

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

केंद्रीय विद्युत प्राधिकरण

Central Electricity Authority

विद्युत प्रणाली योजना एवं मूल्यांकन प्रभाग-I

Power System Planning &amp; Appraisal Division-I

सेवा मे / To,

संलग्न सूची के अनुसार

As per enclosed list

विषय : दक्षिण क्षेत्र विद्युत समिति (परेक्षण योजना) की 3<sup>rd</sup> बैठक की कार्यसूची।**Subject: Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning) [SRPC(TP)].**

महोदय(Sir)/महोदया(Madam),

The 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning) [SRPC(TP)] is scheduled to be held on 24<sup>th</sup> August 2021 at 10:30 AM (via VC). Agenda of the meeting is enclosed. Link for joining the meeting would be sent in due course.

You are requested to participate in the meeting.

भवदीय/Yours faithfully,

(ईशान शरण / Ishan Sharan)

मुख्य अभियंता / Chief Engineer

Copy for kind information to:

- 1) PPS to Member (Power System), CEA

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**List of addressee:**

1. Member Secretary, Southern Region Power Committee, 29, Race Course Cross Road, Bangalore 560 009. FAX : 080-22259343	2. Chief Operating Officer (CTUIL), “Saudamini” Plot No. 2, Sector-29, Gurugram-122001 Tel. No. 0124-2571816
3. Director (System Operations), POSOCO B-9, Qutub Institutional Area, Katwaria Sarai, New Delhi-110016	4. Managing Director Karnataka Power Transmission Corp. Ltd., Cauvery Bhawan, Bengaluru - 560 009.
5. Chairman and Managing Director, Transmission Corp. of Andhra Pradesh Ltd., (APTRANSCO) Gunadala, Eluru Road, Vijayawada, Andhra Pradesh	6. Chairman-cum-Managing Director Transmission Corp. of Telangana Ltd., (TSTRANSCO) Vidyut Soudha, Khairatabad Hyderabad – 500 082.
7. Chairman-cum-Managing Director, Kerala State Electricity Board, Vidyuthi Bhawanam, Pattom, Thiruvananthapuram - 695 004. Fax : 0471-2444738	8. Managing Director, Tamil Nadu Transmission Corporation Ltd (TANTRANSCO), 6 <sup>th</sup> Floor, Eastern Wing, 800 Anna Salai, Chennai - 600002. Fax : 044-28516362
9. The Superintending Engineer –I, First Floor, Electricity Department, Gingy Salai, Puducherry – 605 001. Fax: 0413-2334277/2331556	10. Executive Engineer, Divisional Office, Lakshadweep Electricity Department, Kavaratti Island, UT of Lakshadweep
11. Chairman & Managing Director, NTPC Limited, NTPC Bhawan, SCOPE Complex, Institutional Area, Lodhi Road, New Delhi – 110003	12. Chairman & Managing Director, NHPC Limited, N.H.P.C. Office Complex, Sector-33, Faridabad - 121003 (Haryana)
13. Chairman, Solar Energy Corporation of India Limited, 1 <sup>st</sup> Floor, D-3, A Wing, Primus Platinum Building, District Centre, Saket, New Delhi – 110017	

**Other invitees:**

Director (Operations), NPCIL, Mumbai dschoudhary@npcil.co.in	Director (Power), NLC India Limited Neyveli, Tamil Nadu dir.power@nlcindia.in	Director (Planning & Projects), NLC India Limited Neyveli, Tamil Nadu dpp.co@nlcindia.in
--	--	---

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)****Date: 24<sup>th</sup> August, 2021****Time: 10:30AM****1. Minutes of 2<sup>nd</sup> Meeting of Southern Regional Power Committee (Transmission Planning) [SRPC(TP)]**

- 1.1 Minutes of Meeting of 2<sup>nd</sup> Southern Regional Power Committee (Transmission Planning) [SRPC (TP)] held on 01.10.2020 through VC, was circulated vide letter No. CEA-PS-12-14(12)/1/2018-PSPA-II Division-Part (2) I/12514/2020 dated 03.12.2020. No comments/observations on the minutes have been received.

Hence, the minutes of meeting of 2<sup>nd</sup> Southern Regional Power Committee (Transmission Planning) as circulated, may please be confirmed.

**Members may confirm.**

**A. ToR 2(i) – QUARTERLY REVIEW AND STRENGTHNING OF INTER-REGIONAL TRANSMISSION SYSTEM**

**2. Quarterly Review of transmission lines and substations**

- 2.1. A list transmission lines and substations/ICTs commissioned in the Southern Region FY 2020-21 and Q1 of FY 2021-22 are attached as Annex-I.

Gist of transmission lines and substation/ICTs commissioned in Southern Region FY 2020-21

State	Transmission Line (ckm)			Sub Station (MVA)		
	765kV	400kV	220kV	765kV	400kV	220kV
Andhra Pradesh	0	127	734	0	1760	1730
Telangana	0	13	197	0	0	200
Karnataka	0	2	578	0	2500	1400
Kerala	0	176	280	0	0	1320
Tamil Nadu	0	104	548	0	0	910
Puducherry	0	0	0	0	0	0
ISTS	0	884	0	0	1130	0
<b>Total</b>	<b>0</b>	<b>1306</b>	<b>2337</b>	<b>0</b>	<b>5390</b>	<b>5560</b>
<b>HVDC-800 kV</b>	<b>3531</b>			<b>3000</b>		
<b>HVDC-320 kV</b>	<b>288</b>			<b>1000</b>		

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)Gist of transmission lines and substation/ICTs commissioned in SR Q1 of FY 2021-22

State	Transmission Line (ckm)			Sub Station (MVA)		
	765kV	400kV	220kV	765kV	400kV	220kV
Andhra Pradesh	0	0	49	0	500	80
Telangana	0	0	155	0	315	1147
Karnataka	0	0	0	0	0	100
Kerala	0	0	0	0	0	0
Tamil Nadu	0	0	0	0	0	200
Puducherry	0	0	0	0	0	0
ISTS	0	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>204</b>	<b>0</b>	<b>815</b>	<b>1527</b>
<b>HVDC-320 kV</b>				<b>1000</b>		

Members may update/note.

**3. Assessment of growth in generation capacity and demand in the region**

3.1. The installed generation capacity in Southern Region is as under (as on 30.06.2021):

State	Coal	Hydro	RES	Gas	DG	Nuclear	Total
Andhra Pradesh	5010	1673.6	56.18	235.4	0	0	6975.18
Telangana	5972.5	2479.93	41.22	0	0	0	8493.65
Karnataka	5020	3586.6	193.89	0	0	0	8800.49
Kerala	0	1856.5	178.9	0	159.96	0	2195.36
Tamil Nadu	4320	2178.2	122.7	524.08	0	0	7144.98
Puducherry	0	0	0	32.5	0	0	32.5
Central Sector	15225.02	0	541.9	359.58	0	3320	19446.5
Private	12997	0	43702.97	5340.24	273.7	0	62313.91
<b>Total</b>	<b>48544.52</b>	<b>11774.83</b>	<b>44837.76</b>	<b>6491.8</b>	<b>433.66</b>	<b>3320</b>	<b>115402.57</b>

3.2. The actual/anticipated electricity demand of states in Southern Region are as under:

	Peak Demand (in MW) according to 19 <sup>th</sup> EPS			Actual Peak Demand (MW)
State	2020-21	2021-22	2024-25	2020-21
Andhra Pradesh	11021	11843	14656	11193
Telangana	13757	14499	16885	13688

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

	Peak Demand (in MW) according to 19 <sup>th</sup> EPS			Actual Peak Demand (MW)
State	2020-21	2021-22	2024-25	2020-21
Karnataka	13534	14271	16674	14367
Kerala	5021	5263	6034	4269
Tamil Nadu	19240	20273	24225	16263
Puducherry	561	583	655	429
<b>Total</b>	<b>59581</b>	<b>62975</b>	<b>74666</b>	<b>58395</b>

- 3.3. The anticipated capacity addition in the states of Southern Region during the period for the period 2021-22 to 2024-25 is as given below.

State	Coal	Hydro	Gas	Solar	Wind	Nuclear	Total
Andhra Pradesh	2200	1250	0	9750	150	0	13350
Telangana	4000	0	0	130	0	0	4130
Karnataka	0	0	370	1192	3489	0	5051
Kerala	0	140	0	2346	78	0	2564
Tamil Nadu	5770	2500	0	362	1225	0	9857
Puducherry	-	-	-	-	-	-	-
Central Sector	3420	0	0	0	0	2500	5920
Private	525	0	0	0	0	0	525
<b>Total</b>	<b>15915</b>	<b>3890</b>	<b>370</b>	<b>13780</b>	<b>4942</b>	<b>2500</b>	<b>41397</b>

Members may note and update.

#### 4. Requirement for strengthening of Inter-regional transmission system

- 4.1. MoP vide OM dated 20<sup>th</sup> May, 2021 amended ToR of NCT (copy enclosed at Annex-II) This OM further mention that:

“2(i) The Regional Power Committees (Transmission Planning) can make meaningful recommendations only regarding their own Region. They cannot decide on transfers across region.”

- 4.2. Therefore, it is proposed not to discuss Inter-regional transmission system in this meeting to ensure compliance of the above OM at this stage. Once all-India level generation or surplus/deficit scenario get confirmed in NCT, the same would be informed in the next meeting.

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**5. Review of Transmission system by system operator****5.1. ICT Constraints:**

SRLDC in its quarterly report for January, 21 – March, 21 (Q4: 2020-21) has mentioned that 19 nodes were not complying to 'n-1' contingency for transformation capacity. Details of nodes are given below.

Sl. No.	ICT	Season/ Antecedent Conditions	Description of the constraints	Remarks
1.	400/220 kV 2x500 MVA ICTs at Kolar	Whole Year	'N-1' not satisfied for 1% in Jan, 14 % in Feb, 27% in March.	1x500 MVA, 400/220 kV ICT augmentation proposed in this meeting
2.	400/220 kV 2x500 MVA ICTs at Kaiga	Whole Year	'N-1' not satisfied for 18% in Jan, 16% in Feb, 14% in March. The 2x220 MW Units at Kaiga, Kadra (150 MW) and Kodalalli (120 MW) generation is completely injected into the 400kV system through these ICTs due to opening of 220kV Kodalalli – Nagjheri D/C in view of 220kV system overload.	In 1 <sup>st</sup> SRSCT meeting, committee recommended for re-conductoring of 220kV Nagjheri – Ambewadi DC line, 220kV Ambewadi – Narendra D/C line, 220kV Kaiga – Kodalalli S/C & 220kV Kadra – Kodalalli S/C lines with HTLS conductor. With reconductoring of lines, loading capability & availability of lines will increase. Accordingly loading on ICTs will expected to be reduced. KPTCL has to expedite the same. KPTCL may reply.
3.	400/220 kV 3x500 MVA ICTs at Nelamangala	Whole Year	'N-1' not satisfied for 2% in Jan, 10% in Feb, 28 % in March.	KPTCL may expedite implementation of: • 2x500 MVA, 400/220 kV Peenya S/s • 3 <sup>rd</sup> 500 MVA ICT at Devanhalli S/s. With implementation of above, loading on ICTs at Nelamangal S/s expected to be relieved. KPTCL may substantiate.
4.	400/220 kV 2x315 + 1x500 MVA ICTs at Mysore	Whole Year	'N-1' not satisfied for 24% in Jan, 44% in Feb, 69% in March.	Proposed as above
5.	400/220 kV 2x315 MVA ICTs at Cochin	Whole Year	'N-1' not satisfied for 2 % in March.	Issued will resolve with transformation capacity augmentation by 1x500 MVA, 400/220 kV ICT (3 <sup>rd</sup> ), already discussed and agreed in 2 <sup>nd</sup> SRPC(TP) and 4 <sup>th</sup> NCT.
6.	400/220 kV 3x315 MVA ICTs at Vemagiri	High demand Scenario of SR	'N-1' not satisfied for 7% in Jan, 12% in Feb, 38 % in March.	With commissioning of 4 <sup>th</sup> 500 MVA ICT at Vemagiri, loading of ICT will be normal. APTRANSCO may expedite commissioning of 4 <sup>th</sup> ICT.

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

Sl. No.	ICT	Season/ Antecedent Conditions	Description of the constraints	Remarks
7.	400/220 kV 2x315 MVA ICTs at Narnoor	High demand Scenario of SR	'N-1' not satisfied for 16% in Jan, 22% in Feb, 1% in Mar.	Augmentation of ICTs proposed. APTRANSCO may substantiate.
8.	400/230 kV 3x315 MVA ICTs at Hosur	High demand Scenario of SR	'N-1' not satisfied for 1 % in Mar.	ICT Augmentation proposed.
9.	400/220 kV 2x500 MVA ICTs at Narendra	High demand Scenario of SR	'N-1' not satisfied for 8 % in Mar.	Augmentation of 1x500 MVA ICT (3 <sup>rd</sup> ) proposed
10.	400/230 kV 2x250 MVA ICTs at Neyveli II TPS	High demand Scenario of SR	'N-1' not satisfied for 39 % in Mar.	With implementation of Cuddalore and Manalmedu S/s, loading on ICTs at Neyveli II TPS is expected to be reduced. TANTRANSCO may expedite the implementation of same and may substantiate further, if required.
11.	400/220kV 2x315 MVA ICTs at Hassan	High demand Scenario of SR	'N-1' not satisfied for 5% in Feb, 7% in March.	Loading on ICT s is expected to reduce with commissioning of Kadkola and CN Halli S/s. KPTCL may substantiate.
12.	765/400 kV 2x1500 MVA ICTs at Nizamabad	High demand Scenario of SR	'N-1' not satisfied for 1% in January.	Augmentation of 1x1500 MVA, 765/400 kV ICT (3 <sup>rd</sup> ) at Nizamabad proposed.
13.	400/220 kV 2x315 + 2x250 MVA ICTs at Ramagundam STPS	High demand Scenario of SR	'N-1' not satisfied for 5% in Jan, 12% in Feb, 34% in March.	TSTRANSCO may update.
14.	400/220 kV 2x315 MVA ICTs at Suryapet	High demand Scenario of SR	'N-1' not satisfied for 1% in February.	With implementation of Yadadri generation linked scheme, loading on Suryapet ICT is expected to be reduced. TSTRANSCO may substantiate.
15.	400/220 kV 3x500 MVA ICTs at Somanahalli	High demand Scenario of SR	'N-1' not satisfied for 1% in Jan, 1% in Feb, 5 % in March.	KPTCL may expedite implementation of: • 2x500MVA, 400/220 kV Domasandra S/s • 220 kV line terminating at 3x500 MVA, 400 /220 kV Mylasandra S/s With above, loading on ICTs on Somanhalli is expected to be reduced.

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

Sl. No.	ICT	Season/ Antecedent Conditions	Description of the constraints	Remarks
16.	400/230 kV 2x315 MVA ICTs at Thiruvallam	High demand Scenario of SR	'N-1' not satisfied for 3% in March.	With implementation of 2x200 MVA, 400/110 kV ICTs and 1x500 MVA, 400/230kV 3 <sup>rd</sup> ICT at Tiruvallam, loading on ICTs will be reduced. TANTRANSCO may substantiate.
17.	400/220 kV 2x315 MVA ICTs at UPCL	High demand Scenario in SR	'N-1' not satisfied for 9% in Jan, 31% in Feb, 29 % in March.	KPTCL may update.
18.	400/132 kV, 250 MVA ICT at Ramagundam STPS	-	Limiting constraint for State Drawl capability. N-1 of 400/220kV ICT would result in over loading.	TSTRANSCO may update.
19.	400/110 kV, 2x200 MVA ICTs at Salem SS	Whole year	Limiting constraint for State Drawl capability. 'N- 1' of ICTs would result in over loading.	Augmentation by 1x200 MVA, 400/110 kV ICT at Salem proposed. TANTRANSCO may substantiate.

ICT Constraints reported by SRLDC in Q1 of 2021-22 (April, 21 – June, 21):

Sl. No.	ICT	Season/ Antecedent Conditions	Description of the constraints	Has the constraint occurred in earlier quarter?	CTU proposal / Remarks
1.	400/220 kV 2x500 MVA ICTs at Kolar	Whole Year	'N-1' not satisfied for 3% in April, 1% in May, 3% in June.	Yes	Refer inputs on Q4 2020-21 operational feedback.
2.	400/220 kV 2x500 MVA ICTs at Kaiga	Whole Year	'N-1' not satisfied for considerable time. The 2x220 MW Units at Kaiga, Kadra (150 MW) and Kodasalli (120 MW) generation is completely injected into the 400 kV system through these ICTs due to opening of 220 kV Kodasalli –Nagjheri D/C line in view of 220 kV system overload. N-1 not satisfied for 3% in April, 19% in May, 33% in June.	Yes	Refer inputs on Q4 2020-21 operational feedback.



I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

Sl. No.	ICT	Season/ Antecedent Conditions	Description of the constraints	Has the constraint occurred in earlier quarter?	CTU proposal / Remarks
3.	400/220 kV 3x500 MVA ICTs at Nelamangala	Whole Year	‘N-1’ not satisfied for 17% in April	Yes	Refer inputs on Q4 2020-21 operational feedback.
4.	400/220 kV 2X315 + 1x500 MVA ICTs at Mysore	Whole Year	‘N-1’ not satisfied for 44% in April, 18% in May, 19% in June	Yes	Refer inputs on Q4 2020-21 operational feedback.
5.	400/220 kV 2x315 MVA ICTs at Cochin	Whole Year	‘N-1’ not satisfied for 13% in April	Yes	Refer inputs on Q4 2020-21 operational feedback.
6.	400/220 kV 2x500 MVA ICTs at Narendra	High demand Scenario of SR	‘N-1’ not satisfied for 18% in April	Yes	KPTCL is planning new 2x500 MVA, 400/220kV Lokapur substation to meet the demand with reliability in that area. Issue will be resolved with implementation of Lokapur S/s.
7.	400/230 kV 2x250 MVA ICTs at Neyveli II TPS	High demand Scenario of SR	‘N-1’ not satisfied for 30% in April, 17% in May, 3% in June	Yes	Refer inputs on Q4 2020-21 operational feedback.
8.	400/220 kV 2x315 MVA ICTs at Hassan	High demand Scenario of SR	‘N-1’ not satisfied for 15% in April	Yes	Refer inputs on Q4 2020-21 operational feedback.
9.	400/220 kV 2x315 + 2x250 MVA ICTs at Ramagundam STPS	High demand Scenario of SR	‘N-1’ not satisfied for 6% in April	Yes	Refer inputs on Q4 2020-21 operational feedback.
10.	400/220 kV 3x500 MVA ICTs at Somanahalli	High demand Scenario of SR	‘N-1’ not satisfied for 8% in April	Yes	Refer inputs on Q4 2020-21 operational feedback.

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

Sl. No.	ICT	Season/ Antecedent Conditions	Description of the constraints	Has the constraint occurred in earlier quarter?	CTU proposal / Remarks
11.	400/230 kV 2x315 MVA ICTs at Tiruvallam	High demand Scenario of SR	‘N-1’ not satisfied for 7% in April, 2% in May, 1% in June	Yes	Refer inputs on Q4 2020-21 operational feedback.
12.	400/220 kV 2x315 MVA ICTs at UPCL	High demand Scenario of SR	‘N-1’ not satisfied for 31% in April, 1% in June	Yes	Refer inputs on Q4 2020-21 operational feedback.
13.	400/132kV 250 MVA ICT at Ramagundam STPS	-	Limiting constraint for State Drawl capability. ‘N-1’ of 400/220kV ICT would result in over loading	Yes	Refer inputs on Q4 2020-21 operational feedback.
14.	400/230kV 2x315+1x500 MVA ICTs at Allundur S/s	Whole year	Limiting constraint for S1-S2 drawl capability. ‘N-1’ not satisfied for 11% in April and 1% in May	Yes	TANTRANSCO may clarify considering future requirement and load/ network rearrangement.
15.	400/220 kV 2x315 MVA ICTs at Jindal S/S	High demand and peak solar scenario SR	‘N-1’ not satisfied for 80% in April, 5% in May, 4% in June	No	2x315 MVA, 400/220 kV Jindal S/s is captive power plant S/S. M/s Jindal to take suitable action as per its requirement. KPTCL may substantiate.

Members may deliberate.

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

## 5.2. Transmission Line Constraints

Transmission line constraints reported by SRLDC in Q4 of 2020-21 (Jan'21 – March'21):

Sl. No	Corridor	Season/ Antecedent Conditions	Description of the constraints	Remarks
1	Tamil Nadu 230 kV System	Whole Year	<p>The following lines are heavily loaded:</p> <ul style="list-style-type: none"> <li>• 230 kV NLCTS2 – Kadalangudi S/C</li> <li>• 230kV NLCTS2 - STCMS</li> <li>• 230 kV Kalivendapattu – TharamaniS/C</li> <li>• 230 kV Anaikaduvu – Othakalmandapam D/C (During Wind season)</li> <li>• 230kV Othakalmandapam-Coimbatore S/C</li> <li>• 230 kV Othakalmandapam – ThudialurS/C</li> <li>• 230 kV Othakalmandapam – MywadiS/C</li> <li>• 230 kV Madurai - Sembatty S/C</li> <li>• 230 kV Pugalur – Pugalur(PG) D/C</li> <li>• 230 kV Pugalur-Karukathi S/C</li> <li>• 230 kV Pudanchandai-Pugalur S/C</li> <li>• 230 kV Trichy (PG) – Allundur(TN)D/C</li> <li>• 230 kV TTPS-TSIPCOT S/C</li> <li>• 230kV Kariakudi - Karmbayam</li> </ul>	TANTRANSCO may reply
2	220 kV Bangalore Metro Network	Whole Year	<p>Most of the 220 kV network in Bengaluru is radialised during peak season to prevent over loading of lines. The radialisation of lines decreases the reliability of supply &amp; thus resulting in Low Voltage situation during peak period and High Voltage during Off-Peak period of the day at 400 kV Somanahalli/ Nelamangala/Hoody.</p> <p>There is no sufficient Capacitor Compensation at distribution level in BESCOM area also.</p>	KPTCL may reply
3	Constraints in Nagjheri PH evacuation	Whole Year	<p>The 220 kV Nagjheri – Ambewadi DC, 220 kV Ambewadi – Narendra DC, 220 kV Kodalalli – Nagjheri D/C, 220 kV Kaiga – Kodalalli SC &amp; 220 kV Kadra – Kodalalli SC lines are severely over- loaded. In 1<sup>st</sup> meeting of Southern Regional Power Committee (Transmission Planning) held on 16.12.2019 recommended for Re-conductoring of the lines with HTLS conductor. KPTCL has to expedite the same.</p>	KPTCL may reply

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

Sl. No	Corridor	Season/ Antecedent Conditions	Description of the constraints	Remarks
4	Andhra Pradesh 220kV Network	Whole Year	<p>The following lines are heavily loaded:</p> <ul style="list-style-type: none"> <li>• 220 kV Lower Sileru – Bommuru S/C</li> <li>• 220 kV Maradam-Garividi D/C</li> <li>• 220 kV Maradam-Bobbili D/C</li> <li>• 220 kV Kalpaka-Brandix D/C</li> <li>• 220 kV UpperSileru-Pendurthi S/C</li> <li>• 220 kV LowerSileru-KTSV S/C</li> <li>• 220 kV Gazuwaka-Parvada</li> <li>• 220 kV Vemagiri-Bommuru D/C</li> <li>• 220 kV Gudivada-Nunna D/C</li> <li>• 220 kV Gunadala-Nunna S/C</li> <li>• 220 kV VTPS-Tadikonda D/C</li> <li>• 220 kV Chinakampalli-Rajampet S/C</li> </ul>	APTRANSCO may reply
5	Downstream network of Mysore 400/220 kV SS	Peak demand scenario of SR	<p>The following lines are heavily loaded:</p> <ul style="list-style-type: none"> <li>• 220 kV Mysore-Hootagalli D/C</li> <li>• 220 kV Mysore-Kadakola D/C</li> <li>• 220 kV Mysore-Tubinekare S/C</li> <li>• 220kV Hootagalli-Vajamangala S/C</li> <li>• 220kV Kadakola-Begur D/C</li> <li>• 220kV Hootagalli-Kadakola S/C</li> </ul>	KPTCL may reply

Transmission line constraints reported by SRLDC in Q1 of FY-2021-22 (April, 21-June, 21) is as given below:

Sl. No.	Corridor	Season/ Antecedent Conditions	Description of the constraints	CTU proposal / Remarks
1	Tamil Nadu 230 kV System	Whole Year	<p>The following lines are heavily loaded:</p> <ul style="list-style-type: none"> <li>• 230 kV NLCTS2 – Kadalangudi S/C</li> <li>• 230 kV NLCTS2 - STCMS</li> <li>• 230 kV Kalivendapattu – TharamaniS/C</li> <li>• 230 kV Anaikaduvu – Othakalmandapam D/C (During Windseason)</li> <li>• 230 kV Othakalmandapam-Coimbatore S/C</li> <li>• 230 kV Othakalmandapam – ThudialurS/C</li> <li>• 230 kV Othakalmandapam – MywadiS/C</li> <li>• 230 kV Madurai - Sembatty S/C</li> <li>• 230 kV Pugalur – Pugalur(PG) D/C</li> <li>• 230 kV Pugalur-Karukathi S/C</li> <li>• 230 kV Pudanchandai-Pugalur S/C</li> <li>• 230 kV Trichy (PG) – Allundur(TN)D/C</li> <li>• 230 kV TTPS-TSIPCOT S/C</li> <li>• 230 kV Kariakudi – Karmbayam</li> </ul>	Refer CTU proposal on Q4 2020-21 operational feedback report.
2	220 kV	Whole	Most of the 220 kV network in Bengaluru is	Refer CTU proposal on Q4

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

Sl. No.	Corridor	Season/ Antecedent Conditions	Description of the constraints	CTU proposal / Remarks
	Bangalore Metro Network	Year	radialised during peak season to prevent overloading of lines. The radialisation of lines decreases the reliability of supply & thus resulting in Low Voltage situation during peak period and High Voltage during Off-Peak period of the day at 400 kV Somanahalli/Nelamangala/Hoody. There is no sufficient Capacitor Compensation at distribution level in BESCO area also.	2020-21 operational feedback report.
3	Constraints in Nagjheri PH evacuation	Whole Year	The 220 kV Nagjheri – Ambewadi DC, 220 kV Ambewadi – Narendra DC, 220 kV Kodalalli – Nagjheri D/C, 220 kV Kaiga – Kodalalli SC & 220 kV Kadra – Kodalalli SC lines are severely overloaded. In 1 <sup>st</sup> meeting of Southern Regional Power Committee (Transmission Planning) held on 16.12.2019 recommended for re-conductoring of the lines with HTLS conductor. KPTCL has to expedite the same.	Refer CTU proposal on Q4 2020-21 operational feedback report.
4	Andhra Pradesh 220 kV Network	Whole Year	The following lines are heavily loaded: <ul style="list-style-type: none"> <li>• 220 kV Lower Sileru – Bommuru S/C</li> <li>• 220 kV Maradam-Garividi D/C</li> <li>• 220 kV Maradam-Bobbili D/C</li> <li>• 220 kV Kalpaka-Brandix D/C</li> <li>• 220 kV UpperSileru-Pendurthi S/C</li> <li>• 220 kV LowerSileru-KTSV S/C</li> <li>• 220 kV Gazuwaka-Parvada</li> <li>• 220 kV Vemagiri-Bommuru D/C</li> <li>• 220 kV Gudivada-Nunna D/C</li> <li>• 220 kV Gunadala-Nunna S/C</li> <li>• 220 kV VTPS-Tadikonda D/C</li> <li>• 220 kV Chinakampalli-Rajampet S/C</li> </ul>	Refer CTU proposal on Q4 2020-21 operational feedback report.
5	Downstream network of Mysore 400/220kV SS	Peak demand scenario of SR	The following lines are heavily loaded: <ul style="list-style-type: none"> <li>• 220 kV Mysore-Hootagalli D/C</li> <li>• 220 kV Mysore-Kadakola D/C</li> <li>• 220 kV Mysore-Tubinekare S/C</li> <li>• 220 kV Hootagalli-Vajamangala S/C</li> <li>• 220 kV Kadakola-Begur D/C</li> <li>• 220 kV Hootagalli-Kadakola S/C</li> </ul>	Refer CTU proposal on Q4 2020-21 operational feedback report.
6	Downstream network of UPCL 400/220 kV SS	During UPCL full generation and peak demand scenario of Karnataka	<ul style="list-style-type: none"> <li>• 220 kV UPCL-Kemar D/c</li> </ul>	KPTCL may reply

Members may deliberate.

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

## 5.3. Over Voltage Constraints

5.3.1 SRLDC in its report for the period Q4 of 2020-21 (Jan'21 – March'21) has mentioned that 57 nos. of nodes are experiencing high voltage, out of which 24 nodes are experiencing high voltage almost throughout the year. To control the over voltage, 114 nos. of 765kV and 400kV lines had to be opened 549 times.

5.3.2 Subsequently, SRLDC in its report for the period Q1 of 2021-22 (April'21 – June'21) has reported that about 74 nodes are experiencing high voltage (above 420 kV) during off peak period / whole year. To control the overvoltage, about 98 nos. of 765kV and 400 kV elements had to be opened 282 times.

5.3.3 To mitigate the over/ low voltage issues, reactive compensation studies have been carried regularly with augmentation of new transmission system or operator feedback and put up for deliberation in the SRPC(TP) meetings. On basis of study analysis, 27 nos. of reactors at different ISTS and STU nodes were agreed for implementation in Southern Regional Grid in 1<sup>st</sup> SRSC meeting held on 07.09.2018.

Matter regarding persisting high voltage in Southern Region was also discussed in 2<sup>nd</sup> SRPC(TP) meeting held on 01.10.2020, wherein STUs were asked to expedite the implementation of reactors agreed in various standing committees. Details of the reactors and their implementation status as informed during the 2<sup>nd</sup> SRPC(TP) meeting are as tabulated below.

Sl. No.	Bus Name	Voltage (kV)	ISTS / State	Existing / UC Reactor (MVar)	Type	Reactor Agreed (MVar)	Status as per 2 <sup>nd</sup> SRPC(TP) meeting held on 01.10.2020
1.	Hosur	400	ISTS	63	Bus	125	Awarded, SCOD – July 2021
2.	Madhugiri	400	ISTS	63	Bus	125	
3.	Dharampuri	400	ISTS	-	Bus	125	
4.	Hiriyur	400	ISTS	-	Bus	125	
5.	Pugalur	400	ISTS	-	Bus	125	
6.	Pugalur HVDC STN	400	ISTS	-	Bus	2x125	
7.	Rachagunneri	400	AP	-	Bus	125	Expected to be commissioned by December 2020.
8.	Hindupur	400	AP	80	Bus	125	80 MVAR Bus Reactor is expected to be commissioned by December 2020. Works are to be awarded for 125 MVar reactor.
9.	Yeramarus	400	KAR	-	Bus	125	KPTCL informed that they would obtain the status from PCKL and inform accordingly.
10.	Bellary PS	400	KAR	-	Bus	2x125	Commissioned
11.	CN Halli	400	KAR	-	Bus	2x125	Expected to commissioning by 2022-23

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

Sl. No.	Bus Name	Voltage (kV)	ISTS / State	Existing / UC Reactor (MVar)	Type	Reactor Agreed (MVar)	Status as per 2 <sup>nd</sup> SRPC(TP) meeting held on 01.10.2020
12.	Jagalur	400	KAR	-	Bus	2x125	Instead of 2x125 MVAR, 2x80 MVAR bus reactor commissioned.
13.	Wayanad	400	KER	-	Bus	125	Wayanad S/s is under approval. Reactor to be planned along with sub-station.
14.	Velalividu	400	TN	-	Bus	125	Instead of 125MVAR reactor (as approved), 1x80 MVAR is under implementation & expected to be commission by March, 2021.
15.	Uddandapur	400	TEL		Bus	125	Preparation of technical sanction is under progress.
16.	KTPP SS	400	TEL		Bus	125	Works awarded for construction of 400/220/132 kV KTPP SS along with 1x125 MVAR reactor vide PO dated : 22.05.2020 and works are under progress
17.	Raidurg	400	TEL		Bus	125	Works have been taken up against the ongoing contract of Rayadurg GIS substation and are under progress.
18.	Narlapur	400	TEL		Bus	125	Contract has been awarded for the erection pf 400 kV LI SS at Narlapur, Vатtem, Yedula along with supply & erection of 1x125 MVAR reactor at each substation. The work is likely to be completed in 2021-22
19.	Yedula	400	TEL		Bus	125	
20.	Vатtem	400	TEL		Bus	125	
21.	Narsapur	400	TEL		Bus	125	Works will be taken up after sanction of grant from PSDF
22.	Kethireddypalli	400	TEL		Bus	125	
23.	Kamalapuram	400	TEL		Bus	125	Works have been taken up against the ongoing contract of Kamalapuram LI sub-station and are under progress.
24.	Tippapur	400	TEL		Bus	125	Executing agency was requested to procure and erect 125 MVAR Reactor Bay each at 400 kV Tippapur & Sundilla (Yellampally) and work is under progress.
25.	Sundilla (Yellampalli)	400	TEL		Bus	125	
26.	Chandulapur	400	TEL		Bus	125	All works are completed and the date of commissioning of Reactor Bay is 06.09.2019.
27.	Chouttuppall	400	TEL		Bus	125	Works awarded for construction of 400/220/132 kV Choutuppall SS along with 1x125 MVAR Bus Reactor vide LOI dated:



I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

Sl. No.	Bus Name	Voltage (kV)	ISTS / State	Existing / UC Reactor (MVar)	Type	Reactor Agreed (MVar)	Status as per 2 <sup>nd</sup> SRPC(TP) meeting held on 01.10.2020
							06.08.2020 and are under progress.
28.	Dindi	400	TEL		Bus	2x125	Administrative approval was accorded by TSTRANSCO for installation of Bus/Line Reactors in phased manner at various sub-stations. Accordingly, tenders were invited and finalized for execution of Reactors bays at these substations in first phase. However, procurement of reactors and awarding of contract for reactor bays is pending due to delay in sanction of PSDF.
29.	Janagaon	400	TEL		Bus	125	
30.	Suryapet	400	TEL		Bus	125	
31.	Maheshwaram-TS	400	TEL		Bus	80	
32.	Asupaka	400	TEL		Bus	125	
33.		400	TEL		Line	63	

Members may update.

5.3.4 Subsequently, to analyze the high / low voltage issue in Southern Grid, in time frame of 2024-25 (August-night), detailed study has been carried out by CTU (Results enclosed at Annex-III). Maximum and minimum demand observed by SRLDC for 2020-21 and the demand considered for study analysis in time frame of 2024-25 and are as given below.

Sl. No.	STU	Observed Demand in 2020-21 (MW)		Peak Demand for 2024-25 (MW) (as per 19 <sup>th</sup> EPS)	Demand considered for 2024-25 (MW)	
		Max.	Min.		Max.	Min.
1.	Andhra Pradesh	11193	5786	14600	12800	<b>6800</b>
2.	Telangana	13688	5678	16900	16000	<b>8700</b>
3.	Karnataka	14367	4433	16700	16300	<b>6900</b>
4.	Kerala	4284	1969	6000	5800	<b>2800</b>
5.	Tamil Nadu	16481	10595	24200	22800	<b>12100</b>
6.	Puducherry	421	-	650	570	<b>314</b>
7.	<b>Southern Region</b>	<b>58400</b>	<b>27486</b>	<b>74650</b>	<b>74200</b>	<b>37700</b>

5.3.5 From study results, voltage above than 1.05 pu has been observed at Muddunur, Karaikudi and Velalividu S/s. Further, 1x125 MVAR, 420 kV bus reactor proposed by APTRANSCO at Kalikiri 400/220 kV S/s along with 6100 MW solar generation scheme, has been considered in study analysis.

5.3.6 It may be noted that due to space constraint, it is not possible to implement 420 kV bus reactor at Karakudi 400/230 kV S/s. To control the grid voltage following is proposed for Muddunur and Velalividu S/s.



I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

- Installation of 1x125 MVAR, 420 kV bus reactor is proposed at Muddunur generation end. Presently there is no bus reactor at generator switchyard – **Under the scope of Generator**
- Installation of 1x125 MVAR, 420kV bus reactor is proposed at Velalivedu S/s – **Under the scope of TANTRANSCO**

5.3.7 From study analysis it may be observed that voltage at all 765 kV substations is within the operational limit for 765 kV level i.e. 800 kV.

Further, it may be noted that in study analysis, generators in Southern Region have absorbed reactive power of the order of about 7700 MVAR. If generators are not operated in under excited conditions, more reactors shall be required at different nodes to control the grid voltage.

Members may deliberate.

#### 5.4. Requirement of ‘N-1’ Reliability for ICTs at RE Pooling Grid stations:

5.4.1 As per the Manual on Transmission Planning Criteria, “*para 16.2 The ‘N-1’ criteria may not be applied to the immediate connectivity of wind/solar farms with the ISTS/Intra-STS grid i.e. the line connecting the farm to the grid and the step-up transformers at the grid station*”.

5.4.2 At Grid station, there is need to have ‘N-1’ security for step-up transformers, else loss of one ICT may lead to loss of total RE pooled at the station. SRLDC in its quarterly report Q1 for the time period April’21-June’21 reported such incident at Tuticorin-II GIS S/s and same is reproduced below.

*“Presently 888 MW wind generation is getting evacuated at 400/230 kV Tuticorin GIS through 2x500MVA 400/230 kV ICT#1 and ICT#2 from 4 numbers of Wind Stations namely 230/33 kV Betam, 230/33kV Mytrah, 230/33kV Orange and 230/33/11kV Green Infra (Chandragiri). On 14-07-2021, 400/230kV ICT#1 at TTGS got tripped due to suspected maloperation of Buchholz protection. After the tripping of ICT#1, entire power (735 MW generation prior to incident) got shifted to ICT#2 and over current stage-I protection operated as the current increased to max RMS current of 2300 A. Due to tripping of both ICTs, there was loss of wind evacuation of 735MW. Similarly, N-1 condition is not satisfied at all the RE generation pooling stations”*

5.4.3 Presently in Southern Region, large RE generation projects are under operation viz. Tumkur Solar Park (2050 MW commissioned), N P Kunta (1500 MW out of which 1300 MW is commissioned), Tuticorin-II GIS (LTA granted for about 1100 MW + 540 MW agreed for grant) etc. In case of outage of large capacity RE generation, the possibility of grid eventuality may not be ruled out. In view of safety, security and reliability of grid, at least from ‘N-1’ security point of view, for step-up transformers at ISTS pooling station for RE generators, it is proposed that ‘N-1’ contingency criteria may be considered for step-up transformers at the grid stations (ISTS) and implementation of ICTs may be taken up accordingly.

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)
**B. ToR 2(ii) – ASSESSMENT OF TRANSMISSION SYSTEM REQUIREMENTS IN NEAR, MEDIUM AND LONG TERM AND FORMULATE TRANSMISSION SCHEME**

**6. Proposal for grant of connectivity to NLC India Ltd for TPS-II 2<sup>nd</sup> Expansion (2x660 MW) in Cuddalore, Tamil Nadu, and to control high short circuit fault level in Neyveli Generation complex.**

6.1. Proposal for grant of connectivity to M/s NLC India Ltd for Neyveli TPS-II 2<sup>nd</sup> Expansion thermal power plant was discussed and agreed in the 2<sup>nd</sup> SRSCT meeting held on 10.06.2019 and subsequently in the 1<sup>st</sup> meeting of Southern Regional Power Committee (Transmission Planning) held on 16.12.2019. In view of the connectivity requirements of Neyveli TPS-II 2<sup>nd</sup> expansion from April, 2021, and commissioning of Manalmedu (TANTRANSCO) substation by December, 2021, it was agreed in 1<sup>st</sup> SRPC(TP) meeting that LILO of 2<sup>nd</sup> circuit of Neyveli TS-II / Neyveli TS-I Expn – Trichy 400 kV D/c line at Nagapattinam, shall be restored only after commissioning of Manalmedu S/s, Neyveli TPSII 2<sup>nd</sup> Expn – Manalmedu 400 kV D/c (Quad) line and Manalmedu – Ariyalur 400 kV D/c line by TANTRANSCO.

6.2. Accordingly, following was agreed in the 2<sup>nd</sup> SRSCT/1<sup>st</sup> SRPC(TP) meeting(s):

**Transmission System for providing connectivity to Neyveli TS-II 2<sup>nd</sup> Expn (2x660 MW):**

- i. Re-storation of Neyveli TS-II/Neyveli TS-I Expn - Trichy 400 kV D/c lines through suitable arrangement of bypassing the LILOs at Nagapattinam– to be implemented under ISTS.
- ii. Utilization of LILO sections for making Neyveli TPS-II 2<sup>nd</sup> Expn – Nagapattinam 400 kV, 2xD/c lines upto Neyveli TPS-II 2<sup>nd</sup> Expn switchyard - to be implemented under ISTS.
- iii. LILO of 2<sup>nd</sup> circuit of Neyveli TS-II / Neyveli TS-I Expn – Trichy 400 kV D/c line at Nagapattinam shall be restored only after commissioning of Manalmedu S/s, Neyveli TPSII 2<sup>nd</sup> Expn – Manalmedu 400 kV D/c (Quad) line and Manalmedu – Ariyalur 400 kV D/c line by TANTRANSCO.
- iv. 2x125 MVar bus reactors at generation switchyard (Neyveli TPS-II 2<sup>nd</sup> Expn) – by NLC India Ltd.
- v. The line bays at generation switchyard would be implemented by NLC India Ltd.
- vi. Generation Switchyard to be designed with 50 kA short circuit level.

**Additional System Strengthening for control of short circuit levels in Neyveli generation complex and re-arrangement of network configuration to control overloading of ICTs / 230 kV lines from Neyveli generation complex:**

- i. Neyveli TS-II – Cuddalore 400 kV D/c (Quad) line – under the scope of TANGEDCO as agreed in 1<sup>st</sup> SRSCT.
- ii. Manalmedu – Neyveli TPS-II 2<sup>nd</sup> Expn 400 kV D/c (Quad) line (in place of Cuddalore – Manalmedu 400 kV D/c line agreed in 1<sup>st</sup> SRSCT) – under the scope of TANGEDCO.

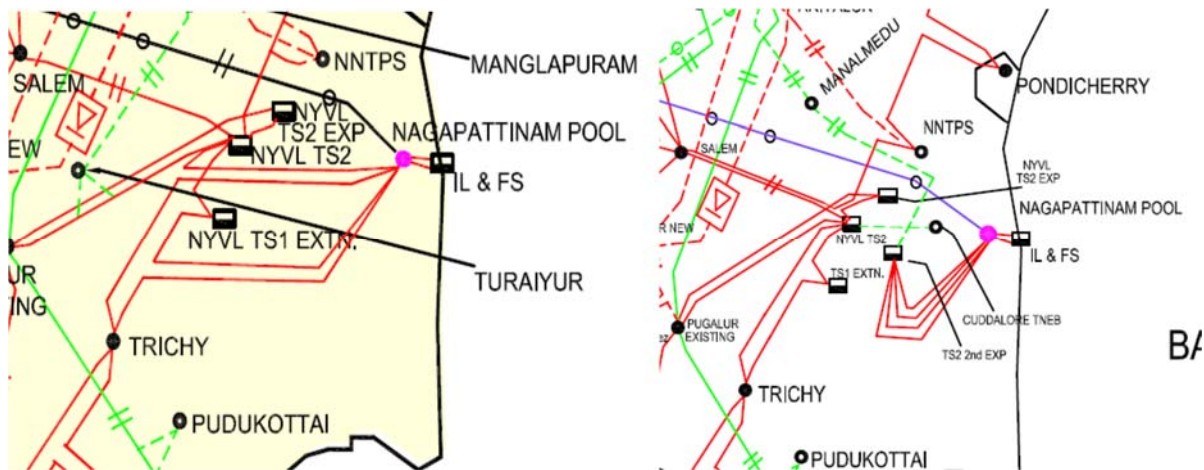
I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

- iii. Bypassing of one ckt. of Neyveli TS-II- Salem 400 kV D/c line of PGCIL and Neyveli TSII- NNTPS 400 kV S/c line of PGCIL, to form NNTPS-Salem 400 kV S/c line (agreed in 42<sup>nd</sup> SCPSPSR) – to be implemented under ISTS.
- 6.3. Subsequently, CTU vide email dated 12.03.2020 sought confirmation of start date of connectivity and expected commissioning schedule of both the units of Neyveli TPS-II 2<sup>nd</sup> Expansion. In reply to the email, M/s NLC India Ltd. has furnished the following information towards start date of connectivity and expected commissioning schedule:
 

▪ Date from which connectivity is required	:	Year 2024-25 (Tentative)
▪ Date of commissioning of Unit 1	:	Year 2025-26 (Tentative)
▪ Date of commissioning of Unit 2	:	Year 2025-26 (Tentative)
- 6.4. M/s NLC India Ltd. has revised the start date of connectivity from April, 2021, to the year 2024-25 (tentative). In view of the delayed schedule of commissioning of Neyveli TPS-II 2<sup>nd</sup> Expansion, implementation of the associated transmission scheme may be required to be phased by Tamil Nadu. Further, as per the revised schedule of commissioning of the generating units, Manalmedu S/S shall be connected radially to Ariyalur till the implementation of Manalmedu – Neyveli TPS-II 2<sup>nd</sup> Expn 400 kV D/c (Quad) line, which shall be implemented matching with schedule of commissioning of generating units of Neyveli TPS-II 2<sup>nd</sup> Expansion. Further LILO of 2<sup>nd</sup> circuit of Neyveli TS-II / Neyveli TS-I Expn – Trichy 400 kV D/c line at Nagapattinam, shall be restored only after commissioning of Manalmedu S/s, Neyveli TPS II 2<sup>nd</sup> Expn – Manalmedu 400 kV D/c (Quad) line and Manalmedu - Ariyalur 400 kV D/c line by TANTRANSCO as agreed in the 1<sup>st</sup> SRPC(TP) meeting.
- 6.5. For transmission system augmentation and re-arrangement of network configuration, as mentioned in para 6.2, firm commissioning schedule of Neyveli TS-II 2<sup>nd</sup> Expn (2x660 MW) is required. As such, the augmentation/re-arrangement work would be taken up upon receipt of firm commissioning schedule of Neyveli TS-II 2<sup>nd</sup> Expn (2x660 MW) from NLC India Ltd.
- 6.6. In the 2<sup>nd</sup> SRPC (TP) meeting, representative of NLC informed that start date of connectivity for Neyveli TPS-II 2<sup>nd</sup> Expn may be considered as 2025-26 (tentative). TANTRANSCO representative informed that works for Manalmedu S/s is likely to start by January/February, 2021, and the substation is expected to be commissioned by 2022-23.
- 6.7. In the view of mismatching timeframe of Neyveli TPS-II 2<sup>nd</sup> Expn and Manalmedu S/s and change in connectivity of Manalmedu S/s proposed by TANTRANSCO, it had been decided in the 2<sup>nd</sup> SRPC(TP) meeting that CEA, CTU, SRPC, NLC, TANTRANSCO and SRLDC/POSOCO may jointly study the proposal and also work out phasing of the transmission scheme. Thereafter, the same would be discussed in the next meeting of SRPC(TP).

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

**Fig: Proposed connectivity for Neyveli TPS-II 2<sup>nd</sup> Expn (2x660 MW)**

6.8. Accordingly, the matter was discussed in the joint study meeting held on 04.02.2021 (MoM enclosed at Annex-IV) and after detailed deliberation following transmission system was proposed:

- i. Rearrangement of 400 kV NNTPS – Neyveli TS II & 400 kV Neyveli TS II – Salem line as 400 kV NNTPS – Salem S/C line to be taken up on urgent basis. TANTRANSCO may utilize the bays at Neyveli TS II for interconnecting with Cuddalore S/S through Neyveli TS-II – Cuddalore 400 kV D/c (Quad) line. The Neyveli TS-II – Cuddalore 400 kV D/c (Quad) line – under the scope of TANGEDCO had been agreed in 1<sup>st</sup> SRSCT meeting.
- ii. Re-storation of Neyveli TS-II/Neyveli TS-I Expn - Trichy 400 kV D/c lines through suitable arrangement of bypassing the LILOs at Nagapattinam (to be implemented as ISTS) would be carried out only after receipt of firm commissioning schedule of Neyveli TPS II 2<sup>nd</sup> Expansion so as to match with the commissioning schedule of Neyveli TPS-II 2<sup>nd</sup> Expansion.
- iii. Manalmedu – Neyveli TPS-II 2<sup>nd</sup> Expn 400 kV D/c (Quad) line (under the scope of TANGEDCO) would be taken up so as to match with the commissioning schedule of Neyveli TPS-II 2<sup>nd</sup> Expansion.
- iv. Manalmedu S/s would be connected to LILO of 400 kV NNTPS – Salem S/C line as an interim arrangement. Detailed connectivity of Manalmedu S/s is discussed in agenda point no. 7.

6.9. In the joint study meeting, it was agreed that the transmission system and its phasing would be put up in the forthcoming meeting of SRPC(TP). Subsequently, revised connectivity for Manalmedu has been proposed by TANTRANSCO. Hence, part of the scheme proposed above would change depending upon the connectivity agreed for Manalmedu.

Members may please discuss.

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**7. Manalmedu 400/230-110 kV substation**

7.1. Establishment of Manalmedu 400/230-110 kV substation was approved in the 41<sup>st</sup> meeting of SCPSPSR (held on 22.09.2017) with the following transmission schemes:

**400 kV transmission lines:**

- i. Ariyalur (proposed 765/400kV SS) - Manalmedu 400 kV D/C link
- ii. Neyveli (TNEB)-Manalmedu 400 kV D/C link.

**230 kV transmission lines:**

- i. LILO of Neyveli TS-II - Kadalangudi 230 kV SC line at Manalmedu.
- ii. Kumbakonam- Manalmedu 230 kV S/C line
- iii. Narimanam- Manalmedu 230 kV S/C line.

**ICTs:**

- i. 2x500 MVA, 400/230 kV ICT
- ii. 2x200 MVA, 400/110 kV ICT

**Bus reactor:**

2x80 MVAr Bus reactors.

7.2. Due to constraints in land acquisition for the establishment of 400 kV S/S at Neyveli, upgradation of the existing Cuddalore 230/110 kV substation into 400/230-110 kV SS instead of the already approved Neyveli 400/230 kV substation had been approved in the 1<sup>st</sup> SRSCT meeting held on 07.09.2018 with the following connectivity:

- (i) Neyveli TS II - Cuddalore 400 kV D/C line.
- (ii) Manalmedu - Cuddalore 400 kV D/C line.
- (iii) 2x500 MVA, 400/230 kV ICTs
- (iv) 2x200 MVA, 400/110 kV ICTs
- (v) 2x125 MVAr, 400 kV bus Reactors

Thus the 400 kV connectivity for Manalmedu SS was modified as given below:

- (i) Ariyalur 765/400 kV SS - Manalmedu 400 kV DC line.
- (ii) Cuddalore - Manalmedu 400 kV D/C line.

7.3. Further, in the 2<sup>nd</sup> SRSCT meeting held on 10.06.2019, as an additional system strengthening scheme for control of short circuit levels in Neyveli generation complex and rearrangement of network configuration to control overloading of ICTs/230 kV lines from Neyveli generation complex, transmission schemes of the already proposed Manalmedu & Cuddalore 400 kV substations were modified as follows:

- (i) Neyveli TS II - Cuddalore 400 kV D/c (Quad) line - under the scope of TANGEDCO as agreed in 1<sup>st</sup> SRSCT meeting.

I/17093/2021

**Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**

- (ii) Manalmedu - Neyveli TPS II 2<sup>nd</sup> Expansion 400 kV D/c (Quad) line (in place of Cuddalore – Manalmedu 400kV D/c line as agreed in 1<sup>st</sup> SRSCT) – under the scope of TANGEDCO

7.4. In the 2<sup>nd</sup> SRPC(TP) meeting, TANTRANSCO had proposed to revise the transmission scheme for the establishment of 400/230-110 kV Manalmedu substation as given below:

**Manalmedu 400/230-110 kV SS – original connectivity:****400 kV transmission lines:**

- i. Erection of 400 kV DC line from Ariyalur 765/400 kV SS to Manalmedu 400 kV SS.
- ii. Erection of 400 kV DC line from the proposed Neyveli TS II 2<sup>nd</sup> Expansion TPP to Manalmedu 400 kV SS.

**ICT**

- i. 2x500 MVA, 400/230 kV ICTs
- ii. 3x200 MVA, 400/110 kV ICTs

**Bus reactor**

2x125 MVAr Bus Reactors

**230 kV transmission lines:**

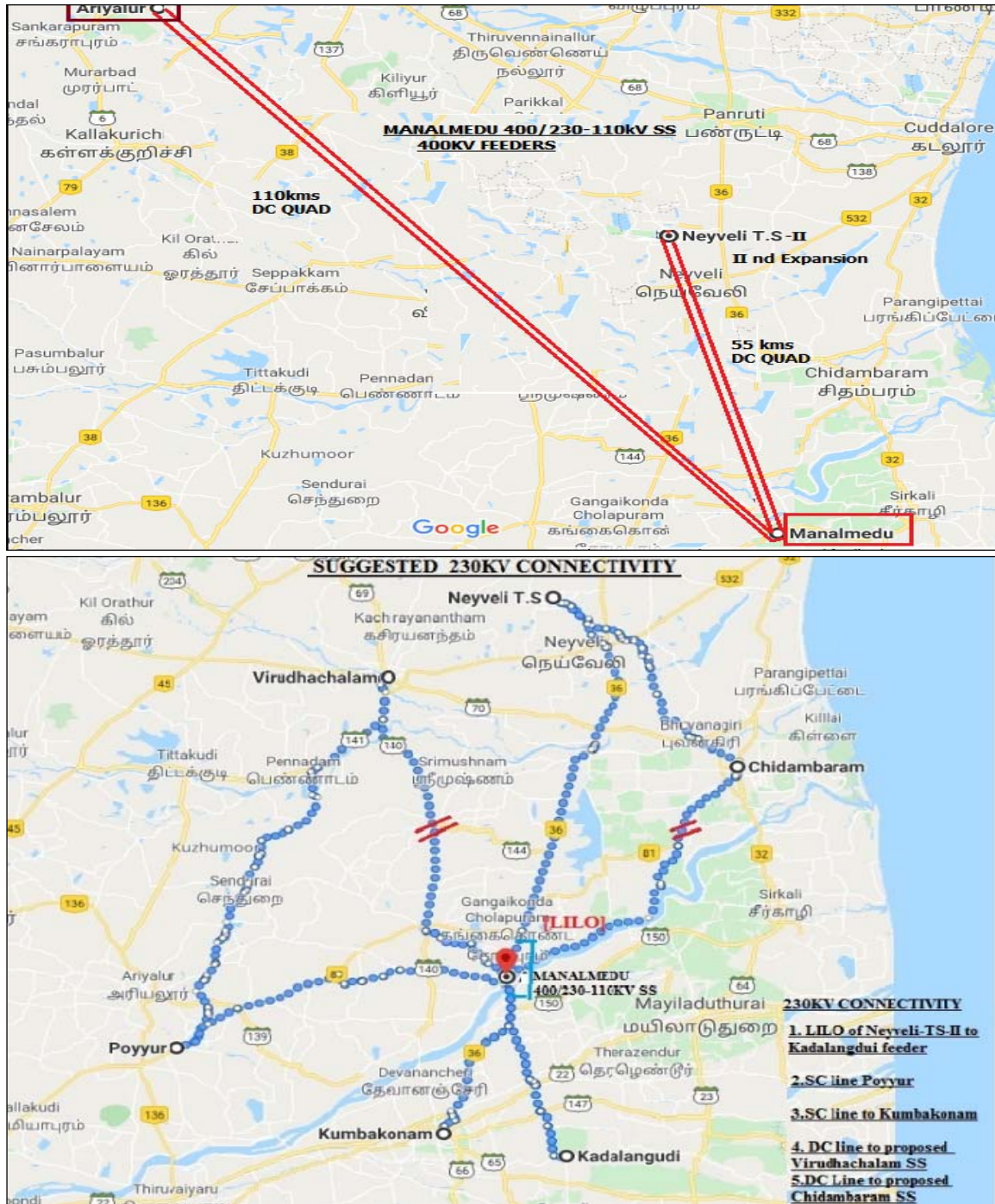
- i. Erection of DC line to make LILO of Neyveli TS-II to Kadalangudi 230 kV feeder at Manalmedu 400 kV SS.
- ii. Erection of SC line to Kumbakonam 230 kV SS from Manalmedu 400 kV SS
- iii. Erection of SC line to Poyyur 230 kV SS from Manalmedu 400 kV SS.
- iv. Erection of DC line to the proposed Chidambaram 230 kV SS from Manalmedu 400 kV SS.
- v. Erection of DC line to the proposed Virudhachalam 230 kV SS from Manalmedu 400 kV SS.

**110 kV transmission lines**

- i. LILO of existing Kadalangudy-LTPCL-Manalmedu 110 kV feeder between LTPCL and Manalmedu substation.
- ii. SC line to Kattumannar Koil 110 kV SS.
- iii. SC line to Sethiyathoppu 110 kV SS.
- iv. DC line to Pappakudi 110 kV SS.
- v. SC line to the sanctioned Naduvalur 110 kV SS.



I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

7.5. In the view of mismatching timeframe of Neyveli TPS-II 2nd Expn TPP and Manalmedu S/s and, instead of Manalmedu – Ariyalur 400 kV D/c line, LILO of NNTPS – Neyveli TS-II 400 kV S/c line at Manalmedu was proposed by TANTRANSCO, it had been decided in the 2nd SRPC(TP) meeting that CEA, CTU, SRPC, NLC, TANTRANSCO and SRLDC/POSO may jointly study the proposal and also work out phasing of the transmission scheme.

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

7.6. Accordingly, the matter was discussed in the Joint Study meeting on 04.02.2021 (MoM at Annex-IV). The following 400 kV connectivity was proposed by TANTRANSCO for Manalmedu SS:

(i) LILO of NNTPS-Neyveli TS-II 400 kV S/c line at Manalmedu

7.7. In the meeting, after deliberations the following 400 kV connectivity was proposed for Manalmedu

(i) LILO of NNTPS-Salem 400kV S/C line at Manalmedu (as an interim arrangement)

(ii) Erection of 400 kV DC line from Ariyalur 765/400 kV SS to Manalmedu 400 kV SS.

(iii) The ICT's, bus reactors, 230 kV and 110 kV connectivity would be as mentioned in para 7.4.

7.8. Once the commissioning schedule of Neyveli TPS II 2<sup>nd</sup> Expn. TPP is firmed up, the 400 kV connectivity to Manlamedu would be as agreed in 2<sup>nd</sup> SRPC (TP) meeting viz.

(i) Erection of 400 kV DC line from the proposed Neyveli TS II 2nd Expansion TPP to Manalmedu 400 kV SS.

(ii) Erection of 400 kV DC line from Ariyalur 765/400 kV SS to Manalmedu 400 kV SS.

7.9. TANTRANSCO representative stated that they would carry out studies with the proposed 400 kV connectivity as per para 7.7 and submit the results to CEA. It was decided that the same would be discussed in the forthcoming meeting of SRPC(TP).

7.10. TANTRANSCO vide their letter dated 11.03.2021 (Annex-V) informed that by making LILO of NNTPS-Salem 400kV S/C line at Manalmedu, the line length between Manalmedu and NNTPS will be 250 km and TSTRANSCO has proposed following connectivity for Manalmedu:

7.11. Without Neyveli TPS II 2<sup>nd</sup> Expn:

i) 400 kV S/C quad moose line from Neyveli TS-II to Manalmedu 400 kV S/S.

ii) 400 kV S/C quad moose line from Neyveli TS-II to Cuddalore 400 kV S/S.

iii) 400 kV S/C quad moose line from Manalmedu 400kV S/S to Cuddalore 400 kV S/S.

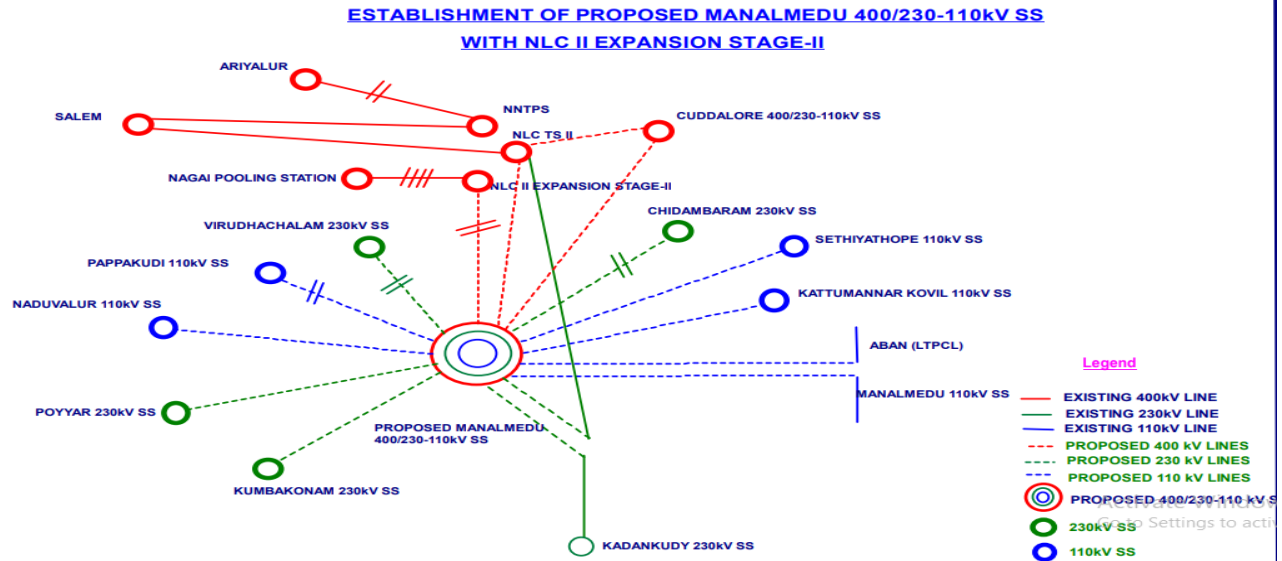
With Neyveli TPS II 2<sup>nd</sup> Expn:

In addition to the 400 kV connectivity mentioned above, the following 400 kV connectivity:

iv) Neyveli TPS II 2<sup>nd</sup> Expn - Manalmedu 400 kV D/C (quad moose) line



I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)ICT & Reactor

- i. 2x500 MVA 400/230 kV ICTs
- ii. 3x200 MVA 400/110 kV ICTs
- iii. 2x125 MVA Bus Reactors

230 kV transmission lines:

- i. Erection of D/C line to make LILO of Neyveli TS-II to Kadalangudi 230 kV feeder at Manalmedu 400 kV SS.
- ii. Erection of S/C line to Kumbakonam 230 kV S/S from Manalmedu 400 kV S/S
- iii. Erection of S/C line to Poyyur 230 kV S/S from Manalmedu 400 kV S/S.
- iv. Erection of D/C line to the proposed Chidambaram 230 kV S/S from Manalmedu 400 kV S/S.
- v. Erection of D/C line to the proposed Virudhachalam 230 kV SS from Manalmedu 400 kV S/S.

110 kV connectivity

- i. LILO of existing Kadalangudy-LTPCL-Manalmedu 110 kV feeder between LTPCL and Manalmedu substation.
- ii. S/C line to Kattumannar coil 110kV S/S.
- iii. S/C line to Sethiyathoppu 110kV SS.
- iv. D/C line to Pappakudi 110kV S/S.
- v. S/C line to the sanctioned Naduvalur 110kV SS.

TANTRANSCO has carried out system studies considering above proposal and results are enclosed at Annex-V.

Members may please discuss.

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**8. Proposal for commissioning of ICT-3 at Tuticorin GIS**

- 8.1. CTU vide email dated 13.04.2021 (Annex-VI) informed that they have received request from POWERGRID for commissioning of 1x500 MVA ICT (3<sup>rd</sup> ICT) along with associated bays at Tuticorin-II (GIS) substation under Regional System Strengthening Scheme.
- 8.2. 1x500 MVA ICT-3 at Tuticorin-II (GIS) substation is under implementation as Southern Regional System Strengthening scheme. Also the common facility works of “extension of indoor GIS bus upto the gantry before bay no. 210 to the outdoor AIS bus bars of 230 kV hybrid switchyard using GIB arrangement and necessary associated common infrastructure works at Tuticorin-II GIS s/stn as part of associated works with augmentation of ICT 3” is also under implementation. The Common Facility works had been approved in 1<sup>st</sup> meeting of SRPC(TP) held on 16.12.2019 and 3<sup>rd</sup> meeting of the NCT held on 26<sup>th</sup> & 28<sup>th</sup> May, 2020. The common facility works were allocated to POWERGRID under regulated tariff mechanism (RTM) vide MoP OM dated 25.09.2020.
- 8.3. However, POWERGRID has sought charging of ICT-3 along with the ICT bays without the availability of the common facility works associated with the ICT-3, citing that the common facilities works were not part of the original scope alongwith 3<sup>rd</sup> ICT and on receipt of communication for common facility works, the work contract of 3<sup>rd</sup> ICT was amended on 11.6.2020 to include the common facility works with an implementation time of 8 months (without taking the COVID-19 impact delays). The supplies are expected in June - July 21 and further two months for erection and testing of common facilities. Also considering the load conditions during this peak generation and summer load season, the commissioning of 3<sup>rd</sup> ICT shall provide 'N-1' reliability for Tuticorin-II GIS substation for injection of RE generations.

Members may discuss.

**9. Requirement of 765 kV spare (1-Ph) Reactors units:**

- 9.1. 765 kV transmission system forms backbone of the power transmission network. Hence, reliability of the 765 kV transmission system is of utmost importance.
- 9.2. Transportation of 765 kV equipments takes much more time than 400 kV units. Therefore, 765 kV S/s are generally planned with one spare unit (1-Ph) of 765/400 kV ICT, 240 MVAR/330 MVAR bus reactors and line reactors so that reliability of 765 kV grid can be maintained.
- 9.3. One spare unit (1-Ph) of 80 MVAR reactor has not been considered for 765 kV Warangal New and Chilkaluripeta TBCB substations. Therefore, it is proposed to provide one spare unit (1-Ph) of 80 MVAR reactor at each 765 kV Warangal New and Chilkaluripeta TBCB substations along with necessary arrangement to take spare reactor units into service as per requirement.

Members may deliberate.

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**10. Scheme to bypass NGR to use Switchable Line Reactor as Bus Reactor**

10.1. SRLDC in its operational feedback has suggested to implement NGR bypass arrangement for switchable line reactors to use them as bus reactor, in case of outage of line. Implementation of Vemagiri – Chilkaluripeta 765kV D/c line along with 240 MVAR switchable line reactor at both ends of each circuit and Chilkaluripeta – Cuddapah 765kV D/c line along with 240 MVAR switchable line reactors at both ends of each circuit as part of “Strengthening of transmission system beyond Vemagiri” was agreed as in the 37<sup>th</sup> meeting of the SCPSPSR held on 31.07.2014. As per present arrangement, NGR bypass arrangement has not been provided at Chilkaluripeta end for each circuit of Chilkaluripeta – Cuddapah 765 kV D/c line and Vemagiri – Chilkaluripeta 765 kV D/c line.

10.2. To use switchable line reactors (240 MVAR each) as bus reactors installed on each circuit of Vemagiri – Chilkaluripeta 765kV D/c line and Chilkaluripeta – Cuddapah 765kV D/c line at Chilkaluripeta 765kV S/s, it is proposed to implement NGR bypass scheme with suitable arrangement.

Members may deliberate.

**11. Conversion of fixed line reactor into switchable line reactor / bus reactor**

11.1. High voltage due to Resonance / Oscillation have been observed during tripping of lines, which are over compensated. Such conditions may cause permanent failure of the equipment. To avoid such condition, fixed line reactor of over compensated (80% to 120%) lines may be converted in switchable line reactor with inter trip scheme arrangement or may be converted into bus reactor on same bus.

11.2. Presently, Vellore – Raichur 400 kV S/c line (about 74 km) is installed with 50 MVAR fixed line reactor at Raichur TPS end under the ownership of Raichur TPS. SRLDC has reported resonance phenomena on above mentioned line during tripping. In view of above, it is proposed to convert fixed line reactor installed at Raichur TPS for Vellore - Raichur 400 kV S/c into switchable line reactor with inter trip scheme. If due to space constraint or any other issue it is not possible to convert fixed line reactor as switchable line reactor then same could be converted into bus reactor at Raichur TPS.

Members may deliberate.

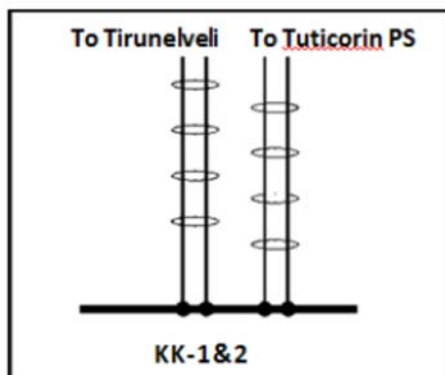
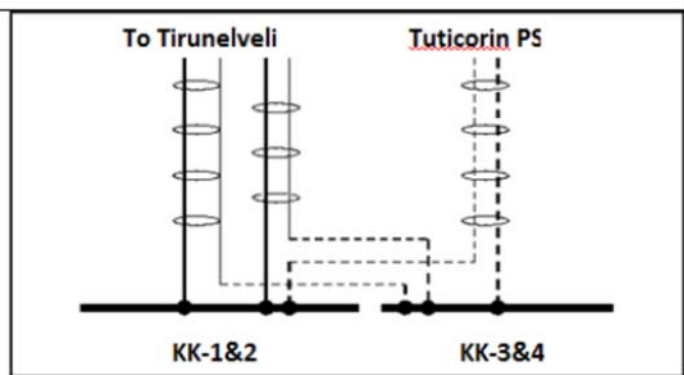
**12. Transmission system for grant of Connectivity to NPCIL for expansion of Kudankulam NPP Unit 3&4 (2x1000 MW)**

12.1. Transmission scheme for grant of connectivity to NPCIL for expansion of Kudankulam NPP Unit 3&4 (2x1000 MW) was discussed in the 1<sup>st</sup> SRPC(TP) meeting held on 16.12.2019 wherein following transmission system was agreed:

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

- i. Restoration of Kudankulam – Tirunelveli 400 kV D/c (Quad) line by terminating it at Tirunelveli substation [presently this line is connected to Tirunelveli – Tuticorin PS 400 kV D/c (Quad) line and thus form Kudankulam (Unit-1&2) – Tuticorin PS 400kV D/c(Quad) line]– Under ISTS
- ii. Kudankulam NPP (Unit-3&4) - Tuticorin PS 400 kV D/c (Quad) line [by implementing Kudankulam-Tirunelveli section and extending this upto Tuticorin PS, using the Tirunelveli-Tuticorin PS –400 kV D/c (Quad) existing line as mentioned in (a) above]– Under ISTS.
- iii. Termination of one circuit of each of Kudankulam Unit-1&2 – Tirunelveli 400 kV 2xD/c (Quad) line at Kudankulam Unit-3&4 and one circuit of Kudankulam Unit-3&4 - Tuticorin PS 400 kV D/c (Quad) line at Kudankulam Unit-1&2. This arrangement shall result into 3 nos. of 400 kV quad circuits from Kudankulam Unit-1&2 and Kudankulam Unit-3&4 generating stations – transmission line works under ISTS and re-arrangement works alongwith 400kV bays at generation switchyard – by NPCIL.
- iv. 2x125 MVAR, 420kV bus reactor at Kudankulam (Unit-3&4) – by NPCIL

**Fig :1 Connectivity arrangement at KKNPP for Unit-1&2****Fig :2 Proposed Connectivity arrangement for KKNPP Unit-3& with KKNPP unit 1&2**

12.2. In 2<sup>nd</sup> SRPC(TP) meeting, CTU informed that NPCIL had not submitted Long Term Access (LTA) application for Kudankulam Unit – 3&4 as per CERC Connectivity Regulations, 2009. In view of the above, it was agreed that connectivity for Kudankulam NPP Unit-3&4 may be provided through bus extension of Kudankulam NPP Unit-1&2 generation switchyard with suitable bus sectionalize arrangement under the scope of NPCIL. The transmission system agreed in 1<sup>st</sup> SRPC(TP) meeting would be taken up upon receipt of LTA application from NPCIL.

12.3. NPCIL vide letter No. NPCIL/Trans/2020/M/33 dated 30.10.2020, has informed that the connectivity requirement of KKNPP- 3&4 will be in February, 2024.

I/17093/2021

**Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**

12.4. Subsequently, NPCIL vide letter dated 04.02.2021 (Annex-VII) has submitted comments on the minutes of the 2<sup>nd</sup> SRPC(TP) held on 01.10.2020, wherein NPCIL has informed that extension of 400 kV bus from KKNPP-1&2 to KKNPP-3&4 via sectionalizer has not been envisaged and cannot be implemented. Sectionalizer is not a part of KKNPP scheme on account of the following:

- The switchyards for KKNPP-1&2 and KKNPP-3&4 are separate, with a distance of about 1.5 km between them.
- KKNPP-3&4 does not have any bay for this purpose. There are total 4 nos. of bays out of which three bays are for transmission line connection.

12.5. In view of same, it is proposed that if bus extension at KKNPP-1&2 is not feasible then connectivity to KKNPP-3&4 may be provided through interconnection between KKNPP-1&2 and KKNPP-3&4. Interconnection line between KKNPP-1&2 and KKNPP-3&4 may be utilized for termination of line as per proposed arrangement at Fig.2

Members may deliberate.

### **13. Implementation of bays at ISTS Substation under the scope of ISTS for termination of dedicated line of RE generators**

#### **i. 1 no. of 230 kV bays at 400/230 kV Tuticorin Substation**

In the 48<sup>th</sup> & 54<sup>th</sup> Southern Region constituents meeting regarding Connectivity/LTA applications held on 27.11.2020 & 28.05.2021 respectively, Stage-II Connectivity to M/s JSW Renew Energy Ltd. & M/s JSW Future Energy Ltd was agreed for grant as per the following details:

Applicant	Nature of applicant	Agreed in	Stage-I Connectivity Quantum (MW)	Stage-II Connectivity Quantum (MW)	Start date of Stage-II Connectivity	Proposed location for Grant of Stage-II Connectivity	Dedicated Transmission System (Under scope of applicant)
JSW Future Energy Ltd	Generator (Wind)	54 <sup>th</sup> SR Conn/LTA meeting	300	300	31.10.2022	Tuticorin-II GIS PS (Erstwhile Tirunelveli GIS PS)	JSW Future Energy Ltd – Tuticorin-II 230kV S/c line along with bays at generator end under scope of applicant.

In meeting, M/s JSW Future Energy Ltd had requested that implementation of bays at ISTS substation may be kept under the scope of ISTS licensee. As per clause 5.3 of the Revised Detailed Procedure for Grant of connectivity to projects based on renewable sources to ISTS,

*“For Connectivity, the dedicated transmission line including line bay(s) at generator pooling station shall be under the scope of the Applicant and the associated bay(s) at the*

I/17093/2021

**Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**

*ISTS sub-station shall be under the scope of transmission licensee owning the ISTS sub-station subject to compliance of relevant provisions of Tariff Policy. Provided that the Applicant may, if it so chooses, construct the associated bay(s) at its own cost, subject to approval of the CTU and agreement with the transmission licensee owning the ISTS sub-station.”*

Accordingly, in 54<sup>th</sup> Southern Region constituents meeting, one 230 kV bay at Tuticorin-II GIS PS was agreed for implementation under the scope of ISTS licensee in line with clause 5.3 of the Revised Detailed Procedure for Grant of connectivity to projects based on renewable sources to ISTS.

Members may deliberate.

**ii. 1 no. 400 kV bay at 765/400 kV Kurnool (New) Substation**

As agreed in the 46<sup>th</sup> Southern Region constituents meeting regarding Connectivity/LTA applications held on 28.09.2020, M/s Greenko AP01 IREP Pvt Ltd was granted 900 MW Stage-II Connectivity at Kurnool (New) substation as per the following details:

Applicant	Nature of applicant	Location	Stage-I Connectivity Quantum (MW)	Stage-II Connectivity Quantum (MW)	Start date of Stage-II Connectivity	location for Grant of Stage-II Connectivity	Dedicated Transmission System (Under scope of applicant)
Greenko AP01 IREP Pvt. Ltd.	Generator (Hybrid) Solar with storage	Kurnool, AP	900	900	04.02.22	Kurnool (New) 765/400 kV Substation	Greenko AP01 IREP Pvt. Ltd – Kurnool New 400 kV S/c line strung on D/c tower (with high capacity conductor enabling at least 900 MW power transfer at nominal voltage like quad moose conductor etc.) along with bay(s) at generator and Kurnool (New) end

Subsequently, M/s Greenko AP01 IREP Pvt Ltd vide letter dated 25.11.2020, had requested that implementation of 400kV bay at Kurnool (new) end for termination of their dedicated line may be kept under the scope of ISTS licensee. The matter regarding implementation of bay under the ISTS was taken up for discussion in the 49<sup>th</sup> Southern Region constituents meeting regarding Connectivity/LTA applications held on 29.12.2020. In the meeting, it was agreed that 400 kV bay at Kurnool (New) substation may be implemented under the scope of ISTS licensee in line with the clause 5.3 of the Revised Detailed Procedure for Grant of connectivity to projects based on renewable sources to ISTS.

Members may deliberate



I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**14. Use of switchable line reactors as bus reactors at Kurnool Sub-Station:**

14.1. In 37<sup>th</sup> SCPSPSR meeting held on 31<sup>st</sup> July 2014, the scheme “Additional inter-Regional AC link for import into Southern Region i.e. Warora – Warangal and Chilakaluripeta - Hyderabad - Kurnool 765 kV link” was agreed as part of the System for increasing capacity of Inter-State Transmission system for import of power into SR up to 2018-19. Scheme was awarded to M/s Essel Infra projects Ltd, through TBCB route. The scheme includes Hyderabad– Kurnool 765 kV D/c line with 240 MVAR switchable line reactor at Kurnool end. As per Gazette notification, POWERGRID to provide bays at Kurnool 765kV S/s for termination of Hyderabad– Kurnool 765 kV D/c line with 240 MVAR switchable line reactor at Kurnool end.

14.2. In 35<sup>th</sup> SRPC meeting held on 02.02.2019, following is noted.

*“the nodes at Maheswaram and Kurnool were experiencing high voltages and for effective management of the system, POSOCO was instructing closing and opening of the lines on a daily basis. For the TBCB line coming from Warora, PGCIL was carrying out the works of bay extension at Warangal, Maheswaram and Kurnool. The contractual schedule was around February/March 2019 while the lines were expected by November 2019. However, PGCIL was ready with bays at Kurnool with two reactors (2 x 240 MVAR) which could be energized by end of February 2019 or first week of March 2019. The reactors were likely to reduce the voltages of 765 kV node by 10 – 11 kV and about 4-5 kV of 400 kV node at Kurnool, if the reactors are permitted to be commissioned by the forum.”*

After deliberation it was agreed for early commissioning (end of February 2019/first week of March 2019) of the line reactors at Kurnool for voltage management.

14.3. As per latest status on 31.05.2021, the Hyderabad– Kurnool 765 kV D/c line got stuck in severe RoW issue and also got impacted due to COVID-19. The anticipated CoD of the scheme is October, 22. Further, SRLDC in its quarterly report for quarter-III & quarter -IV of 2020-21 has mentioned that voltage remains very high most of the time of whole year at Kurnool PG 400 kV bus.

14.4. In view of above, it is proposed that 2x240 MVAR switchable line reactors at Kurnool 765kV S/s for Hyderabad– Kurnool 765 kV D/c line may be continued to be used as bus reactor till commissioning of Hyderabad– Kurnool 765 kV D/c line.

Members may deliberate.

**15. Augmentation of Transformation Capacity in Southern Region:**

15.1. The present peak demand (2020-21) for Southern Region is about 58,400 MW and it is likely to increase to 74,000 MW by 2024-25 (as per 19<sup>th</sup> EPS). To meet the power demand and facilitate power drawl by STUs from the grid, detailed study analysis has been carried out regarding

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

requirement for transformation capacity augmentation in time frame of 2024-25. STU wise peak demand for 2020-21 and expected peak demand for 2024-25 are tabulated below.

Sl. No.	STU	Peak Demand in 2020-21 (MW)	Projected Peak Demand for 2024-25 (MW) (as per 19 <sup>th</sup> EPS)	Peak Demand considered for 2024-25 (MW)
1.	Andhra Pradesh	11193	14600	12800
2.	Telangana	13688	16900	16000
3.	Karnataka	14367	16700	16300
4.	Kerala	4284	6000	5800
5.	Tamil Nadu	16481	24200	22800
6.	Puducherry	421	650	570
	<b>Southern Region</b>	<b>58400</b>	<b>74650</b>	<b>74200</b>

Detailed System Study results with ICTs flows at various substations in Southern Region are given at Annex- VIII. From the study results it is observed that loading on the ICTs at some of the substations are on higher side and the ICT augmentation is required at these sub-stations.

The list of substations under ISTS and STUs where transformation capacity augmentation is required are tabulated below:

Sl. No.	Transmission License	Substation	Voltage Level (kV)	Existing & UC ICT Capacity (MVA)	Expected ICT loading (MW)		Remarks
					All ICTs in service	With N-1	
	Study Analysis for Morning Peak, March 2025						
1.	KPTCL	Guttur	400/220	2x315	2x225	1x287	
2.	KPTCL	Peenya	400/220	2x500	2x317	1x452	
3.	APTRANSCO	Kurnool	400/220	3x315	2x228	2x288	
4.	APTRANSCO	Rachagunneri	400/220	2x315	2x230	1x306	
5.	APTRANSCO	Kakinadasez	400/220	2x500	2x445	-----	
6.	TSTRANSCO	Dichipalli	400/220	3x315	3x220	2x398	
7.	TSTRANSCO	Narsapur	400/220	2x315	2x236	1x299	
8.	TANTRANSCO	Salem	400/110	3x200	3x184	2x245	
9.	TANTRANSCO	S P budur	400/110	2x200	2x167	2x198	
10.	TANTRANSCO	Edayarpym	400/110	3x200	3x220	----	
11.	TANTRANSCO	Velalividu	400/110	2x200	2x148	1x230	
12.	TANTRANSCO	Ariyalur	400/230	2x500	2x327	1x491	
13.	TANTRANSCO	Ariyalur	765/400	2x1500	2x1203	1x1800	
14.	TANTRANSCO	Manalmedu	400/230	2x500	2x416	1x668	
15.	KSEB	Kottayam	400/220	2x315	2x276	1x355	
16.	KSEB	Madkthra	400/220	3x315	3x238	2x293	
17.	KSEB	Kasargode	400/220	2x315	2x258	1x145	
18.	POWERGRID	Trivandrum	400/220	3x315	3x224	2x303	
19.	POWERGRID	Cochin	400/220	2x315+1x500	2x204 +1x326	2x280	Space not available for 4 <sup>th</sup> ICT augmentation
20.	POWERGRID	Elappuly	400/220	2x315	2x198	1x303	
21.	POWERGRID	Narendra	400/220	2x500	2x280	1x430	Space not available for 3 <sup>rd</sup> ICT augmentation



I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

22.	POWERGRID	Nizamabad	765/400	2x1500	2x1100	1x1700	
23.	POWERGRID	Hosur	400/220	3X315	3x235	2x300	
<b>Study Analysis for Evening Peak, March 2025</b>							
24.	POWERGRID	Kolar	400/220	2x500	2x254	1x418	

15.2. POWERGRID has communicated that space is available for augmentation of transformation capacity at Trivandrum, Elappully (Palakkad), Kolar and Nizamabad S/s. Further, it is also informed that for augmentation of 1x500 MVA, 400/220 kV ICT at Kolar, cables will be required for interconnection between ICT and 220 kV bus.

15.3. Towards augmentation of transformation capacity at Hosur S/s, POWERGRID informed that ICT bays are not available for augmentation of transformation capacity. However, space is available for future 400 kV line bays, however, due to severe RoW issues, these line bays cannot be utilized for termination of line. Further, 1x63 MVAr bus reactor is installed adjacent to 3x315 MVA ICTs and 220 kV switchyard. The 400/230kV, 1x500 MVA 4<sup>th</sup> ICT may be accommodated by shifting of 63 MVAr bus reactor to available 400 kV line bays.

Accordingly, it is proposed that transformation capacity with 1x500 MVA, 400/230 kV ICT (4<sup>th</sup>) may be augmented at Hosur substation by shifting of 1x63 MVAR bus reactor to available 400 kV line bays with suitable arrangement.

15.4. Regarding, Narendra and Cochin substation, POWERGRID has informed that space is not available for augmentation of 3<sup>rd</sup> and 4<sup>th</sup> ICT respectively.

15.5. In view of above, augmentation of transformation capacity is proposed at following locations.

Sl. No.	Transmission License	Substation	Voltage Level (kV)	Existing & UC ICT Capacity (MVA)	Expected ICT loadings (MW)		Proposed ICT augmentation Capacity (MVA)
					All ICTs in service	With N-1	
1.	KPTCL	Guttur	400/220	2x315	2x225	1x287	1x500
2.	KPTCL	Peenya	400/220	2x500	2x317	1x452	1x500
3.	APTRANSCO	Kurnool	400/220	3x315	2x228	2x288	1x500
4.	APTRANSCO	Rachaguneri	400/220	2x315	2x230	1x306	1x500
5.	APTRANSCO	Kakinadasez	400/220	2x500	2x445	-----	1x500
6.	TSTRANSCO	Dichipalli	400/220	3x315	3x220	2x398	1x500
7.	TSTRANSCO	Narsapur	400/220	2x315	2x236	1x299	1x500
8.	TANTRANSCO	Salem	400/110	3x200	3x184	2x245	1x200
9.	TANTRANSCO	S P BUDUR	400/110	2x200	2x167	2x198	1x200
10.	TANTRANSCO	Edayarpym	400/110	3x200	3x220	----	1x200
11.	TANTRANSCO	Velalividu	400/110	2x200	2x148	1x230	1x200
12.	TANTRANSCO	Ariyalur	400/230	2x500	2x327	1x491	1x500
13.	TANTRANSCO	Ariyalur	765/400	2x1500	2x1203	1x1800	1x1500
14.	TANTRANSCO	Manalmedu	400/230	2x500	2x416	1x668	1x500
15.	KSEB	Kottayam	400/220	2x315	2x276	1x355	1x500
16.	KSEB	Madkthra	400/220	3x315	3x238	2x293	1x500
17.	KSEB	Kasrgode	400/220	2x315	2x258	1x145	1x500
18.	POWERGRID	Trivdrum	400/220	3x315	3x224	2x303	1x500

I/17093/2021

**Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**

19.	POWERGRID	Elappully	400/220	2x315	2x198	1x303	1x500
20.	POWERGRID	Nizamabad	765/400	2x1500	2x1100	1x1700	1x1500
21.	POWERGRID	Hosur	400/220	3x315	3x235	2x300	1x500
22.	POWERGRID	Kolar	400/220	2x500	2x254	1x418	1x500

15.6. Further, POWERGRID informed that loading of more than 100% has been observed on all three ICTs at some occasions at Mysore S/s. Presently, Mysore substation has 2x315 + 1x500 MVA transformation capacity. Loading pattern of ICTs observed between Dec' 2020 to March' 2021, as informed by POWERGRID are tabulated below:

Time Period	ICT#1 (315 MVA)	ICT#2 (315 MVA)	ICT#3 (500 MVA)
Nov'2020	222	221	378
Dec'2020	252	252	422
Jan'2021	267	289	481
Feb'2021	300	300	494
Mar'2021	317	316	517

15.7. SRLDC in its operational feedback also mentioned that ISTS substation at Mysore is not complying with 'N-1' contingency criteria of ICTs.

15.8. In this regard it may be pointed out that KPTCL has planned 2x500 MVA, 400/220 kV S/s at Kadakola for relieving loading on ICTs at Mysore and meeting the increasing demand of the area. The same was discussed and agreed in 2<sup>nd</sup> SRSC meeting held on 10<sup>th</sup> June 2019. However, it may be noted that Kadakola substation is yet to be awarded and can be expected in 24 - 36 months. KPTCL may update the latest status of the Kadakola substation.

However, loading of more than 100% may cause failure of entire Mysore S/s and may result in blackout of large area in and around Mysore city. Till the commissioning of Kadkola S/s, loadings on ICTs at Mysore S/s shall remain critical.

15.9. In view of delayed commissioning of Kadkola S/s and critical loadings of ICTs at Mysore, it is proposed that Mysore substation may be augmented with 1x500 MVA, 400/220 kV (4<sup>th</sup> ICT) transformation capacity. POWERGRID has informed availability of space for transformation capacity augmentation at Mysore S/s, however 400kV & 220kV spare ICT bays are not available. Further the space available may not be sufficient for ICT and ICT AIS bays. After analysis, it was found that in the available space ICT and 400 kV & 220 kV outdoor GIS ICT bays can be accommodated.

Accordingly, it is proposed to augment transformation capacity by 1x500 MVA, 400/220 kV ICT (4<sup>th</sup>) at Mysore ISTS S/s along with outdoor GIS ICT bays, both 400 kV & 220 kV bays, and other required suitable arrangement under compressed time schedule.

Members may deliberate.

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**16. Short Circuit studies for Southern Region**

16.1. In the 1<sup>st</sup> SRPC(TP) meeting held on 16.12.2019, CTU had informed about the likely locations where high short circuit level could be observed for 2023-24-time frame. In the meeting, it was decided that STUs may also carry out detailed studies for identification of locations where fault levels were expected to cross the design limits and suggest necessary measures for control of fault level. Details of short circuit current and switchyard rating of ISTS and STU substations as informed are tabulated below.

Sl. No.	Substation	Voltage level (kV)	3-Ph SC (kA)	1-Ph SC (kA)	Ownership	Switchyard rating (kA) / Remarks
1.	Maheshwaram-TS	400	63.7	45.5	TSTRANSCO	50
2.	Maheshwaram	400	63.5	45.6	POWERGRID	63
3.	Udumalpet	400	51.8	37.1	POWERGRID	40
4.	Yadadri	400	49.3	49.9	TSTRANSCO	50
5.	Chittor	400	47.4	33.5	APTRANSCO	Fault level is expected to remain within design limits with implementation of <i>scheme to control fault level at Thiruvalam S/s</i>
6.	Dindi	400	46.9	33.2	TSTRANSCO	50
7.	Edayarpalayam	400	46.7	33.3	TANTRANSCO	63
8.	Tirunelveli	400	45.7	35.0	POWERGRID	40
9.	Hyderabad-TS	400	45.5	31.0	TSTRANSCO	40
10.	Kurnool	400	45.1	33.3	APTRANSCO	
11.	Kurnool	765	40.5	27.5	POWERGRID	40

16.1.1. In the 2<sup>nd</sup> SRPC(TP) meeting, it was decided that the scheme to control the fault level at Maheshwaram-TS may be evolved through joint system study with participation from CEA, SRPC, CTU, TSTRANSCO and POSOCO/SRLDC. It was also decided that scheme for controlling fault level at Kurnool (APTRANSCO), Hyderabad-TS (TSTRANSCO), Tirunelveli (POWERGRID) may be put-up for discussions in subsequent SRPC(TP) meetings.

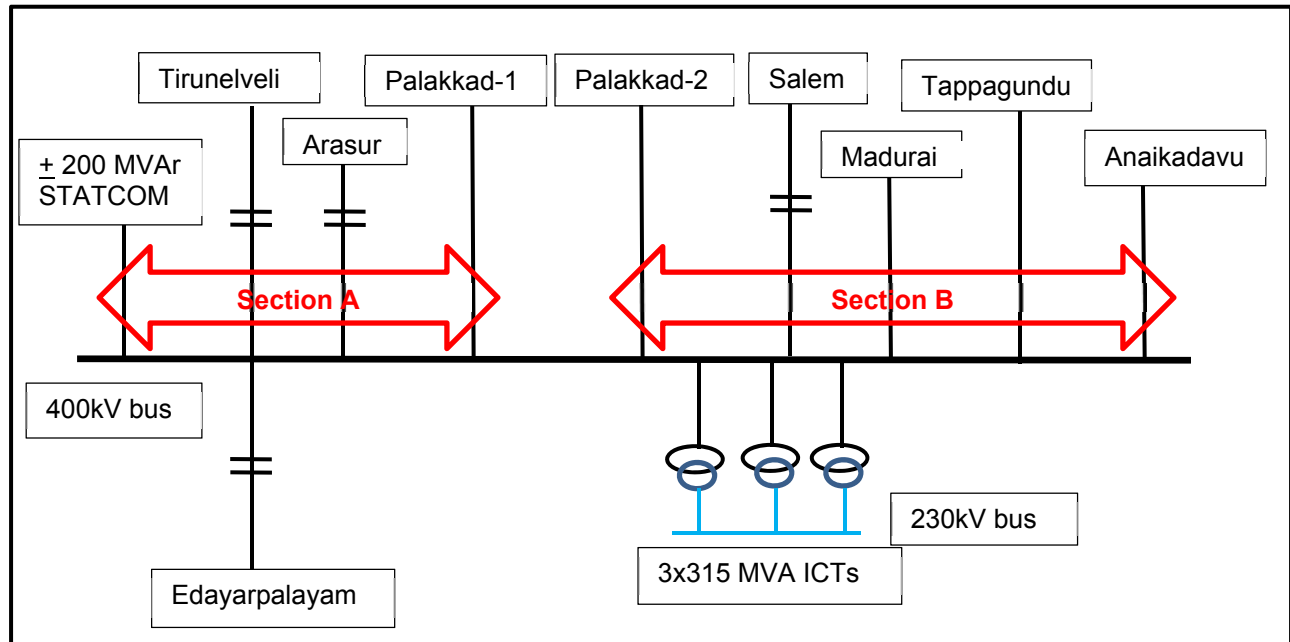
16.1.2. Accordingly, the proposal was discussed in the joint study meeting held on 04.02.2021. In the meeting, Sr. GM (CTU) gave presentation on uprating of existing substation on increasing short circuit current. He informed that following can inter-alia be implemented for mitigating the short circuit fault level:

- i. Up gradation of substation equipments
- ii. Splitting of Bus bar
- iii. Higher impedance transformer/ICTs for the proposed substation

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

16.2. **Scheme to control fault level at Udumalpet S/s:** The scheme to control fault level at Udumalpet S/s was discussed in 2<sup>nd</sup> SRPC(TP) meeting. From the system studies for 2023-24-time frame, the 3-phase short circuit levels at 400 kV bus of Udumalpet S/s were observed to be of the order of about 49 kA, whereas the substation has been designed for 40 kA fault level. SLD of Udumalpet S/s is depicted below.



*Fig: Schematic for Transmission system for controlling high Short Circuit Current level at Udumalpet 400/230kV substation*

In order to control the fault current levels at 400 kV Udumalpet bus, the 400 kV bus has been segregated into two sections (Section A & B) and series reactors have been introduced in the sections to control the fault levels along with bypassing of some of the transmission lines as well. The alternatives and the results are provided in the table below. From the study results it is observed that in case of Alternative-3, the fault currents in both sections of the Udumalpet 400 kV bus remains well within 40 kA limit, the designed fault levels of the bus.

Alternative	Scheme	Connectivity Details	3-Ph Fault current (kA)	
			Section-A	Section-B
	Base case	Palakkad D/c line, Arasur D/c line, Edayarpalayam(quad) D/c line, Tirunelveli D/c line, Salem D/c line, Madurai S/c line, Tappagundu S/c line, Anaikadevu S/c line and 3x315 MVA, 400/230kV ICTs	49.1	-

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

Alternative	Scheme	Connectivity Details	3-Ph Fault current (kA)	
			Section-A	Section-B
1	12Ω, 420kV fault limiting bus series reactors between Bus Section-A and Bus Section-B	<b>Bus section-A:</b> One ckt. of Palakkad D/c line, Arasur D/c line, Edayarpalayam (quad) D/c line, Tirunelveli D/c line, $\pm 200$ MVar Statcom  <b>Bus section-B:</b> 2 <sup>nd</sup> ckt. of Palakkad D/c line, Salem D/c line, Madurai S/c line, Tappagundu S/c line, Anaikadevu S/c line and 3x315 MVA, 400/230 kV ICTs	38.2	38.3
2	12Ω, 420kV fault limiting bus series reactors between Bus Section-A and Bus Section-B  12Ω, 420 kV fault limiting series line reactor in Udumalpet – Anaikadevu 400kV S/c line at Udumalpet	<b>Bus section-A:</b> One ckt. of Palakkad D/c line, Arasur D/c line, Edayarpalayam (quad) D/c line, Tirunelveli D/c line, $\pm 200$ MVar Statcom  <b>Bus Section-B:</b> 2 <sup>nd</sup> ckt. of Palakkad D/c line, Salem D/c line, Madurai S/c line, Tappagundu S/c line, Anaikadevu S/c line and 3x315 MVA, 400/230 kV ICTs.	38.2	36.2
3	12Ω, 420 kV fault limiting bus series reactors between Bus Section-A and Bus Section-B.  Bypass of one ckt of Udumalpet – Arasur and Udumalpet – Anikadevu at Udumalpet to form Anikadevu – Arasur 400kV S/c line.	<b>Bus section-A:</b> One ckt. of Palakkad D/c line, Arasur S/c line, Edayarpalayam (quad) D/c line, Tirunelveli D/c line, $\pm 200$ MVar Statcom  <b>Bus Section-B:</b> 2 <sup>nd</sup> ckt. of Palakkad D/c line, Salem D/c line, Madurai S/c line, Tappagundu S/c line and 3x315 MVA, 400/230kV ICTs.	35.7	32.5

16.2.1. From the above table it was observed that Alternative-3 is suitable for control of fault level at Udumalpet S/s. Accordingly, following transmission system strengthening scheme was proposed for controlling fault level at 400 kV bus of Udumalpet substation:

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

- a) 12 $\Omega$ , 420 kV fault limiting bus series reactors between Bus section-A and bus Section-B
- b) Bypassing one ckt of Udumalpet – Arasur line and Udumalpet – Anikadevu line at Udumalpet to form Anikadevu – Arasur 400kV S/c line.

16.2.2. In the 2<sup>nd</sup> SRPC(TP) meeting, TANTRANSCO had proposed that bypass of Udumalpet – Anikadevu line and one ckt of Udumalpet - Edayarpalyam line may be carried out instead of bypass of Udumalpet – Anikadevu line and one ckt of Udumalpet – Arasur line. In the meeting, it was decided that CEA, SRPC, CTU, TANTRANSCO and SRLDC/ POSOCO may jointly study the scheme for controlling fault level at Udumalpet S/s.

16.2.3. In the joint study meeting held on 04.02.2021, TANTRANSCO representative stated that the Udumalpet– Edayarpalyam line is quad moose whereas Udumalpet – Anikadevu line is twin moose, so they agree to the earlier proposal of bypassing of Udumalpet – Anikadevu line and one circuit of Udumalpet – Arasur line at Udumalpet to control the short circuit fault level at Udumalpet bus (Alternative-3).

Members may please note.

#### 17. Phasing of transmission system for evacuation of power from potential REZ in Gadag & Karur

MoP vide OM dated 19 July 2021 (Annex-IX) has approved the phasing of Karur and Gadag.

#### A. Transmission Scheme for Evacuation of power from RE sources in Karur/ Tiruppur Wind Energy Zone (Tamil Nadu) (2500 MW):

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

- 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

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

*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.*

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

- 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 500 MW at Karur.*

**Members may please note the same.**

**B. Transmission scheme for evacuation of power from Gadag SEZ (2500 MW) - Part A:**

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

- 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 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 MVA (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.*

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

- 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)



I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

*Phase-II scheme to be taken up only after receipt of Connectivity/LTA applications beyond 1000 MW at Gadag or beyond 1500 MW at Koppal P.S. The schedule of implementation of Phase-II of the scheme would be matching with schedule of RE developers or 18 months from the date of transfer of SPV, whichever is later.*

Members may note the same.

### 18. Phase-I & Phase-II Solar & Wind Energy Zone Transmission Schemes

- 18.1. Transmission scheme for integration and evacuation of 18.5 GW REZ was discussed and agreed in the 1<sup>st</sup> SRSCT meeting held on 07.09.2018 and 2<sup>nd</sup> SRSCT meeting held on 10.06.2019. Further, various issues related to availability of land, bidding, identification of potential and All-India Studies were raised by TANGEDCO in various forums including proceedings before CERC in the petition no. 200/MP/2019, which were deliberated in the 1<sup>st</sup> SRPC(TP) meeting held on 16.12.2019. Status of availability of land, bidding and applications in various REZ were further informed in the 2<sup>nd</sup> SRPC(TP) meeting held on 01.10.2020, however, due to paucity of time, the agenda could not be discussed completely and it was decided that same may be taken up in the next SRPC(TP) meeting.
- 18.2. The transmission system discussed and agreed for 18.5 GW potential RE Zone in SR is given below:
  - a) Tirunelveli and Tuticorin Wind Energy Zone (Tamil Nadu) (500 MW)
  - b) Karur / Tiruppur Wind Energy Zone (Tamil Nadu) (2500 MW)
  - c) Koppal Renewable Energy Zone (Karnataka) (2500 MW)
  - d) Kurnool Wind Energy Zone (3000 MW) /Solar Energy Zone (AP) (1500 MW)
  - e) Ananthapuram (Ananthapur) SEZ (AP) (2500 MW) and Kurnool SEZ (AP) (1000 MW)
  - f) Gadag SEZ (Karnataka) (2500 MW)
  - g) Bidar SEZ (Karnataka) (2500 MW)
  - h) Common transmission system strengthening in Southern Region for enabling evacuation and export of power from Solar & Wind Energy Zones in Southern Region
- 18.3. As per discussions in 2<sup>nd</sup> SRSCT meeting, the above transmission system is a broad master plan to serve integration of RE generation potential assessed in Tamil Nadu, Karnataka and Andhra Pradesh for period upto 2021-22. As such, it was agreed that the scheme would be implemented as ISTS, consequent to grant of LTA by CTU. The transformation capacity at various sub-stations and certain elements may be required to be reviewed based on LTA applications. Accordingly, this broad master plan would be implemented in stages to serve RE integration.
- 18.4. As per information furnished by SECI, status of land availability for setting up of RE generation projects (18.5 GW) in Southern Region is detailed below:



I/17093/2021

**Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**

- Land is available in Gadag (2500 MW SEZ) and Koppal (2500 MW WEZ) and Government of Karnataka has already identified the land. However, Koppal was originally envisaged as Wind Energy Zone but SECI has now proposed to develop Koppal as a SEZ/Hybrid.
- Regarding Bidar (2500 MW SEZ), Karnataka, land is yet to be firmed up.
- Land is available in Ananthpuram (2,500 MW SEZ) and Kurnool (2,500 MW SEZ, 3,000 MW WEZ) Andhra Pradesh.
- Regarding Karur WEZ (2,500 MW), Tamil Nadu Government has raised specific concerns about the availability of land for the identified potential of 2500 MW. Regarding Tirunelveli WEZ (500 MW), Tamil Nadu Government has not confirmed the availability of land.

18.5. Further, the following were also decided in the 1<sup>st</sup> SRPC(TP) meeting:

- i. SECI would share the RE potential assessment study/report for 18.5 GW of envisaged RE potential in states of Andhra Pradesh, Karnataka and Tamil Nadu with CEA/CTU/SRPC and with STU's of SR.
- ii. SRPC would co-ordinate with states to find out the RE potential already developed and the balance RE potential which could be developed in different locations (connected to ISTS as well as intra-state network), based on availability of land and other infrastructure within two months and forward their findings to CEA.
- iii. SECI/MNRE to confirm whether the assessed RE potential at different locations in Southern Region includes the potential being developed in intra-state system or excludes the same. For example, whether the RE potential (2.5 GW) at Koppal, Karnataka, is the total potential of Koppal area and includes the RE potential (of about 1 GW) being developed by KPTCL in Koppal or is over and above the potential being developed by KPTCL.
- iv. SECI was requested to expedite the bidding process of planned RE capacity in Southern region so as to avoid mismatch between commissioning of RE capacity and associated transmission system.
- v. Accordingly, CEA/CTU may review the transmission plans/schemes based on the above.

18.6. SECI along with NIWE, made a presentation on assessment of 18.5 GW RE Potential in states of Andhra Pradesh, Karnataka and Tamil Nadu at TNEB Headquarters Chennai on 11<sup>th</sup> February 2020. The meeting was attended by SR constituents.

18.7. During the 2<sup>nd</sup> SRPC(TP) meeting, Director (PSPA-I), CEA, stated that out of 18.5 GW of RE potential, land availability corresponding to 5.5 GW of RE (Karur - 2.5 GW, Tirunelveli – 0.5 GW and Bidar – 2.5 GW) is yet to be finalized. Chief Engineer (PSPA-I), CEA, requested SECI to furnish the details of land availability in Koppal, Gadag, Kurnool and Ananthapuram. Towards this, representative of SECI stated that land has been finalized by A.P. government for setting up RE generation projects in Ananthpuram and Kurnool and the same will be formalized within two

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

months. He also informed that SECI has invited bidders to set up solar park of 2,500 MW capacity in Koppal. He further clarified that SECI has not identified Koppal as SEZ only, Koppal may be developed as a hybrid zone and has the potential for both solar and wind power. Regarding Gadag, land is available corresponding to 2,100 MW of solar power.

18.8. Representative from TANGEDCO stated that as per the directions of CERC, SECI has been asked to file an affidavit for the following for each RE location in Southern Region:

- Firm availability of land.
- Status of bidding.
- Status of LTA application.
- Whether RE power can be evacuated through existing transmission system or augmentation is required.
- Whether the proposed transmission network for evacuation of RE power can be taken up independently and in phased manner

Subsequently, SECI has filed an affidavit informing that land is available in Koppal to develop 2.5 GW of solar park. However, as per TANGEDCO, SECI, has not provided any document related to land availability. Therefore, TANGEDCO requested to defer the scheme till land availability issue is resolved.

18.9. During the 2<sup>nd</sup> SRPC(TP) meeting, SECI representative informed that SECI has submitted all the documents in respect of land availability which has been made available either by Karnataka Government or A.P Government.

18.10. CTU has submitted affidavit dated 26.08.2020 in compliance of CERC directions issued vide ROP dated 06.08.2020 regarding prioritization of transmissions schemes. CTU vide referred affidavit submitted that transmission scheme for Koppal and Gadag may be taken up for implementation on priority. In addition, regulatory approval sought for Tuticorin may be given which shall be implemented after receipt of LTA for more than 1500 MW. Further implementation of Kurnool & Ananthapur to be taken-up after issuance of location specific bids by SECI (presently to be put on hold due to non-availability of LTA applications). Karur, Bidar and Common transmission scheme to be put on hold.

18.11. Subsequently, as per the meeting held in CEA on 12.10.2020 regarding development of Common Transmission System for Connectivity, meeting held on 16.10.2020 for review of 66.5 GW RE linked Transmission schemes and 12<sup>th</sup> meeting of the Monitoring Committee on Inter-State Transmission System (ISTS) for 66.5 GW REZs held on 22.10.2020, it was decided that transmission system identified for integration of REZ may be taken-up for implementation after grant of LTA. It was also decided that the transmission system for evacuation of power from RE sources in Bidar, Karur, Kurnool & Anantapur area may be put-on hold due to non-availability of LTA applications.

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

- 18.12. CTU has granted/ received Stage-I / Stage-II Connectivity for 300 MW at Karur PS and LTA for 100 MW. Accordingly, implementation of Karur PS was also recommended in phased manner vide additional affidavit dated 29.04.21.
- 18.13. The details of Connectivity & LTA applications received for Koppal, Gadag & Karur PS are as given below:

REZ	St-II Connectivity (MW)		LTA (MW)	
	Granted	Addl. agreed for grant	Granted (beneficiaries)	Addl. agreed for grant
<b>Koppal</b>	600	600	300 (NR-100, WR-100, ER-100)	300 (NR-150, WR-75, ER-75)
<b>Gadag</b>	160	300	0	460 (NR-150, WR-235, ER-75)
<b>Karur</b>	270 <sup>#</sup>	150	100 (NR-100)	-
<b>Tirunelveli / Tuticorin</b>	2220.1	-	1100.1**	-

# On request of applicant, Stage-II Connectivity has been reduced from 310 MW to 270 MW.

\*\* Additionally, LTA application for 540 MW has been received in June 2021 for which 4<sup>th</sup> ICT at Tuticorin-II shall be required.

- 18.14. As per CERC directions in the Regulatory Approval petition 200/MP/2019, vide affidavit dated 29.04.21, CTU has submitted the land details of the generation projects as received from RE developers at Koppal, Gadag and Karur. SECI had also submitted land-related details of respective State Governments vide Affidavit dated 25.08.2020.
- 18.15. Further, in RoP dated 25.06.2021, CERC had directed to hold the RPC meeting to discuss the developments and implementation of the transmission schemes in phase-wise manner with the constituents of the Southern Region and to file the minutes of meeting. Further the Commission also directed the Petitioner and SECI to furnish the available details regarding acquisition of land by the RE developers in the States of Tamil Nadu and Karnataka.

Members may please note.

## 19. All-India studies for evolution of additional transmission scheme for export of power from Southern grid to rest of all-India grid

- 19.1. It was decided in the 2<sup>nd</sup> SRSCCT meeting that all-India studies would be carried out with the participation of CEA, CTU, POSOCO and concerned beneficiaries/STUs for evolution of additional (over and above the above proposed transmission scheme) transmission scheme for export of power from Southern grid to rest of all-India grid.
- 19.2. Accordingly, Load-Generation balance was prepared by CEA and CTU to carry out system studies for integration of 175 GW RE by the year 2022 and the load generation balance along with PSSE

I/17093/2021

**Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**

file for one scenario (August 2021-22 Afternoon Peak) had been circulated to SR constituents and POSOCO on 19.11.2019. The same was also discussed with the SR constituents and POSOCO in the joint study meeting on 21-22 November, 2019, at New Delhi and subsequently in the 1<sup>st</sup> SRPC(TP) meeting held on 16.12.2019 at Hyderabad.

- 19.3. In the 1<sup>st</sup> SRPC(TP) meeting, it was decided to prepare total nine scenarios for the month of June, 2021, August, 2021 and February, 2022, for afternoon peak, evening peak and night off- peak scenarios (three scenarios for each month viz. June, August and February). It was further decided that the same shall be circulated to SR constituents for their comments /observations/suggestions. Further, SR Constituents were again requested to forward their comments/observations on the already circulated Load-Generation balance and PSSE file, so that the nine number of scenarios could be formulated.
- 19.4. In view of the above, LGB for 9 nos. of scenarios and system studies file for one scenario (June 2021-22 Afternoon Peak) was prepared. Load generation scenarios, results of the system studies, study assumptions & inputs considered were uploaded on CTU website and were also circulated to all the regional constituents for their comments/observations vide emails dated 20.05.2020 (SR), 08.06.2020 (WR) and 11.06.2020 (NR, ER & NER).
- 19.5. Comments were received from POSOCO vide letter dated 25.06.2020. Further, observations pertaining to certain transmission network data updation of STU network and generation dispatches were also received from TANTRANSCO vide email dated 02.06.2020 and KPTCL vide email dated 08.06.2020. KPTCL has stated that the 9 nos. of load generation balance scenarios and assumptions considered for study pertaining to Karnataka is in line with the historical pattern. No comments were received from any other constituents. Accordingly, the system studies file was updated incorporating the above observations of the constituents and system studies were carried out for all the 9 nos. of scenarios. The system studies along with observations received from POSOCO/constituents were also discussed with CEA and POSOCO in meeting held on 23.07.2020.
- 19.6. The Load generation scenarios, study assumptions & inputs considered, system studies and the detailed study analysis was uploaded on CTU website on 03.08.2020 and the same was also circulated to constituents for their comments and observations. Comments were received from POSOCO vide letter dated 30.09.2020, TSTRANSCO vide letter dated 29.09.2020 and TANTRANSCO vide letter dated 11.03.2021. Comments from POSOCO were discussed in the meeting held on 11.03.2021 for Load Generation Balance for All India Studies for 2024-25 which are being done as a continuation of the All-India Studies of 2021-22 with the integration of additional identified potential in NR & WR (20 GW in Rajasthan & 15 GW in Khavda).
- 19.7. POSOCO vide letter dated 30.09.2020 has submitted observations on the All-India Studies for RE integration in 2021-22 which were discussed in detail in the meeting. POSOCO has raised

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

observations regarding similarity between off-peak demand and afternoon peak and maximum demand for all- India being considered on higher side. It was also reported that demand in WR for afternoon should be more than evening scenario. During the meeting, CTU informed that load demand and generation dispatches considered in the 2021-22 studies were as per the CEA report dated 30.01.2020 and as decided in the meeting of CEA, CTU & POSOCO held on 23.07.2020.

19.8. It was informed that net afternoon peak demand figures were arrived at after reduction of dispatch from roof-top solar from regional demands. So the afternoon demand appears to be on lower side. POSOCO has also raised observations on the generation dispatches considered in the studies. Various transmission element overloading and voltage violations within a region were also highlighted. Observations of POSOCO have been duly considered and accordingly the generation dispatches have been appropriately revised in the 2024-25 LGB/scenarios. Further, the electricity demand considered may be reviewed based on the receipt of revised load factors from POSOCO. It was also informed that All-India Studies for 2021-22 were primarily focused on the sufficiency of IR links in various scenarios and highlight the major issues likely to be faced on account of integration of huge quantum of RE in the Grid. However, the observations raised by POSOCO on various power flow/voltage violations have been duly noted and same shall be considered in detail in 2024-25 system studies.

19.9. Based on the observations received from constituents, nine no of scenarios for all India files (2024-25 timeframe) were created as per LGB deliberated in meeting held on 11.03.21 among CTU, POSOCO & CEA. Minutes of the meeting are attached as Annex-X. As per the deliberations held in the meeting and subsequent comments received from POSOCO, LGB and system studies were revised and from the system studies, the IR flows across the regions for the time-frame of 2024-25 are given below:

Scenario No	1	2	3	4	5	6	7	8	9
IR Flows	Aug'24			Jun'24			Feb'25		
Corridor	Solar Max	Peak Load	Off Peak	Solar Max	Peak Load	Off Peak	Solar Max	Peak Load	Off Peak
WR-NR	404	18996	18177	-1149	23596	17821	-17924	7949	1655
ER-NR	-12753	-5182	-3412	-10810	-1055	-1421	-7785	4	-468
ER-WR	-5727	-5619	-5415	-5666	-5870	-5229	-1991	-2197	-1214
ER-SR	1870	872	1034	2699	1672	1902	5567	4504	5047
WR-SR	-4572	-9017	-8339	-2208	-7162	-6821	7564	4392	5984
NER-ER	-1701	-1547	-1459	-1476	-1168	-1161	-2154	-1749	-1838

Assumptions considered, LGB, generation dispatched considered and flow patterns between different regions are attached at Annex-XI.

19.10. From the study results, primarily it has been observed that constraints are likely to be faced in case of export of surplus RE power from Southern Region which shall enhance to the quantum of about 9000 MW in 2024-25-time frame. System studies indicate that the following transmission elements become 'n-1' non-compliant after Upgradation/charging of Narendra New - Kolhapur (PG) 765 kV D/c line (initially charged at 400 kV) to its rated voltage of 765 kV:

I/17093/2021

**Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**

- Kolhapur (PG) – Kolhapur (MSETCL) 400kV D/c line
- Kolhapur(MSETCL) – Karad (MSETCL) 400kV D/c line

19.11. Issue of transmission constraints beyond Kolhapur in case of export of power from SR to WR were also highlighted in the all-India Studies for integration of RE in 2021-22 wherein export of the order of 5000 MW was expected in high RE scenario from SR to WR. It was also brought out that the following transmission system shall be required in order to enable export of surplus power from SR to WR:

- Kolhapur(PG) - Pune (GIS) 765kV D/c line
- Reconductoring of Kolhapur (PG) - Kolhapur(MSETCL) 400kV D/c line with conductor having minimum capacity of 2100MVA per circuit at nominal voltage
- Augmentation of Narendra (New) by 1x1500 MVA, 765/400 kV ICTs

19.12. Further, in the 3<sup>rd</sup> meeting of NCT held on 20<sup>th</sup> & 28<sup>th</sup> January, 2021, it was agreed that Strengthening of Kolhapur (PG) - Kolhapur (MSETCL) 400 kV section may be taken in RPC(TP) based on the operational constraint reported by POSOCO. Subsequently, POSOCO vide letter dated 02.02.2021 (Annex-XII) has intimated that during Dec'20 – Jan'21 period, power flow in the Kolhapur (PG) - Kolhapur(MSETCL) 400 kV D/c line has been observed very high with 'n-1' non-compliance. NLDC and RLDCs are taking various measures in operations such as reduction in power order of HVDCs toward southern region (Talcher – Kolar, Bhadravati, Raigarh – Pugalur) to relieve the loading of Kolhapur (PG) – Kolhapur (MSETCL) 400 kV D/c line. The issue shall be aggravated with the injection of power at Narendra (New), from the identified REZ potential in Koppal and Gadag together with generation from Kudgi TPS.

19.13. Transmission system requirement for export of power from Southern Region to Western Region has been deliberated with WR constituents in the 3<sup>rd</sup> WRPC(TP) meeting wherein the following was agreed:

- Re-conductoring of Kolhapur (PG) – Kolhapur 400 kV D/c line with conductor of minimum capacity of 2100 MVA/Ckt at nominal voltage along with bay upgradation work at Kolhapur (MSETCL).
- The strengthening requirement beyond Kolhapur other than re-conductoring of Kolhapur (PG) – Kolhapur 400 kV D/c line would be studied in separate joint study meeting with CEA, CTU, WRPC & POSOCO.

Members may please note.

## **20. Assessment of online Dynamic Line Rating**

20.1. As per the directions of CERC regarding implementation of assessment of Dynamic Line Loadings in real time / day ahead for optimal utilization of transmission lines, the matter was discussed in 37<sup>th</sup> SRPC and 167<sup>th</sup> OCC meetings held on 01.02.2020 and 13.03.2020 respectively. In the OCC meeting it was decided that SRPC may take up the matter with POSOCO/CTU to have a pilot



I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

project on any critical line in Southern Region. Member Secretary, SRPC vide letter dated 16.03.2020 (Annex-XIII) had requested to have a pilot project on any critical line in Southern Region. KSEB has proposed installation of the system for dynamic loadings on Udumalpet–Palakad 400 kV D/c line.

- 20.2. In view of above, Udumalpet – Palakad 400 kV D/c line (line length 95 km.), Tuticorin PS – Madurai 400 kV D/c (quad) line (line length 95 km), N. P. Kunta – Kolar 400 kV S/c line (line length 130 km) or any other transmission line may also be considered as potential candidate for the pilot project. In the 2<sup>nd</sup> SRPC(TP) meeting, a presentation was made on the basics of Dynamic Line Rating. Due to paucity of time, the matter could not be discussed in detail and it was decided that the matter would be discussed in next SRPC(TP) meeting.

Members may please discuss.

<b>C. ToR 2(iii) – APPLICATIONS FOR CONNECTIVITY AND ACCESS</b>
---

21. Connectivity Transmission system agreed after 2<sup>nd</sup> SRPC(TP) meeting in various Connectivity/LTA meetings of Southern Region

- 21.1. CTU informed that following dedicated transmission system was agreed for grant of Stage-II connectivity in various Connectivity/LTA meetings of Southern Region held after 2<sup>nd</sup> SRPC(TP)

Sl. No.	Application No.	Applicant	Location	Stage-II Connectivity (MW)	Start Date of Stage-II connectivity	Location for grant of Stage-II Connectivity	Dedicated Transmission System
<b>46<sup>th</sup> Conn/LTA meeting held on 28.09.2020</b>							
1	1200002672	Greenko AP01 IREP Pvt Ltd	Brahman Palle, Kurnool, AP	900	04-Feb-22	Kurnool (New)	Greenko AP01 IREP Pvt. Ltd. – Kurnool New 400kV S/c line strung on D/c towers (with high capacity conductor enabling at least 900 MW power transfer at nominal voltage like Quad Moose conductor etc.) along with line bay at generation end under the scope of applicant and one bay at Kurnool New S/s under the scope of ISTS licensee.
<b>48<sup>th</sup> Conn/LTA meeting held on 27.10.2020</b>							
2	1200002868	JSW Renew Energy Ltd.	Tiruppur, Tamil Nadu	310 (reduced to 270 MW in 55 <sup>th</sup> meeting)	31-Oct-22 or availability of common transmission system for	Karur (PS)	JSW Renew Energy Ltd – Karur PS 230kV S/c line (with equivalent conductor enabling at least 310 MW power

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

Sl. No.	Application No.	Applicant	Location	Stage-II Connectivity (MW)	Start Date of Stage-II connectivity	Location for grant of Stage-II Connectivity	Dedicated Transmission System
					Connectivity, whichever is later		transfer at nominal voltage)
3	1200002869	JSW Renew Energy Ltd.	Tuticorin, Tamil Nadu	500	31-Oct-22	Tuticorin-II GIS	JSW Renew Energy Ltd – Tuticorin-II 230kV D/c line with bay at generator end under the scope of applicant and bays at ISTS end under the scope of ISTS licensee
4	1200002872	Vena Energy Vidyuth Pvt Ltd	Koppal, Karnataka	160	31-May-22 or availability of common transmission system for Connectivity, whichever is later	Gadag PS	Vena Energy Vidyuth Pvt Ltd – Gadag PS 220kV S/c line
<b>51<sup>st</sup> Conn/LTA meeting held on 26.02.2021</b>							
5	1200003011	Boreas Renewable Energy Pvt Ltd	Nimbalagiri, Bellary, Karnataka	175	01.04.2022	Hiriyur	Boreas Renewable Energy Pvt Ltd – Hiriyur 220kV S/c line along with bays at both ends under the scope of applicant
<b>52<sup>nd</sup> Conn/LTA meeting held on 31.03.2021</b>							
6	1200003076	Viento Renewables Pvt Ltd	Thoothukudi, Tamil Nadu	79.80	15.03.2022	Tuticorin-II	Through dedicated line of GRT Jewellers (India) Pvt Ltd GRT – Tuticorin-II 230kV S/c line
<b>53<sup>rd</sup> Conn/LTA meeting held on 28.04.2021</b>							
7	1200003181	Ayana Renewable Power Six Pvt Ltd	Gadag, Karnataka	300	01.08.2022	Koppal PS	Ayana Renewable Power Six Pvt Ltd – Koppal 220kV S/c line along with 220kV bay at generation end under the scope of applicant and bay at Koppal PS under the scope of ISTS
<b>54<sup>th</sup> Conn/LTA meeting held on 28.05.2021</b>							
8	1200003212	JSW Future Energy Ltd	Tiruppur, Dindigul, Tamil Nadu	150	31.10.2022	Karur PS	JSW Future Energy Ltd – Karur 230kV S/c line along with 230kV bay at generation end under

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

Sl. No.	Application No.	Applicant	Location	Stage-II Connectivity (MW)	Start Date of Stage-II connectivity	Location for grant of Stage-II Connectivity	Dedicated Transmission System
							the scope of applicant and bay at Karur PS under the scope of ISTS
9	1200003214	JSW Future Energy Ltd	Tuticorin, Tamil Nadu	300	31.10.2022	Tuticorin-II	JSW Future Energy Ltd – Tuticorin-II 230kV S/c line
10	1200003221	Adani Renewable Energy Holding Fifteen Ltd	Gadag, Karnataka	300	30.12.2022	Koppal PS	Adani Renewable Energy Holding Fifteen Ltd - Koppal 220kV S/c line along with 220kV bay at generation end under the scope of applicant and bay at Koppal PS under the scope of ISTS
11	1200003242	Renew Solar Power Pvt Ltd	Gadag, Bagalkote, Koppal, Karnataka	300	31.10.2022	Gadag PS	Renew Solar Power Pvt Ltd – Gadag PS 220kV S/c line along with 220kV bay at generation end under the scope of applicant and bay at Koppal PS under the scope of ISTS.
<b>55<sup>th</sup> Conn/LTA meeting held on 28.06.2021</b>							
12	1200003254	Renew Solar Power Pvt Ltd	Gadag, Bagalkote, Koppal, Karnataka	300	31.12.2022	Koppal PS	Renew Solar Power Pvt Ltd – Koppal PS 220kV S/c line on D/c tower along with 220kV bay at generation end under the scope of applicant and 220kV bay at Koppal PS under the scope of ISTS
<b>56<sup>th</sup> Conn/LTA meeting held on 27.07.2021</b>							
13	1200003300	Zenataris Renewable Energy Pvt Ltd	Nimbalagiri, Bellary, Karnataka	125	30.07.2022	Hiriyur	Through sharing of dedicated transmission line of M/s Boreas Renewable Energy Pvt Ltd (BREPL) i.e. Boreas Renewable Energy Pvt Ltd – Hiriyur 220kV S/c line along with bays at both ends under the scope of M/s BREPL

I/17093/2021

**Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**

Further, following Connectivity application of NTPC for proposed solar plants at Kayamkulam within premises of the existing NTPC Kayamkulam plant was agreed for grant in 49<sup>th</sup> Conn/LTA meeting held on 29.12.2020:

Sl. No.	Application No.	Applicant	Location	Connectivity Sought (MW)	Date of connectivity application	Nature of applicant	Transmission System
1	1200002927	NTPC Ltd	Allappuzha, Kerala	92	18-Nov-20	Solar Generator (At NTPC Kayamkulam generation switchyard)	Through bus extension of NTPC Kayamkulam plant

Following LTA applications were agreed for grant in various Connectivity/LTA meetings of Southern Region:

Sl. No.	Application No.	Applicant	Location of RE generation	LTA quantum (MW)	Beneficiaries (MW)	Date of start of LTA
<b>50<sup>th</sup> Conn/LTA meeting held on 28.01.2021</b>						
1	1200002956	JSW Renew Energy Ltd	Karur	100	(NR target)	01-Jun-22
2	1200002993	Renew Surya Ojas Pvt Ltd	Koppal	300	NR: 100 MW, WR: 100 MW & ER: 100 MW	01-Oct-22
3	1200002950	GRT Jewellers (India) Pvt Ltd	Tuticorin	150	NBPDCL & SBPDCL	15-Dec-21
<b>55<sup>th</sup> Conn/LTA meeting held on 28.06.2021</b>						
4	1200003267	ReNew Solar Power Private Limited	Koppal	300	ER: 75 MW, NR: 150 MW WR: 75 MW (Target)	31.12.2022
5	1200003268	ReNew Solar Power Private Limited	Gadag	300	ER: 75 MW, NR: 150 MW WR: 75 MW (Target)	31.12.2022
6	1200003276	Vena Energy Vidyuth Private Limited	Gadag	160	MPPMCL, WR	31.03.2023

Members may please note.

**D. ToR 2(iv) – REVIEW OF UPSTREAM AND DOWNSTREAM NETWORK****22. Status of Implementation of downstream network by State utilities associated with ISTS substation of POWERGRID**

22.1. Augmentation of transformation capacity in various existing substations as well as addition of new substations along with line bays for downstream network are under implementation at various locations in Southern Region. For utilization of these transformation capacities, implementation

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

of downstream 220 kV system needs to be done. The status of downstream system as informed by respective states in the 2<sup>nd</sup> SRPC(TP) meeting is as follows:

Sl. No.	Name of Existing Substation	MVA Capacity	Total 220 kV Bays	Total Un-utilized bays	Remarks	Deliberations in 2 <sup>nd</sup> SRPC(TP) meeting
1.	Tumkur (Vasantnarapur)	3×500 MVA	6	2	Construction of downstream T/L for 2 Nos 220 kV bays to be expedited by KPTCL.	<ul style="list-style-type: none"> <li>• 220kV D/c line Tumkur-Antrasanahalli – <b>Commissioned.</b></li> <li>• 220kV DC line Tumkur-Madhugiri – <b>Commissioned.</b></li> <li>• 2 Nos 220 kV circuits to Vasanthanarsapur industrial area of KIADB – <b>by Mar’22</b></li> </ul>
2.	Yelahanka	2x500 MVA	10	4	Construction of downstream T/L for 4 Nos 220 kV bays to be expedited by KPTCL.	<ul style="list-style-type: none"> <li>• 220kV Yelahanka – DG Plant 2000sq mm UG cable 2 runs – <b>Commissioned</b></li> <li>• Proposal for strengthening of Bengaluru transmission network to utilize the remaining bays at Yelahanka is under planning.</li> </ul>
3.	Bidadi	2x500 MVA	6	4	Construction of downstream T/L for 4 Nos 220 kV bays to be expedited by KPTCL.	<ul style="list-style-type: none"> <li>• 220kV D/c line between Bidadi (PG)- Bidadi (KPTCL) – <b>Commissioned</b></li> <li>• 220kV D/c line Bidadi – Magadi – <b>Target Mar’21</b></li> <li>• 220kV Bidadi – Kumbalgod – 1200 sq mm UG cable S/c line – <b>under execution (Target to be confirmed by KPTCL)</b></li> <li>• 220kV S/c line identified to Kampagada layout</li> </ul>
4.	Hiriyur	2x315 MVA	6	2	Construction of downstream T/L for 2 Nos 220 kV bays	<ul style="list-style-type: none"> <li>• 220kV Hiriyur – Chitradurga via Thallak to Hiriyur – <b>Commissioned.</b></li> </ul>

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

					to be expedited by KPTCL.	<ul style="list-style-type: none"> <li>• 220kV D/c Hiriya – Gowribidnur- <b>Commissioned.</b></li> <li>• 220kV Hiriya (PGCIL) – Hiriya (KPTCL) – <b>under execution, Target by Nov'20</b></li> <li>• 220 kV Hiriya (PGCIL) – Chitradurga. – <b>under execution, Target by Nov'20</b></li> </ul>
5.	Hassan	2x315 MVA	6	2	Construction of downstream T/L for 2 Nos 220 kV bays to be expedited by KPTCL.	<ul style="list-style-type: none"> <li>• LILO of B4 circuit of Shimoga – Bangalore 220kV at Hassan – <b>under execution, Target by Dec'20</b></li> </ul>
6.	Kolar	2x500 MVA	6	2	Construction of downstream T/L for 2 Nos 220 kV bays to be expedited by KPTCL.	<ul style="list-style-type: none"> <li>• 220kV D/c line Kolar(PG) – Kolar(KPTCL) <b>Commissioned.</b></li> <li>• 220kV D/c line Kolar – Chintamani – <b>Commissioned.</b></li> <li>• 2 Nos 220 kV downstream T/L to Gollahalli – <b>under execution, target by December, 20.</b></li> </ul>
7.	Kozhikode	2x315 + 1x500 MVA	4	1	Construction of downstream T/L for 1 Nos 220 kV bay to be expedited by KSEB.	<ul style="list-style-type: none"> <li>• KSEB is enhancing the capacity of existing 3 nos. of 220 kV feeders from 400 kV Kozikode (PGCIL) S/s to 220 kV Areecode (KSEB) S/s by changing from single moose conductor to double moose conductor. With the upgradation of existing 3 nos. of feeders, the power transfer capacity at 400 kV Kozikode substation would</li> </ul>



I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

						be fully utilized. Accordingly, KSEB is not planning to construct the 4 <sup>th</sup> 220kV feeder between the sub-station at present. The work of upgrading the existing 220kV feeders is in progress and is tentatively scheduled for commissioning by Jan'21.
--	--	--	--	--	--	--

Members may please update.

<b>E. ToR 2(v) – EXAMINE AND EVALUATE INTRA-STATE PROPOSALS</b>
---

**Transmission planning proposals by KPTCL****23. Modifications in 220 kV transmission system proposed by KPTCL at Yalwar (associated transmission lines of 400/220 kV Yalwar Substation.)**

23.1. KPTCL had requested modifications in the associated 220 kV transmission system of 400/220 kV Yalwar S/S. This system, as agreed in the 2<sup>nd</sup> meeting of SRSCT held on 10.06.2019 is given below:

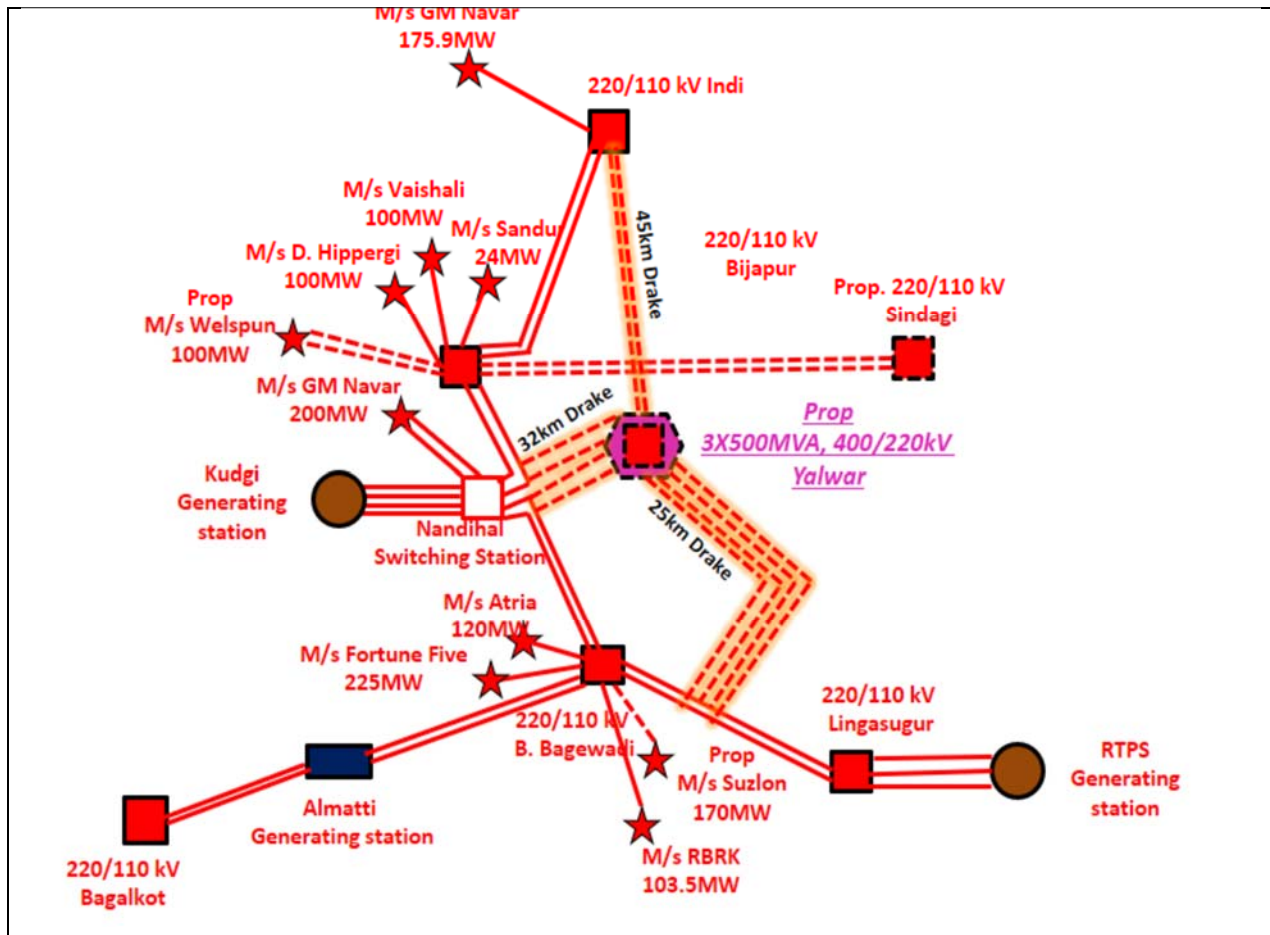
- i. LILO of both circuits of existing B. Bagewadi – Lingasugur 220 kV D/C line at Yalwar.
- ii. LILO of both circuits of Bijapur- Sindagi 220 kV D/C line at Yalwar sub-station.
- iii. B. Bagewadi -Yalwar 220 kV D/C line.

23.2. Modifications in 220 kV transmission system proposed by KPTCL, as given below was discussed in the 1<sup>st</sup> SRPC(TP) meeting held on 16.12.2019.

- i. D/C LILO of existing B.Bagewadi – Lingasugur 220 kV DC line to the proposed 400/220 kV Yalwar sub-station.
- ii. 220 kV D/C line from proposed 400/220 kV Yalwar (Shivanagi) sub-station to 220 kV Indi substation.
- iii. 220 kV multi-circuit line to the LILO point of 220 kV D/C Basavana Bagewadi-Vijayapur line near 220 kV Nandihal switching station.

The transmission line at Sl. No. (i) was already agreed in the 2<sup>nd</sup> SRSCT meeting. Changes have been suggested in Sl. No. (ii) and (iii).

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

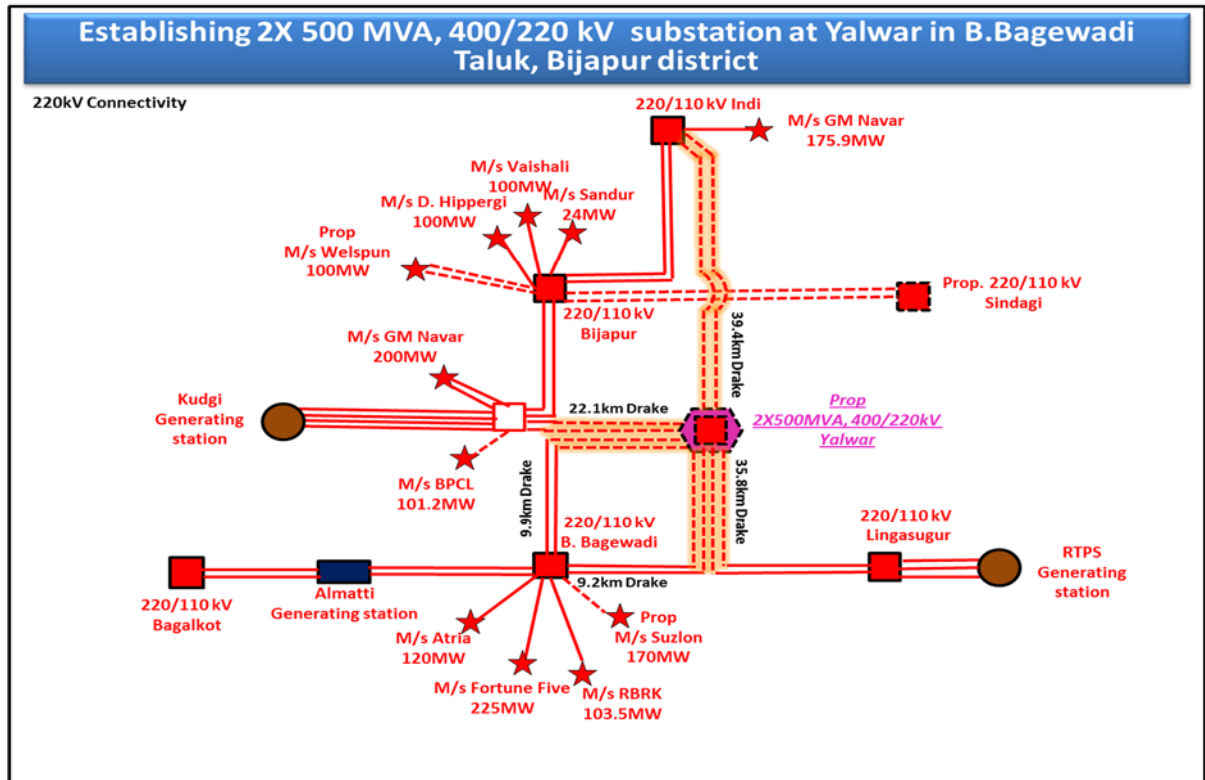
- 23.3. In the 1<sup>st</sup> SRPC(TP) meeting, Chief Engineer (PSPA-II), CEA, had stated that with the proposed connectivity, there would be unequal loading between B. Bagewadi –Yalwar. KPTCL representative had informed that in order to solve the problem of unequal loading, they were planning to use series capacitors for matching the impedance of transmission lines between B. Bagewadi –Yalwar. COO(CTU) had opined that Kudgi generating station being nearby, use of series capacitors in the transmission line may cause the problem of sub- synchronous resonance.
- 23.4. As such, it was decided in the 1<sup>st</sup> SRPC(TP) meeting that KPTCL will carry out detailed study with the planned series capacitors and submit the study results to CEA. The matter would be discussed in the next meeting of SRPC(TP).
- 23.5. In the 2<sup>nd</sup> SRPC (TP) meeting, representative of KPTCL informed that detailed survey is being carried out to finalize the route length of the proposed LILO line (4 nos. of 220 kV circuits) from proposed 400/220 kV Yalwar sub-station to LILO the existing 220 kV B.Bagewadi - Lingasugur DC line. Results of the detailed technical study would be submitted before the next SRPC(TP) meeting

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

23.6. KPTCL vide letter dated 17.12.2020 (Annex-XIV) requested for the approval of modified 220 kV transmission scheme of 400/220 kV Yalwar as given below:

- i. Double circuit LILO of existing B. Bagewadi - Lingasugur 220 kV D/C line to the proposed 400/220 kV Yalwar sub-station.
- ii. 220 kV D/C line from proposed 400/220 kV Yalwar (Shivanagi) sub-station to 220 kV Indi sub-station.
- iii. Double circuit LILO of 220 kV Basavana Bagewadi – Nandihal switching station **line** to proposed 400/220 kV Yalwar sub-station.



23.7. The revised proposal was discussed in the joint study meeting held on 04.02.2021 (MoM at Annex-IV) and after detailed deliberation same was agreed with the recommendation to put up in the forthcoming SRPC(TP) meeting. In view of the above, connectivity of Yalwar Substation will be as follows:

400 kV system:

- i. Gulbarga- Yalwar 400 kV D/C line (with quad moose ACSR Conductor or twin HTLS).
- ii. 2 x 500 MVA, 400/220 kV ICTs at Yalwar.
- iii. 2 x 125 MVar bus reactors.

220kV connectivity:

I/17093/2021

**Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**

- i. Double circuit LILO of existing B. Bagewadi - Lingasugur 220 kV DC line to the proposed 400/220 kV Yalwar sub-station.
- ii. 220 kV DC line from proposed 400/220 kV Yalwar (Shivanagi) sub-station to 220 kV Indi sub-station.
- iii. Double circuit LILO of 220 kV Basavana Bagewadi – Nandihal switching station line to proposed 400/220 kV Yalwar sub-station.

Members may please note.

**24. Establishment of 3x500 MVA, 400/220 kV Sub-station at Mysandra (Electronic City) in Bengaluru**

24.1. The proposal for providing additional feed to 3x500 MVA, 400/220 kV substation at Mysandra, (Electronic City) Bengaluru and establishment of 2x500 MVA, 400/220 kV substation at Dommasandra in Bengaluru was approved in the 2<sup>nd</sup> meeting of Southern Region Standing Committee on Transmission (SRST) held on 10<sup>th</sup> June, 2019, as follows:

**Additional feed for Mysandra 400/220 kV substation:**

- i. 3x500 MVA, 400/220 kV ICTs.
- ii. LILO of one circuit of Dharampuri – Somanahally 400 kV D/C (Quad) line at proposed 400/220 kV substation at Mysandra.
- iii. Mysandra – Dommasandra 400 kV S/C line (with quad Moose ACSR conductor).

**Establishment of Dommasandra 400/220 kV substation**

- i. 2x500 MVA, 400/220 kV ICTs.
- ii. LILO of Kolar – Somanahally 400 kV S/C line at Dommasandra 400/220 kV substation.

24.2. KPTCL vide letter dated 13.11.2020 (Annex-XV) has informed that 3x500 MVA, 400/220kV substation at Mysandra (Electronic city) was expected to be commissioned by December, 2020 with the provision of 400 kV MC towers for incoming line with LILO arrangement of existing 400 kV Kolar-Somanahalli SC Twin Moose line. However, the final arrangement of incoming lines to 400 kV Mysandra will be as approved in 2<sup>nd</sup> SRST meeting i.e.:

- LILO of one circuit of Dharampuri – Somanahally 400 kV D/C (Quad) line at proposed 400/220 kV substation at Mysandra.
- Mysandra – Dommasandra 400 kV S/C line (with quad Moose ACSR conductor).

24.3. KPTCL requested for the approval to commission 400/220 kV Mysandra sub-station with interim arrangement of LILO of 400 kV Kolar –Somanahalli SC Twin Moose line at Mysandra.

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

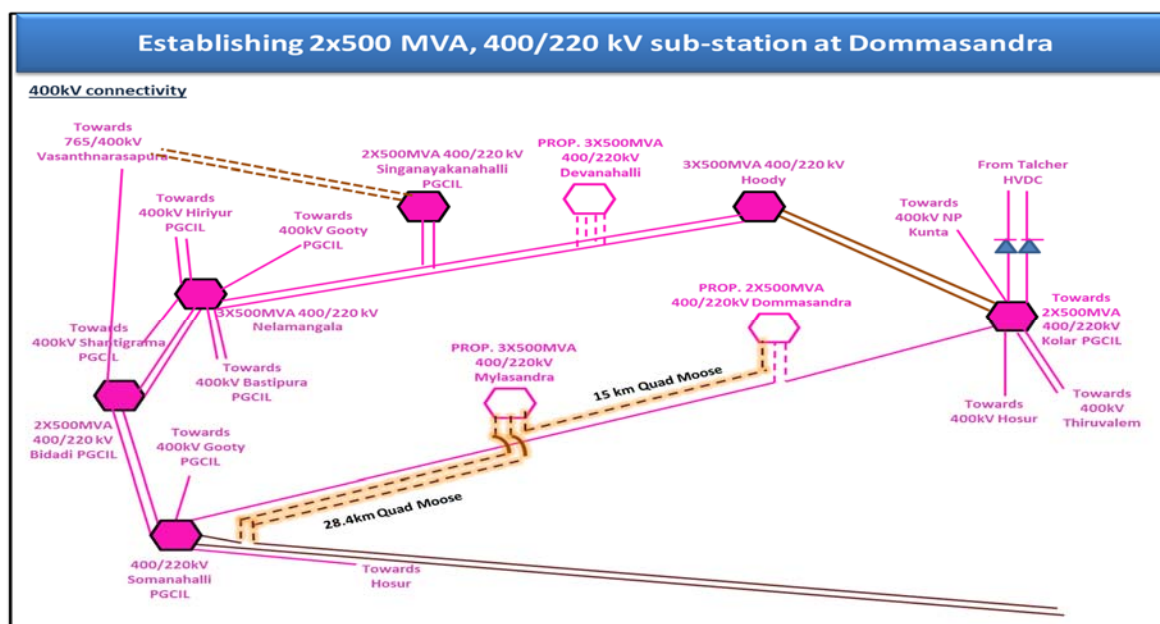
24.4. The proposal of KPTCL was discussed in the joint study meeting held on 04.02.2021 and after detailed deliberations the proposal of LILO of Kolar-Somanhally 400 kV SC line at Mylasandra (electronic City) S/s was agreed as an interim arrangement. KPTCL was requested to expedite the works of Dommasandra SS and the work of balance transmission system and to ensure that the connectivity for Mylasandra and Dommasandra is as agreed in 2<sup>nd</sup> SRSCT meeting as reproduced below:

Additional feed for Mylasandra 400/220 kV substation:

- i. 3x500 MVA, 400/220 kV ICTs
- ii. LILO of one circuit of Dharampuri – Somanhally 400 kV D/C (Quad) line at proposed 400/220 kV substation at Mylasandra.
- iii. Mylasandra – Dommasandra 400 kV S/C line (with quad Moose ACSR conductor)

Establishment of Dommasandra 400/220 kV substation

- i. 2x500 MVA, 400/220 kV ICTs
- ii. LILO of Kolar – Somanhally 400 kV S/C line at 400/220 kV Dommasandra substation.



24.5. In the meeting, it was also decided that the matter would be put up in the forthcoming meeting of SRPC(TP) for ratification.

Members may please note.

24.6. KPTCL vide letter dated 29.03.2021 (Annex-XVI) has proposed installation of 1x125 MVAR bus reactor at the proposed 400/220 kV Mylasandra sub-station.

Members may deliberate.

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**25. Power Evacuation scheme for the proposed 2000 MW Sharavathy Pumped Storage Project**

- 25.1. The proposed transmission scheme for evacuation of power from 2000MW Sharavathy Pumped storage Project was placed for approval in the 2<sup>nd</sup> SRSCT meeting held and it was decided that the proposed transmission scheme would be discussed and finalized at a later stage, based on the status of commissioning of Sharavathy Pumped Storage Plant.
- 25.2. KPTCL vide letter dated 13.11.2020 has informed that the 2000 MW Sharavathy Pumped storage project is likely to be commissioned by December 2026.
- 25.3. Transmission scheme proposed for evacuation of power from 2000MW Sharavathy Pumped storage Project is as follows:
- i. Construction of 400 kV MC line with Quad Moose conductor/400 kV DC Quad equivalent High Performance conductor from proposed Sharavathy Pumped Storage Station to 400/220 kV Talaguppa sub-station by utilizing the existing 220 kV S1, S2 or S3, S4 corridor with 4Nos/2Nos of 400kV TBs at Talaguppa.
  - ii. Strengthening of 400 kV Talaguppa - proposed C.N.Halli DC Twin Moose line by higher ampacity conductor (Twin Moose equivalent HTLS).
  - iii. Augmentation of existing 1x315 MVA (out of 3X315) transformers by 1x500 MVA, 400/220 kV transformers at Talaguppa.
  - iv. Strengthening of 220 kV Talaguppa-Sharavathy DC line by higher ampacity conductor (Drake equivalent HTLS).
  - v. By utilizing the existing corridor of S1-S2 or S3-S4, replacing the S1-S2 & S3-S4 DC lines with Drake conductor by 220 kV MC line between Sharavathy-Shimoga (S1, S2, S3, S4) with AAAC Moose conductor.



[illegible]

- Line loading considering full generation of about 3000 MW at Sharavathy existing and Sharavathy Pumped Storage Project.
- Line loading when Sharavathy Pumped Storage Project would be operating in pumping mode (during off peak load hours or during high RE generation period).
- To review the ICT requirement at Talaguppa, if required.

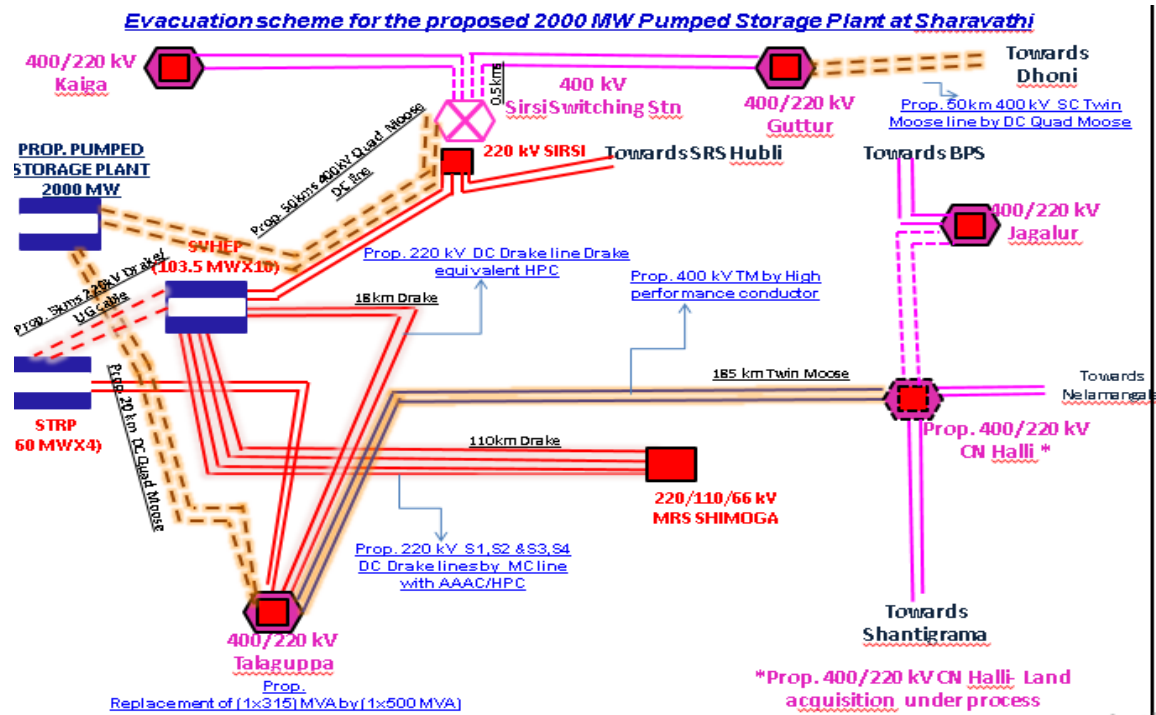
25.5. Accordingly, matter was discussed in the meeting held on 19.05.2021 (MoM at Annex-XVII). KPTCL carried out study for the above scenarios and proposed following additional connectivity:

- 59

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

- iv. Strengthening of 400kV S/C Twin Moose line between Dhoni-Guttur by DC line with Quad Moose conductor.
- v. Strengthening of 220 kV Talaguppa-Sharavathy DC line by higher ampacity conductor (Drake equivalent HPC instead of HTLS).



25.6. After deliberations, KPTCL was requested to carry out the studies incorporating demand as per 19<sup>th</sup> EPS for the year 2026-27 and come-up with other alternatives, as LILO of Kaiga – Devangere (Guttur) 400 kV D/c line may hamper the power evacuation from Kaiga generation project (Nuclear Generation).

25.7. KPTCL vide letter date 20.07.2021 (Annex-XVIII) proposed following transmission scheme:

- i. Construction of 400 kV DC line with Quad Moose conductor/twin equivalent High Performance conductor from proposed Sharavathy Pumped Storage Station to 400/220 kV Talaguppa sub-station by utilizing the existing 220 kV corridor in Sharavathy complex with 2 Nos of 400 kV TBs at 400 kV Talaguppa S/S.
- ii. Strengthening of 400 kV Talaguppa - proposed C.N.Halli DC Twin Moose line by higher Performance Conductor (Twin Moose equivalent HPC).
- iii. Providing additional 1x315 MVA 400/220 kV transformers at Talaguppa.

I/17093/2021

**Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**

- iv. Establishing 400 kV Switching station at Sirsi with Double circuit LILO of 400 kV Kaiga-Guttur DC line with twin moose conductor.
- v. Construction of 400/220 kV MC/MV Double circuit line with Quad Moose conductor/Twin equivalent HPC from proposed Sharavathy Pumped Storage Station to proposed 400 kV Switching station at Sirsi limits in existing 220 kV DC Sharavathy-Sirsi line corridor.
- vi. Provision for 1x125 MVar Bus Reactor at proposed 2000 MW Sharavathy Pumped Storage Plant.
- vii. Strengthening of 220 kV Talaguppa-Sharavathy DC line by higher ampacity conductor (Drake equivalent HTLS).
- viii. Strengthening of 220kV Sharavathy-Shimoga D/C line (S1, S2, S3, S4) by replacing existing conductor by AAAC.

25.8. KPTCL further informed that they have carried out system studies considering following scenario and result enclosed in Annex-XVIII.

- A. Morning Peak load (Solar Peak) with proposed 2000MW generation
- B. Evening Peak load with proposed 2000MW generation.
- C. Light load with high RE scenario with proposed 2000MW pump.

25.9. KPTCL informed that Load flow study results reveal that in scenario A & B, major quantum of power from the 2000MW generation from proposed PSP is evacuated to Mysore and Nelamangala via 400 kV Talaguppa & CNHalli sub-stations. The 400 kV PSP- Talaguppa DC Quad moose line and 400 kV PSP-Sirsi Switching station DC Quad moose lines are loaded to an extent of 789 MW and 111 MW on each circuit respectively.

25.10. In light load condition (Case C), with High RE (60% generation from wind and 40% generation from solar), pumping mode of operation has been considered at proposed 2000 MW PSP. The proposed 2000MW load of Sharavthy pumped storage plant is mainly fed from the RE generations at Guttur and Doni downstream along with Kaiga and generation from Sharavathy complex. The 400kV PSP- Talaguppa DC Quad moose line and 400 kV PSP- Sirsi Switching station DC Quad moose lines are loaded to an extent of 400 MW and 601 MW each circuit respectively. The 4x315 MVA transformers at Talaguppa are loaded to an extent of 168 MW on each transformer.

25.11. Further, for sensitivity analysis, load flow study has been conducted with full generation from Sharavathy complex for all the scenarios. Study reveals that there are no loading violations of the transmission system under concern in both peak and off-peak cases during normal and contingency conditions in all the scenarios studied.

Members may please discuss.

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**26. Charging of 2<sup>nd</sup> 315 MVA, 400/220/33 kV ICT at Bellary thermal Power station(BTPS)**

- 26.1. KPTCL vide letter dated 23.04.2021 (Annex-XIX) informed that KPCL have already installed 2<sup>nd</sup> 315MVA, 400/220/33kV ICT (ICT-2) at BTPS and the same is ready for charging. Hence, M/s KPCL has requested to arrange to give clearance for charging of ICT-2 at BTPS at the earliest with due ratification in the forthcoming meeting of SRPC(TP).
- 26.2. The issue was discussed in the meeting held on 19.05.2021 and it was noted that there was lack of coordination in planning between KPCL and KPTCL as far as ICT-2 at BTPS was concerned and it was advised to avoid such instances in future and to put up the proposals for discussion/approval in Standing Committee meeting/RPC(TP) meetings in advance.
- 26.3. In the meeting, KPCL informed that commissioning of ICT-2 would facilitate the evacuation of power to 220 kV level and would also provide reliability to the system.
- 26.4. After deliberations, the proposal of charging of 2<sup>nd</sup> 315MVA, 400/220/33kV ICT at Bellary Thermal Power Station (BTPS) was agreed. It was also decided that the same would be put up in SRPC(TP) meeting for ratification.

Members may please note.

**27. Establishing 2 x 500 MVA, 400/220 kV Sub-Station at Lokapur in Mudhol Taluk, Bagalkot district.**

- 27.1. KPTCL vide letter dated 02.07.2021 (Annex-XX) has proposed to establish 2x500 MVA, 400/220 kV Sub-station at Lokapur with following connectivity:

**400 kV Connectivity:**

- a) 400 kV D/C line with Quad Moose conductor between Narendra New sub-station and 400/220 kV Lokapur sub-station.
- b) 2x500 MVA 400/220 kV ICT.
- c) 2x125 MVAr bus reactors.

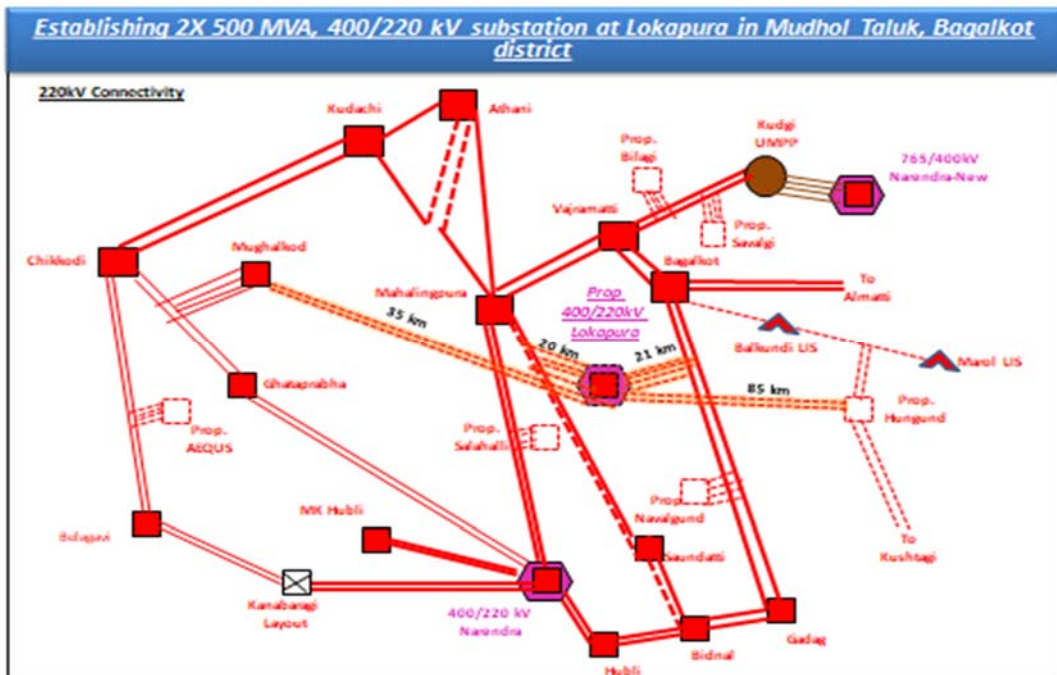
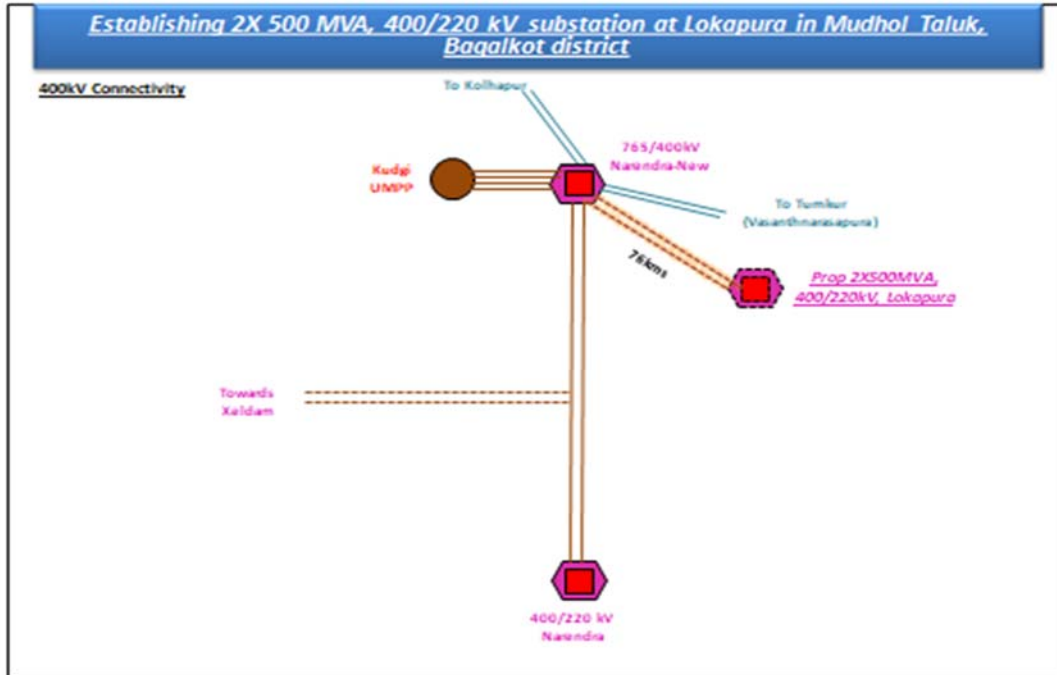
**220 kV connectivity:**

- a) Double LILO of existing 220 kV Gadag-Bagalkot DC line to proposed 400/220 kV Lokapur.
- b) Double LILO of 220 kV Mahalingpura-Soundatti DC line (Considering approved 2<sup>nd</sup> circuit between Mahalinpur and Bidanal with LILO to Soundatti) to proposed 400 kV Lokapur.

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

- c) 220 kV DC line to proposed 220 kV Mughalkod sub-station from proposed 400/220 kV Lokapur.
- d) 220 kV DC line to proposed 220 kV Hungund sub-station from proposed 400/220 kV Lokapur.



I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

- 27.2. KPTCL informed that presently, 220/110 kV sub-stations at Athani, Kuduchi, Chikkodi, Ghataprabha, Belgaum, M.K.Hubli and SRS Hubli and part loads of Mahalingapura are fed from existing 2x500 MVA, 400/220 kV Narendra(PGCIL) sub-station. In addition to these 4 nos. of 220/110 kV sub-stations namely Mugulkhod, Hattargi, Desur and Salahalli sub-stations with transformation capacity of 800 MVA are proposed.
- 27.3. During fault at 400kV Narendra sub-station, power supply to these 220kV sub-stations are affected. Also the 2x500 MVA, 400/220kV transformers at Narendra and the 220 kV lines emanating from 400kV Narendra are not satisfying 'n-1' contingency criteria during peak load condition. Further, about 528 MW Wind generation, 229 MW Solar generation and 640 MW Co-generation plants are interconnected to 220 kV Athani, Kuduchi, Chikkodi, Mahalingapura, Mughlkod, Soundatti and Bagalkot sub-stations.
- 27.4. The proposed 400/220 kV Lokapur sub-station results in increase in reliability of power supply to the 220 kV sub-stations in the districts of Belagavi and Bagalkot. The 220 kV lines in the vicinity are optimally loaded and the proposed 400 kV sub-station also aids in reliable evacuation of power from RE generations in the 220 kV and downstream sub-stations in the vicinity.
- 27.5. However, from the study carried out by CEA/CTU, it is observed that there is flow of power from Lokapur to Narendra (New) in the high RE generation scenario in Karnataka and power is being injected at Narendra (New). It has already been highlighted that the constraint in Kolhapur-Kolhapur (PG) 400 kV line is a limiting factor in export of power from Southern Region. Hence, if KPTCL is planning to inject power in the ISTS system, LTA needs to be applied by KPTCL so that system strengthening could be suitably planned.

Members may please discuss.

**28. Up-gradation of existing 220/66 kV sub-station by 2x500 MVA, 400/220 kV sub-station at Peenya in Bengaluru city -Modification in 400 kV incoming line**

- 28.1. KPTCL vide letter dated 02.07.2021 (Annex-XX) has informed that the proposal of establishing 2x500 MVA, 400/220 kV sub-station at Peenya with following 400 kV connectivity was approved in 41<sup>st</sup> SCSPSR held on 22.09.2017.
- a) Up-gradation of existing 220kV substation to 400/220 kV GIS sub-station at Peenya in Bengaluru City with 2x500 MVA, 400/220 kV transformers.
  - b) Peenya –Nelamangala 400kV D/C (with Quad Moose line conductor).
  - c) Bus extension to 220 kV Peenya (Existing).
  - d) Peenya-NRS 220 kV D/C line.
- 28.2. In view of corridor constraint, following modification in 400 kV incoming line is proposed:



I/17093/2021

**Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**

“Construction of 400 kV D/C Transmission line for a route length of 16.46 km with HPC equivalent to twin ACSR Moose with ‘V’ strings from 400 kV Nelamangala sub-station to the proposed 400/220 kV sub-station at Peenya in the existing 220 kV DC B1-B2 transmission line corridor (Between Nelamangala-Peenya) using special design Narrow based towers”.

Members may please discuss.

**29. Providing STATCOMs to 400/220 kV sub-station in Bengaluru city:**

- 29.1. In the 1<sup>st</sup> SRPC(TP) meeting held on 16.12.2019, providing dynamic reactive power support by utilizing STATCOMs at Hoody and Nelamangala was discussed and it was also decided to explore the feasibility for use of both Solar inverter and STATCOM for containing voltage within limits in the SR Grid.
- 29.2. Further, during the Joint study meeting of CEA with CTU and KPTCL held on 02.02.2020, it was suggested to provide STATCOM with capacity of  $\pm 2 \times 250$  MVAR at any of the 400/220 kV sub-stations in Bengaluru city. CTU representative had informed that there was no space to provide STATCOM in any ISTS sub-station in and around Bengaluru. However, land availability adjacent to 400/220 kV Bidadi sub-station shall be confirmed. In this context, letter had been addressed to KPCL dated 21<sup>st</sup> April 2021 to furnish details on availability of land to an extent of appx.100x150 sq.m plot for installing  $\pm 2 \times 250$  MVAR STATCOM adjacent to 400 kV bus of 400/220 kV Bidadi PGCIL sub-station and the reply is awaited.
- 29.3. KPTCL vide letter dated 02.07.2021 (Annex- XX) has informed that land is available to install  $\pm 2 \times 250$  MVAR STATCOM at 400/220 kV Mylasandra sub-station of KPTCL and has requested for approval to install the STATCOM. KPTCL has also proposed installation of 1x125 MVAR reactor at Mylasandra. If STATCOM is installed at Mylasandra, reactor may not be required.

Members may please discuss.

**Transmission planning proposals by APTRANSCO****30. Evacuation of 6,100 MW (AC) of Solar Power proposed by Andhra Pradesh Green Energy Corporation Limited (APGECL) from various Pooling Stations under Phase-I out of 10,000 MW (AC) of Solar power**

- 30.1. APTRANSCO informed that Andhra Pradesh Green Energy Corporation Limited (APGECL) has proposed 6,100 MW (AC) of solar power to be set by them under Phase-I in Prakasam, YSR Kadapa and Ananthapur districts of Andhra Pradesh.

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

30.2. The locations of Solar Power Parks along with capacities are tabulated below. As per APTRANSCO, power generated from the solar parks would be used for meeting the nine hours Agricultural Supply in the state during day time.

Sl. No.	Location of Solar Park	Capacity proposed under Phase-I (MW)
1	C.S. Puram, Prakasam Dist.	600
2	Rudrasamudram, Prakasam Dist.	600
3	Pendlimarri, YSR Kadapa Dist.	500
4	M. Kambaladinne, YSR Kadapa Dist.	500
5	Urichintala, Ananthapur Dist.	600
6	Mudigubba, Ananthapur Dist.	500
7	Chakrayapeta, YSR Kadapa Dist.	500
8	Thonduru, YSR Kadapa Dist.	400
9	Pampanuruthanda, Ananthapur Dist.	1,300
10	Kolimigundla, Ananthapur Dist.	600
	<b>Total capacity</b>	<b>6,100</b>

30.3. APTRANSCO has carried out system studies for the following scenarios considering an annual peak electricity demand of 14,611 MW by the year 2022-23. A maximum capacity factor of 75% has been taken for wind and solar power as per Transmission Planning Criteria.

Scenario 1: Full Solar Full Wind (75% Solar, 75% wind)

Scenario 2: Full Solar Full Wind (75% Solar, 75% wind, RTPP NIL)

Scenario 3: Full Solar Less wind (75% Solar, 40% wind)

Scenario 4: Full Solar, No wind (75% Solar, 0% wind)

Scenario 5: Less Solar, Full wind (40% Solar, 75% wind)

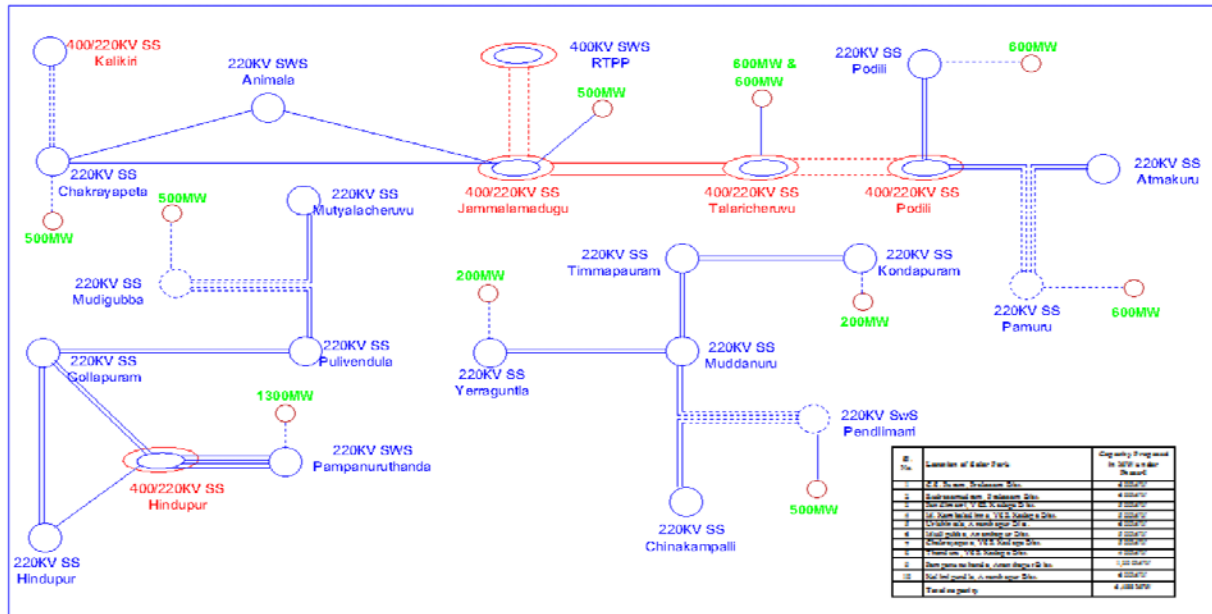
Scenario 6: No Solar, Full wind (0% Solar, 75% wind)

Scenario 7: Less Solar, Less wind (40% Solar, 40% wind)

Scenario 8: No Solar, No wind (0% Solar, 0% wind)

30.4. Based on the system studies for the 6,100 MW Solar Power, the following evacuation lines are proposed for evacuation of 6,100 MW of Solar Power in Prakasam, YSR Kadapa and Ananthapur Districts under Phase-1.

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

Sl. No.	Description	Revised Solar Power Capacity	Revised Network for evacuation and Deletion of earlier proposed Lines
1	C.S. Puram Pooling Stations-1&2 to Pamur Substation Prakasam Dist.	600 MW	1) 220 kV TMSC Line (4 km) from PS-1 to Common Tower, 220 kV TMSC Line (4 km) from PS-2 to Common Tower and 220 kV TMDC Line (15 km) from common Tower to Pamur SS. 2) Upgradation of existing 132 kV SS/Pamur into 220 kV SS. 3) Double LILO of existing 220 kV SMDC Line from 400 kV SS/Podili to Atmakuru to Pamur SS (13.5 km).
2	Rudrasamudram Pooling Stations-1&2 to 220KV SS/Podili, Prakasam Dist.	600 MW	220 kV TMSC Line (8 km) from PS-1 to Common Tower, 220 kV TMSC Line (4 km) from PS-2 to Common Tower and 220 kV TMDC Line (38 km) from common Tower to 220 kV SS/Podili.
3	Pendlimarri Pooling Stations-1&2 to proposed Pendlimarri Sw. Station, YSR Kadapa Dist.	500 MW	1) 220 kV TMSC Line (3 km) from PS-1 to Common Tower, 220 kV TMSC Line (4 km) from PS-2 to Common Tower and 220 kV TMDC Line (6 km) from common Tower to proposed 220 kV Sw. Station at Pendlimarri. 2) Double LILO of existing 220 kV Muddnuru(RTPP)-Chinakampalli SMDC Line to Pendlimarri Sw. Station duly converting it as TMDC. Towers are suitable for Twin Moose DC.

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

Sl. No.	Description	Revised Solar Power Capacity	Revised Network for evacuation and Deletion of earlier proposed Lines
4	M. Kambaladinne Pooling Stations-1&2 to 400KV SS/Jammalamadugu, YSR Kadapa Dist.	500 MW	220 kV TMSC Line (2 km) from PS-1 to Common Tower, 220 kV TMSC Line (5 km) from PS-2 to Common Tower and 220 kV TMDC Line (20 km) from common Tower to the existing 400 kV/SS Jammalamadugu.
5	Urichinthala Pooling Stations-1&2 to 400KV SS/Talaricheruvu, Anantapur Dist.	600 MW	220 kV TMSC Line (4 km) from PS-1 to Common Tower, 220 kV TMSC Line (1 km) from PS-2 to Common Tower and 220 kV TMDC Line (6 km) from common Tower to the existing 400 kV/SS Talaricheruvu.
6	Mudigubba Pooling Stations-1&2 to the proposed Sw. Station at Mudigubba, Anantapur Dist.	500 MW	1) 220 kV TMSC Line (4 km) from PS-1 to Common Tower, 220 kV TMSC Line (3 km) from PS-2 to Common Tower and 220 kV TMDC Line (7 km) from common Tower to the proposed Sw. Station at Mudigubba 2) Making Double LILO of 220 kV Pulivendula-Mutyalacheruvu SMDC Line (5 km) which is (under construction) to the proposed Mudigubba Sw. Station.
7	Chakrayapeta Pooling Stations-1&2 to the existing 220KV SS/ Chakrayapeta, YSR Kadapa Dist.	500 MW	1) 220 kV TMSC Line (2 km) from PS-1 to Common Tower, 220 kV TMSC Line (2 km) from PS-2 to Common Tower and 220 kV TMDC Line (8 km) from common Tower to the existing 220 kV SS/Chakrayapeta 2)220 kV TMDC line from the existing 220 kV SS/ Chakrayapeta to the existing 400 kV SS/ Kalikiri (80 km).
8	Thonduru Pooling Station-1 to the existing 220KV SS/Kondapuram & Pooling Station-2 to the existing 220KV SS/ Yerraguntla, YSR Kadapa Dist.	400 MW	1) 220 kV SMDC line (30 km) from PS-1 to the existing 220 kV SS/Kondapuram 2) 220 kV SMDC line (35 km) from PS-2 to the existing 220 kV SS/Yerraguntla
9	Pampanur Tanda Pooling Stations- 1,2,3&4 to proposed Sw. Station at Pampanur Tanda, Anantapur Dist.	1300 MW	1) 220 kV TMSC Line (3 km) from PS-1 to Common Tower, 220KV TMSC Line (3KM) from PS-2 to Common Tower and 220KV TMDC Line (4 km) from common Tower to the proposed Sw. Station at Pampanur Tanda. 2) 220 kV TMSC Line (3 km) from PS-3 to Common Tower, 220KV TMSC Line (3 km) from PS-4 to Common Tower and 220KV TMDC Line (4 km) from common Tower to the proposed Sw. Station at Pampanur Tanda.

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

Sl. No.	Description	Revised Solar Power Capacity	Revised Network for evacuation and Deletion of earlier proposed Lines
10	Kolimigundla Pooling Stations-1&2 to 400KV SS/Talaricheruvu, Anantapur Dist.	600 MW	220 kV TMSC Line (2 km) from PS-1 to Common Tower, 220KV TMSC Line (2 km) from PS-2 to Common Tower and 220 kV TMDC Line (15 km) from common Tower to the existing 400 kV SS at Talaricheruvu
	Total Capacity	6100 MW	

30.5. In addition, the following transmission scheme have also been proposed by APTRANSCO.

1	<p>Proposal for extension of Power Supply for a CMD of 400 MVA to the proposed Industrial Park at Guttapadu by APIIC:</p> <p>i. laying 220 kV TMDC Line from 400 kV Ghani SS to the proposed Switching Station at Guttapadu,(14 km length) and</p> <p>ii. Making Double LILO of the 220 kV Narnur-Somayajulu Palli DC line at the proposed Switching Station at Guttapadu (7 km)</p>
---	--

The already approved transmission schemes in AP and changes proposed by APTRANSCO are given below:

Sl. No.	Schemes approved earlier	Revised Proposals/Remarks
1	400 kV Jammalamadugu (Kondapuram) - Ghani QMDC line as per 38 <sup>th</sup> SCPSPSR	<p><b>Dropped.</b></p> <p><u>Proposed Lines:</u></p> <p>a) 400 kV QMDC line from Takaricheruvu to Podili</p> <p>b) 400 kV TMDC Line from Jammalamadugu (Kondapuram) to RTPP</p>
2	<p><u>400KV SS Uravakonda:</u></p> <p>a) 2x315 + 2x500 MVA ICTs</p> <p>b) 220 kV DC line from 220 kV Vajrakarur SS to 220 kV Ananthapur SS</p> <p>as per 40<sup>th</sup> Standing Committee Meeting.</p>	<p>a) Proposed 4x500 MVA ICT to meet the N-1 contingency.</p> <p>b) <b>Dropped.</b></p>
3	<p><u>400kV Talarichervu SS:</u></p> <p>3x315 MVA ICT as per 40<sup>th</sup> Standing Committee Meeting.</p>	Proposed 1x315 + 3x500 MVA ICTs
4	<p><u>400/220kV SS at Mylavaram</u></p> <p>3x315 MVA ICTs and 1x125 MVAR Bus reactor and 400kV QMDC line from 400kV</p>	<p><b>Dropped.</b></p> <p><b>1000MW will be evacuated to 400 kV Jammalamadugu (Kondapuram)</b></p>

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

Sl. No.	Schemes approved earlier	Revised Proposals/Remarks
	Jammalmadugu–Mylavaram SS (2 km) for evacuation of 1000 MW of Solar Power at Mylavaram (1000MW Solar Power of Kadapa Ultra Mega Solar Park of APSPCL) as per 40 <sup>th</sup> Standing Committee Meeting.	<b>Substation:</b> a) PS-1 to Jammalamadugu SS: 220kV TMDC/SC line: 12.5 km b) PS-2 to Jammalamadugu SS: 220kV TMDC/SC line: 10.0 km c) PS-3 to Jammalamadugu SS: 220kV SMDC line: 8.0 km d) PS-4 to Jammalamadugu SS: 220kV SMDC Line: 9.8 km <b>(Already commissioned)</b>
5	400 kV Jammalamadugu SS (Kondapuram): 3x315 MVA ICTs as per 40 <sup>th</sup> Standing Committee Meeting.	Proposed 2x500 +2x315 MVA ICTs
6	220 kV Single Moose DC line from 400/220 kV Hindupur SS to 220 kV Pampanur Tanda SS as per 40 <sup>th</sup> Standing Committee Meeting.	Proposed 220 kV Twin Moose DC line from 400/220 kV Hindupur SS to 220 kV Pampanur Tanda SS.

30.6. In the 2<sup>nd</sup> SRPC(TP) meeting, it was decided that the transmission scheme proposed by APTRANSCO would be studied in detail in a joint meeting of CEA, SRPC, CTU, POSOCO/SRLDC and APTRANSCO and the scheme would be put up in the next SRPC(TP) meeting for discussion.

30.7. Accordingly, the proposal was discussed in the joint study meeting on 04.02.2021 (MoM at Annex-IV). After detailed deliberation, it was decided that APTRANSCO will carry out studies on the all-India study file prepared in consultation with SR constituents, for the following nine scenarios:

June- afternoon, evening, late night

August- afternoon, evening, late night

February- afternoon, evening, late night

and the study results will be discussed in the separate meeting with CEA, CTU and SRLDC and the transmission system emerged from the study would be discussed in the forthcoming SRPC(TP).



I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

30.8. APTRANSCO had conducted system studies for the above 9 scenarios considering the proposed 6100 MW solar power along with three additional scenarios for August month with lean agriculture consumption & one with less solar and one for June month with 80% solar. LGB for 12 scenarios is given below:

ALL INDIA SCENARIOS LOAD GENERATION BALANCE AUGUST, JUNE & FEBRUARY FY 2022-23												
TYPE OF GENERATION	AUGUST- AFTERNOON	AUGUST-AFTERNOON LESS AGRICULTURE LOAD	AFTERNOON WITH LESS AGRICULTURE LOAD WITH 30% SOLAR	AUGUST- EVENING	AUGUST- NIGHT	JUNE- AFTERNOON	JUNE- AFTERNOON 80% SOLAR	JUNE- EVENING	JUNE- NIGHT	FEBRUARY- AFTERNOON	FEBRUARY- EVENING	FEBRUARY- NIGHT
HYDEL : 2954MW	1033	553	1909	1909.3	1120	685	0	1767.3	1120	297	828	604.5
AP THERMAL : 6610MW	1890	1890	3000	2268	1890	1890	1890	2268	2268	3564	4643	3375
SOLAR : 100%	50%	50%	10%	0	0	60%	80%	0	0	70%	0	0
SOLAR : 9335MW	4667.5	4667.5	933.5	0	0	5601	7468	0	0	6534	0	0
WIND : 100%	50%	50%	50%	75%	30%	40%	40%	75%	25%	0	20%	0
WIND : 4259.9MW	2129.95	2129.95	2129.95	3194.925	1277.97	1703.96	1703.96	3194.925	1064.975	0	851.98	0
GAS : 3007.8MW	303	0	350	445	256	358	200	358	358	358	358	358
HINDUJA : 1040MW	271	271	271	271	271	271	271	271	271	542	542	542
AP GENERATION : 27206.7MW	10294.45	9511.45	8593.45	8088.225	4814.97	10508.96	11532.96	7859.225	5081.975	11295	7222.98	4879.5
CGS & QA : 2059MW	1803.55	1013.55	1931.55	1979.775	1902.03	1072.04	48.04	1077.775	957.025	1817	2094.02	1732.5
TOTAL GENERATION : 29265.7MW	12098	10525	10525	10068	6717	11581	11581	8937	6039	13112	9317	6612
TOTAL LOAD AS PER APERC FOR FY 2022-23 : 14315MW	12098	10525	10525	10068	6717	11581	11581	8937	6039	13112	9317	6612
*AGRICULTURE DEMAND CONSIDERED INCLUDED IN TOTAL LOAD	3147	1573	1573			3800	3800			4296		
*During the good monsoon with more Hydel generation is available and low agriculture consumption, Solar Power from APGECL Solar Parks will be curtailed accordingly for LGB.												

30.9. Results of the system studies was discussed in the meeting on 19.05.2021 (MoM at Annex-XVII) with APTRANSCO, CTU, SRPC and SRLDC. After deliberation following were agreed:

- i. Transmission system proposed by APTRANSCO was agreed with following modifications:
  - As line length of Talaricheruvu-Podili 400 kV QMDC Line is about 250 km (as informed by APTRANSCO), the installation of 80 MVar Switchable Line Reactors at both the ends on each circuit may result in overcompensation and also may lead to oscillations. Accordingly, Talaricheruvu – Podili 400 kV QMDC line may be implemented with 125 MVar switchable line reactor on each circuit at Talaricheruvu end and 125 MVar bus reactor shall be provided at Podili substation.
  - As line length of Jammalamadugu-RTPP 400 kV TMDC Line is about 30 km (as informed by APTRANSCO), therefore to avoid any overvoltage during switching, it was agreed to install 2x125 MVar bus reactor at Jammalamadugu end instead of 80MVar Switchable Line Reactors at Jammalamadugu end on each circuit of Jammalamadugu-RTPP 400 kV TMDC Line.
  - 1x125 MVar, 420 kV bus reactor to be installed at 400/220 kV Kalikiri S/s.
- ii. With respect to load generation imbalance during lean / no demand from agricultural sector, APTRANSCO confirmed that dispatch of thermal machines would be reduced so as to maintain the load generation balance and APTRANSCO also ensured that they would not

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

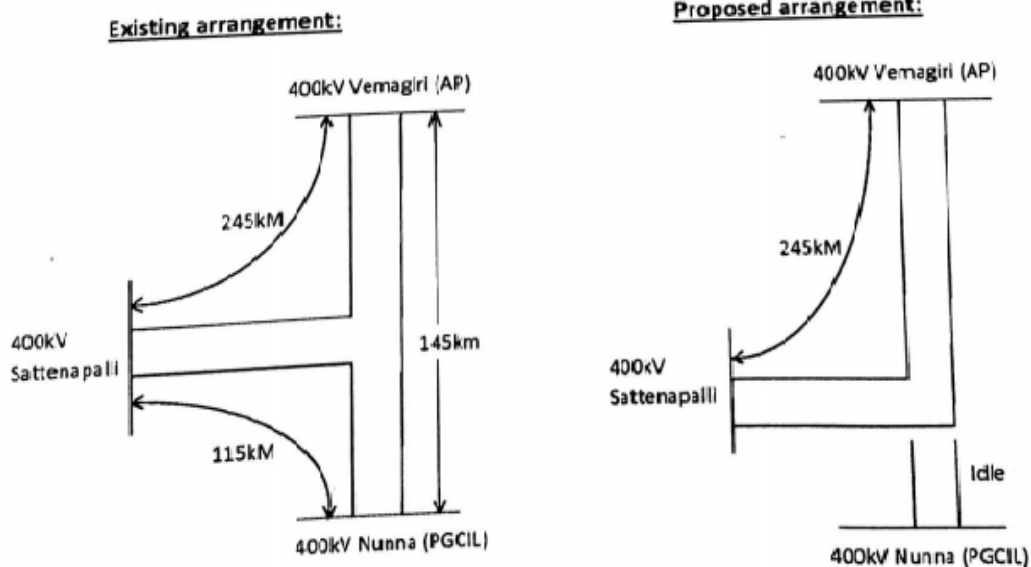
cause any congestion/ constraints in the ISTS grid due to injection of power from the proposed solar parks.

- iii. In case, any constraints / congestion are observed in the ISTS grid due to injection of power from the proposed solar generators or non-backing down of thermal generators during high RE generation, APTRANSCO would apply for LTA so that suitable system strengthening of ISTS could be identified and implemented as per requirements.

Members may please note.

### 31. Proposal for removing LILO arrangement of 400 kV Vemagiri – Sattenapalli Line at 400/220 kV SS (PGCIL)/Nunna to make 2<sup>nd</sup> circuit of 400 kV Vemagiri – Sattenapalli Line.

- 31.1. APTRANSCO vide letter dated 30.03.2021 (attached as Annex-XXI) informed that in the special meeting on grid related issues held on 20<sup>th</sup> October 2015 at SRPC, Bengaluru, it was recorded that LILO of one circuit from existing 400 kV Vemagiri – Nunna TMDC line at 400 kV SS Sattenapalli was agreed due to non-availability of sufficient load at 400 kV Sattenapalli SS. APTRANSCO has now proposed to remove the LILO arrangement of 400 kV Vemagiri – Sattenapalli Line at 400/220 kV SS Nunna (PGCIL) SS to make 2<sup>nd</sup> circuit of 400 kV Vemagiri – Sattenapalli Line.



- 31.2. If above proposal is agreed, the equipments pertaining to following 400 kV Bays of APTRANSCO at 400/220KV SS (PGCIL), Nunna will be taken out and kept as spare which will be utilized by APTRANSCO whenever necessary.

- i. 400 kV Vemagiri Feeder Main Bay
- ii. 400 kV Vemagiri Feeder Tie Bay
- iii. 400 kV Sattenapalli Feeder Main Bay

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

## iv. 63 MVAR Bus Reactor including Bus Reactor Bay

31.3. After removing LILO arrangement of 400 kV Vemagiri – Sattenapalli Line at 400/220 kV SS(PGCIL) Nunna, the only feeder which will be in service at 400/220 kV SS (PGCIL) Nunna SS is 400 kV VTPS Feeder. As the length of 400 kV VTPS – Nunna is short (~19.3 km), 63 MVAR Bus Reactor of APTRANSCO will be taken out and installed at one of the 400 kV Substations of APTRANSCO based on Voltage Profile and Field Feasibility. As per System Studies carried out with the existing network, it is observed that there is no much difference in Power flows on the Lines after removing LILO arrangement of 400 kV Vemagiri – Sattenapalli line at 400/220 kV SS (PGCIL), Nunna, to make 2<sup>nd</sup> circuit of 400 kV Vemagiri-Sattenapalli line.

31.4. The proposal was discussed in the meeting held on 19.05.2021 (MoM at Annex-XVII) and in the meeting, it was informed that in the 9<sup>th</sup> SCPSPSR meeting held on 04.12.1998, it was recorded that Vizag – Rajamundry – Vijayawada 400 kV D/c lines and Vizag – Khammam – Hyderabad 400 kV D/c lines had been planned by APSEB as a part of the generation planned at Simhadri complex. The proposals had already been accorded techno-economic clearance of CEA.

Subsequently in the 14<sup>th</sup> SCPSPSR meeting held on 03.12.2001 as part deliberations for “Provision of 2<sup>nd</sup> 400/220 kV, 315 MVA transformer at Vijaywada” following had been recorded:

*“C.E. (SP&PA), CEA stated that studies had also indicated the need of another 400 kV substation namely at Tadikonda, to be constructed by APTRANSCO as a part of their transmission system for evacuation of power from short gestation projects. The 400 kV D/c line from Vemagiri could be taken to Tadikonda instead of Vijaywada (Nunna) and the Tadikonda substation could be integrated with the grid through a LILO of Vijaywada (Nunna) – Srisaillam line. APTRANSCO could provide one or two transformers at Tadikonda depending on their need and as such the provision of 2<sup>nd</sup> transformer at Vijaywada (Nunna) may not be necessary.”*

In the 15<sup>th</sup> SCPSPSR meeting held on 18.04.2002, as part of proposal for LILO of 400 kV Gazuwaka – Vijaywada D/C line at Vemagiri of APTRANSCO it has been recorded that: *“Vemagiri was planned to be the pooling station for short gestation projects in that area of A.P. from where 400 kV lines to Vizag and Tadikonda (new 400 kV S/S) were planned in the AP system.”* During the meeting it was also recorded that *“LILO of Gazuwaka – Vijaywada D/C line at Vemagiri would be permitted only after completion of Vemagiri – Vizag and Vemagiri – Tadikonda 400kV D/C lines by APTRANSCO.”* Further The proposal was concurred after review in the 19<sup>th</sup> SCPSPSR meeting held on 14.06.2004. However, in the subsequent SCPSPSR meetings the lines are referred as Vemagiri – Narsaraopet 400 kV transmission corridor.

31.5. APTRANSCO informed that Rajamundry is Vemagiri only and the Tadikonda was renamed as Narsaraopet and later on as Sattenapalli based on the local village names.

I/17093/2021

**Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**

- 31.6. During the meeting, it was concluded that Vizag – Rajamundry (Vemagiri) – Vijayawada (Nunna) 400 kV D/c lines were planned and agreed as part of Vizag transmission system for evacuation of power from Simhadri generation complex. However, with the gas based generations in Vemagiri area and load requirements of Andhra Pradesh, Tadikonda (Narsaraopet) new 400 kV substation was planned by APTRANSCO and the Rajamundry (Vemagiri) – Vijayawada (Nunna) 400 kV D/c lines was to be terminated at Tadikonda (Narsaraopet) or now referred as Sattenapalli, instead of Vijayawada (Nunna) substation of PGCIL. However, no records have been found towards the LILO arrangement of one circuit of Vimagiri – Vijayawada (Nunna) 400kV D/c line at Sattenapalli of APTRANSCO.
- 31.7. After detailed deliberations and looking into the approval of original arrangement for establishment of Vimagiri – Sattenapalli (Tadikonda or Narsaraopet) 400 kV D/c line, the proposal for removal of LILO arrangement of 400 kV Vemagiri – Sattenapalli line at 400/220 kV SS (PGCIL) / Nunna to make 2<sup>nd</sup> circuit of 400 kV Vemagiri – Sattenapalli line was agreed. It was also agreed that APTRANSCO may remove/dismantle the balance portion from the Nunna substation upto the LILO point and the two nos. of 400 kV bays at Nunna and utilize the same as per their suitability. It was also decided that the proposal would be put up in the next meeting of SRPC(TP) for ratification.

Members may please note.

**32. Evacuation of Power from 1x800 MW Sri Damodaram Sanjeevaiah (SDS) TPS/Stage-II (Unit-3) established by APPDCL at 400 kV SS Krishnapatnam**

- 32.1. APTRANSCO vide email dated 08.04.2021 (Annex-XXII) had informed that APPDCL is constructing 1x800 MW SDS TPS/Stage-II (Unit-3) at Krishnapatnam, which is in final stage of construction and expected to be commissioned shortly. This generating unit would be connected to 400 kV Bus of Krishnapatnam 400 kV S/S. However, transmission system for evacuation of power from the generating unit had not been planned and the same had not been put up for approval in any SCPSPSR/SRSCT meetings. APTRANSCO had requested for in-principal approval for commissioning of 1x800 MW SDSTPS/ Stage-II (Unit-3).
- 32.2. The proposal was discussed in the meeting held on 19.05.2021. In the meeting it was informed that as the Standing Committee or SRPC(TP) forum had not been informed by APTRANSCO regarding implementation of 1x800 MW SDSTPS/Stage-II (Unit-3) at Krishnapatnam generation complex, transmission system for evacuation of power from the generating unit had not been planned. However, with the bypassing of Nellore (existing) from Nellore PS, power flow pattern has changed and sufficient margins are available in the grid to evacuate power from 1x800 MW SDSTPS/Stage-II (Unit-3). The bypassing arrangement has also facilitated in maintaining short circuit level at Nellore (existing) and Nellore (PS) within the prescribed limits. Further loadings on Krishnapatnam – Nellore 400 kV D/c line (Quad Moose, with thermal rating of about 1,750

I/17093/2021

**Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**

MW) is observed to be about 1,500-1,600 MW, which is quite close to the thermal limit of the line. Therefore, in case any constraints are observed in future, this section may need augmentation.

- 32.3. After detailed deliberations, it was agreed that looking into advanced commissioning stage of 1x800 MW SDSTPS/Stage-II (Unit-3) at Krishnapatnam generation complex, in-principal approval may be accorded for evacuation of power from the generating unit, subject to the generation developer meeting the other conditions as specified by SLDC/SRLDC for connectivity to the grid. The same would be taken up for ratification in the next meeting of SRPC(TP).

APTRANSCO shall put up transmission system strengthening required, if any, in the SRPC(TP) forum for deliberation and approval.

Members may please note.

**Transmission planning proposals by TSTRANSCO****33. Relocation of 125 MVAR Reactors from proposed 400/11kV Veljipur SS, 400/11 kV Yellaipally SS and 400/11 kV Tukkapur (New) SS**

- 33.1. The proposal for extending power supply to meet the load requirement for lifting additional 1 TMC of water from Godavari Basin in Link-I, Link-II & Link-IV of Kaleshwaram Lift Irrigation Scheme was approved in 2<sup>nd</sup> meeting of Southern Regional Power Committee (Transmission Planning) [SRPC(TP)].

- 33.2. TSTRANSCO vide letter dated 08.02.2021 (Annex-XXIII) has informed that they have accorded approval for providing only Consumer Bus at new 400/11kV Veljipur, 400/11kV Yellaipally & 400/11kV Tukkapur (New) Lift irrigation(LI) substations under Link – IV due to near vicinity to the corresponding existing Link IV substations. At the new proposed 400/11kV Veljipur, 400/11kV Yellaipally & 400/11kV Tukkapur (New) LI substations, only Metering Bay and Consumer Bus with Bus Sectionalizer is proposed and there is no 400kV Double Bus System. Therefore, 125MVAR Reactors cannot be connected at the new proposed 400kV substations.

In view of the above, TSTRANSCO has proposed the relocation of 125MVAR Reactors as follows:

Sl. No.	Earlier approved 125 MVAR Reactor at Substations of Link – IV	Now Proposed Substations to relocate Reactors
1	400/11 kV Veljipur LI SS	400/13.8/11 kV Ramadugu LI SS
2	400/11 kV Yellaipalli LI SS	400 kV Kachapur Switching Station
3	400/11 kV Tukkapur (New) LI SS	Tukkapur 400/11 kV LI SS (Existing)

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

**33.3. Relocating 125 MVAR Reactor from Veljipur 400/11 kV LI Substation to 400 kV Ramadugu LI Substation:**

The Veljipur 400/11kV LI Substation is around 5 km from existing 400/11kV Tippapur LI Substation where 1No. 400kV 125 MVAR Reactor is already provided. The Ramadugu 400/220/11kV LI Substation is in Link – II of the Kaleshwaram Lift irrigation project and is connected to two major Power Sources NTPC and STPP Jaipur (Singareni) and there is no Reactor at Ramadugu LI Substation. Hence it is proposed to relocate 125 MVAR Reactor from Veljipur LI Substation to Ramadugu LI Substation.

**33.4. Relocating 125 MVAR Reactor from Yellaipalli 400/11 kV LI Substation to 400 kV Kachapur Switching Station:**

The Yellaipally 400 kV Switchyard is around 8 km from existing 400/13.8/11kV Chandlapur LI Substation where 1 No. 400kV 125 MVAR Reactor is already provided.

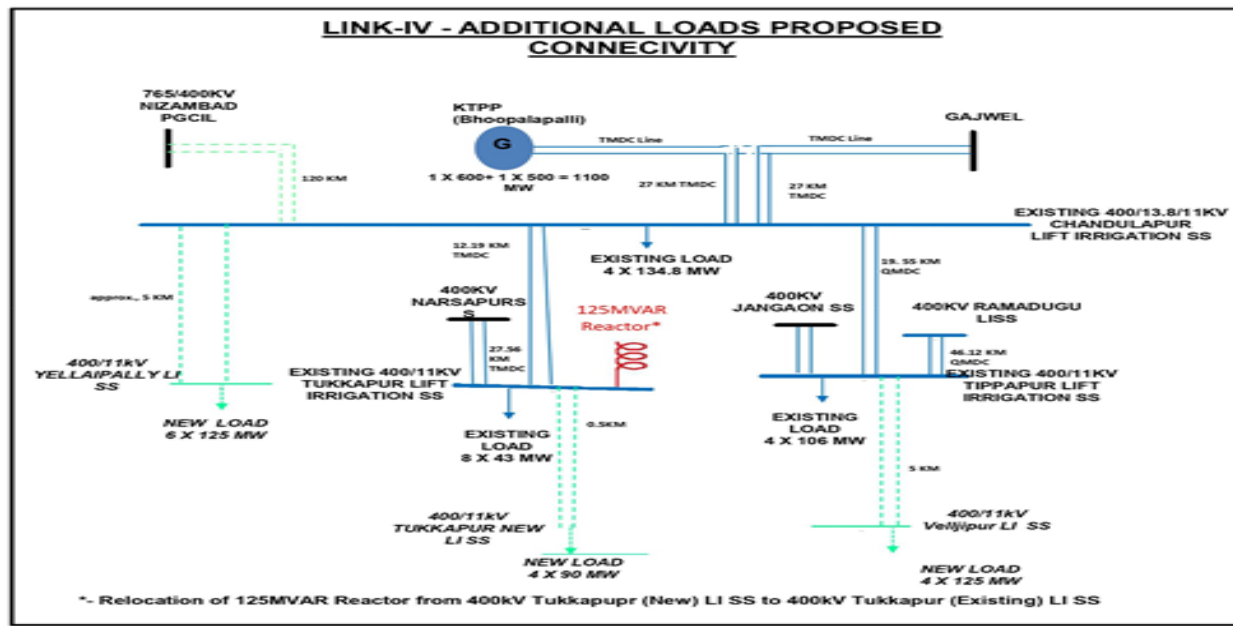
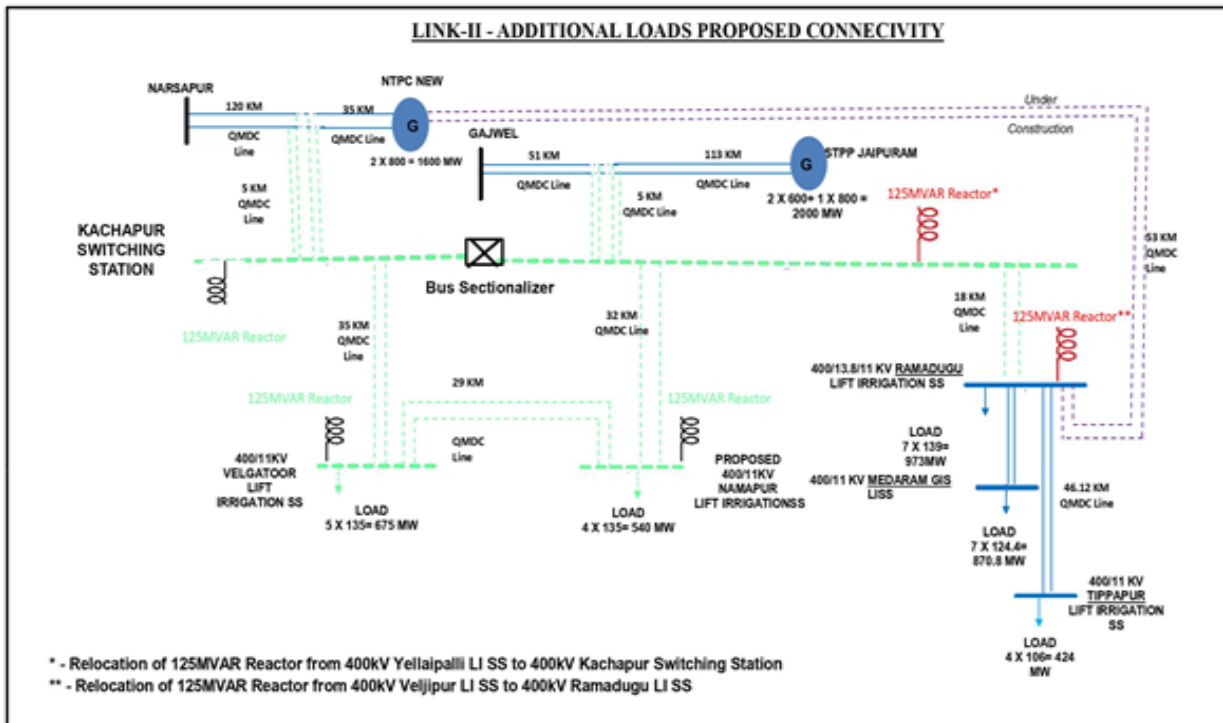
In the 2<sup>nd</sup> SRPC(TP) meeting, 400 kV Kachapur Switching Station was approved with bus sectionaliser arrangement along with 1 No. 400kV, 125 MVAR Reactor. Now it is proposed to relocate 125MVAR Reactor from Yellaipalli LI Substation to Kachapur Switching Station and with this relocation, 400kV Kachapur Switching Station will have 125 MVAR Reactors on both the sections.

**33.5. Relocating 125 MVAR Reactor from Tukkapur (New) 400/11 kV LI Substation to 400 kV Tukkapur (Existing) LI Substation:**

The Tukkapur (New) 400/11kV LI Substation is around 0.5 km from existing 400/11 kV Tukkapur (Existing) LI Substation and there is no reactor at Tukkapur (Existing) Substation and hence, it is proposed to relocate 125 MVAR Reactor from Tukkapur (New) 400/11kV LI Substation to 400 kV Tukkapur (Existing) LI Substation.



I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

Members may please discuss.

**Transmission Planning proposals by KSEB****34. Modification in 400 kV Edamon substation**

I/17093/2021

**Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)**

34.1. 400 kV substation at Edamon was agreed at 39<sup>th</sup> SCPSPSR held on 28-29 December, 2015. The following scheme was agreed upon:

- Six 400 kV line bays
- Four spare 400 kV line bays
- Two transformer bays with 2x315 MVA 400/220 kV ICT's.
- The 400 kV connectivity would be established by charging existing 220 kV Tirunelveli – Edamon Twin Moose D/c feeder, constructed in 400 kV parameters, at 400 kV, and by LILO-ing both circuits of under construction 400 kV Tirunelveli – Cochin East Quad Moose D/c feeder.
- Additional connectivity to 400 kV substation, Trivandrum North is planned later by LILO of existing 400 kV Tirunelveli – Trivandrum (North) Twin Moose D/c feeder.
- Downstream 220kV connectivity: -
  - a. 220 kV connectivity will be directly to existing 220 kV switchyard of Edamon and further to following stations
  - b. 220 kV D/c feeder to Pothencode
  - c. 220 kV D/c and 220 kV S/c feeders to Sabarigiri
  - d. 220 kV feeders to Kundara and Edappon.

34.2. In the 2<sup>nd</sup> SRPC(TP) meeting. KSEB informed that as per studies carried out by KSEB, only six circuits need to be connected to the new 400/220 kV substation at Edamon, Nagamala Estate. The following revised transmission scheme has been proposed by KSEB:

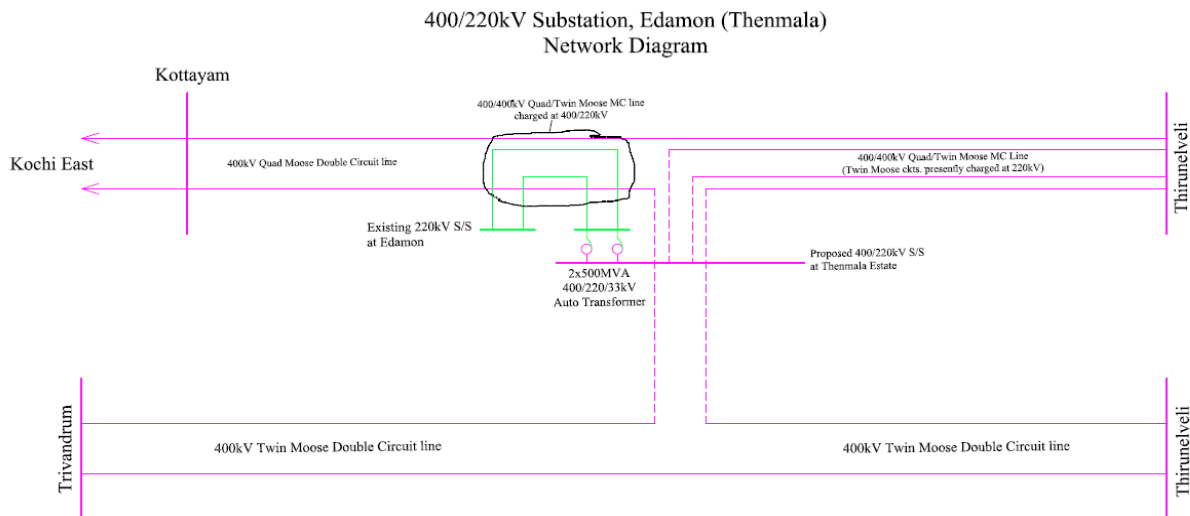
- i. Tirunelveli - Edamon I & II Twin Moose feeders constructed in 400 kV parameters and now charged at 220 kV level will be terminated at 400 kV Edamon substation.
- ii. One of the 400 kV Quad Moose Tirunelveli- Cochin East I & II feeders will be LILO'ed at 400 kV Edamon substation.
- iii. One of the 400 kV Twin Moose Tirunelveli - Trivandrum I & II feeders will be LILO'ed at 400 kV Edamon substation.
- iv. The 220 kV connectivity to 220 kV Edamon (KSEBL) existing substation will be established by using the balance portion of Twin Moose feeder to Edamon (KSEB) substation.
- v. 3 Nos. + 1 No.(spare) 166.67 MVA, 400/220/33 kV single phase auto transformer banks at 400 kV Edamon substation.

34.3. Further, KSEB had proposed the following downstream connectivity at Edamon (Nagamala Estate):

I/17093/2021

Agenda for 3<sup>rd</sup> meeting of Southern Regional Power Committee (Transmission Planning)

- 220 kV connectivity to existing 220 kV switchyard of Edamon
- 220 kV D/c feeder to Pothencode
- 220 kV D/c feeder to Sabarigiri
- 220 kV feeder to Pathanamthitta
- 220 kV feeders to Kundara and Edappon.



34.4. In the meeting, it was decided that the transmission system for Edamon would be studied in a joint meeting of CEA, SRPC, CTU, SRLDC/POSOCO and KSEB and the same would be discussed in the 3<sup>rd</sup> SRPC(TP) meeting.

34.5. KSEB vide letter dated 23.03.2021 (Annex-XXIV) revised ICT capacity at Edamon to 2x500 instead of 2x315.

Members may please discuss.