKT 2 | 874.68 | 857 | 102.06 | SC-7 |
| 245. | 164458 BIKANER-NW 400.00 164495 BIKANER-II 400.00 1 | OPEN LINE FROM BUS 164458 [BIKANER-NW 400.00] TO BUS 164495 [BIKANER-II 400.00] CKT 2 | 861.12 | 857 | 100.48 | SC-7 |
| 246. | 354050 PRANTIJ 400.00 354137 SANKHARI 400.00 1 | OPEN LINE FROM BUS 354050 [PRANTIJ 400.00] TO BUS 354137 [SANKHARI 400.00] CKT 2 | 859.67 | 857 | 100.31 | SC-7 |

| S.No | Monitored Element | Contingency | Flow under Contingency | Rate | % loading | Scenario |
|---|---|---|---|---|---|---|
| 247. | 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 | 2145.86 | 2186 | 98.16 | SC-7 |
| 248. | 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 | 835.93 | 852 | 98.11 | SC-7 |
| 249. | 374042 PUNE-PG-AIS 400.00 374045 PUNE-PG-GIS 400.00 1 | OPEN LINE FROM BUS 374042 [PUNE-PG-AIS 400.00] TO BUS 374045 [PUNE-PG-GIS 400.00] CKT 3 | 840.56 | 857 | 98.08 | SC-7 |
| 250. | 3 ASOJ-BYP-KOS400.00 354029 KOSAMBA 400.00 1 | OPEN LINE FROM BUS 358044 [AHMDABAD PG 765.00] TO BUS 358208 [NAVSARI-NEW 765.00] CKT 2 | 837.43 | 857 | 97.72 | SC-7 |
| 251. | 164405 BHINMAL 400.00 164418 KANKROLI 400.00 1 | OPEN LINE FROM BUS 164405 [BHINMAL 400.00] TO BUS 354019 [ZERDA 400.00] CKT 2 | 828.7 | 857 | 96.7 | SC-7 |
| 252. | 164495 BIKANER-II 400.00 164774 KHETRI 400.00 1 | OPEN LINE FROM BUS 164495 [BIKANER-II 400.00] TO BUS 164774 [KHETRI 400.00] CKT 2 | 807.02 | 857 | 94.17 | SC-7 |
| 253. | 374001 KALWA4 400.00 374012 PADGH4 400.00 1 | OPEN LINE FROM BUS 374001 [KALWA4 400.00] TO BUS 374012 [PADGH4 400.00] CKT 2 | 801.23 | 857 | 93.49 | SC-7 |
| 254. | 514001 RAMGUNDM STP400.00 514009 CHANDRAPR-SR400.00 1 | OPEN LINE FROM BUS 514001 [RAMGUNDM STP400.00] TO BUS 514009 [CHANDRAPR-SR400.00] CKT 2 | 794.15 | 852 | 93.21 | SC-7 |
| 255. | 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 | 1018.16 | 1093 | 93.15 | SC-7 |
| 256. | 354029 KOSAMBA 400.00 354047 VAV4 400.00 1 | OPEN LINE FROM BUS 354002 [GANCS4 400.00] TO BUS 354047 [VAV4 400.00] CKT 2 | 796.19 | 857 | 92.9 | SC-7 |
| 257. | 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 | 1701.92 | 857 | 198.59 | SC-8 |
| 258. | 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 | 1516.99 | 857 | 177.01 | SC-8 |
| 259. | 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 | 1279.36 | 857 | 149.28 | SC-8 |
| 260. | 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 | 1180.86 | 857 | 137.79 | SC-8 |
| 261. | 314023 KWPCL 400.00 314029 RAIGARH POOL400.00 1 | OPEN LINE FROM BUS 314023 [KWPCL 400.00] TO BUS 314029 [RAIGARH POOL400.00] CKT 2 | 1093.44 | 857 | 127.59 | SC-8 |
| 262. | 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 | 1074.5 | 857 | 125.38 | SC-8 |
| 263. | 314019 BALCO-CPP 400.00 314032 DHARAMJAIGAR400.00 1 | OPEN LINE FROM BUS 314019 [BALCO-CPP 400.00] TO BUS 314032 [DHARAMJAIGAR400.00] CKT 2 | 1063.28 | 857 | 124.07 | SC-8 |
| 264. | 374003 LONIKAND I 400.00 374042 PUNE-PG-AIS 400.00 1 | OPEN LINE FROM BUS 374029 [CHAKAN 400.00] TO BUS 374042 [PUNE-PG-AIS 400.00] CKT 1 | 1008.34 | 857 | 117.66 | SC-8 |
| 265. | 174468 ANPARA4 400.00 174923 SINGRL4 400.00 1 | OPEN LINE FROM BUS 174465 [FATEH-PG 400.00] TO BUS 174923 [SINGRL4 400.00] CKT 1 | 978.81 | 857 | 114.21 | SC-8 |

| S.No | Monitored Element | Contingency | Flow under Contingency | Rate | % loading | Scenario |
|---|---|---|---|---|---|---|
| 266. | 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 | 952.67 | 857 | 111.16 | SC-8 |
| 267. | 524016 GULBRG 400.00 524083 YERAMRS TPP 400.00 1 | OPEN LINE FROM BUS 524016 [GULBRG 400.00] TO BUS 524083 [YERAMRS TPP 400.00] CKT 3 | 1039.56 | 948 | 109.66 | SC-8 |
| 268. | 364009 JABALPUR-4 400.00 364026 JABALPR-POOL400.00 1 | OPEN LINE FROM BUS 364009 [JABALPUR-4 400.00] TO BUS 364026 [JABALPR-POOL400.00] CKT 2 | 933.17 | 857 | 108.89 | SC-8 |
| 269. | 174468 ANPARA4 400.00 174472 OBRA4 400.00 1 | OPEN LINE FROM BUS 177406 [ANPARA-D 765.00] TO BUS 177712 [OBRAC 765.00] CKT 1 | 932.58 | 857 | 108.82 | SC-8 |
| 270. | 134406 RAJPURA_TH 400.00 134407 RAJPURA 400.00 1 | OPEN LINE FROM BUS 134406 [RAJPURA_TH 400.00] TO BUS 134407 [RAJPURA 400.00] CKT 2 | 922.07 | 857 | 107.59 | SC-8 |
| 271. | 374012 PADGH4 400.00 374052 KUDUS 400.00 1 | OPEN LINE FROM BUS 374012 [PADGH4 400.00] TO BUS 374052 [KUDUS 400.00] CKT 2 | 878.98 | 857 | 102.56 | SC-8 |
| 272. | 164420 KOTA 400.00 164463 ANTA-4 400.00 1 | OPEN LINE FROM BUS 167761 [ANTA-7 765.00] TO BUS 167773 [JAIPUR 765.00] CKT 1 | 868.67 | 857 | 101.36 | SC-8 |
| 273. | 144404 JHAJAR_N 400.00 144408 DHANONDA 400.00 1 | OPEN LINE FROM BUS 144404 [JHAJAR_N 400.00] TO BUS 144408 [DHANONDA 400.00] CKT 2 | 841.05 | 857 | 98.14 | SC-8 |
| 274. | 174264 KARCHNA 400.00 174265 REWA 400.00 1 | OPEN LINE FROM BUS 174264 [KARCHNA 400.00] TO BUS 174265 [REWA 400.00] CKT 2 | 834.82 | 857 | 97.41 | SC-8 |
| 275. | 364030 MALWA 400.00 364099 MALWA_II 400.00 1 | OPEN LINE FROM BUS 364031 [PITHAMPUR-4 400.00] TO BUS 364099 [MALWA_II 400.00] CKT 1 | 829.16 | 857 | 96.75 | SC-8 |
| 276. | 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 | 809.57 | 857 | 94.47 | SC-8 |
| 277. | 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 | 807.17 | 857 | 94.19 | SC-8 |
| 278. | 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 | 799.62 | 857 | 93.3 | SC-8 |
| 279. | 514001 RAMGUNDM STP400.00 514009 CHANDRAPR-SR400.00 1 | OPEN LINE FROM BUS 514001 [RAMGUNDM STP400.00] TO BUS 514009 [CHANDRAPR-SR400.00] CKT 2 | 793.81 | 852 | 93.17 | SC-8 |
| 280. | 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 | 788.89 | 857 | 92.05 | SC-8 |
| 281. | 374001 KALWA4 400.00 374012 PADGH4 400.00 1 | OPEN LINE FROM BUS 374001 [KALWA4 400.00] TO BUS 374012 [PADGH4 400.00] CKT 2 | 787.09 | 857 | 91.84 | SC-8 |
| 282. | 174468 ANPARA4 400.00 174923 SINGRL4 400.00 1 | OPEN LINE FROM BUS 174465 [FATEH-PG 400.00] TO BUS 174923 [SINGRL4 400.00] CKT 1 | 1325.81 | 857 | 154.7 | SC-9 |
| 283. | 314023 KWPCL 400.00 314029 RAIGARH_POOL400.00 1 | OPEN LINE FROM BUS 314023 [KWPCL 400.00] TO BUS 314029 [RAIGARH_POOL400.00] CKT 2 | 1086.57 | 857 | 126.79 | SC-9 |
| 284. | 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 | 1020.01 | 857 | 119.02 | SC-9 |

| S.No | Monitored Element | Contingency | Flow under Contingency | Rate | % loading | Scenario |
|---|---|---|---|---|---|---|
| 285. | 514001 RAMGUNDM STP400.00 514009 CHANDRAPR-SR400.00 1 | OPEN LINE FROM BUS 514001 [RAMGUNDM STP400.00] TO BUS 514009 [CHANDRAPR-SR400.00] CKT 2 | 998.26 | 852 | 117.17 | SC-9 |
| 286. | 374003 LONIKAND I 400.00 374042 PUNE-PG-AIS 400.00 1 | OPEN LINE FROM BUS 374029 [CHAKAN 400.00] TO BUS 374042 [PUNE-PG-AIS 400.00] CKT 1 | 975.68 | 857 | 113.85 | SC-9 |
| 287. | 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 | 955.39 | 857 | 111.48 | SC-9 |
| 288. | 524016 GULBRG 400.00 524083 YERAMRS TPP 400.00 1 | OPEN LINE FROM BUS 524016 [GULBRG 400.00] TO BUS 524083 [YERAMRS TPP 400.00] CKT 3 | 1002.05 | 948 | 105.7 | SC-9 |
| 289. | 544084 TIRUVLM SE-B400.00 544087 TIRUVLM SE-A400.00 1 | OPEN LINE FROM BUS 504007 [CUDP 400.00] TO BUS 504024 [CHITOR 400.00] CKT 1 | 864.41 | 857 | 100.86 | SC-9 |
| 290. | 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 | 817.96 | 857 | 95.44 | SC-9 |
| 291. | 174468 ANPARA4 400.00 174472 OBRA4 400.00 1 | OPEN LINE FROM BUS 177406 [ANPARA-D 765.00] TO BUS 177712 [OBRAC 765.00] CKT 1 | 812.96 | 857 | 94.86 | SC-9 |
| 292. | 514002 HYDERABAD 400.00 514022 GAJWEL4 400.00 1 | OPEN LINE FROM BUS 514001 [RAMGUNDM STP400.00] TO BUS 514022 [GAJWEL4 400.00] CKT 1 | 794.74 | 852 | 93.28 | SC-9 |
| 293. | 314001 KNTPC 400.00 314003 KORBA-WEST 400.00 1 | OPEN LINE FROM BUS 314001 [KNTPC 400.00] TO BUS 314005 [BHATP4 400.00] CKT 1 | 772.16 | 857 | 90.1 | SC-9 |

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**Annex-7.5**

## Over Voltage Nodes

### 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 | 0.95 | 1.05 | 1.01 | 0.94 | 1.03 | 1.00 | 0.96 | 1.06 | 1.02 | 1.06 |
| NORTH | AJMER-NW | 0.97 | 1.08 | 1.05 | 0.97 | 1.03 | 1.03 | 0.97 | 1.07 | 1.06 | 1.08 |
| NORTH | RAMGARH-I | 0.95 | 1.00 | 1.03 | 0.95 | 0.96 | 1.06 | 0.96 | 1.00 | 1.05 | 1.06 |
| NORTH | CHIT-NEW | 0.98 | 1.04 | 1.03 | 0.97 | 1.00 | 1.01 | 0.94 | 1.05 | 1.04 | 1.05 |
| NORTH | BIKANER-NW | 0.95 | 1.07 | 1.03 | 0.95 | 1.03 | 1.02 | 0.96 | 1.06 | 1.04 | 1.07 |
| NORTH | BHADLA PG | 0.97 | 1.08 | 1.03 | 0.96 | 1.03 | 1.02 | 0.98 | 1.07 | 1.05 | 1.08 |
| NORTH | FATEH-2 | 0.97 | 1.06 | 1.02 | 0.97 | 1.01 | 1.01 | 0.98 | 1.06 | 1.04 | 1.06 |
| NORTH | FATEHG-3 | 0.95 | 1.05 | 1.03 | 0.95 | 1.01 | 1.02 | 0.93 | 1.05 | 1.04 | 1.05 |
| NORTH | BHADLA-3 | 0.93 | 1.03 | 1.03 | 0.93 | 0.99 | 1.06 | 0.94 | 1.03 | 1.05 | 1.06 |
| NORTH | SIKAR NEW | 0.91 | 1.05 | 1.03 | 0.90 | 1.02 | 1.02 | 0.93 | 1.05 | 1.04 | 1.05 |
| NORTH | BHADLA-2 | 0.95 | 1.06 | 1.02 | 0.95 | 1.02 | 1.01 | 0.96 | 1.06 | 1.04 | 1.06 |
| NORTH | BEAWAR | 0.96 | 1.07 | 1.05 | 0.96 | 1.02 | 1.03 | 0.94 | 1.07 | 1.05 | 1.07 |
| NORTH | JAIPUR | 0.98 | 1.08 | 1.05 | 0.97 | 1.03 | 1.03 | 0.98 | 1.07 | 1.05 | 1.08 |
| NORTH | JODH KANKANI | 0.97 | 1.11 | 1.06 | 0.97 | 1.03 | 1.03 | 0.98 | 1.09 | 1.07 | 1.11 |
| NORTH | DAUSA | 0.97 | 1.06 | 1.04 | 0.97 | 1.03 | 1.02 | 0.97 | 1.06 | 1.04 | 1.06 |
| NORTH | BARA | 1.00 | 1.05 | 1.00 | 1.00 | 1.05 | 0.99 | 0.99 | 1.05 | 0.99 | 1.05 |
| NORTH | ANPARAC | 1.00 | 1.07 | 1.00 | 1.00 | 1.07 | 1.00 | 1.00 | 1.07 | 1.00 | 1.07 |
| NORTH | ANPARA-D | 1.00 | 1.07 | 1.00 | 1.00 | 1.07 | 1.00 | 1.00 | 1.07 | 1.00 | 1.07 |
| NORTH | LALITPUR | 1.03 | 1.03 | 1.03 | 1.03 | 1.05 | 1.02 | 0.99 | 0.99 | 0.98 | 1.05 |
| NORTH | OBRAC | 1.00 | 1.06 | 1.00 | 1.00 | 1.06 | 1.00 | 1.00 | 1.07 | 1.00 | 1.07 |
| NORTH | JAKHORA765 | 1.03 | 1.03 | 1.03 | 1.03 | 1.05 | 1.02 | 0.99 | 0.99 | 0.99 | 1.05 |
| NORTH | GURUSARAI765 | 1.03 | 1.02 | 1.03 | 1.02 | 1.06 | 1.01 | 0.99 | 1.01 | 1.00 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NRTHEAST | BORNAGAR | 1.02 | 1.05 | 1.04 | 1.03 | 0.97 | 1.04 | 1.03 | 1.01 | 1.05 | 1.05 |
| WEST | SASAN | 1.00 | 1.06 | 1.00 | 1.00 | 1.06 | 1.00 | 1.00 | 1.06 | 1.00 | 1.06 |
| WEST | VIN-POOL | 1.00 | 1.05 | 1.00 | 1.00 | 1.05 | 1.00 | 1.00 | 1.05 | 1.00 | 1.05 |
| WEST | JABALPR-POOL | 1.02 | 1.06 | 1.04 | 1.01 | 1.05 | 1.02 | 1.01 | 1.05 | 1.03 | 1.06 |
| WEST | GADARWARA | 1.02 | 1.05 | 1.03 | 1.00 | 1.05 | 1.02 | 1.00 | 1.05 | 1.01 | 1.05 |
| WEST | BHOPAL_STER | 1.00 | 1.06 | 1.05 | 1.00 | 1.05 | 1.03 | 1.01 | 1.03 | 1.03 | 1.06 |
| EAST | KATIHAR8 | 1.00 | 1.06 | 1.06 | 1.03 | 0.98 | 1.05 | 1.01 | 1.01 | 1.07 | 1.07 |
| EAST | MEDINIPUR7 | 0.94 | 0.94 | 0.96 | 0.91 | 0.96 | 0.95 | 1.02 | 1.03 | 1.09 | 1.09 |
| EAST | JEERAT7 | 0.93 | 0.92 | 0.94 | 0.89 | 0.95 | 0.94 | 1.02 | 1.02 | 1.09 | 1.09 |
| EAST | RANCHI-NEW | 0.98 | 0.99 | 0.98 | 0.96 | 0.99 | 0.97 | 1.00 | 1.03 | 1.06 | 1.06 |
| SOUTH | HYDR_800 | 1.03 | 1.04 | 1.03 | 1.03 | 1.04 | 1.03 | 1.03 | 1.05 | 1.04 | 1.05 |
| SOUTH | BIDAR PS SZ | 1.03 | 1.04 | 1.03 | 1.02 | 1.04 | 1.04 | 1.02 | 1.05 | 1.04 | 1.05 |
| SOUTH | UPPUR | 1.02 | 1.06 | 1.00 | 1.02 | 1.06 | 1.00 | 1.02 | 1.06 | 1.00 | 1.06 |

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

## 400kV Bus Voltage >=1.05 PU

| Area Name | Bus Name | V-Sc1 | V-Sc2 | V-Sc3 | V-Sc4 | V-Sc5 | V-Sc6 | V-Sc7 | V-Sc8 | V-Sc9 | Max |
|---|---|---|---|---|---|---|---|---|---|---|---|
| WEST | ASOJBY_SS-CH | 1.00 | 1.02 | 1.05 | 0.99 | 1.02 | 1.03 | 1.00 | 1.03 | 1.02 | 1.05 |
| NORTH | JAISALMER-2 | 1.00 | 1.12 | 1.04 | 1.00 | 1.01 | 1.02 | 1.00 | 1.09 | 1.08 | 1.12 |
| NORTH | MERTA | 0.97 | 1.08 | 1.04 | 0.97 | 1.01 | 1.01 | 0.98 | 1.06 | 1.04 | 1.08 |
| NORTH | AKAL-4 | 1.00 | 1.15 | 1.04 | 0.99 | 1.01 | 1.02 | 1.00 | 1.11 | 1.08 | 1.15 |
| NORTH | BARMER-4 | 0.99 | 1.13 | 1.05 | 0.98 | 1.01 | 1.01 | 0.98 | 1.09 | 1.08 | 1.13 |
| NORTH | RAMGARH | 0.99 | 1.14 | 1.02 | 0.99 | 1.00 | 1.01 | 1.00 | 1.10 | 1.07 | 1.14 |
| NORTH | BHADLA | 0.98 | 1.09 | 1.03 | 0.98 | 1.02 | 1.01 | 0.99 | 1.07 | 1.05 | 1.09 |
| NORTH | BHINMAL | 0.97 | 1.10 | 1.05 | 0.96 | 1.00 | 1.00 | 0.94 | 1.07 | 1.06 | 1.10 |
| NORTH | HERAPU-4 | 0.99 | 1.06 | 1.04 | 0.97 | 1.01 | 1.00 | 1.00 | 1.05 | 1.03 | 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 | RATANGAR | 0.99 | 1.07 | 1.05 | 0.97 | 1.01 | 1.01 | 1.00 | 1.04 | 1.02 | 1.07 |
| NORTH | BHILWA-4 | 1.00 | 1.08 | 1.06 | 1.00 | 1.02 | 1.01 | 0.99 | 1.06 | 1.03 | 1.08 |
| NORTH | RAJWEST | 0.99 | 1.12 | 1.05 | 0.98 | 1.00 | 1.01 | 1.00 | 1.09 | 1.07 | 1.12 |
| NORTH | DEEDWANA | 0.99 | 1.09 | 1.06 | 0.98 | 1.02 | 1.01 | 0.99 | 1.06 | 1.04 | 1.09 |
| NORTH | AJMER | 0.99 | 1.09 | 1.06 | 0.98 | 1.03 | 1.02 | 0.99 | 1.07 | 1.05 | 1.09 |
| NORTH | AJMER-NW | 0.98 | 1.09 | 1.05 | 0.98 | 1.03 | 1.02 | 0.98 | 1.07 | 1.05 | 1.09 |
| NORTH | KANKROLI | 1.00 | 1.08 | 1.05 | 1.00 | 1.00 | 1.00 | 1.00 | 1.05 | 1.03 | 1.08 |
| NORTH | RAMG-I | 0.97 | 0.99 | 1.03 | 0.97 | 0.96 | 1.06 | 0.98 | 0.99 | 1.05 | 1.06 |
| NORTH | CHITTOR4 | 1.00 | 1.08 | 1.06 | 0.99 | 1.01 | 1.01 | 0.98 | 1.05 | 1.03 | 1.08 |
| NORTH | CHIT-NEW | 0.99 | 1.07 | 1.05 | 0.99 | 1.01 | 1.01 | 0.97 | 1.06 | 1.03 | 1.07 |
| NORTH | PACHPADRA | 0.99 | 1.13 | 1.06 | 0.98 | 1.01 | 1.02 | 0.99 | 1.10 | 1.08 | 1.13 |
| NORTH | BASSI | 0.99 | 1.06 | 1.03 | 0.98 | 1.01 | 1.00 | 1.00 | 1.04 | 1.02 | 1.06 |
| NORTH | JODH SURPURA | 0.98 | 1.12 | 1.06 | 0.98 | 1.02 | 1.02 | 0.99 | 1.09 | 1.08 | 1.12 |
| NORTH | JODH KANKANI | 0.97 | 1.12 | 1.06 | 0.97 | 1.03 | 1.03 | 0.98 | 1.10 | 1.08 | 1.12 |
| NORTH | SIKAR | 0.98 | 1.06 | 1.04 | 0.97 | 1.02 | 1.01 | 0.99 | 1.04 | 1.03 | 1.06 |
| NORTH | JAIPUR_RS | 0.99 | 1.07 | 1.04 | 0.98 | 1.02 | 1.01 | 0.99 | 1.06 | 1.04 | 1.07 |
| NORTH | BIKANE-4 | 0.98 | 1.09 | 1.05 | 0.97 | 1.02 | 1.01 | 0.99 | 1.06 | 1.04 | 1.09 |
| NORTH | SURATG-4 | 0.99 | 1.08 | 1.05 | 0.97 | 1.00 | 1.00 | 1.00 | 1.02 | 1.00 | 1.08 |
| NORTH | BIKANER-NW | 0.98 | 1.05 | 1.02 | 0.98 | 1.02 | 1.01 | 0.99 | 1.05 | 1.03 | 1.05 |
| NORTH | BHADLA PG | 0.98 | 1.08 | 1.02 | 0.98 | 1.02 | 1.01 | 0.98 | 1.07 | 1.05 | 1.08 |
| NORTH | FATEHGARH | 1.00 | 1.05 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.04 | 1.03 | 1.05 |
| NORTH | FATEHG-3 SPL | 0.99 | 1.08 | 1.02 | 0.99 | 1.00 | 1.00 | 1.00 | 1.06 | 1.05 | 1.08 |
| NORTH | SHRECEM | 0.98 | 1.06 | 1.03 | 0.97 | 1.00 | 0.99 | 0.98 | 1.03 | 1.03 | 1.06 |
| NORTH | FATEHG-2 | 0.99 | 1.05 | 1.00 | 0.98 | 1.00 | 1.00 | 0.99 | 1.04 | 1.03 | 1.05 |
| NORTH | BHADLA-2 | 0.98 | 1.05 | 1.01 | 0.98 | 1.00 | 1.00 | 0.99 | 1.05 | 1.03 | 1.05 |
| NORTH | BEAWAR | 0.97 | 1.06 | 1.04 | 0.96 | 1.01 | 1.01 | 0.95 | 1.05 | 1.04 | 1.06 |
| NORTH | NAGAUR | 0.99 | 1.10 | 1.05 | 0.98 | 1.00 | 0.99 | 0.99 | 1.06 | 1.03 | 1.10 |

| Area Name | Bus Name | V-Sc1 | V-Sc2 | V-Sc3 | V-Sc4 | V-Sc5 | V-Sc6 | V-Sc7 | V-Sc8 | V-Sc9 | Max |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTH | LALSOT | 1.00 | 1.07 | 1.05 | 0.98 | 0.99 | 0.98 | 1.02 | 1.03 | 1.00 | 1.07 |
| NORTH | HANUMAN | 0.99 | 1.10 | 1.07 | 0.98 | 1.02 | 1.01 | 1.01 | 1.04 | 1.02 | 1.10 |
| NORTH | POKARAN | 0.98 | 1.14 | 1.06 | 0.98 | 1.02 | 1.02 | 0.99 | 1.10 | 1.08 | 1.14 |
| NORTH | MEJA | 1.00 | 1.06 | 1.00 | 1.00 | 1.07 | 1.00 | 1.00 | 1.07 | 1.00 | 1.07 |
| NORTH | UNCHAHAAR | 0.99 | 1.04 | 1.00 | 0.98 | 1.05 | 1.00 | 1.00 | 1.05 | 1.00 | 1.05 |
| NORTH | BARA | 1.00 | 1.07 | 1.00 | 1.00 | 1.07 | 1.00 | 1.00 | 1.07 | 1.00 | 1.07 |
| NORTH | KARCHNA | 1.00 | 1.07 | 1.00 | 1.00 | 1.07 | 1.00 | 1.00 | 1.07 | 1.00 | 1.07 |
| NORTH | REWA | 1.00 | 1.06 | 1.00 | 1.00 | 1.06 | 1.00 | 1.00 | 1.07 | 1.00 | 1.07 |
| NORTH | GONDA | 1.01 | 1.04 | 1.00 | 1.00 | 1.04 | 1.00 | 1.01 | 1.07 | 1.01 | 1.07 |
| NORTH | MASAULI | 1.00 | 1.06 | 1.00 | 1.00 | 1.06 | 1.00 | 1.01 | 1.06 | 1.01 | 1.06 |
| NORTH | SHAHJ-PG | 1.00 | 1.04 | 1.00 | 1.00 | 1.04 | 1.00 | 1.01 | 1.06 | 1.01 | 1.06 |
| NORTH | ANPARA4 | 1.00 | 1.05 | 1.00 | 1.00 | 1.05 | 1.00 | 1.00 | 1.05 | 1.00 | 1.05 |
| NORTH | ANPARA-D | 1.00 | 1.05 | 1.00 | 1.00 | 1.05 | 1.00 | 1.00 | 1.05 | 1.00 | 1.05 |
| NORTH | ANPARAC | 1.00 | 1.05 | 1.00 | 1.00 | 1.05 | 1.00 | 1.00 | 1.05 | 1.00 | 1.05 |
| NORTH | ROSA-TP2 | 1.01 | 1.04 | 1.00 | 1.00 | 1.04 | 1.00 | 1.01 | 1.06 | 1.01 | 1.06 |
| NORTH | OBRA4 | 1.00 | 1.07 | 1.00 | 1.00 | 1.07 | 1.00 | 1.00 | 1.07 | 1.00 | 1.07 |
| NORTH | SULTANP4 | 1.01 | 1.03 | 0.99 | 1.00 | 1.03 | 0.99 | 1.01 | 1.05 | 1.01 | 1.05 |
| NORTH | BASTI | 1.00 | 1.03 | 1.00 | 1.00 | 1.02 | 1.00 | 1.01 | 1.05 | 1.01 | 1.05 |
| NORTH | TANDA2 | 1.00 | 1.05 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.07 | 1.01 | 1.07 |
| NORTH | OBRA-C | 1.00 | 1.07 | 1.00 | 1.00 | 1.07 | 1.00 | 1.00 | 1.07 | 1.00 | 1.07 |
| NORTH | BADAUN | 1.01 | 1.03 | 1.00 | 1.00 | 1.03 | 1.00 | 1.01 | 1.05 | 1.02 | 1.05 |
| NORTH | JAKHORA400 | 1.02 | 1.03 | 1.03 | 1.02 | 1.05 | 1.02 | 0.99 | 0.99 | 0.98 | 1.05 |
| NRTHEAST | MISA-PG | 1.06 | 1.01 | 1.00 | 1.07 | 1.00 | 0.99 | 1.11 | 1.01 | 1.01 | 1.11 |
| NRTHEAST | MARIANI-PG | 1.11 | 1.03 | 1.01 | 1.12 | 1.02 | 0.99 | 1.18 | 1.02 | 1.01 | 1.18 |
| NRTHEAST | BON-BAL-FSC1 | 0.99 | 1.01 | 0.98 | 1.01 | 1.06 | 0.98 | 1.01 | 1.01 | 0.98 | 1.06 |
| NRTHEAST | BON-BAL-FSC2 | 0.99 | 1.01 | 0.98 | 1.01 | 1.06 | 0.98 | 1.01 | 1.01 | 0.98 | 1.06 |
| NRTHEAST | AZARA | 1.06 | 1.01 | 1.00 | 1.05 | 0.97 | 0.99 | 1.10 | 1.00 | 1.02 | 1.10 |

| Area Name | Bus Name | V-Sc1 | V-Sc2 | V-Sc3 | V-Sc4 | V-Sc5 | V-Sc6 | V-Sc7 | V-Sc8 | V-Sc9 | Max |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NRTHEAST | SONAPUR | 1.07 | 1.01 | 1.01 | 1.07 | 0.98 | 1.00 | 1.12 | 1.01 | 1.03 | 1.12 |
| NRTHEAST | SILCHAR-PG | 1.12 | 0.99 | 1.00 | 1.13 | 1.01 | 0.98 | 1.19 | 1.01 | 1.02 | 1.19 |
| NRTHEAST | BYRNIHAT | 1.07 | 1.02 | 1.01 | 1.06 | 0.98 | 1.00 | 1.11 | 1.01 | 1.03 | 1.11 |
| NRTHEAST | NEW KOHIMA | 1.13 | 1.03 | 1.02 | 1.14 | 1.03 | 0.98 | 1.20 | 1.03 | 1.02 | 1.20 |
| NRTHEAST | IMPHAL-PG | 1.14 | 1.02 | 1.02 | 1.15 | 1.03 | 0.99 | 1.22 | 1.03 | 1.03 | 1.22 |
| MYANMAR | TAMU | 1.14 | 1.02 | 1.02 | 1.15 | 1.03 | 0.99 | 1.22 | 1.03 | 1.03 | 1.22 |
| NRTHEAST | THOUBAL | 1.14 | 1.02 | 1.02 | 1.15 | 1.03 | 0.99 | 1.22 | 1.03 | 1.03 | 1.22 |
| NRTHEAST | PKBARI-ISTS | 1.13 | 0.98 | 1.00 | 1.14 | 1.01 | 0.96 | 1.22 | 1.00 | 0.99 | 1.22 |
| NRTHEAST | SURAJMANI NG | 1.13 | 0.99 | 1.00 | 1.14 | 1.02 | 0.96 | 1.22 | 1.01 | 0.99 | 1.22 |
| NRTHEAST | PALATANA | 1.13 | 1.00 | 1.00 | 1.14 | 1.03 | 0.98 | 1.22 | 1.03 | 1.00 | 1.22 |
| NRTHEAST | PURBANOAGAON | 1.13 | 0.99 | 1.00 | 1.15 | 1.02 | 0.96 | 1.22 | 1.01 | 0.99 | 1.22 |
| WEST | RAJG-FS1 | 1.01 | 1.06 | 1.07 | 1.01 | 1.03 | 1.03 | 0.99 | 1.02 | 1.00 | 1.07 |
| WEST | RAJG-FS2 | 1.01 | 1.06 | 1.07 | 1.01 | 1.03 | 1.03 | 0.99 | 1.02 | 1.00 | 1.07 |
| WEST | BHACHAUNDA | 1.04 | 1.05 | 1.06 | 1.02 | 1.05 | 1.04 | 1.04 | 1.05 | 1.06 | 1.06 |
| WEST | SHIVLAKHAPS | 1.04 | 1.06 | 1.08 | 1.02 | 1.06 | 1.06 | 1.04 | 1.07 | 1.08 | 1.08 |
| WEST | INDORE-4 | 0.99 | 1.04 | 1.05 | 0.98 | 1.03 | 1.02 | 0.99 | 1.02 | 1.01 | 1.05 |
| WEST | BHOPAL-4 | 1.01 | 1.06 | 1.06 | 1.00 | 1.05 | 1.03 | 1.00 | 1.03 | 1.02 | 1.06 |
| WEST | NAGDA-4 | 1.00 | 1.06 | 1.06 | 0.99 | 1.03 | 1.03 | 0.98 | 1.03 | 1.02 | 1.06 |
| WEST | ITARSI-4 | 1.00 | 1.05 | 1.05 | 1.00 | 1.04 | 1.02 | 1.00 | 1.02 | 1.02 | 1.05 |
| WEST | KHANDWA-4 | 1.01 | 1.06 | 1.06 | 1.00 | 1.04 | 1.03 | 1.00 | 1.03 | 1.02 | 1.06 |
| WEST | RAJGARH-4 | 1.01 | 1.05 | 1.06 | 1.00 | 1.03 | 1.03 | 1.00 | 1.03 | 1.02 | 1.06 |
| WEST | DAMOHPG-4 | 1.01 | 1.06 | 1.06 | 1.01 | 1.04 | 1.03 | 1.00 | 1.01 | 1.02 | 1.06 |
| WEST | BIRSINGPR-4 | 1.03 | 1.06 | 1.05 | 1.02 | 1.05 | 1.03 | 1.01 | 1.03 | 1.03 | 1.06 |
| WEST | KATNI-4 | 1.03 | 1.06 | 1.06 | 1.02 | 1.05 | 1.04 | 1.01 | 1.03 | 1.03 | 1.06 |
| WEST | KHACS1 | 0.99 | 1.05 | 1.06 | 0.98 | 1.03 | 1.02 | 0.99 | 1.03 | 1.01 | 1.06 |
| WEST | KHAC2 | 0.99 | 1.05 | 1.06 | 0.98 | 1.03 | 1.02 | 0.99 | 1.03 | 1.01 | 1.06 |
| WEST | SHUJALPR-4 | 1.00 | 1.06 | 1.06 | 0.99 | 1.04 | 1.03 | 0.98 | 1.02 | 1.02 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| WEST | INDORE-74 | 1.00 | 1.06 | 1.06 | 0.99 | 1.03 | 1.03 | 1.00 | 1.02 | 1.02 | 1.06 |
| WEST | CHEGAON | 1.01 | 1.06 | 1.07 | 1.00 | 1.04 | 1.03 | 1.00 | 1.03 | 1.01 | 1.07 |
| WEST | MALWA | 1.01 | 1.07 | 1.07 | 1.01 | 1.04 | 1.03 | 1.01 | 1.04 | 1.00 | 1.07 |
| WEST | PITHAMPUR-4 | 1.01 | 1.06 | 1.07 | 1.00 | 1.04 | 1.03 | 1.00 | 1.03 | 1.02 | 1.07 |
| WEST | JULWNIA-4 | 1.00 | 1.05 | 1.06 | 0.99 | 1.02 | 1.02 | 1.00 | 1.01 | 1.00 | 1.06 |
| WEST | BHOPAL_STER | 1.00 | 1.06 | 1.06 | 1.00 | 1.05 | 1.03 | 1.00 | 1.03 | 1.03 | 1.06 |
| WEST | MANDSAUR-4 | 1.00 | 1.07 | 1.07 | 0.99 | 1.03 | 1.03 | 0.97 | 1.04 | 1.03 | 1.07 |
| WEST | UJJAIN-4 | 1.00 | 1.06 | 1.06 | 0.99 | 1.03 | 1.03 | 0.99 | 1.03 | 1.02 | 1.06 |
| WEST | ASHTA-4 | 1.01 | 1.06 | 1.07 | 1.00 | 1.04 | 1.03 | 1.00 | 1.03 | 1.02 | 1.07 |
| WEST | GUNA4_TBCB | 1.02 | 1.06 | 1.05 | 1.01 | 1.05 | 1.03 | 1.00 | 1.03 | 1.03 | 1.06 |
| WEST | MANDIDEEP-4 | 1.00 | 1.06 | 1.06 | 1.00 | 1.04 | 1.03 | 1.00 | 1.02 | 1.02 | 1.06 |
| WEST | BETULGIS-4 | 1.01 | 1.05 | 1.06 | 1.01 | 1.04 | 1.03 | 1.00 | 1.03 | 1.02 | 1.06 |
| WEST | PACHORASP | 1.00 | 1.07 | 1.06 | 1.00 | 1.05 | 1.03 | 1.00 | 1.03 | 1.03 | 1.07 |
| WEST | NEEMUCH_PS | 1.00 | 1.07 | 1.06 | 1.00 | 1.03 | 1.02 | 0.97 | 1.05 | 1.04 | 1.07 |
| WEST | MALWA_II | 1.01 | 1.07 | 1.07 | 1.01 | 1.04 | 1.03 | 1.01 | 1.04 | 1.00 | 1.07 |
| WEST | BADNAWAR-4 | 1.00 | 1.05 | 1.06 | 0.99 | 1.03 | 1.03 | 1.00 | 1.03 | 1.02 | 1.06 |
| WEST | KHARGONE | 1.01 | 1.05 | 1.05 | 1.00 | 1.05 | 1.02 | 1.00 | 1.05 | 1.01 | 1.05 |
| WEST | MAUDA | 1.03 | 1.06 | 1.06 | 1.02 | 1.05 | 1.04 | 1.02 | 1.04 | 1.03 | 1.06 |
| WEST | JAIGAD II | 1.07 | 0.96 | 0.94 | 1.00 | 0.96 | 0.95 | 0.98 | 0.96 | 0.96 | 1.07 |
| WEST | DOLVI | 1.06 | 0.93 | 0.91 | 1.00 | 0.92 | 0.92 | 0.97 | 0.92 | 0.94 | 1.06 |
| EAST | PATNA | 1.00 | 1.01 | 1.03 | 1.00 | 1.05 | 1.02 | 1.00 | 1.05 | 1.01 | 1.05 |
| EAST | GAYA-PG | 1.00 | 1.03 | 1.01 | 1.01 | 1.04 | 1.01 | 1.01 | 1.06 | 1.02 | 1.06 |
| EAST | NABINAGAR-II | 1.00 | 1.02 | 1.02 | 1.01 | 1.07 | 1.02 | 1.00 | 1.07 | 1.00 | 1.07 |
| EAST | BARH-I | 1.00 | 1.02 | 1.03 | 1.01 | 1.08 | 1.03 | 1.00 | 1.08 | 1.00 | 1.08 |
| EAST | BAKHTIYR-NEW | 1.00 | 1.02 | 1.03 | 1.00 | 1.06 | 1.03 | 1.00 | 1.06 | 1.00 | 1.06 |
| EAST | BARH-II | 1.00 | 1.02 | 1.03 | 1.01 | 1.08 | 1.03 | 1.00 | 1.08 | 1.00 | 1.08 |
| EAST | JAKKANPUR-NW | 1.00 | 1.01 | 1.03 | 1.00 | 1.05 | 1.02 | 1.00 | 1.05 | 1.01 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EAST | CHANDAUTI NW | 1.00 | 1.03 | 1.01 | 1.01 | 1.04 | 1.01 | 1.01 | 1.06 | 1.02 | 1.06 |
| EAST | KATIHAR4 | 1.00 | 1.04 | 1.04 | 1.02 | 0.99 | 1.04 | 1.01 | 1.02 | 1.05 | 1.05 |
| EAST | CHAPRA NEW | 1.01 | 1.02 | 1.04 | 1.01 | 1.05 | 1.04 | 1.02 | 1.06 | 1.03 | 1.06 |
| EAST | BIHARSHARF-B | 1.02 | 1.04 | 1.04 | 1.02 | 1.05 | 1.04 | 1.03 | 1.06 | 1.05 | 1.06 |
| EAST | KAHALGAON-A | 1.03 | 1.07 | 1.03 | 1.03 | 1.07 | 1.03 | 1.01 | 1.07 | 1.06 | 1.07 |
| EAST | SASARAM-NR | 1.02 | 1.06 | 1.01 | 1.02 | 1.06 | 1.01 | 1.02 | 1.07 | 1.02 | 1.07 |
| EAST | DUBURI | 0.98 | 0.97 | 0.96 | 0.98 | 0.98 | 1.00 | 1.03 | 1.01 | 1.08 | 1.08 |
| EAST | MENDHASAL | 0.99 | 0.97 | 0.97 | 0.99 | 0.99 | 1.01 | 1.03 | 1.01 | 1.07 | 1.07 |
| EAST | PARADEEP4 | 0.96 | 0.95 | 0.93 | 0.96 | 0.96 | 0.99 | 1.01 | 1.00 | 1.08 | 1.08 |
| EAST | KEONJHAR | 0.96 | 0.99 | 0.99 | 0.98 | 0.99 | 1.00 | 0.99 | 0.99 | 1.05 | 1.05 |
| EAST | PANDIABILI | 0.99 | 0.98 | 0.97 | 0.99 | 0.99 | 1.01 | 1.03 | 1.02 | 1.07 | 1.07 |
| EAST | BEGUNIA | 1.00 | 0.99 | 0.98 | 1.00 | 1.00 | 1.01 | 1.03 | 1.03 | 1.06 | 1.06 |
| EAST | MERAMNDLI-B | 0.99 | 0.98 | 0.97 | 0.99 | 0.99 | 1.01 | 1.03 | 1.02 | 1.07 | 1.07 |
| EAST | BARIPADA | 0.97 | 0.98 | 0.99 | 0.97 | 0.99 | 1.00 | 1.02 | 1.02 | 1.10 | 1.10 |
| EAST | KHUNTUNI4 | 0.99 | 0.98 | 0.97 | 0.99 | 0.99 | 1.01 | 1.03 | 1.01 | 1.07 | 1.07 |
| EAST | GMR-OD | 0.99 | 0.98 | 0.97 | 0.99 | 0.99 | 1.01 | 1.03 | 1.02 | 1.07 | 1.07 |
| EAST | BHADRAK-NEW | 0.98 | 0.98 | 0.98 | 0.98 | 0.99 | 1.01 | 1.03 | 1.02 | 1.10 | 1.10 |
| EAST | DURGAPUR TPS | 1.01 | 1.06 | 1.04 | 1.01 | 1.06 | 1.04 | 1.00 | 1.06 | 1.08 | 1.08 |
| EAST | MEJIA-B | 1.03 | 1.06 | 1.04 | 1.03 | 1.07 | 1.04 | 1.02 | 1.07 | 1.08 | 1.08 |
| EAST | JAMSHEDPR-PG | 1.00 | 1.03 | 1.01 | 1.00 | 1.03 | 1.02 | 1.01 | 1.05 | 1.09 | 1.09 |
| EAST | KODERMA-DVC | 1.02 | 1.05 | 1.04 | 1.03 | 1.06 | 1.04 | 1.03 | 1.07 | 1.05 | 1.07 |
| EAST | RAGHUNATHTPS | 1.01 | 1.05 | 1.04 | 1.02 | 1.05 | 1.04 | 1.00 | 1.06 | 1.08 | 1.08 |
| EAST | MAITHON-A | 1.01 | 1.05 | 1.04 | 1.02 | 1.04 | 1.04 | 1.01 | 1.05 | 1.08 | 1.08 |
| EAST | BIDHAN NGR | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.00 | 1.00 | 1.03 | 1.08 | 1.08 |
| EAST | DURGAPUR-B | 1.02 | 1.06 | 1.05 | 1.02 | 1.05 | 1.05 | 1.01 | 1.06 | 1.09 | 1.09 |
| EAST | BOKARO-A | 1.03 | 1.05 | 1.05 | 1.03 | 1.07 | 1.05 | 1.03 | 1.08 | 1.06 | 1.08 |
| EAST | MAITHON-RB | 1.00 | 1.05 | 1.04 | 1.01 | 1.04 | 1.04 | 1.00 | 1.05 | 1.08 | 1.08 |

| Area Name | Bus Name | V-Sc1 | V-Sc2 | V-Sc3 | V-Sc4 | V-Sc5 | V-Sc6 | V-Sc7 | V-Sc8 | V-Sc9 | Max |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EAST | JMSDPR-DVC | 0.99 | 1.03 | 1.01 | 0.99 | 1.02 | 1.01 | 1.01 | 1.04 | 1.09 | 1.09 |
| EAST | MAITHON-B | 1.03 | 1.06 | 1.04 | 1.03 | 1.07 | 1.04 | 1.02 | 1.07 | 1.08 | 1.08 |
| EAST | DURGAPUR-A | 1.00 | 1.01 | 1.00 | 1.00 | 1.02 | 1.00 | 1.00 | 1.04 | 1.08 | 1.08 |
| EAST | MEDINIPUR4 | 0.95 | 0.95 | 0.96 | 0.92 | 0.97 | 0.96 | 1.03 | 1.03 | 1.10 | 1.10 |
| EAST | RAJARHAT | 0.90 | 0.89 | 0.93 | 0.86 | 0.94 | 0.93 | 1.01 | 1.00 | 1.09 | 1.09 |
| EAST | JEERAT | 0.91 | 0.90 | 0.94 | 0.87 | 0.95 | 0.94 | 1.02 | 1.01 | 1.09 | 1.09 |
| EAST | SUBHASGRAM | 0.89 | 0.88 | 0.93 | 0.85 | 0.94 | 0.93 | 1.02 | 1.00 | 1.09 | 1.09 |
| EAST | KOLAGHAT | 0.94 | 0.92 | 0.95 | 0.91 | 0.96 | 0.96 | 1.03 | 1.02 | 1.12 | 1.12 |
| EAST | HALDIA-TPS | 0.89 | 0.92 | 0.96 | 0.84 | 0.98 | 0.96 | 1.02 | 1.02 | 1.09 | 1.09 |
| EAST | CHANDITALA_N | 0.94 | 0.93 | 0.96 | 0.91 | 0.96 | 0.96 | 1.03 | 1.02 | 1.11 | 1.11 |
| EAST | KHARAGPR-WB | 0.96 | 0.96 | 0.97 | 0.93 | 0.98 | 0.97 | 1.03 | 1.03 | 1.11 | 1.11 |
| EAST | BAKRASWR | 0.95 | 0.92 | 0.96 | 0.91 | 0.97 | 0.96 | 1.02 | 1.02 | 1.11 | 1.11 |
| EAST | GOKARNA | 0.97 | 0.98 | 0.99 | 0.95 | 0.99 | 0.99 | 1.01 | 1.02 | 1.06 | 1.06 |
| EAST | ARAMBAGH | 0.94 | 0.93 | 0.96 | 0.91 | 0.97 | 0.96 | 1.03 | 1.02 | 1.11 | 1.11 |
| EAST | NEW LAXMKTNP | 0.89 | 0.89 | 0.94 | 0.84 | 0.95 | 0.94 | 1.02 | 1.01 | 1.09 | 1.09 |
| EAST | PPSP_NEW | 1.00 | 1.03 | 1.00 | 1.00 | 1.03 | 1.00 | 1.00 | 1.03 | 1.07 | 1.07 |
| EAST | PURULIAPS | 1.00 | 1.03 | 1.00 | 1.00 | 1.03 | 1.00 | 1.00 | 1.03 | 1.07 | 1.07 |
| EAST | JEERAT-NEW | 0.91 | 0.90 | 0.94 | 0.87 | 0.95 | 0.94 | 1.02 | 1.01 | 1.09 | 1.09 |
| EAST | KATWA-TPS | 0.96 | 0.97 | 0.98 | 0.95 | 0.99 | 0.99 | 1.02 | 1.03 | 1.08 | 1.08 |
| EAST | TURGA_PSP | 1.00 | 1.03 | 1.00 | 1.00 | 1.03 | 1.00 | 1.00 | 1.03 | 1.07 | 1.07 |
| EAST | FAR_K-A_D-B | 1.03 | 1.08 | 1.05 | 1.04 | 1.08 | 1.05 | 1.02 | 1.08 | 1.08 | 1.08 |
| EAST | FAR_K-A_D-A | 1.02 | 1.05 | 1.02 | 1.02 | 1.05 | 1.02 | 1.01 | 1.06 | 1.07 | 1.07 |
| EAST | LATEHAR-NEW | 1.00 | 1.04 | 1.01 | 1.01 | 1.04 | 1.01 | 1.00 | 1.05 | 1.03 | 1.05 |
| EAST | PATRATU | 1.00 | 1.05 | 1.00 | 1.00 | 1.05 | 1.00 | 1.00 | 1.05 | 1.03 | 1.05 |
| EAST | ESSAR-BYPASS | 1.00 | 1.04 | 1.01 | 1.01 | 1.03 | 1.01 | 1.00 | 1.06 | 1.03 | 1.06 |
| EAST | ADHUNIK | 1.00 | 1.03 | 1.01 | 1.00 | 1.03 | 1.02 | 1.01 | 1.05 | 1.09 | 1.09 |
| EAST | JHARKND-POOL | 1.00 | 1.04 | 1.01 | 1.01 | 1.03 | 1.01 | 1.00 | 1.06 | 1.03 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EAST | DHANBAD_4 | 1.00 | 1.05 | 1.04 | 1.01 | 1.03 | 1.04 | 1.00 | 1.04 | 1.08 | 1.08 |
| EAST | RANCHI | 1.01 | 1.04 | 1.02 | 1.01 | 1.03 | 1.02 | 1.01 | 1.05 | 1.06 | 1.06 |
| EAST | RNC-SIPT FSC | 1.02 | 1.08 | 1.06 | 1.04 | 1.07 | 1.07 | 0.98 | 1.04 | 1.06 | 1.08 |
| EAST | RNC-SIPT FSC | 1.02 | 1.08 | 1.06 | 1.04 | 1.07 | 1.07 | 0.98 | 1.04 | 1.06 | 1.08 |
| EAST | NORTHKARNPRA | 1.01 | 1.04 | 1.01 | 1.01 | 1.03 | 1.01 | 1.00 | 1.07 | 1.02 | 1.07 |
| EAST | PVUNL | 1.00 | 1.05 | 1.00 | 1.00 | 1.05 | 1.00 | 1.00 | 1.05 | 1.03 | 1.05 |
| EAST | NEW CHANDIL | 1.00 | 1.05 | 1.01 | 1.00 | 1.03 | 1.01 | 1.01 | 1.03 | 1.05 | 1.05 |
| EAST | CHAIBASA | 0.99 | 1.01 | 1.00 | 0.99 | 1.01 | 1.01 | 1.01 | 1.03 | 1.08 | 1.08 |
| EAST | RR1 | 1.01 | 1.04 | 1.02 | 1.01 | 1.03 | 1.02 | 1.01 | 1.05 | 1.06 | 1.06 |
| EAST | RR2 | 1.01 | 1.04 | 1.02 | 1.01 | 1.03 | 1.02 | 1.01 | 1.05 | 1.06 | 1.06 |
| SOUTH | MUDN400 | 1.04 | 1.06 | 1.04 | 1.03 | 1.06 | 1.00 | 1.05 | 1.06 | 1.00 | 1.06 |
| SOUTH | JAGALUR4 | 1.02 | 1.05 | 1.03 | 1.01 | 1.04 | 1.01 | 1.00 | 1.04 | 1.01 | 1.05 |
| SOUTH | TORNGL4 | 1.02 | 1.04 | 1.02 | 1.00 | 1.05 | 1.00 | 1.00 | 1.05 | 1.00 | 1.05 |
| SOUTH | BELLARY TPP | 1.01 | 1.06 | 1.00 | 1.01 | 1.06 | 1.00 | 1.00 | 1.06 | 1.00 | 1.06 |
| SOUTH | YERAMRS TPP | 1.02 | 1.05 | 1.00 | 1.01 | 1.05 | 1.00 | 1.00 | 1.05 | 1.00 | 1.05 |
| SOUTH | BELLARY-POOL | 1.02 | 1.04 | 1.02 | 1.00 | 1.05 | 1.00 | 1.00 | 1.05 | 1.00 | 1.05 |
| SOUTH | NEY 2 EXT2ND | 1.00 | 1.05 | 1.01 | 1.00 | 1.04 | 1.00 | 1.00 | 1.05 | 1.01 | 1.05 |
| SOUTH | NAGAPTNM4 | 1.00 | 1.05 | 1.01 | 1.00 | 1.05 | 1.00 | 1.00 | 1.05 | 1.01 | 1.05 |
| SOUTH | KARAIK | 1.01 | 1.05 | 1.03 | 1.01 | 1.03 | 1.01 | 1.02 | 1.04 | 1.03 | 1.05 |
| SOUTH | OPG400KV | 1.06 | 0.99 | 1.00 | 1.06 | 0.99 | 1.00 | 1.00 | 0.99 | 1.00 | 1.06 |
| SOUTH | VIRUDHNAGAR | 1.01 | 1.05 | 1.02 | 1.01 | 1.04 | 1.00 | 1.01 | 1.04 | 1.01 | 1.05 |
| SOUTH | MANALMEDU4 | 1.00 | 1.05 | 1.02 | 1.00 | 1.05 | 1.01 | 1.01 | 1.05 | 1.01 | 1.05 |
| SOUTH | ALAGARKOIL | 1.02 | 1.05 | 1.03 | 1.01 | 1.04 | 1.01 | 1.02 | 1.04 | 1.02 | 1.05 |
| SOUTH | VELALAVIDU | 1.01 | 1.06 | 1.04 | 1.00 | 1.03 | 1.01 | 1.02 | 1.04 | 1.03 | 1.06 |
| SOUTH | UDNGDI4 | 1.01 | 1.05 | 1.02 | 1.01 | 1.05 | 1.00 | 1.00 | 1.05 | 1.00 | 1.05 |
| SOUTH | ILFS-OA | 1.00 | 1.05 | 1.00 | 1.00 | 1.05 | 1.00 | 1.00 | 1.05 | 1.00 | 1.05 |
| SOUTH | ETPSEXP4 | 1.06 | 0.99 | 1.00 | 1.06 | 0.99 | 1.00 | 1.00 | 0.99 | 1.00 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SOUTH | NORTH CHEN P | 1.06 | 0.99 | 1.00 | 1.06 | 0.99 | 1.00 | 1.00 | 0.99 | 1.00 | 1.06 |
| SOUTH | ENNORE-SEZ | 1.06 | 0.99 | 1.00 | 1.06 | 0.99 | 1.00 | 1.00 | 0.99 | 1.00 | 1.06 |
| SOUTH | SAMUGARANGAP | 1.01 | 1.05 | 1.02 | 1.01 | 1.05 | 1.00 | 1.00 | 1.05 | 1.00 | 1.05 |

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

## Under Voltage Nodes

### 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTH | MOGA-PG | 0.95 | 1.05 | 1.01 | 0.94 | 1.03 | 1.00 | 0.96 | 1.06 | 1.02 | 0.94 |
| NORTH | BHIWN-PG | 0.95 | 1.03 | 1.01 | 0.94 | 1.01 | 1.00 | 0.97 | 1.03 | 1.02 | 0.94 |
| NORTH | NARELA ISTS | 0.93 | 1.02 | 1.00 | 0.92 | 1.00 | 1.00 | 0.95 | 1.03 | 1.02 | 0.92 |
| NORTH | JHATI-PG | 0.94 | 1.02 | 1.00 | 0.93 | 1.00 | 0.99 | 0.96 | 1.02 | 1.02 | 0.93 |
| NORTH | CHIT-NEW | 0.98 | 1.04 | 1.03 | 0.97 | 1.00 | 1.01 | 0.94 | 1.05 | 1.04 | 0.94 |
| NORTH | BIKANER-NW | 0.95 | 1.07 | 1.03 | 0.95 | 1.03 | 1.02 | 0.96 | 1.06 | 1.04 | 0.95 |
| NORTH | FATEHG-3 | 0.95 | 1.05 | 1.03 | 0.95 | 1.01 | 1.02 | 0.93 | 1.05 | 1.04 | 0.93 |
| NORTH | BHADLA-3 | 0.93 | 1.03 | 1.03 | 0.93 | 0.99 | 1.06 | 0.94 | 1.03 | 1.05 | 0.93 |
| NORTH | SIKAR NEW | 0.91 | 1.05 | 1.03 | 0.90 | 1.02 | 1.02 | 0.93 | 1.05 | 1.04 | 0.90 |
| NORTH | BHADLA-2 | 0.95 | 1.06 | 1.02 | 0.95 | 1.02 | 1.01 | 0.96 | 1.06 | 1.04 | 0.95 |
| NORTH | BEAWAR | 0.96 | 1.07 | 1.05 | 0.96 | 1.02 | 1.03 | 0.94 | 1.07 | 1.05 | 0.94 |
| NORTH | KHETRI | 0.93 | 1.05 | 1.02 | 0.92 | 1.02 | 1.01 | 0.95 | 1.05 | 1.04 | 0.92 |
| NORTH | MEERTFS1 | 0.96 | 1.01 | 0.99 | 0.95 | 1.00 | 0.99 | 0.96 | 1.02 | 1.01 | 0.95 |
| NORTH | MEERTFS2 | 0.96 | 1.01 | 0.99 | 0.95 | 1.00 | 0.99 | 0.96 | 1.02 | 1.01 | 0.95 |
| WEST | VADODARA | 0.95 | 1.01 | 1.03 | 0.92 | 1.01 | 1.01 | 0.97 | 1.03 | 1.02 | 0.92 |
| WEST | AHMDABAD PG | 0.93 | 0.99 | 1.01 | 0.89 | 0.99 | 0.99 | 0.92 | 1.02 | 1.01 | 0.89 |

| Area Name | Bus Name | V-Sc1 | V-Sc2 | V-Sc3 | V-Sc4 | V-Sc5 | V-Sc6 | V-Sc7 | V-Sc8 | V-Sc9 | Min |
|---|---|---|---|---|---|---|---|---|---|---|---|
| WEST | BANASKANTHA | 0.97 | 1.00 | 1.02 | 0.94 | 1.00 | 1.01 | 0.95 | 1.03 | 1.03 | 0.94 |
| WEST | LAKADIA 765 | 0.96 | 0.99 | 1.02 | 0.95 | 1.00 | 1.01 | 0.96 | 1.03 | 1.03 | 0.95 |
| WEST | NAVSARI-NEW | 0.93 | 0.97 | 0.98 | 0.88 | 0.96 | 0.98 | 0.92 | 0.99 | 0.99 | 0.88 |
| WEST | PUNE-PG-GIS | 0.98 | 0.99 | 0.99 | 0.95 | 0.98 | 0.99 | 0.96 | 0.99 | 0.99 | 0.95 |
| WEST | PADGHEGIS | 0.96 | 0.98 | 0.99 | 0.93 | 0.97 | 0.98 | 0.95 | 0.99 | 0.99 | 0.93 |
| EAST | MEDINIPUR7 | 0.94 | 0.94 | 0.96 | 0.91 | 0.96 | 0.95 | 1.02 | 1.03 | 1.09 | 0.91 |
| EAST | JEERAT7 | 0.93 | 0.92 | 0.94 | 0.89 | 0.95 | 0.94 | 1.02 | 1.02 | 1.09 | 0.89 |

**Note: Highlighted cell indicates 765kV Bus Voltage <=0.95 P.U.**

## 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 | ASOJ-BYP-KOS | 0.96 | 1.00 | 1.03 | 0.90 | 0.99 | 1.00 | 0.96 | 1.00 | 1.01 | 0.90 |
| WEST | DGM-BYP-NICL | 0.95 | 0.99 | 1.02 | 0.90 | 0.98 | 0.99 | 0.95 | 1.00 | 1.01 | 0.90 |
| WEST | DGM-BYP-PIR | 0.96 | 1.00 | 1.02 | 0.92 | 0.99 | 1.00 | 0.96 | 1.02 | 1.02 | 0.92 |
| NORTH | K-B-FSC2 | 0.95 | 0.98 | 0.97 | 0.95 | 0.98 | 0.97 | 0.98 | 1.00 | 1.01 | 0.95 |
| NORTH | K-B-FSC3 | 0.95 | 0.98 | 0.97 | 0.95 | 0.98 | 0.97 | 0.98 | 1.00 | 1.01 | 0.95 |
| NORTH | BAMNAULI4 | 0.94 | 1.00 | 0.98 | 0.93 | 0.98 | 0.97 | 0.97 | 1.02 | 1.02 | 0.93 |
| NORTH | MUNDKA | 0.95 | 1.01 | 1.00 | 0.94 | 1.00 | 0.99 | 0.98 | 1.02 | 1.01 | 0.94 |
| NORTH | JHATIKALA-PG | 0.95 | 1.01 | 1.00 | 0.94 | 1.00 | 0.99 | 0.98 | 1.02 | 1.01 | 0.94 |
| NORTH | TUGHLAKABAD | 0.95 | 0.99 | 0.98 | 0.94 | 0.98 | 0.97 | 0.98 | 1.01 | 1.01 | 0.94 |
| NORTH | GOPAL PUR | 0.95 | 1.00 | 0.99 | 0.94 | 0.99 | 0.98 | 0.97 | 1.01 | 1.01 | 0.94 |
| NORTH | DWARKA | 0.94 | 1.00 | 0.99 | 0.93 | 0.98 | 0.98 | 0.97 | 1.02 | 1.02 | 0.93 |
| NORTH | NARELA ISTS | 0.94 | 1.01 | 0.99 | 0.94 | 0.99 | 0.99 | 0.97 | 1.01 | 1.01 | 0.94 |
| NORTH | JHATIKARASP | 0.94 | 1.00 | 0.99 | 0.93 | 0.99 | 0.98 | 0.97 | 1.02 | 1.02 | 0.93 |
| NORTH | MAHARANIBAGH | 0.95 | 1.00 | 0.99 | 0.94 | 0.99 | 0.98 | 0.98 | 1.01 | 1.01 | 0.94 |

| Area Name | Bus Name | V-Sc1 | V-Sc2 | V-Sc3 | V-Sc4 | V-Sc5 | V-Sc6 | V-Sc7 | V-Sc8 | V-Sc9 | Min |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTH | BHINMAL | 0.97 | 1.10 | 1.05 | 0.96 | 1.00 | 1.00 | 0.94 | 1.07 | 1.06 | 0.94 |
| NORTH | SIKAR NEW | 0.93 | 1.04 | 1.03 | 0.92 | 1.02 | 1.02 | 0.94 | 1.05 | 1.04 | 0.92 |
| WEST | MAGARWADA-DD | 0.96 | 0.97 | 0.99 | 0.90 | 0.97 | 0.98 | 0.96 | 0.98 | 0.99 | 0.90 |
| WEST | KALA DNH | 0.96 | 0.97 | 0.99 | 0.91 | 0.96 | 0.98 | 0.96 | 0.98 | 0.99 | 0.91 |
| WEST | ASOJ4 | 0.96 | 1.00 | 1.03 | 0.90 | 0.99 | 1.00 | 0.96 | 1.00 | 1.01 | 0.90 |
| WEST | GANCS4 | 0.96 | 0.99 | 1.01 | 0.88 | 0.98 | 1.00 | 0.96 | 0.99 | 1.00 | 0.88 |
| WEST | DEHGM4 | 0.98 | 1.01 | 1.04 | 0.92 | 1.00 | 1.01 | 0.97 | 1.00 | 1.01 | 0.92 |
| WEST | WANAKBORI | 0.97 | 1.01 | 1.04 | 0.91 | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | 0.91 |
| WEST | SOJA4 | 0.98 | 1.01 | 1.04 | 0.92 | 1.00 | 1.01 | 0.97 | 1.01 | 1.02 | 0.92 |
| WEST | UKAI | 0.96 | 0.98 | 1.01 | 0.87 | 0.97 | 1.00 | 0.96 | 0.98 | 1.00 | 0.87 |
| WEST | GPEC4 | 0.96 | 0.99 | 1.02 | 0.88 | 0.98 | 1.00 | 0.96 | 0.99 | 1.01 | 0.88 |
| WEST | VAPI4 | 0.96 | 0.97 | 0.99 | 0.91 | 0.96 | 0.99 | 0.97 | 0.97 | 0.99 | 0.91 |
| WEST | SUGEN | 0.95 | 0.98 | 1.00 | 0.86 | 0.98 | 1.00 | 0.95 | 0.98 | 1.00 | 0.86 |
| WEST | PIRANA_T | 0.93 | 0.98 | 1.00 | 0.88 | 0.98 | 0.99 | 0.92 | 1.00 | 1.00 | 0.88 |
| WEST | PIRANA_P | 0.95 | 0.99 | 1.01 | 0.90 | 0.98 | 0.99 | 0.94 | 1.01 | 1.01 | 0.90 |
| WEST | RANCHODPURA | 0.98 | 1.01 | 1.03 | 0.94 | 1.00 | 1.01 | 0.98 | 1.02 | 1.03 | 0.94 |
| WEST | KASOR4 | 0.99 | 1.02 | 1.04 | 0.95 | 1.01 | 1.01 | 0.99 | 1.02 | 1.02 | 0.95 |
| WEST | HAZIRA4 | 0.93 | 0.96 | 1.00 | 0.83 | 0.94 | 0.97 | 0.94 | 0.96 | 0.98 | 0.83 |
| WEST | SAMI_FSC | 0.99 | 1.01 | 1.04 | 0.95 | 1.01 | 1.01 | 0.98 | 1.01 | 1.02 | 0.95 |
| WEST | SAMI-F2 | 0.99 | 1.01 | 1.04 | 0.95 | 1.01 | 1.01 | 0.98 | 1.01 | 1.02 | 0.95 |
| WEST | KOSAMBA | 0.96 | 0.98 | 1.01 | 0.88 | 0.98 | 1.00 | 0.96 | 0.99 | 1.01 | 0.88 |
| WEST | SUGEN-UN | 0.95 | 0.98 | 1.00 | 0.86 | 0.98 | 1.00 | 0.95 | 0.98 | 1.00 | 0.86 |
| WEST | DGEN | 0.98 | 1.00 | 1.00 | 0.91 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.91 |
| WEST | NAVSARI | 0.98 | 0.99 | 1.00 | 0.91 | 0.98 | 1.00 | 0.98 | 0.99 | 1.00 | 0.91 |
| WEST | VADODARA | 0.95 | 1.00 | 1.02 | 0.91 | 1.00 | 1.00 | 0.96 | 1.02 | 1.02 | 0.91 |
| WEST | AHMDABAD PG | 0.94 | 0.99 | 1.01 | 0.89 | 0.98 | 0.99 | 0.93 | 1.01 | 1.01 | 0.89 |
| WEST | VAV4 | 0.96 | 0.98 | 1.00 | 0.88 | 0.97 | 1.00 | 0.96 | 0.98 | 1.00 | 0.88 |

| Area Name | Bus Name | V-Sc1 | V-Sc2 | V-Sc3 | V-Sc4 | V-Sc5 | V-Sc6 | V-Sc7 | V-Sc8 | V-Sc9 | Min |
|---|---|---|---|---|---|---|---|---|---|---|---|
| WEST | PRANTIJ | 0.98 | 1.01 | 1.04 | 0.92 | 1.00 | 1.01 | 0.97 | 1.02 | 1.02 | 0.92 |
| WEST | VAPI NEW | 0.97 | 0.97 | 0.99 | 0.91 | 0.97 | 0.99 | 0.97 | 0.97 | 0.99 | 0.91 |
| WEST | KAKRAPR-3&4 | 1.00 | 1.00 | 1.00 | 0.94 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.94 |
| WEST | NICOL TORREN | 0.94 | 0.98 | 1.01 | 0.89 | 0.97 | 0.98 | 0.93 | 1.00 | 1.00 | 0.89 |
| WEST | SAYAKHA | 0.97 | 1.00 | 1.02 | 0.89 | 0.99 | 1.01 | 0.97 | 1.00 | 1.02 | 0.89 |
| WEST | NAVSARI-NEW | 0.94 | 0.97 | 0.99 | 0.89 | 0.96 | 0.98 | 0.94 | 0.98 | 0.99 | 0.89 |
| WEST | KALWA4 | 0.96 | 0.95 | 0.96 | 0.92 | 0.93 | 0.95 | 0.95 | 0.94 | 0.97 | 0.92 |
| WEST | KHARGAR | 0.96 | 0.95 | 0.96 | 0.92 | 0.93 | 0.96 | 0.95 | 0.95 | 0.97 | 0.92 |
| WEST | LONIKAND I | 0.96 | 0.94 | 0.95 | 0.91 | 0.91 | 0.93 | 0.94 | 0.92 | 0.97 | 0.91 |
| WEST | JEJ4 | 0.96 | 0.92 | 0.94 | 0.90 | 0.89 | 0.92 | 0.94 | 0.91 | 0.96 | 0.89 |
| WEST | TAPS4 | 0.97 | 0.97 | 0.98 | 0.94 | 0.96 | 0.97 | 0.97 | 0.97 | 0.99 | 0.94 |
| WEST | BOISAR | 0.97 | 0.97 | 0.98 | 0.93 | 0.96 | 0.98 | 0.97 | 0.97 | 0.99 | 0.93 |
| WEST | CHAKAN | 0.96 | 0.94 | 0.96 | 0.91 | 0.92 | 0.94 | 0.94 | 0.93 | 0.97 | 0.91 |
| WEST | PUNE-PG-AIS | 0.97 | 0.96 | 0.97 | 0.92 | 0.93 | 0.95 | 0.95 | 0.95 | 0.98 | 0.92 |
| WEST | PUNE-PG-GIS | 0.98 | 0.98 | 0.99 | 0.95 | 0.96 | 0.98 | 0.96 | 0.97 | 0.99 | 0.95 |
| WEST | PADGHEGIS | 0.97 | 0.98 | 0.98 | 0.95 | 0.97 | 0.98 | 0.97 | 0.98 | 0.99 | 0.95 |
| WEST | JAIGAD II | 1.07 | 0.96 | 0.94 | 1.00 | 0.96 | 0.95 | 0.98 | 0.96 | 0.96 | 0.94 |
| WEST | DOLVI | 1.06 | 0.93 | 0.91 | 1.00 | 0.92 | 0.92 | 0.97 | 0.92 | 0.94 | 0.91 |
| WEST | LONIKANDII | 0.96 | 0.94 | 0.95 | 0.91 | 0.91 | 0.93 | 0.94 | 0.92 | 0.97 | 0.91 |
| WEST | HINJWD40 | 0.95 | 0.92 | 0.94 | 0.90 | 0.89 | 0.92 | 0.93 | 0.91 | 0.96 | 0.89 |
| WEST | KESURDI400 | 0.97 | 0.94 | 0.95 | 0.93 | 0.91 | 0.93 | 0.96 | 0.93 | 0.97 | 0.91 |
| WEST | RETWADI400 | 0.96 | 0.94 | 0.95 | 0.91 | 0.91 | 0.93 | 0.94 | 0.93 | 0.97 | 0.91 |
| WEST | VIKROLI400 | 0.96 | 0.95 | 0.96 | 0.92 | 0.93 | 0.95 | 0.95 | 0.94 | 0.97 | 0.92 |
| WEST | VELGAON4 | 0.97 | 0.97 | 0.98 | 0.94 | 0.95 | 0.97 | 0.96 | 0.96 | 0.98 | 0.94 |
| WEST | NAVI-MUM | 0.96 | 0.95 | 0.97 | 0.92 | 0.93 | 0.96 | 0.95 | 0.95 | 0.97 | 0.92 |
| EAST | JEY-BOL_FSC | 0.97 | 0.94 | 0.96 | 0.94 | 0.96 | 0.96 | 0.96 | 0.97 | 0.96 | 0.94 |
| EAST | PARADEEP4 | 0.96 | 0.95 | 0.93 | 0.96 | 0.96 | 0.99 | 1.01 | 1.00 | 1.08 | 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 | MEDINIPUR4 | 0.95 | 0.95 | 0.96 | 0.92 | 0.97 | 0.96 | 1.03 | 1.03 | 1.10 | 0.92 |
| EAST | RAJARHAT | 0.90 | 0.89 | 0.93 | 0.86 | 0.94 | 0.93 | 1.01 | 1.00 | 1.09 | 0.86 |
| EAST | JEERAT | 0.91 | 0.90 | 0.94 | 0.87 | 0.95 | 0.94 | 1.02 | 1.01 | 1.09 | 0.87 |
| EAST | SUBHASGRAM | 0.89 | 0.88 | 0.93 | 0.85 | 0.94 | 0.93 | 1.02 | 1.00 | 1.09 | 0.85 |
| EAST | KOLAGHAT | 0.94 | 0.92 | 0.95 | 0.91 | 0.96 | 0.96 | 1.03 | 1.02 | 1.12 | 0.91 |
| EAST | HALDIA-TPS | 0.89 | 0.92 | 0.96 | 0.84 | 0.98 | 0.96 | 1.02 | 1.02 | 1.09 | 0.84 |
| EAST | CHANDITALA_N | 0.94 | 0.93 | 0.96 | 0.91 | 0.96 | 0.96 | 1.03 | 1.02 | 1.11 | 0.91 |
| EAST | KHARAGPR-WB | 0.96 | 0.96 | 0.97 | 0.93 | 0.98 | 0.97 | 1.03 | 1.03 | 1.11 | 0.93 |
| EAST | BAKRASWR | 0.95 | 0.92 | 0.96 | 0.91 | 0.97 | 0.96 | 1.02 | 1.02 | 1.11 | 0.91 |
| EAST | ARAMBAGH | 0.94 | 0.93 | 0.96 | 0.91 | 0.97 | 0.96 | 1.03 | 1.02 | 1.11 | 0.91 |
| EAST | NEW LAXMKTNP | 0.89 | 0.89 | 0.94 | 0.84 | 0.95 | 0.94 | 1.02 | 1.01 | 1.09 | 0.84 |
| EAST | JEERAT-NEW | 0.91 | 0.90 | 0.94 | 0.87 | 0.95 | 0.94 | 1.02 | 1.01 | 1.09 | 0.87 |
| EAST | KATWA-TPS | 0.96 | 0.97 | 0.98 | 0.95 | 0.99 | 0.99 | 1.02 | 1.03 | 1.08 | 0.95 |
| SOUTH | ANNARAM-LI | 0.93 | 1.03 | 0.97 | 0.94 | 1.04 | 1.00 | 0.99 | 1.04 | 1.00 | 0.93 |
| SOUTH | SINGARENI | 0.93 | 1.04 | 0.98 | 0.95 | 1.05 | 1.00 | 1.00 | 1.05 | 1.00 | 0.93 |
| SOUTH | RAMADAGU LI | 0.95 | 1.01 | 0.96 | 0.96 | 1.02 | 0.99 | 0.99 | 1.02 | 0.98 | 0.95 |
| SOUTH | MYDARAM LI | 0.94 | 1.00 | 0.95 | 0.95 | 1.02 | 0.98 | 0.98 | 1.01 | 0.97 | 0.94 |
| SOUTH | YELLAMPALLI | 0.94 | 1.03 | 0.97 | 0.95 | 1.04 | 1.00 | 1.00 | 1.04 | 1.00 | 0.94 |

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

**Annex 7.6.1**

## 765kV Buses Exceeding Design Fault Current

| Area | Bus Name | Unit | Sc-1 | Sc-2 | Sc-3 | Sc-4 | Sc-5 | Sc-6 | Sc-7 | Sc-8 | Sc-9 | Max | Design Level | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTH | JAIPUR 765.00 | kA | 36 | 36 | 36 | 39 | 38 | 38 | 41 | 38 | 38 | 41 | 40 | STU |
| WEST | BLPSR WR 765.00 | kA | 38 | 41 | 41 | 42 | 43 | 43 | 44 | 44 | 44 | 44 | 40 | ISTS |
| WEST | BINA-PG-7 765.00 | kA | 39 | 40 | 40 | 40 | 41 | 41 | 41 | 41 | 41 | 41 | 40 | ISTS |
| WEST | JABALPR-POOL765.00 | kA | 45 | 48 | 48 | 48 | 51 | 51 | 51 | 51 | 51 | 51 | 50 | ISTS |
| WEST | WARDHA 765.00 | kA | 37 | 39 | 39 | 39 | 40 | 40 | 41 | 40 | 40 | 41 | 40 | ISTS |
| WEST | AURANG-CHTPM765.00 | kA | 37 | 39 | 39 | 38 | 40 | 40 | 41 | 40 | 40 | 41 | 40 | ISTS |

**Note: Highlighted cell indicates 765 kV Bus Fault Current greater than Design level**

## 400kV Buses Exceeding Design Fault Current

| Area | Bus Name | Unit | Sc-1 | Sc-2 | Sc-3 | Sc-4 | Sc-5 | Sc-6 | Sc-7 | Sc-8 | Sc-9 | Max | Design Level | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTH | PATIALA 400.00 | kA | 41 | 45 | 45 | 42 | 45 | 45 | 44 | 45 | 45 | 45 | 40 | ISTS |
| NORTH | JALANDHA 400.00 | kA | 38 | 43 | 43 | 39 | 43 | 43 | 42 | 43 | 43 | 43 | 40 | ISTS |
| NORTH | SONAROAD 400.00 | kA | 38 | 42 | 42 | 39 | 43 | 43 | 41 | 43 | 43 | 43 | 40 | STU |
| NORTH | DAULATABAD4 400.00 | kA | 37 | 43 | 43 | 38 | 43 | 44 | 40 | 43 | 43 | 44 | 40 | STU |
| NORTH | JHAJAR_N 400.00 | kA | 32 | 40 | 40 | 32 | 40 | 40 | 39 | 40 | 40 | 40 | 40 | GEN |
| NORTH | DHANONDA 400.00 | kA | 42 | 49 | 49 | 42 | 50 | 50 | 48 | 50 | 50 | 50 | 40 | STU |
| NORTH | PANCH-PG 400.00 | kA | 39 | 43 | 43 | 40 | 43 | 43 | 41 | 43 | 43 | 43 | 40 | ISTS |
| NORTH | ABDULLAP 400.00 | kA | 44 | 49 | 49 | 45 | 49 | 49 | 46 | 49 | 49 | 49 | 40 | ISTS |
| NORTH | BAWANA-G 400.00 | kA | 40 | 50 | 50 | 40 | 51 | 51 | 43 | 51 | 51 | 51 | 40 | STU |

| Area | Bus Name | Unit | Sc-1 | Sc-2 | Sc-3 | Sc-4 | Sc-5 | Sc-6 | Sc-7 | Sc-8 | Sc-9 | Max | Design Level | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTH | BAWANA 400.00 | kA | 40 | 50 | 51 | 41 | 51 | 51 | 43 | 51 | 51 | 51 | 40 | STU |
| NORTH | MANDOLA 400.00 | kA | 38 | 41 | 41 | 38 | 42 | 42 | 39 | 41 | 41 | 42 | 40 | ISTS |
| NORTH | MUNDKA 400.00 | kA | 36 | 42 | 42 | 36 | 42 | 42 | 38 | 42 | 42 | 42 | 40 | STU |
| NORTH | MANDOLASP2 400.00 | kA | 38 | 41 | 41 | 38 | 42 | 42 | 39 | 41 | 41 | 42 | 40 | ISTS |
| NORTH | MANDOLASP3 400.00 | kA | 38 | 41 | 41 | 38 | 42 | 42 | 39 | 41 | 41 | 42 | 40 | ISTS |
| NORTH | GOPAL PUR 400.00 | kA | 39 | 41 | 42 | 39 | 42 | 42 | 41 | 42 | 42 | 42 | 40 | STU |
| NORTH | BHADLA 400.00 | kA | 42 | 34 | 35 | 42 | 35 | 36 | 44 | 35 | 35 | 44 | 40 | STU |
| NORTH | BASSI 400.00 | kA | 44 | 44 | 44 | 45 | 45 | 46 | 47 | 45 | 45 | 47 | 40 | ISTS |
| NORTH | NEEMR-PG 400.00 | kA | 44 | 48 | 48 | 45 | 49 | 49 | 49 | 49 | 49 | 49 | 40 | ISTS |
| NORTH | SIKAR 400.00 | kA | 39 | 38 | 38 | 39 | 41 | 41 | 42 | 41 | 41 | 42 | 40 | ISTS |
| NORTH | JAIPUR_RS 400.00 | kA | 46 | 46 | 46 | 48 | 47 | 47 | 50 | 47 | 47 | 50 | 40 | STU |
| NORTH | BHADLA PG 400.00 | kA | 50 | 38 | 38 | 50 | 39 | 39 | 51 | 39 | 39 | 51 | 50 | ISTS |
| NORTH | ANTA-4 400.00 | kA | 24 | 37 | 37 | 33 | 41 | 41 | 41 | 41 | 41 | 41 | 40 | STU |
| NORTH | FATEHG-2 400.00 | kA | 51 | 36 | 36 | 52 | 36 | 37 | 53 | 36 | 36 | 53 | 50 | ISTS |
| NORTH | BHADLA-2 400.00 | kA | 52 | 39 | 39 | 52 | 40 | 40 | 53 | 39 | 39 | 53 | 50 | ISTS |
| NORTH | BHIWADI 400.00 | kA | 44 | 45 | 45 | 44 | 47 | 47 | 47 | 46 | 46 | 47 | 40 | ISTS |
| NORTH | MEJA 400.00 | kA | 41 | 42 | 42 | 42 | 49 | 49 | 48 | 48 | 48 | 49 | 40 | GEN |
| NORTH | BAGPAT 400.00 | kA | 41 | 43 | 43 | 41 | 44 | 44 | 42 | 43 | 43 | 44 | 40 | STU |
| NORTH | BARA 400.00 | kA | 40 | 41 | 41 | 41 | 45 | 45 | 44 | 44 | 44 | 45 | 40 | STU |
| NORTH | REWA 400.00 | kA | 36 | 37 | 37 | 37 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | STU |
| NORTH | GNOIDAUP 400.00 | kA | 47 | 50 | 50 | 48 | 54 | 54 | 49 | 51 | 51 | 54 | 40 | STU |
| NORTH | GAZIABAD 400.00 | kA | 38 | 40 | 40 | 39 | 42 | 41 | 40 | 40 | 40 | 42 | 40 | STU |
| NORTH | UNNAO4 400.00 | kA | 37 | 39 | 39 | 38 | 41 | 41 | 39 | 39 | 39 | 41 | 40 | STU |
| NORTH | DADR-NCR 400.00 | kA | 44 | 51 | 51 | 44 | 53 | 53 | 46 | 52 | 52 | 53 | 40 | GEN |
| NORTH | KANPUR 400.00 | kA | 45 | 47 | 47 | 46 | 48 | 48 | 47 | 48 | 48 | 48 | 40 | ISTS |

| Area | Bus Name | Unit | Sc-1 | Sc-2 | Sc-3 | Sc-4 | Sc-5 | Sc-6 | Sc-7 | Sc-8 | Sc-9 | Max | Design Level | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTH | GNOIDA4 400.00 | kA | 46 | 51 | 51 | 46 | 53 | 53 | 48 | 51 | 51 | 53 | 40 | STU |
| NORTH | LUCK4-PG 400.00 | kA | 45 | 48 | 48 | 46 | 50 | 49 | 49 | 49 | 49 | 50 | 40 | ISTS |
| NORTH | LUCK74-P 400.00 | kA | 43 | 46 | 46 | 45 | 48 | 47 | 47 | 47 | 47 | 48 | 40 | ISTS |
| NORTH | DADR-HVD 400.00 | kA | 43 | 50 | 50 | 44 | 52 | 52 | 45 | 51 | 51 | 52 | 40 | GEN |
| NORTH | ANPARA4 400.00 | kA | 49 | 51 | 51 | 51 | 52 | 52 | 52 | 52 | 52 | 52 | 40 | GEN |
| NORTH | ANPARA-D 400.00 | kA | 43 | 45 | 45 | 45 | 46 | 45 | 45 | 46 | 46 | 46 | 40 | GEN |
| NORTH | ANPARAC 400.00 | kA | 48 | 50 | 50 | 50 | 51 | 50 | 51 | 51 | 51 | 51 | 40 | GEN |
| NORTH | ALLAHABA 400.00 | kA | 45 | 47 | 47 | 46 | 50 | 50 | 49 | 50 | 50 | 50 | 40 | ISTS |
| NORTH | BAL74-PG 400.00 | kA | 41 | 43 | 43 | 41 | 47 | 44 | 46 | 46 | 46 | 47 | 40 | ISTS |
| NORTH | SARNATH4 400.00 | kA | 40 | 42 | 42 | 41 | 42 | 42 | 43 | 43 | 43 | 43 | 40 | STU |
| NORTH | KANPRNEW 400.00 | kA | 47 | 49 | 49 | 48 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | ISTS |
| NORTH | MEERUT 400.00 | kA | 58 | 62 | 62 | 58 | 63 | 63 | 61 | 62 | 62 | 63 | 40 | ISTS |
| NORTH | AGRA 400.00 | kA | 50 | 50 | 50 | 50 | 52 | 52 | 52 | 51 | 51 | 52 | 40 | STU |
| NORTH | SINGRL4 400.00 | kA | 43 | 43 | 43 | 43 | 44 | 44 | 44 | 44 | 44 | 44 | 40 | GEN |
| NORTH | TIKRI KHURD 400.00 | kA | 37 | 45 | 45 | 37 | 45 | 45 | 39 | 45 | 45 | 45 | 40 | STU |
| WEST | KNTPC 400.00 | kA | 45 | 44 | 44 | 46 | 44 | 44 | 47 | 44 | 44 | 47 | 40 | GEN |
| WEST | BHI4 400.00 | kA | 43 | 45 | 45 | 45 | 46 | 46 | 47 | 46 | 46 | 47 | 40 | GEN |
| WEST | JINDAL_EX 400.00 | kA | 39 | 42 | 42 | 42 | 42 | 42 | 43 | 43 | 43 | 43 | 40 | GEN |
| WEST | BIL-POOL 400.00 | kA | 37 | 43 | 43 | 46 | 47 | 47 | 47 | 47 | 47 | 47 | 40 | ISTS |
| WEST | RAIPUR SPLT 400.00 | kA | 40 | 41 | 41 | 41 | 42 | 42 | 43 | 42 | 42 | 43 | 40 | ISTS |
| WEST | CHORN4 400.00 | kA | 40 | 42 | 42 | 40 | 43 | 43 | 42 | 44 | 44 | 44 | 40 | STU |
| WEST | RANCHODPURA 400.00 | kA | 37 | 38 | 38 | 37 | 39 | 39 | 39 | 40 | 40 | 40 | 40 | STU |
| WEST | CGPL 400.00 | kA | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 40 | GEN |
| WEST | VADODARA 400.00 | kA | 38 | 40 | 40 | 39 | 41 | 41 | 39 | 41 | 41 | 41 | 40 | ISTS |
| WEST | BHUJ POOL 400.00 | kA | 43 | 40 | 41 | 43 | 40 | 42 | 43 | 41 | 41 | 43 | 40 | ISTS |

| Area | Bus Name | Unit | Sc-1 | Sc-2 | Sc-3 | Sc-4 | Sc-5 | Sc-6 | Sc-7 | Sc-8 | Sc-9 | Max | Design Level | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WEST | SANKHARI 400.00 | kA | 42 | 42 | 42 | 42 | 44 | 44 | 45 | 46 | 46 | 46 | 40 | STU |
| WEST | NAVSARI-NEW 400.00 | kA | 38 | 41 | 41 | 38 | 41 | 41 | 39 | 41 | 41 | 41 | 40 | ISTS |
| WEST | BHOPAL-4 400.00 | kA | 40 | 40 | 40 | 41 | 41 | 41 | 42 | 41 | 41 | 42 | 40 | STU |
| WEST | BINA-4 400.00 | kA | 37 | 39 | 39 | 40 | 39 | 39 | 40 | 39 | 39 | 40 | 40 | ISTS |
| WEST | NAGDA-4 400.00 | kA | 40 | 39 | 40 | 40 | 41 | 41 | 41 | 42 | 42 | 42 | 40 | STU |
| WEST | JABALPUR-4 400.00 | kA | 36 | 37 | 37 | 36 | 40 | 40 | 41 | 40 | 40 | 41 | 40 | ISTS |
| WEST | ITARSI-4 400.00 | kA | 38 | 39 | 39 | 39 | 40 | 40 | 41 | 41 | 41 | 41 | 0 | ISTS |
| WEST | KHANDWA-4 400.00 | kA | 40 | 42 | 42 | 43 | 45 | 45 | 43 | 46 | 46 | 46 | 40 | ISTS |
| WEST | BINA-PG-74 400.00 | kA | 37 | 39 | 39 | 40 | 39 | 40 | 41 | 40 | 40 | 41 | 40 | ISTS |
| WEST | PARLI-GIRWAL400.00 | kA | 40 | 40 | 40 | 41 | 40 | 41 | 43 | 41 | 41 | 43 | 40 | STU |
| WEST | CHANDRAPUR I400.00 | kA | 24 | 39 | 39 | 24 | 44 | 44 | 45 | 44 | 44 | 45 | 40 | STU |
| WEST | BHADR4 400.00 | kA | 23 | 34 | 34 | 23 | 40 | 40 | 41 | 40 | 40 | 41 | 40 | ISTS |
| WEST | AURANGBD-I 400.00 | kA | 44 | 45 | 45 | 45 | 45 | 45 | 46 | 46 | 46 | 46 | 40 | STU |
| WEST | CHANDRPR-II 400.00 | kA | 24 | 39 | 39 | 24 | 44 | 44 | 45 | 44 | 44 | 45 | 40 | STU |
| WEST | PARLI-PG 400.00 | kA | 41 | 41 | 41 | 42 | 41 | 41 | 44 | 41 | 41 | 44 | 0 | ISTS |
| WEST | AURANGABD-II400.00 | kA | 44 | 45 | 45 | 45 | 46 | 46 | 47 | 46 | 46 | 47 | 40 | STU |
| WEST | AURANGBD-III400.00 | kA | 44 | 45 | 45 | 45 | 46 | 46 | 47 | 46 | 46 | 47 | 40 | STU |
| WEST | PARLI NEW 400.00 | kA | 39 | 38 | 38 | 39 | 39 | 39 | 41 | 39 | 39 | 41 | 40 | ISTS |
| WEST | PADGHEGIS 400.00 | kA | 49 | 53 | 53 | 50 | 53 | 53 | 51 | 53 | 53 | 53 | 50 | ISTS |
| WEST | KUDUS 400.00 | kA | 51 | 54 | 55 | 52 | 55 | 55 | 53 | 55 | 55 | 55 | 40 | STU |
| WEST | CHNDPUR_SW 400.00 | kA | 23 | 37 | 37 | 23 | 42 | 42 | 43 | 42 | 42 | 43 | 40 | STU |
| EAST | PATNA 400.00 | kA | 30 | 32 | 32 | 31 | 41 | 33 | 40 | 40 | 40 | 41 | 40 | ISTS |
| EAST | GAYA-PG 400.00 | kA | 43 | 46 | 46 | 44 | 50 | 46 | 54 | 54 | 54 | 54 | 40 | ISTS |
| EAST | BARH-I 400.00 | kA | 28 | 31 | 31 | 28 | 47 | 31 | 47 | 47 | 47 | 47 | 40 | GEN |
| EAST | BARH-II 400.00 | kA | 28 | 31 | 31 | 28 | 47 | 31 | 47 | 47 | 47 | 47 | 40 | GEN |

| Area | Bus Name | Unit | Sc-1 | Sc-2 | Sc-3 | Sc-4 | Sc-5 | Sc-6 | Sc-7 | Sc-8 | Sc-9 | Max | Design Level | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EAST | PURNEA-NW-PG400.00 | kA | 38 | 40 | 40 | 38 | 41 | 40 | 40 | 41 | 41 | 41 | 40 | ISTS |
| EAST | JHARSUGUDA-A400.00 | kA | 50 | 51 | 51 | 51 | 52 | 52 | 52 | 52 | 52 | 52 | 40 | ISTS |
| EAST | STERLITE 400.00 | kA | 50 | 51 | 51 | 51 | 51 | 51 | 52 | 52 | 52 | 52 | 50 | STU |
| EAST | JHARSUGUDA-B400.00 | kA | 40 | 41 | 41 | 41 | 43 | 41 | 42 | 42 | 42 | 43 | 40 | ISTS |
| EAST | GAZUWAKA-ER 400.00 | kA | 52 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 52 | 40 | ISTS |
| EAST | SAGARDIGHI_4400.00 | kA | 30 | 40 | 40 | 30 | 40 | 40 | 32 | 40 | 40 | 40 | 40 | GEN |
| EAST | FARAKKA 400.00 | kA | 38 | 44 | 44 | 38 | 45 | 44 | 41 | 45 | 45 | 45 | 40 | ISTS |
| EAST | ESSAR-BYPASS400.00 | kA | 35 | 36 | 36 | 35 | 37 | 36 | 43 | 43 | 43 | 43 | 40 | GEN |
| EAST | JHARKND-POOL400.00 | kA | 36 | 37 | 37 | 36 | 38 | 37 | 44 | 44 | 44 | 44 | 40 | ISTS |
| EAST | RANCHI 400.00 | kA | 41 | 43 | 43 | 42 | 43 | 43 | 47 | 47 | 47 | 47 | 40 | ISTS |
| EAST | RANCHNEW 400.00 | kA | 48 | 50 | 50 | 48 | 50 | 50 | 54 | 54 | 54 | 54 | 40 | ISTS |
| SOUTH | KURNOOL4 400.00 | kA | 44 | 43 | 43 | 44 | 43 | 43 | 43 | 44 | 41 | 44 | 40 | STU |
| SOUTH | VIJ-AP 400.00 | kA | 37 | 41 | 41 | 38 | 41 | 41 | 40 | 42 | 41 | 42 | 40 | STU |
| SOUTH | RAMGUNDM STP400.00 | kA | 38 | 40 | 40 | 38 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | GEN |
| SOUTH | HYDERABAD-TS400.00 | kA | 42 | 47 | 47 | 42 | 44 | 44 | 47 | 47 | 47 | 47 | 40 | STU |
| SOUTH | DICHPAL4 400.00 | kA | 36 | 40 | 40 | 36 | 40 | 40 | 41 | 40 | 40 | 41 | 40 | STU |
| SOUTH | NIZAMABAD 400.00 | kA | 38 | 42 | 42 | 38 | 42 | 42 | 43 | 43 | 42 | 43 | 40 | ISTS |
| SOUTH | MAHESWRM 400.00 | kA | 56 | 62 | 63 | 56 | 59 | 59 | 63 | 63 | 62 | 63 | 63 | ISTS |
| SOUTH | MAHESH-TS 400.00 | kA | 56 | 63 | 63 | 56 | 59 | 59 | 63 | 63 | 62 | 63 | 50 | STU |
| SOUTH | TIPPAPUR LI 400.00 | kA | 33 | 41 | 41 | 33 | 39 | 39 | 41 | 41 | 41 | 41 | 40 | STU |
| SOUTH | CHANDULAPUR 400.00 | kA | 34 | 42 | 42 | 34 | 40 | 40 | 42 | 42 | 42 | 42 | 40 | STU |
| SOUTH | DINDI 400.00 | kA | 41 | 47 | 47 | 41 | 43 | 43 | 47 | 47 | 46 | 47 | 40 | STU |
| SOUTH | NELMANG4 400.00 | kA | 39 | 40 | 40 | 40 | 41 | 41 | 42 | 42 | 41 | 42 | 40 | STU |
| SOUTH | MADHUGI4 400.00 | kA | 42 | 42 | 42 | 44 | 44 | 44 | 45 | 44 | 43 | 45 | 40 | ISTS |
| SOUTH | UDMP 400.00 | kA | 41 | 44 | 45 | 43 | 46 | 46 | 40 | 46 | 42 | 46 | 40 | ISTS |

| Area | Bus Name | Unit | Sc-1 | Sc-2 | Sc-3 | Sc-4 | Sc-5 | Sc-6 | Sc-7 | Sc-8 | Sc-9 | Max | Design Level | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SOUTH | PUGALUR4 400.00 | kA | 36 | 38 | 38 | 37 | 39 | 40 | 34 | 40 | 35 | 40 | 40 | ISTS |
| SOUTH | TIRUNEL4 400.00 | kA | 37 | 38 | 38 | 39 | 42 | 42 | 38 | 42 | 38 | 42 | 40 | ISTS |
| SOUTH | TUTI-POOL 400.00 | kA | 30 | 30 | 31 | 39 | 40 | 41 | 35 | 40 | 35 | 41 | 40 | ISTS |
| SOUTH | ARIYALUR4 400.00 | kA | 36 | 40 | 40 | 37 | 41 | 41 | 38 | 41 | 40 | 41 | 40 | STU |

**Note: Highlighted cell indicates 400 kV Bus Fault Current greater than Design level**

**Prepared by**
**Central Transmission Utility (CTU)**

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