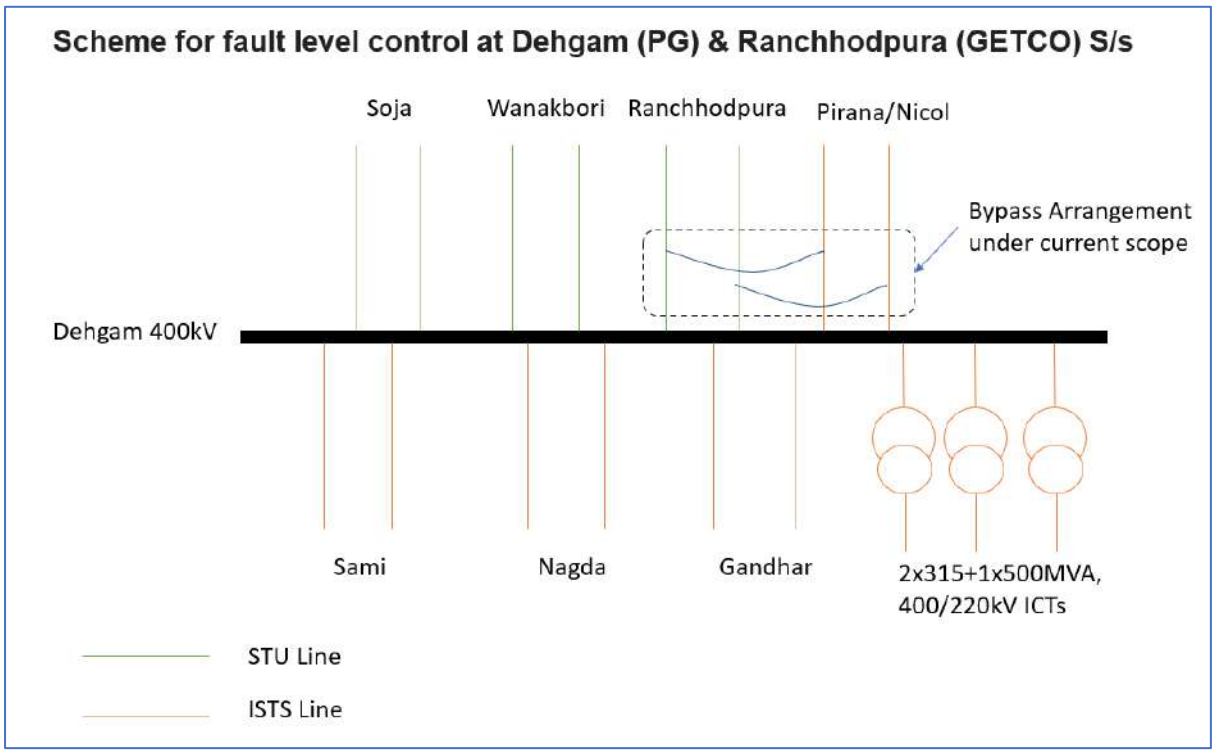
Figure 5-5: Schematic for fault level control at Dehgam(PG) & Ranchodpura(GETCO) substations



5.4.2 Chhattisgarh

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

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

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

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

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

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

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

a) <u>Western Region Expansion Scheme-XXVII (WRES-XXVII)</u>

The scheme involves Raipur Pool – Dhamtari 400 kV D/c line. The scheme was planned in the 2nd Joint study meeting on Transmission Planning for Western Region on 10.12.2021 & 2nd CMETS-WR meeting held on 28.12.2021 for improvement of import capability of

Chhattisgarh and reliability of power supply to Dhamtari S/s of CSPTCL and for relieving loading on NSPCL ICTs which are critically loaded in present time-frame.

Scope of work along with tentative Cost and Implementation time-frame is mentioned below in Table 5-11:

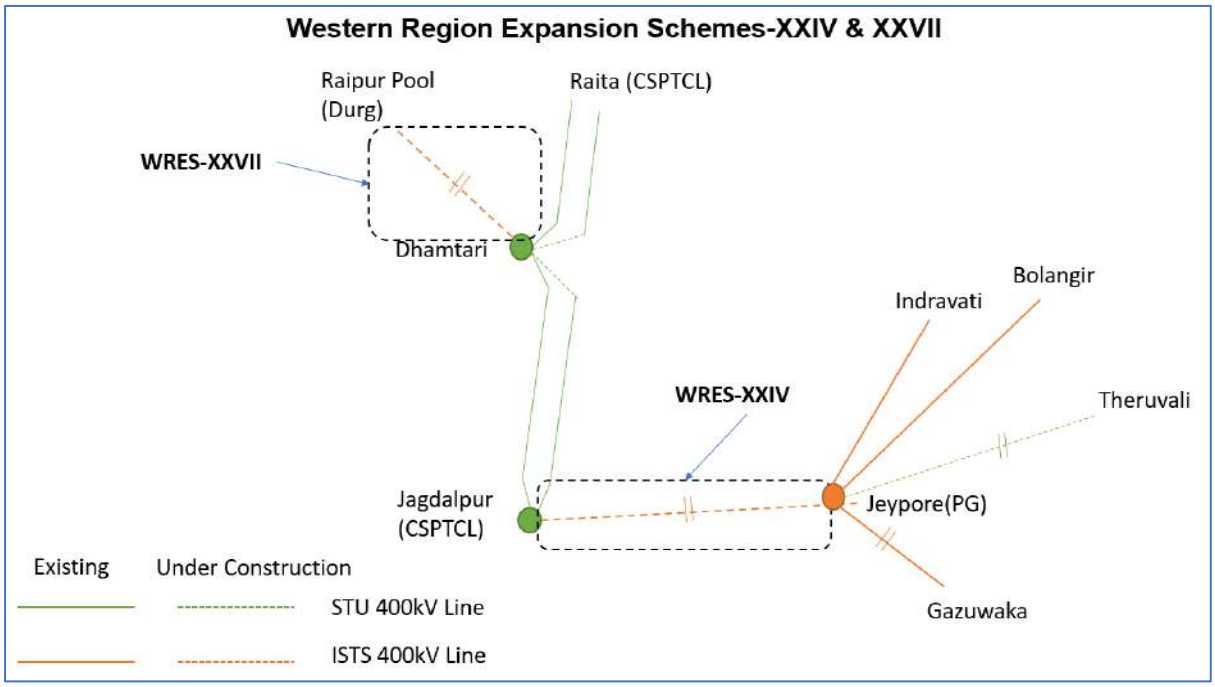
Table 5-11: Western Region Expansion Scheme-XXVII (WRES-XXVII)

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

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

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

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



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

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

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

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

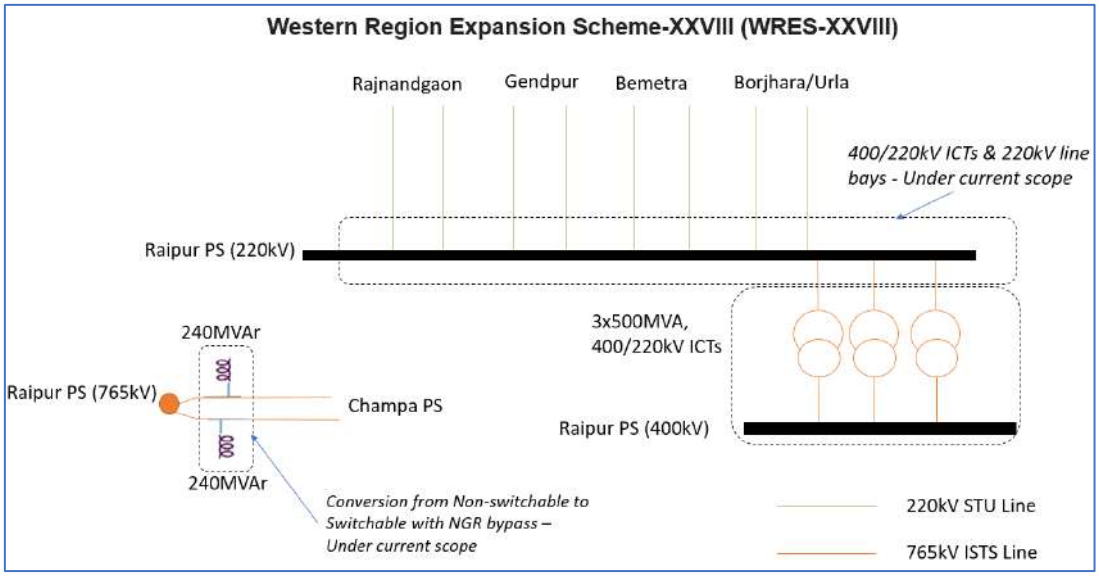
Table 5-12: Western Region Expansion Scheme-XXVIII (WRES-XXVIII)

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

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

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

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



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

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

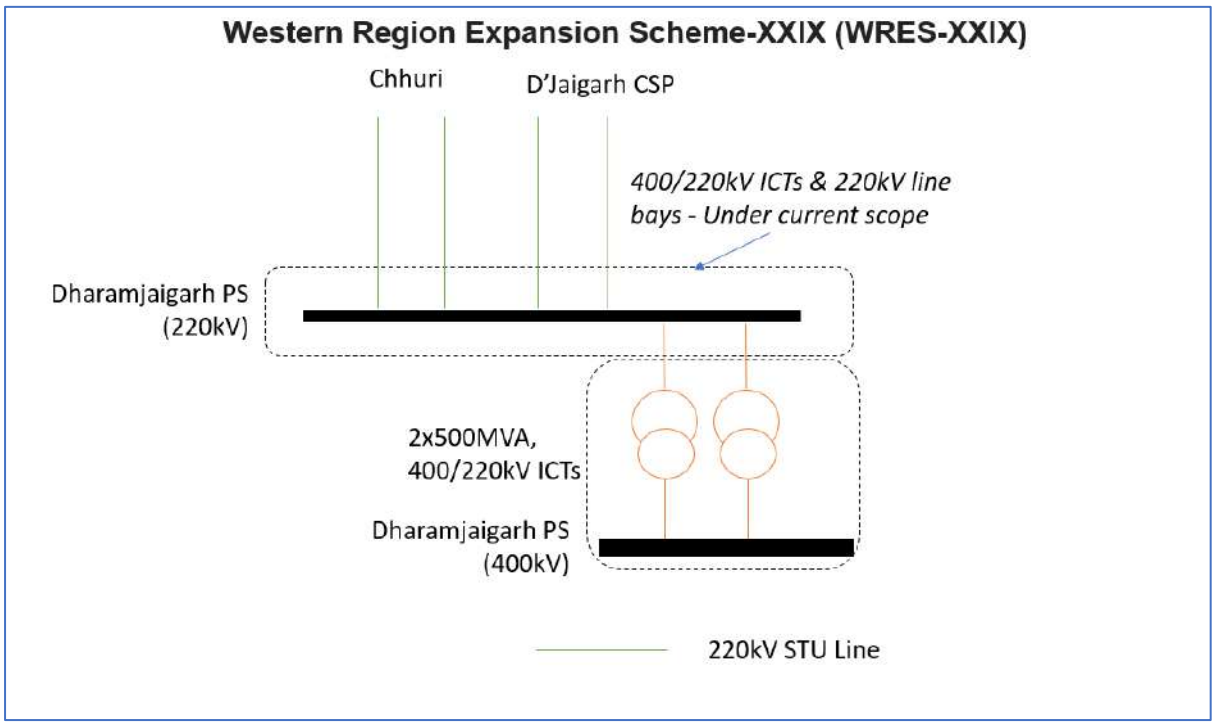
Scope of work along with tentative Cost and Implementation time-frame is mentioned below in Table 5-13:

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

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

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

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



Inter-Regional Scheme:

d) <u>Western Region Expansion Scheme-XXIV (WRES-XXIV)</u>

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

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

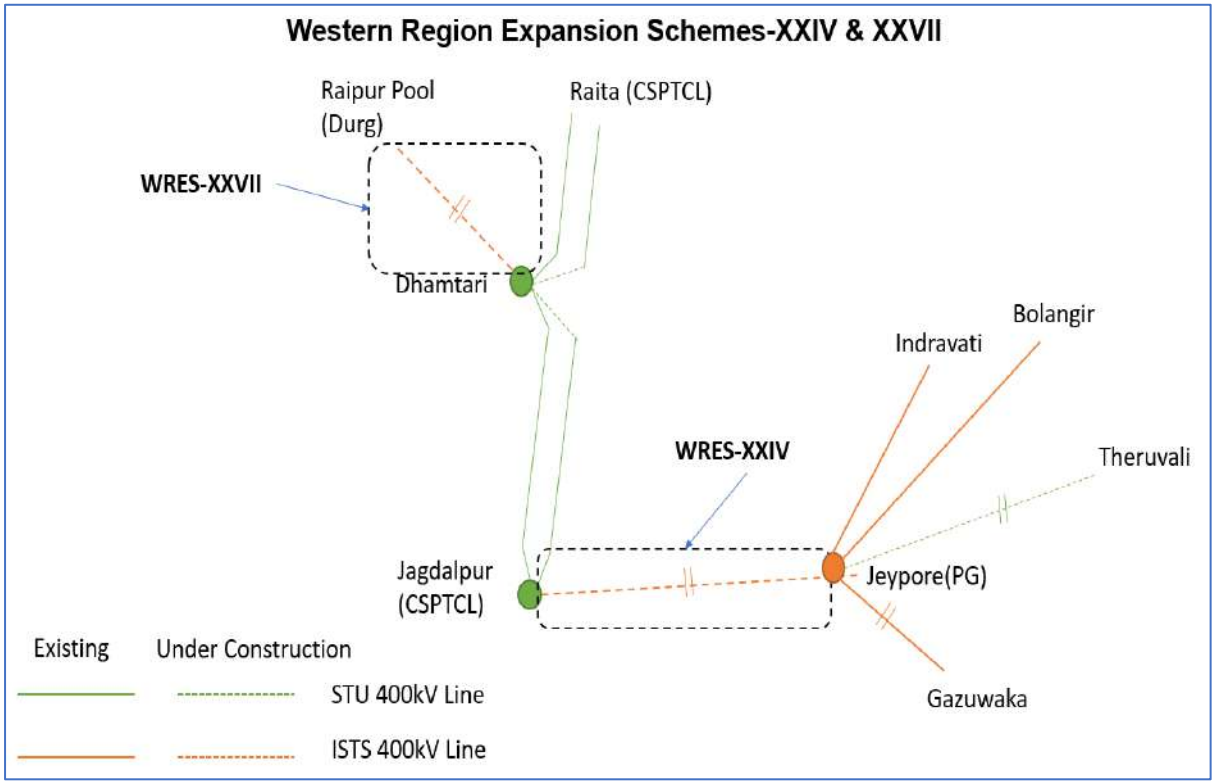
Table 5-14: Western Region Expansion Scheme-XXIV (WRES-XXIV)

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

Sl. No.	Scope of the Transmission Scheme	Capacity/km	Implementation timeframe
			(anticipated by Mar-24), whichever is later
		Total Estimated Cost:	**Rs. 293 Crore**

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

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



Other Schemes:

e) <u>Western Region Expansion Scheme-XXV (WRES-XXV)</u>

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

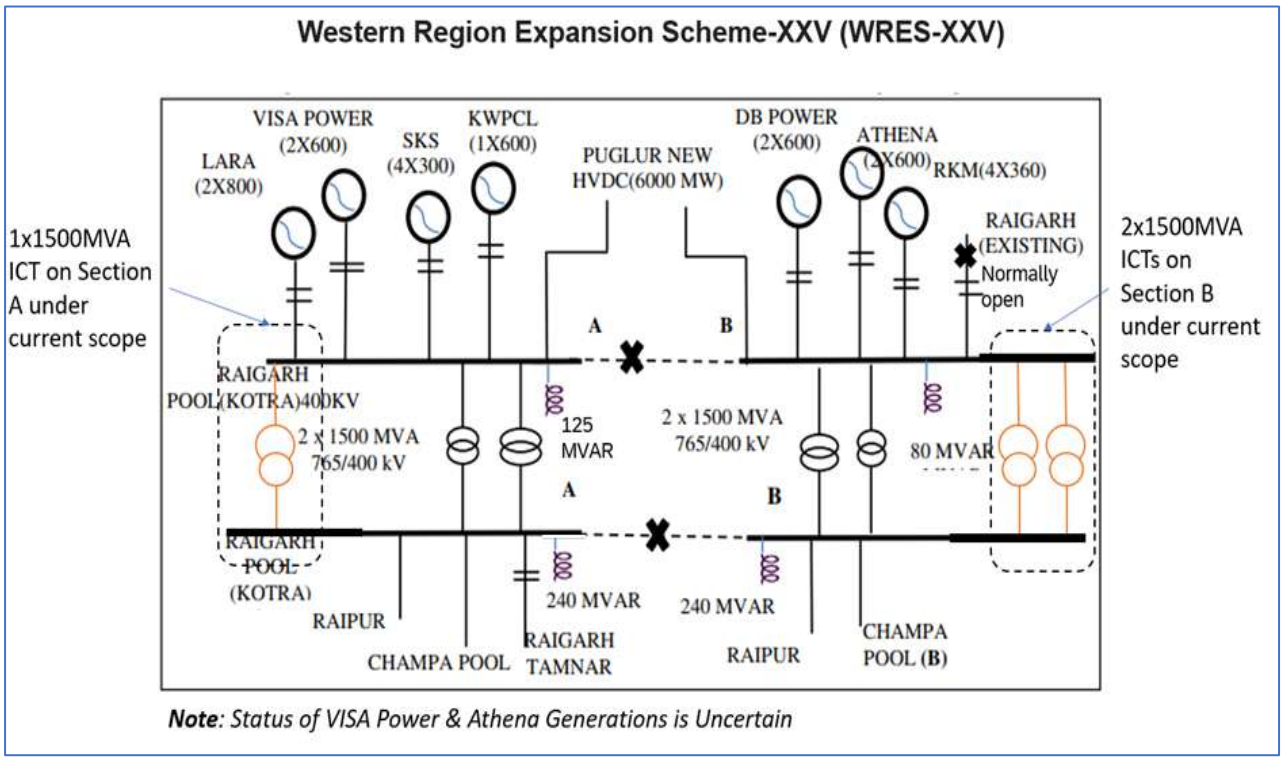
Scope of work along with tentative Cost and Implementation time-frame is mentioned below in Table 5-15:

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

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

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

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



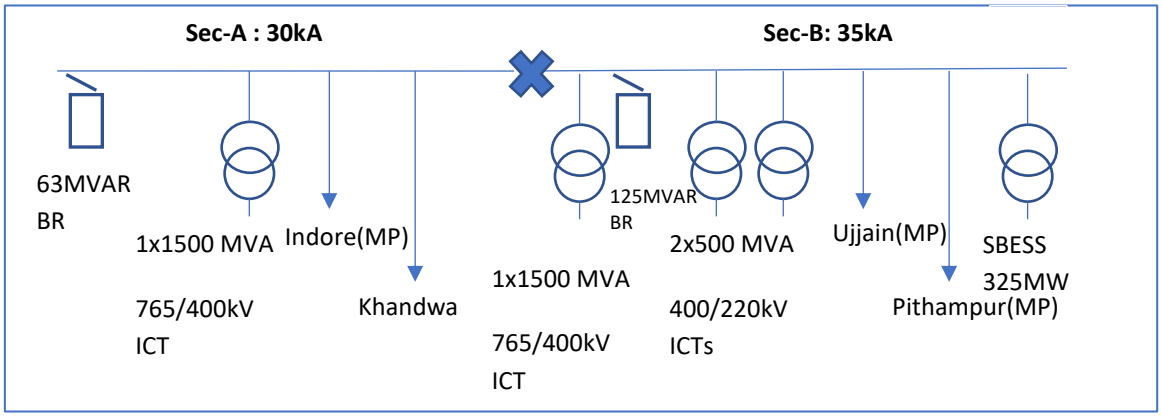
5.4.3 Madhya Pradesh:

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

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

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

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



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

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

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

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

5.4.4 Maharashtra:

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

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

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

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

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

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

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

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

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

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

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

The scheme involves Creation of 220kV level (GIS) at 765/400kV Shikrapur (PGCIL) (GIS) Substation with 2x500MVA, 400/220kV ICTs and 4 nos. of 220kV line bays. The scheme has

been evolved to feed demand in the vicinity of the Pune area (Ranjangaon/Khed City) through deliberations in 2nd CMETS-WR meeting held on 28.12.2021.

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

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

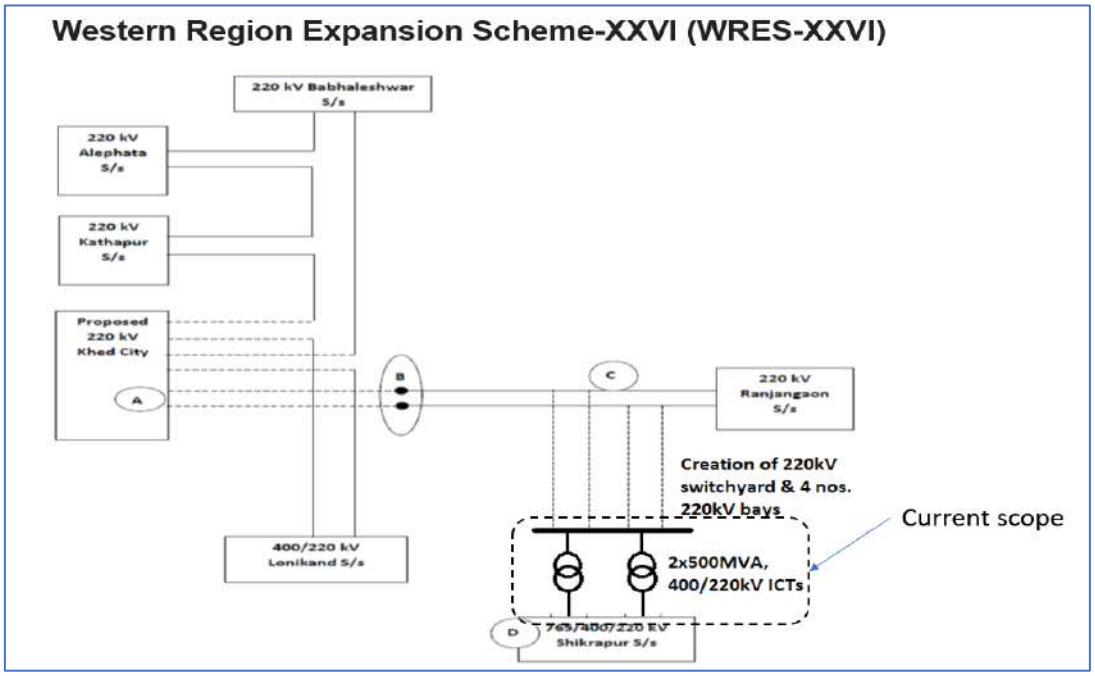
Sl. No.	Scope of the Transmission Scheme	Capacity	Implementation timeframe
1	Creation of 220kV level (GIS) at 765/400kV Shikrapur (PGCIL) (GIS) Substation with 2x500MVA, 400/220kV ICTs and 4 nos. of 220kV line bays.	400/220kV, 500MVA ICT– 2 nos. 400kV ICT Bay (GIS) – 2nos. 220kV ICT Bay (GIS) –2nos.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

Note:

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

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

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



Inter-Regional Scheme:

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

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

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

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

**Narendra (New)(GIS) - Kolhapur 765kV D/c line to be kept charged at 400kV level*

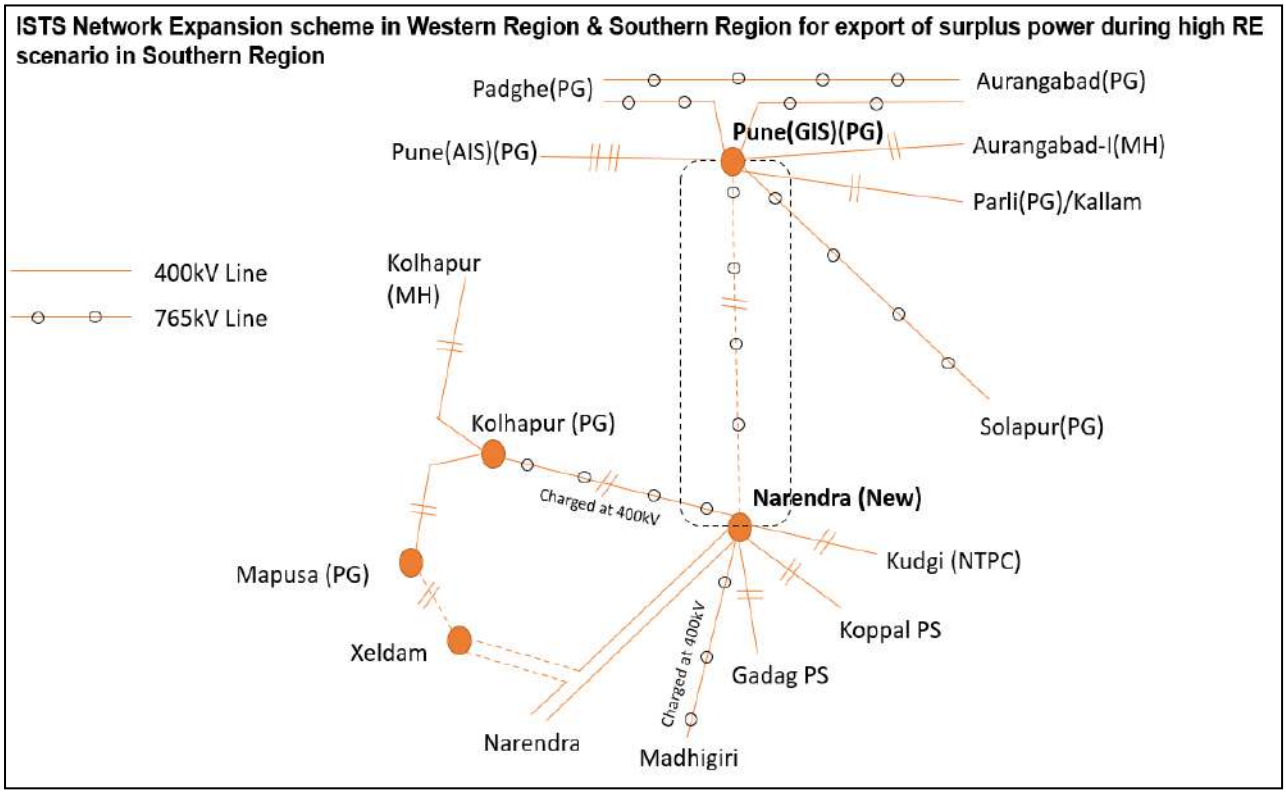
^ Two nos. equipped 400kV bays (opposite Koppal line bays) under implementation under TBCB route (Koppal WEZ scheme) to be utilised for 400kV side of 2 nos. 765/400kV Transformers

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

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

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

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



5.5 System Study Analysis and Results

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

5.5.1 Voltage Analysis

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

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

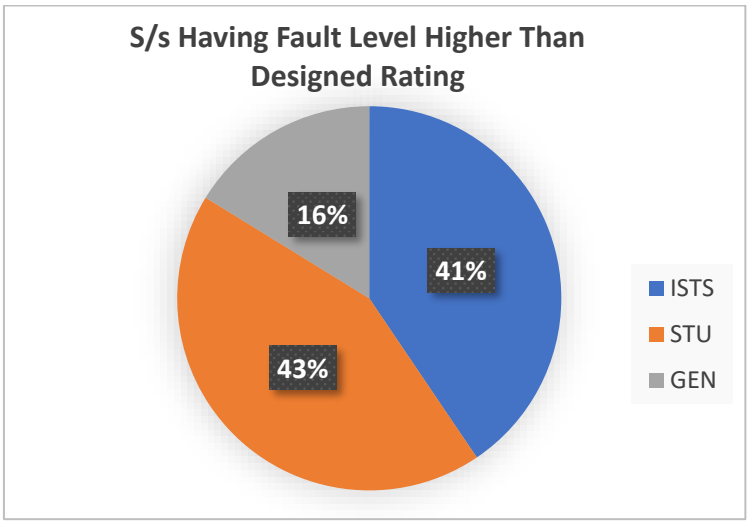
Sl. No.	Bus Name	Voltage Level	Owner	Max/Min	Scenario
Overvoltage					
1	Wardha	765	ISTS	1.05	2 and 3
2	Aurangabad	765	ISTS	1.05	2 and 3
3	Shivlakha PS	400	STU	1.06	3,8 and 9
4	Mauda	400	ISGS	1.05	2 and 3
5	Jaigad II	400	STU	1.11	1
6	Dolvi	400	STU	1.10	1
7	Wardha SP	400	ISTS	1.05	2 and 3
8	Warora Pool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

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

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

5.5.2 Short Circuit Analysis

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



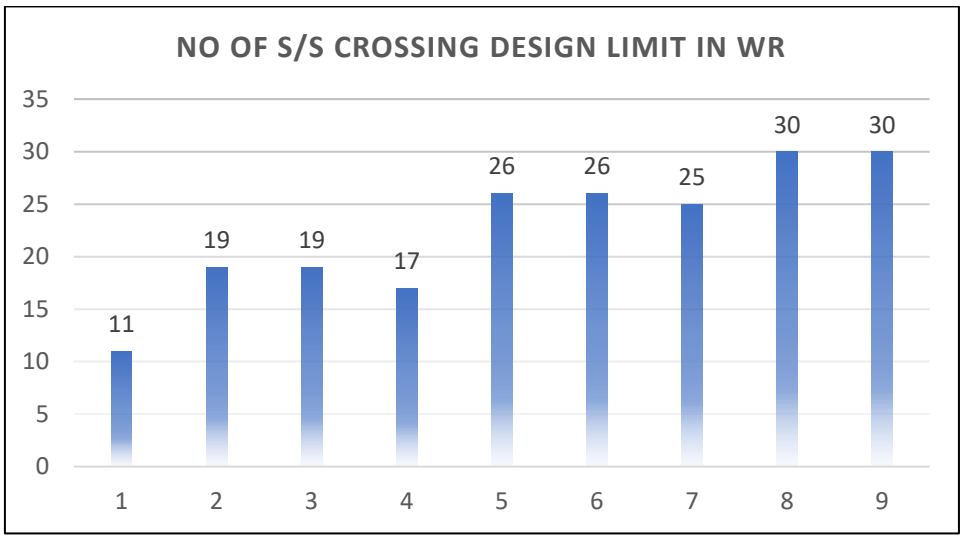


Figure 5-14: Substations crossing the design limit in WR

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

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

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

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

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

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

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

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

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

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

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

- High fault levels at various 400kV substations of MSETCL

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

5.5.3 Contingency Analysis

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

a) Transmission Lines

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

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

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

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

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

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

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

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

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

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

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

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

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

b) Transformers

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

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

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

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

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

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

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

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

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

Sl. No.	Name of the Element	Scenario No.	Owner	Maximum Base Case Flow	Maximum Loading under N-1 of ICT	% Loading	Rating
1	400/220kV, (2X315) + (1X500) MVA Nagothane ICTs	1	MSETCL	400	515	163%	315
2	400/220kV, 2X315 MVA Dolvi ICTs	4	MSETCL	294	656	131%	500
3	400/220kV 2X500 MVA Prantij ICTs	4	GETCO	335	502	100%	500
4	400/220kV 2X315 MVA Mandsaur ICTs	7	MPPTCL	273	387	123%	315

Sl. No.	Name of the Element	Scenario No.	Owner	Maximum Base Case Flow	Maximum Loading under N-1 of ICT	% Loading	Rating
5	400/220kV 2X500 MVA Malegaon ICTs	7	MSETCL	403	604	120%	500
6	400/220kV 2X315 MVA Sagar ICTs	7	MPPTCL	256	366	116%	315
7	400/220kV 3X315 MVA Chakan ICTs	7	MSETCL	260	348	110%	315
8	400/220kV 2X500 MVA Kudus ICTs	7	MSETCL	461	555	111%	500
9	400/220kV 3X315 MVA Zerda ICTs	7	GETCO	285	353	112%	315
10	400/220kV (3X315 +1x500+1x600) MVA Padghe ICTs	7	MSETCL	279	335	106%	315
11	400/220kV 3X500 MVA Velgaon ICTs	7	MSETCL	426	504	101%	500
12	400/220kV, 2X315 MVA Mundra APL ICTs	2	APL	275	379	120%	315
13	400/220kV, 2X500 MVA Koradi II ICTs	2,3	Maha Genco	556	809	162%	500
14	400/220kV, 2x500MVA Nanded ICTs	8	MSETCL	322	506	101%	500

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

Chapter 6: Southern Region

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

6.1 Present Power Supply Scenario

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

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

(All Fig in GW)

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

Source: CEA monthly report

6.2 Envisaged Power Supply Scenario

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

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

(All Fig in GW)

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

There is growth of around 43 % in peak demand of Southern Region from present time-frame to 2026-27. The state wise peak demand growth is given at **Table 6-3**.

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

(All Fig in MW)

Peak Demand (MW)				
State	**2021-22**	**2026-27**	**Difference**	**% Increase**
Andhra Pradesh	11570	16820	5250	45.38%
Telangana	13622	18653	5031	36.93%
Karnataka	14158	18481	4323	30.53%
Kerala	4261	6603	2342	54.96%
Tamil Nadu	16541	27392	10851	65.60%
Puducherry	465	708	243	52.26%
Total	**58430**	**83652**	**25222**	**43.17%**

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

6.3 Load generation Balance

In the previous chapter, All India Load Generation Balance (LGB) for identified nine scenarios was prepared as per the methodology finalized in consultation with CTU, CEA and POSOCO. This section elaborates the Southern Region Load Generation Balance (LGB) for 2026-27 time-frame. For Southern Region also, three points on the daily load curve i.e. Solar max (afternoon), Peak load (evening) and Off-peak load (night) for three seasons viz. Monsoon (August), Summer (June) and Winter (February) have been considered.

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

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

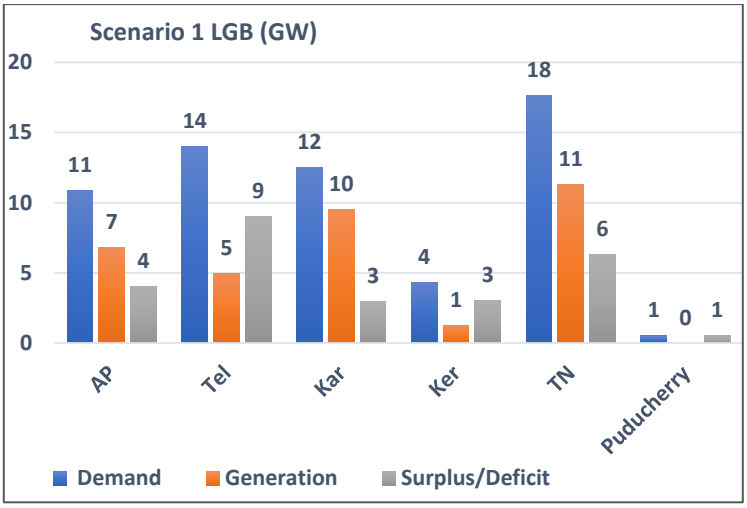
Scenario No & Name	Generation Dispatch Factors						Demand Factors
	Hydro	Nuclear	Solar	Rooftop	Wind	Gas	
1-Aug Solar Max	40%	80%	80%	50%	55%	0%	74%
2-Aug Peak Load	70%	80%	0%	0%	75%	85%	76%
3-Aug Night Off Peak	40%	80%	0%	0%	65%	65%	63%
4-Jun Solar Max	40%	80%	85%	60%	55%	0%	80%
5-Jun Peak Load	70%	80%	0%	0%	75%	85%	85%
6-Jun Night Off Peak	40%	80%	0%	0%	65%	60%	71%
7-Feb Solar Max	20%	80%	90%	60%	0%	0%	94%
8-Feb Peak Load	40%	80%	0%	0%	20%	85%	86%
9-Feb Night Off Peak	20%	80%	0%	0%	0%	30%	70%

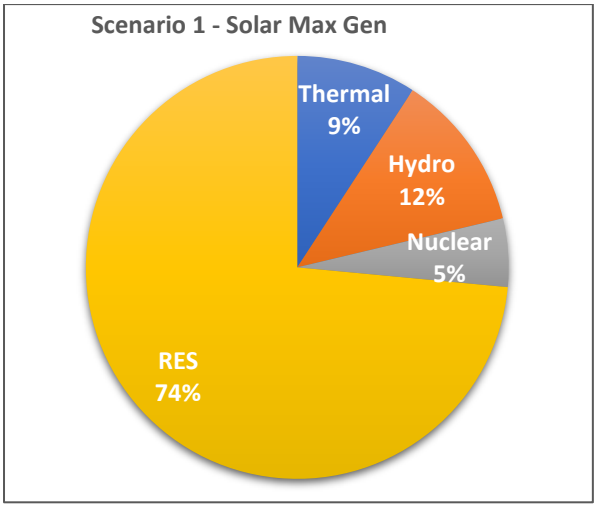
Out of these nine scenarios, Scenario-3 and Scenario-7 corresponds to two extreme cases with respect to demand i.e. lowest demand (52.8 GW) and highest demand (76.2 GW) scenarios respectively. In all other scenarios, Southern Region demand is varying between these two demands as per demand factors.

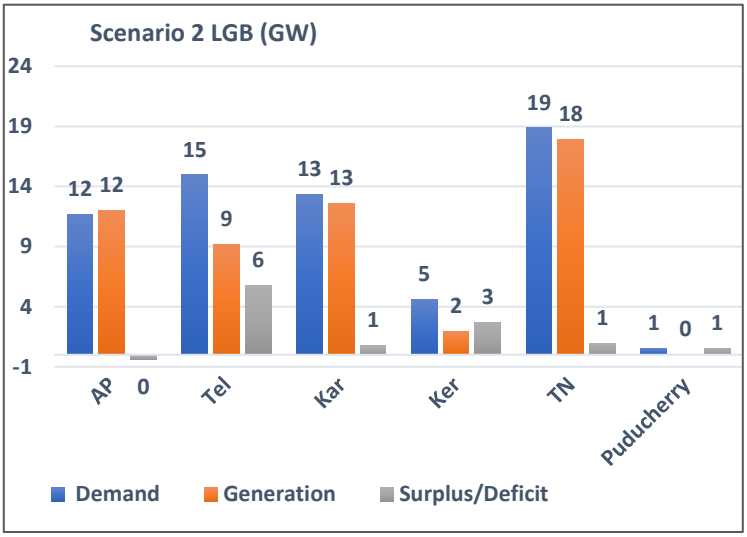
Southern Region LGBs for all 9 nos. of scenarios are summarized in below figures.

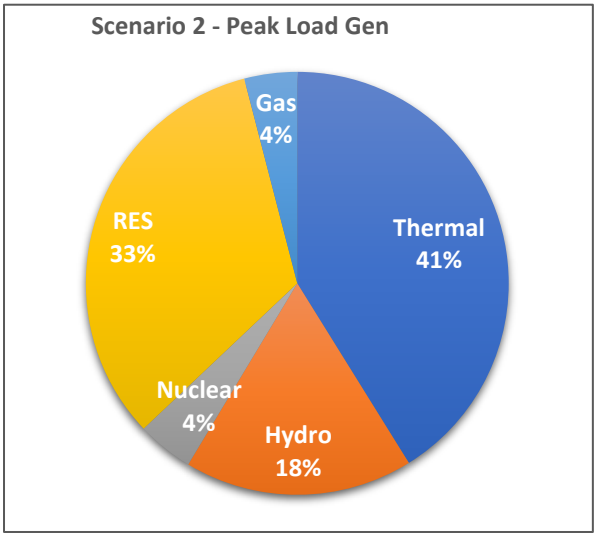
6.3.1 Monsoon Aug'2026

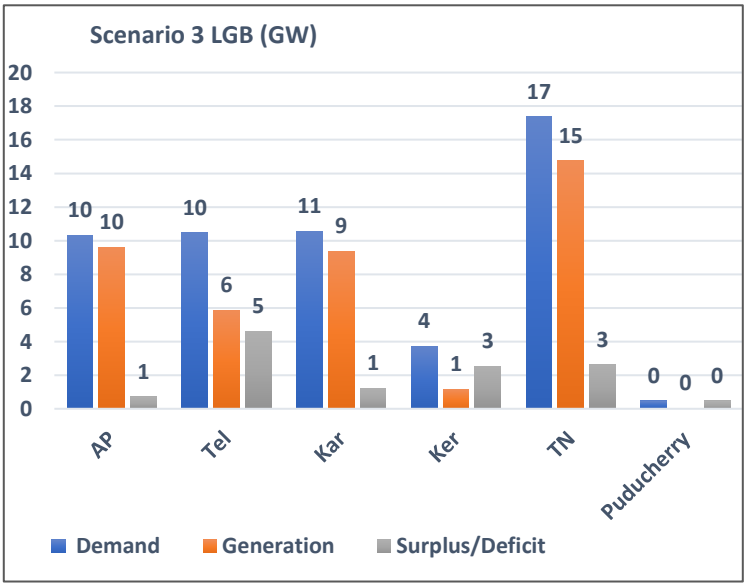
Figure 6-1: LGB For Monsson Aug'2026

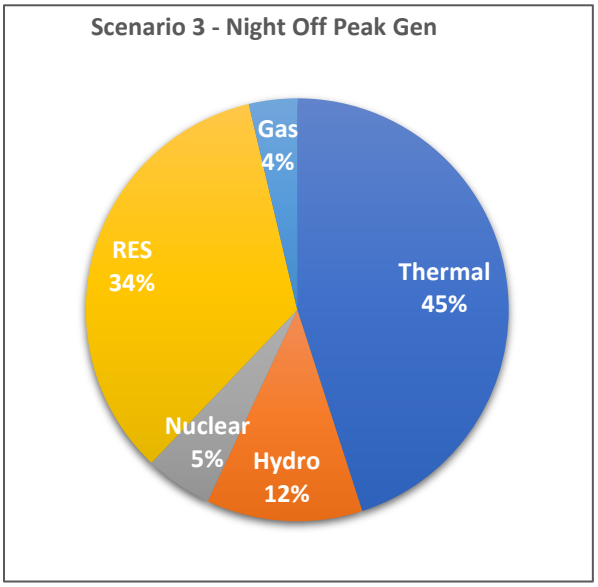






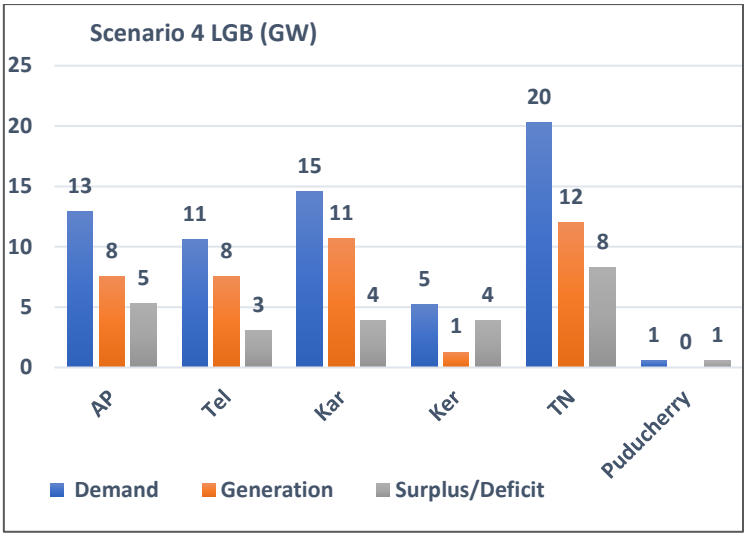


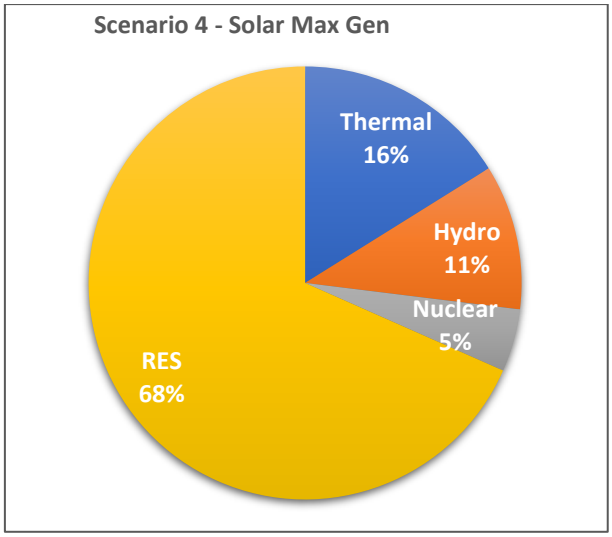


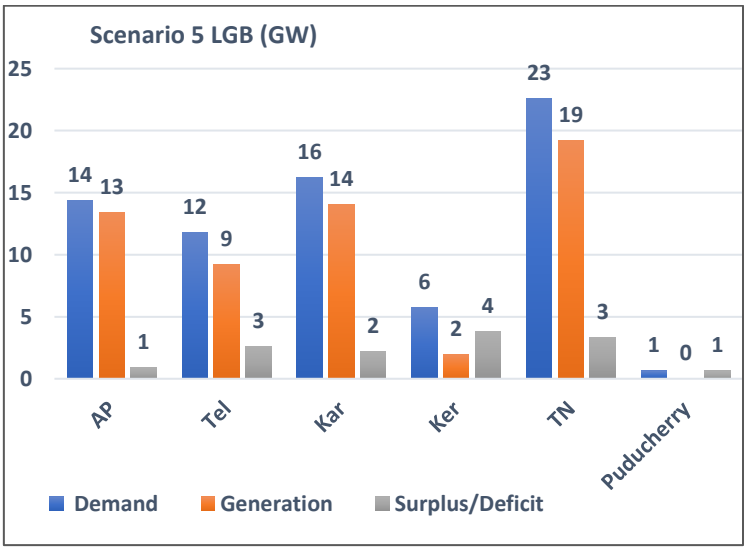


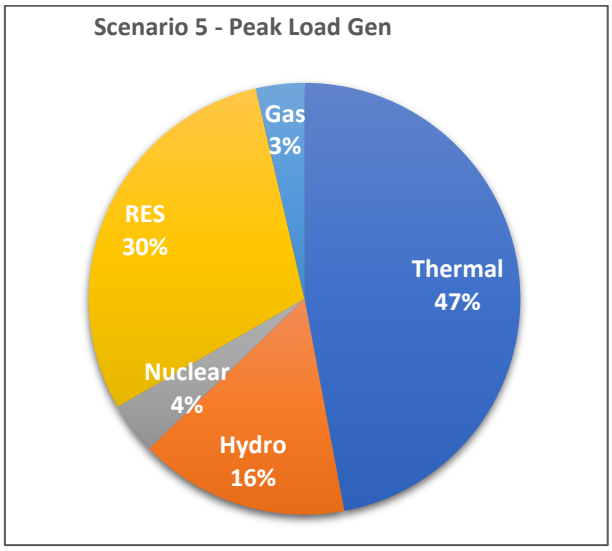
6.3.2 Summer June'2026

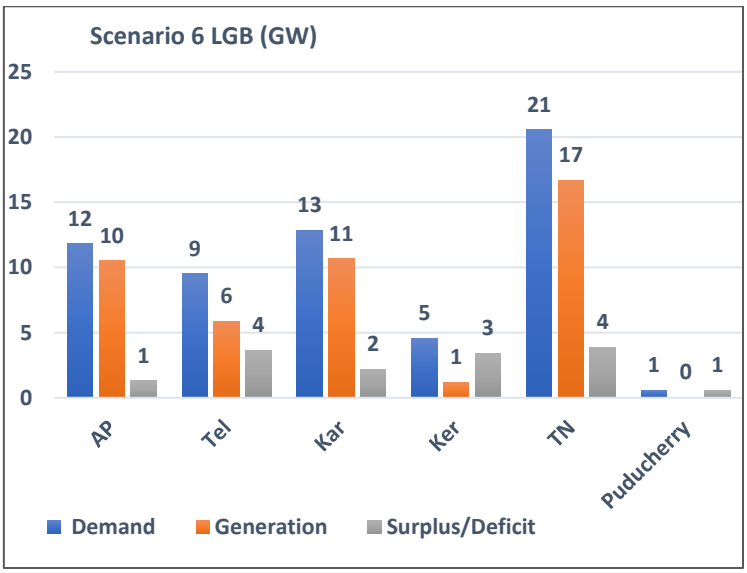
Figure 6-2: LGB For Summer June'2026

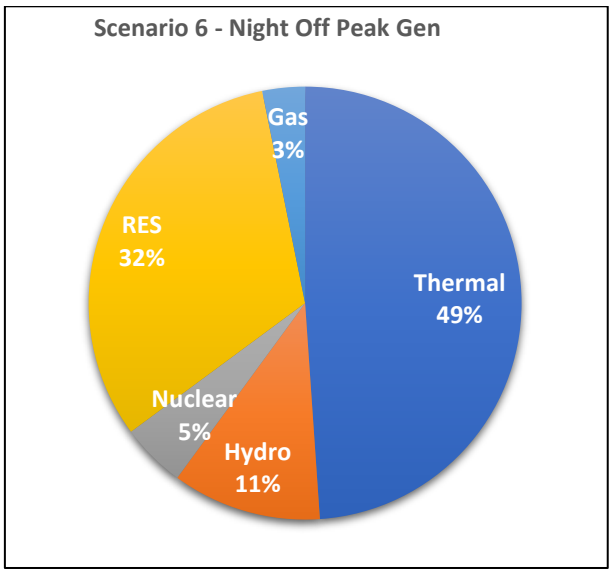






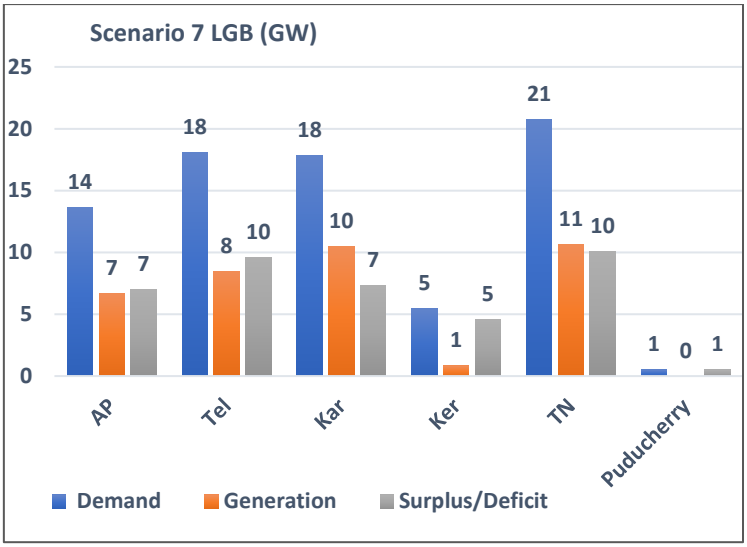


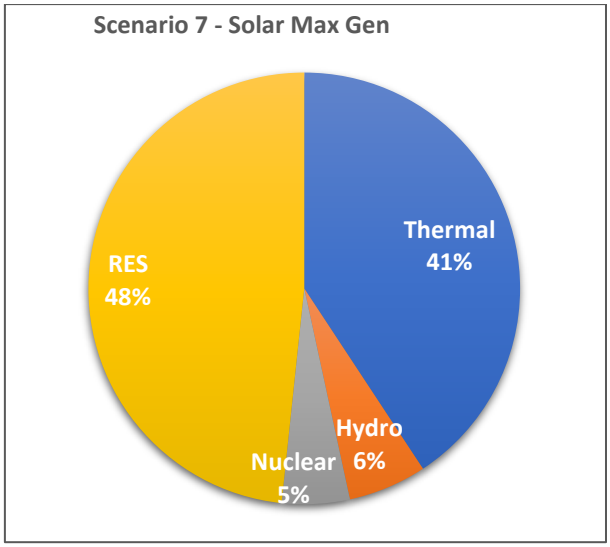


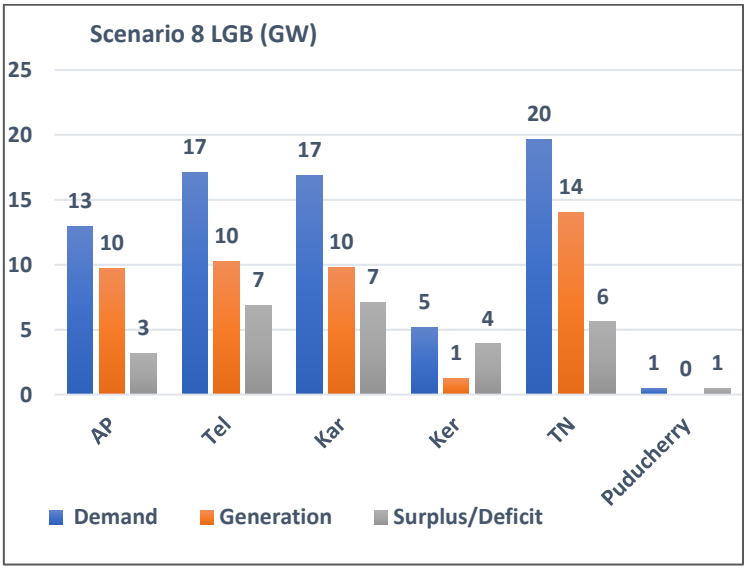


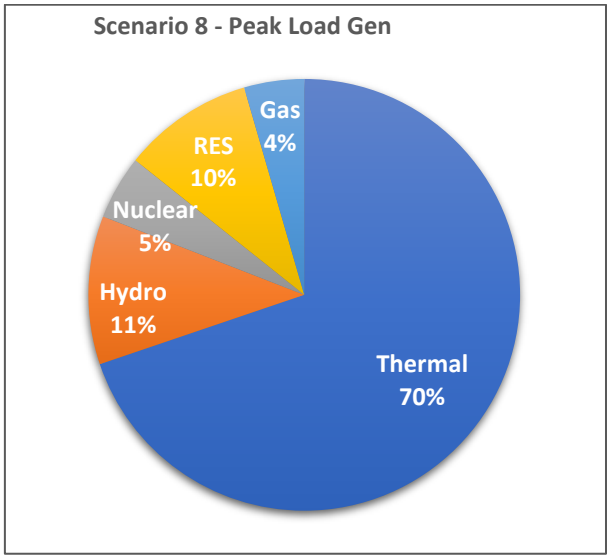
6.3.3 Winter Feb'2027

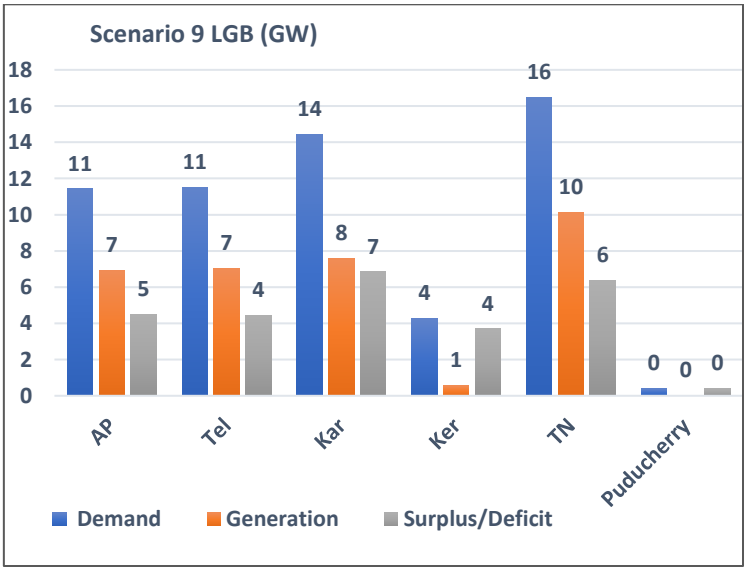
Figure 6-3: LGB For Winter Feb'2027

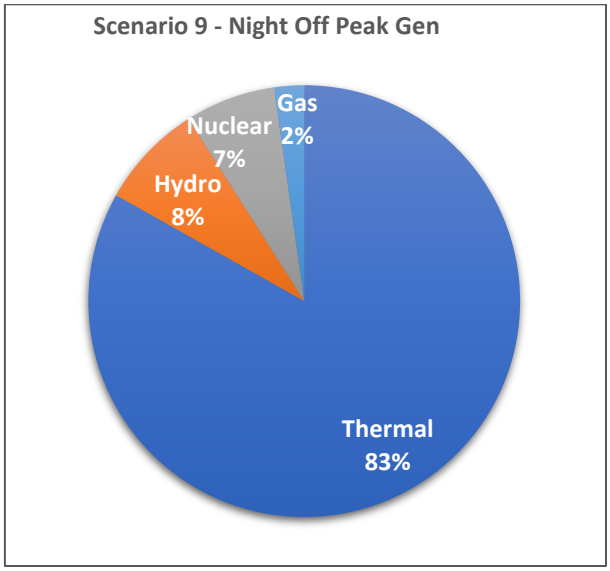












Based on the LGB, state wise drawl from ISTS under these scenarios is summarised in **Table 6-5**. Further, both maximum and minimum import of each state is also highlighted in table below.

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

(All Fig in MW)

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

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

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

6.4 ISTS Network Expansion Scheme in Southern Region

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

6.4.1 Tamil Nadu

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

To facilitate ISTS interconnection of RE power projects and transfer of power to beneficiaries from these RE projects in Tirunelveli area of Tamil Nadu, 2x500 MVA, 400/230kV Tuticorin-II (GIS) substation along with 2x125 MVAR, 420 kV Bus Reactors was planned as part of Green Energy Corridor and it was interconnected with existing Tuticorin PS with Tuticorin-II - Tuticorin Pooling Station 400 kV 2xD/c (Quad) lines. Subsequently, the substation was

augmented with 1x500 MVA, 400/230kV (3rd) transformer and the same has been commissioned recently. To cater the long-term demand in Tuticorin area, 4th 1x500MVA, 400/230 kV ICT was also planned which is under implementation by POWERGRID under RTM with commissioning schedule of March'23.

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

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

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

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

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

6.4.2 Karnataka

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

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

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