

I/2732/2018



सत्यमेव जयते

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority

विद्युत प्रणाली योजना एवं मूल्यांकन प्रभाग -II
Power System Planning & Appraisal Division-II

सेवा मे /To,

संलग्न सूची के अनुसार
As per list enclosed

विषय: ट्रांसमिशन पर दक्षिणी क्षेत्र स्थायी समिति (एसआरएससीटी) की पहली बैठक का कार्यवृत्त ।

Subject: Minutes of 1st meeting of Southern Region Standing Committee on Transmission (SRST)

महोदय(Sir)/महोदया(Madam),

ट्रांसमिशन पर दक्षिणी क्षेत्र स्थायी समिति (एसआरएससीटी) की पहली बैठक 07 सितंबर, 2018 को आयोजित की गई थी। इस बैठक के कार्यवृत्त की प्रति आपकी सूचना एवं आवश्यक कार्यवाही हेतु संलग्न है।

1st meeting of Southern Region Standing Committee on Transmission (SRST) was held on 7th September, 2018 at Chennai (Tamil Nadu). A copy of minutes of the meeting is enclosed for your information and necessary action.

भवदीय/Yours faithfully,

B.S. Bairwa
01.11.2018

(बी.एस.बैरवा/B.S. Bairwa)
निदेशक/Director

I/2732/2018

Address List:

1. The Member Secretary, Southern Regional Power Committee, 29, Race Course Cross Road, Bangalore 560 009. FAX : 080-22259343	2. Chief Operating Officer, Central Transmission Utility (CTU), Power Grid Corporation of India "Saudamini" Plot No. 2, Sector-29, Gurugram-122001 Tel. No. 0124-2571816 Fax No.0124-2571932
3. Director (System Operations), POSOCO B-9, Qutub Institutional Area, Katwaria Sarai, New Delhi-110016 Tel. No. 26852843 Fax No. 2626524525, 26536901	4. Managing Director Karnataka State Power Trans. Corp.Ltd., Cauvery Bhawan, Bangalore - 560 009. FAX : 080 -22228367
5. Chairman and Managing Director Transmission Corp. of Andhra Pradesh Ltd., (APTRANSCO) Gunadala, Eluru Rd, 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 th 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

Minutes of 1st Meeting of the Southern Region Standing Committee on Transmission (SRST) held on 07th September, 2018(Friday) at Chennai, Tamil Nadu.

List of participants is enclosed at **Annex-I**.

Member (PS), CEA welcomed the participants. He stated that Ministry of Power, Govt. of India vide its order dated 13th April 2018, has constituted Southern Region Standing Committee on Transmission (SRST) for planning of Transmission System in the Southern Region. Accordingly, this is the first meeting of newly constituted Standing Committee. He thanked TANTRANSCO for hosting the meeting.

MD, TANTRANSCO welcomed the participants and briefed about Tamil Nadu Transmission System.

Chief Engineer (PSPA-II), CEA stated that SR is rich in RES and contribution of generation from RES particularly wind and solar generation is maximum in All India generation capacity from Renewable sources. Large-scale integration of Renewable generation is a challenge for Southern States to absorb and evacuate surplus power to other Regions. The agenda for the meeting inter-alia covers intra-State Transmission Schemes of Tamil Nadu, Karnataka and Andhra Pradesh and follow up actions of the previous Standing Committee Meeting on Power System Planning. He stated that the MoP vide letter dated 13th April 2018, (copy enclosed at Annexure-II) have also constituted the "Empowered Committee on Transmission" (ECT), "National Committee on Transmission"(NCT).

As per MoP letter, the Southern Region Standing Committee on Transmission (SRST) have following members:

1. Member (Power System), Central Electricity Authority (CEA), as Chairperson
2. Chief Operating Officer, Central Transmission Utility (POWERGRID), as Member
3. Director (System Operation), Power System Operation Corporation Ltd., as Member
4. Heads of State Transmission Utilities (STUs) of Telangana, Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Puducherry, Lakshadweep # as Members (STUs to coordinate with their respective Distribution Companies DISCOMs)
5. Member Secretary of Southern Region Power Committee, as Member
6. Chief Engineer (from Power System Wing), Central Electricity Authority (CEA), as Member Secretary

The Terms of Reference (ToR) of SRST are as follows:

- (i) Evolve and finalize system strengthening schemes for removal of operational constraints and transfer of surplus power through inter-regional corridors
- (ii) Examine the proposals for transmission systems for access/ connectivity applications
- (iii) Examine the associated transmission systems with electricity generators
- (iv) Review the up- stream and down -stream network associated with transmission schemes
- (v) Examine and evaluate the intra- state transmission proposals

Further, Chief Engineer (PSPA-II), CEA informed that as per MoP letter, STUs have to coordinate with respective DISCOMS for development of intra-state as well as inter-state transmission system in the region.

After a brief introduction of participants, he requested Director (PSPA-II), CEA to take up the agenda items for deliberation.

1.0 Minutes of 42nd meeting of the Standing Committee on Power System Planning

- 1.1 Director(PSPA-II), CEA informed that the minutes of 42nd meeting of the Standing Committee on Power System Planning of Southern Region (SCPSPSR) held on 27th April 2018 were issued vide CEA's letter No. 1/1221/2018 dated 15th June 2018. No comments/observations have been received on the minutes

Follow up issues of previous meetings of SCPSPSR

2.0 Proposal of erection of 125 MVAR Bus Reactor at other end instead of 400 kV GIS Srisailam Left Bank Hydro Electric Station (SLBHES)

- 2.1 Director (PSPA-II) CEA, informed that in the 39th Standing Committee meeting, installation of the 400kV, 1x125MVAR, Bus reactor at Srisailam Left Bank Hydro Electric Station(SLBHES) 400kV GIS substation was approved. In the 41st meeting of SCPSPSR, representative of TSTRANSCO informed that erection of Bus reactor was not feasible due to space constraint at SLBHES. Accordingly, it was decided to study and examine the installation of bus reactors at other end of the substations connecting SLBHES GIS substation.
- 2.2 Subsequently, a meeting was held in CEA on 06.02.2018, wherein it was observed that the effect of one 400kV, 125MVAR bus reactor planned at Dindi substation would not be adequate to bring down the overvoltage within limit at SLBHES bus. However, the voltage would be within limit by installation of additional bus reactors of 125 MVAR (400kV) capacity at Dindi i.e. installation

of 400kV, 2x125MVAR bus reactor (including one reactor already planned at Dindi substation). Accordingly, it was decided that a team comprising officers from CEA, CTU and TSTRANSCO would visit SLBHES switchyard to explore the feasibility to accommodate the reactor (125 MVAR).

- 2.3 Accordingly, a team comprising of officers of CEA, CTU and TSTRANSCO visited SLBHES on 08.08.2018. After visiting the site and discussion with the project authorities, the team was of view that there is no possibility of locating the 125MVAR reactor on SLBHES bus without compromising the safety and security of the plant.
- 2.4 Accordingly, it was decided that TSTRANSCO would install an additional bus reactor of 125 MVAR (400kV) capacity at Dindi (one reactor already planned at Dindi substation, thus there will be two reactors at Dindi) as an intra-state scheme.

3.0 High voltage system studies and proposal for reactive compensation in SR

- 3.1 Director, CEA stated that in the 42nd meeting of SCPSPSR, CTU had proposed Bus Reactors in 24 nos. of ISTS and STU substations, wherein requirement of bus reactors at 6 nos. of ISTS sub-station and 18 nos. of state sub-stations was agreed in principle. However, TSTRANSCO and KPTCL stated that they will send their consent within 15 days of the meeting.
- 3.2 Representative of KPTCL consented for installation of bus reactors at Yeramarus, Bellary PS, CN Halli and Jagalur as agreed in 42nd meeting of SCPSPSR.
- 3.3 Representative of TSTRANSCO stated that 11 nos. of 125 MVAR reactors at 10 substations of Telangana were proposed in the 42nd meeting of SCPSPSR. He added that as per studies carried out by them, four bus reactor of 125MVAR each at Tippapur, Kamalapuram, Manikonda and Yellampalli substations would be sufficient to keep the bus voltage under control during off-peak conditions for 2021-22 time frame.
- 3.4 Representative of CTU stated that the study carried out by TSTRANSCO was examined and observations are as follows:
 - a. TSTRANSCO have considered 5 generating units of Damacharla generator whereas CTU had considered two generating units only.
 - b. TSTRANSCO had allowed absorption of reactive power upto their capability limits, which always may not be available on the bars.
 - c. There is difference in length of cables for which has reactive power injection is different. Due to correction in cable length, bus reactor requirement at Raidurg would be 1x125MVAR only.

- 3.5 Representative of CTU further stated that the System Studies for analysis of High Voltage conditions in Southern Region were carried out for the off-peak conditions wherein the certain machine were taken out of service which were operating below technical minimum to balance the load-generation of the region. However, TSTRANSCO has considered the machine and allowed the MVAR absorption upto their limits which may not be the realistic scenario. Therefore, it is desirable that the Bus Reactors may be agreed and installed for smooth and reliable operation of the SR Grid.
- 3.6 On query about status of Damacharla generation, TSTRANSCO replied that all 5 units are expected by 2021-22.
- 3.7 CTU representative stated that in the high renewable scenario in SR, generation from conventional sources are expected to backed down and reactive support of these units shall not be available, under such situation the bus reactors are necessary to control the Voltages within the permissible limits.
- 3.8 Representative of POSOCO stated that in high wind scenario reactive support from conventional generation sources may not be available and suggested TSTRANSCO to review their study and shall install the bus reactors.
- 3.9 Representative of TSTRANSCO stated that underutilization of the lines may result in high voltage scenario, therefore, techno-economic studies need to be carried out before adding the reactors.
- 3.10 MS, SRPC said that the high voltages may also occur because many generating units are not absorbing reactive power as per the machine capability curve. The mismatch between design and real scenario cannot be taken care by techno-economic studies.
- 3.11 Representative of POSOCO stated that as per Planning criteria renewable generator has to maintain power factor as 0.98 and this facility is provided by inverter. He suggested to utilized the inverter capability to absorb reactive power when there is no generation from the renewable.
- 3.12 After detailed deliberations, following requirements of bus reactors were agreed for implementation.

Sl. No.	Bus Name	Voltage (in kV)	ISTS / STATE	Existing / UC BUS Reactor (MVar)	Bus Reactor Agreed (MVar)
1	HOSUR	400	ISTS	63	125
2	MADHUGI	400	ISTS	63	125
3	DHARAMPURI	400	ISTS	-	125
4	HIRIYUR	400	ISTS	-	125
5	PUGALUR	400	ISTS	-	125
6	PUGALUR HVDC STN	400	ISTS	-	2x125
7	RACHAGUNNERI	400	AP	-	125
8	SURYPET	400	TEL	-	125
9	RAIDURG	400	TEL	-	125
10	KAMALAPURAM	400	TEL	-	125

Sl. No.	Bus Name	Voltage (in kV)	ISTS / STATE	Existing / UC BUS Reactor (MVA)	Bus Reactor Agreed (MVA)
11	NARSAPUR	400	TEL	-	125
12	MAHESHWARAM-TS	400	TEL	-	125
13	TIPPAPUR	400	TEL	-	125
14	MANIKONDA	400	TEL	-	125
15	JANAGAON	400	TEL	-	125
16	CHOUTTUPPAL	400	TEL	-	125
17	YELLAMPALLI	400	TEL	-	125
18	YERAMARUS	400	KAR	-	125
19	BELLARY PS	400	KAR	-	2x125
20	HINDPUR	400	AP	80	125
21	CNHALLI	400	KAR	-	2x125
22	JAGALUR	400	KAR	-	2x125
23	WAYANAD	400	KER	-	125
24	VELALIVIDU	400	TN	-	125

3.13 Further, it was agreed that bus reactors need to be implemented by respective agencies in phased manner. TSTRANSCO may implement reactors at Tippapur, Kamalapuram, Manikonda and Yellampalli in first phase

4.0 Providing additional feed to 3x500 MVA, 400/220kV substation at Mylasandra (Electronic City) and Establishment of 2x500 MVA, 400/220 kV Sub-station at Dommasandra in Bengaluru

4.1 Director(PSPA-II) CEA, informed that, establishment of 400/220 kV sub-station (3 x 500 MVA) at Mylasandra (Electronic City) in Bangalore was approved in 27th meeting of SCPSPSR with LILO of Somanahalli-Kolar 400 kV S/C line (Twin Moose) at Mylasandra. In the 41st meeting of SCPSPSR, the issue of strengthening of upstream lines to Mylasandra sub-station by converting 400 kV Somanahalli-Kolar S/C line (with Twin Moose ACSR conductor) along with LILO portion to D/C line (with quad moose ACSR conductor) was discussed. In the 42nd meeting of SCPSPSR, KPTCL proposed to construct LILO of one circuit of proposed Dharmapuri-Somanahalli 400kV D/c line (PGCIL line) at 400 kV Mylasandra sub-station. With above proposals 400kV system at proposed 400/220kV Mylasandra substation would be as under:

- i. 3x500MVA, 400/220kV ICTs
- ii. LILO of single circuit of Dharmapuri-Somanahalli 400kV D/C line (quad Moose ACSR conductor) at Mylasandra
- iii. LILO of single circuit of Kolar-Somanahalli 400kV S/C line (Twin Moose) at Mylasandra

4.2 Further, KPTCL had proposed in 42nd meeting of SCPSPSR, for establishment of 400/220 kV sub-station at Dommasandra (400/220kV,

2x500MVA ICTs) in Bengaluru city to relieve loading 400kV Mylasandra sub-station, to reduce the loading of 220 kV lines and to meet the future load growth in the vicinity with following details:

- i. 2 X 500 MVA, 400/220 kV GIS substation at Domasendra
- ii. LILO of Kolar – Mylasandra 400kV S/C line (with Twin Moose ACSR conductor) at proposed Dommasandra substation.
- iii. Somanahalli - Dommasandra 400kV S/C line (with Twin Moose ACSR conductor)
- iv. LILO of Somanahalli - Malur 220 kV D/C line between proposed 220kV EXORA and Malur sub-station (With this line arrangement, there will be 220kV DC connectivity between Dommasandra & EXORA, 220 kV SC connectivity from Dommasandra, each to Sarjapura and Malur).
- v. 220 kV, 1000sqmm UG cable link between 220 kV VT Park substation and 220kV EXORA sub-station (proposed).

4.3 In the 42nd meeting of SCPSPSR, it was decided that the strengthening of upstream lines to Mylasandra sub-station and the proposal of LILO of Dharmapuri-Somanahalli 400kV D/C line at Mylasandra will be studied in detail along with proposal of establishment of a 400kV substation at Dommasandra after joint study of system carried by CEA, CTU, POSOCO and KPTCL.

4.4 Accordingly, the issue was discussed in a joint study meeting held on 10th/11th May 2018, wherein following system was agreed for Mylasandra and Dommasandra 400kV S/S for supplying reliable power to Bengaluru city:

Connectivity at Mylasandra 400/220kV substation:

- (i) 3x500MVA, 400/220kV ICTs
- (ii) LILO of Kolar – Somanahalli 400kV S/C line at Mylasandra 400/220 kV substation (already agreed)
- (iii) Mylasandra – Dommasandra 400kV S/C line (with twin Moose ACSR conductor)

400/220kV substation at Dommasandra :

- i) 2x500MVA, 400/220kV ICTs
- ii) LILO of one circuit of Dharmapuri – Somanahalli 400kV D/C line (with Quad moose ACSR Conductor) at proposed 400/220 kV substation at Dommasandra.
- iii) Mylasandra – Dommasandra 400kV S/C line (with twin moose ACSR Conductor) on D/C towers

- 4.5 Representative of KPTCL stated that as per the field report with the agreed system in joint study, there would be five circuits on a tower near Mylasandra (3 twin moose line and 2 Quad moose line). In addition to this Existing 220kV Peenya-Singarpet line, is passing through this area and height of the 400kV tower at the crossing point will be greater than 130 meters. In view of this KPTCL requested for revision in connectivity of Mylasandra 400/220kV and Dommasandra 400/220kV S/S as follows:

Connectivity at Mylasandra 400/220kV substation:

- i) 3x500MVA, 400/220kV ICTs
- ii) LILO of Kolar – Somanhally 400kV S/C line at Mylasandara 400/220 kV substation (already agreed)
- iii) Mylasandra – Dommasandra 400kV S/C line (with twin Moose ACSR conductor)

Connectivity at Dommasandra 400/220kV substation

- i) 2x500MVA, 400/220kV ICTs
- ii) LILO of one circuit of Dharampuri – Somanhally 400kV D/C line (with Quad moose ACSR Conductor) at proposed 400/220 kV substation at Dommsandra.
- iii) LILO of Mylasandra – Kolar 400kV S/C line at proposed 400/220 kV substation at Dommsandra. (with twin moose ACSR Conductor)

- 4.6 Director, CEA stated that proposed connectivity is similar to earlier proposal of KPTCL which has already been discussed during the 42nd meeting of Standing committee. The proposed connectivity would reduce the reliability of Mylasandra. He suggested that the issue of 5 circuits on one tower can be addressed by suitable technical solution like use of Gas Insulated Transmission Lines (GITL) for circuits with Quad Moose Conductor.
- 4.7 After deliberation, it was decided that the issue may be discussed in a separate meeting of CEA, CTU and KPTCL.

5.0 Evacuation of power from RE sources in Southern Region (Proposed Wind Energy Zone by MNRE)

- 5.1 Director (PSPA-II) CEA informed that, in the 42nd meeting of SCPSPSR held on 27.04.2018, it was informed that based on various inputs like district wise NIWE potential, SNA developable potential, pooling station wise wind capacity sanctioned by STU, RE applications received in ISTS by CTU and detailed discussion with MNRE & wind IPPs/developers, projected capacity in each Wind Energy Zone (WEZ) were identified and prioritized for implementation in 2021-22-time frame in wind resource rich states. In the meeting held in MNRE, Koppal (2500 MW) in Karnataka, Kurnool (3000 MW) in Andhra

Pradesh and Karur (2500 MW) in Tamil Nadu were identified as prioritized Wind Energy zones in Southern region for which transmission infrastructure needs to be developed/made available under ISTS/ transmission system. Further, it was indicated that Tirunelveli/ Tuticorin district in TN is also a high wind potential complex and 2500 MW of wind energy potentials can be considered for development of transmission infrastructure under ISTS transmission system.

- 5.2 In the 42nd meeting of SCPSPSR it was decided that, comprehensive study would be carried out with Southern Region constituents for accessing the transmission system requirement in the region as a whole.
- 5.3 A joint system study was held in SRPC, Bengaluru on 10&11, May 2018. In the meeting, LGB was finalized considering peak wind scenario and peak and off peak demand scenario (2021-22). Minutes of the joint study meeting is enclosed at Annexure –III. Further Tamil Nadu shall balance its load generation in such manner that it shall have zero exchange with ISTS in the high renewable generation scenario. Further Tamil Nadu shall reduce its LTA schedule to lowest/zero level from Tuticorin JV & Coastal Energen generation projects under above high RE injection scenario. In the joint study meeting following Transmission system were agreed:

A. Tirunelveli and Tuticorin Wind Energy Zone (Tamil Nadu):

- i. Addition of 2x500 MVA, 400/230kV ICTs (4th & 5th) at Tuticorin-II GIS sub-station.
- ii. Operation of Tuticorin Pooling Station – Dharmapuri (Salem) 765kV D/C line (presently operating at 400kV) at its rated voltage. (i.e 765kV) would be reviewed for dispersal of more than 2000MW RE generation

B. Karur / Tiruppur Wind Energy Zone (Tamil Nadu):

- i. Establishment of 5x500 MVA, 400/230 kV Karur Pooling Station (at a location in between Karur Wind zone and Tiruppur wind zone)
- ii. LILO of both circuits of Pugalur – Pugalur (HVDC) 400 kV D/c line (with Quad Moose ACSR Conductor) at Karur PS
- iii. 9 Nos. of 230kV line bays for interconnection of wind projects
- iv. 2x125 MVA, 400kV Bus reactors at Karur PS

C. Koppal Wind Energy Zone (Karnataka)

- i. Establishment of 5x500 MVA, 400/220kV pooling station near Munirabad /suitable location in Koppal distt.
- ii. Pooling station (near Munirabad /suitable location in Koppal distt.) - Munirabad 400 kV D/c Line (with Quad Moose ACSR conductor)

- iii. Pooling station (near Munirabad /suitable location in Koppal distt.) - Narendra (New) 400 kV D/c Line (with Quad Moose ACSR conductor)
- iv. 9 Nos of 220kV line bays for interconnection of wind projects
- v. 2x125 MVA, 400kV bus reactor at Pooling station (near Munirabad /suitable location in Koppal distt.)
- vi. Adequate space provision for future expansion.

D. Kurnool Wind Energy Zone (AP):

- i. Establishment of 765/400/220kV Pooling station (at suitable location in Kurnool substation Distt) at Kurnool-III (e.g. near Adoni) with 3x1500 MVA, 765/400kV; 6x500 MVA, 400/220kV transformation capacity
 - ii. Kurnool-III Pooling station - Kurnool(new) 765 kV D/c Line
 - iii. 10 nos of 220kV line bays for interconnection of wind projects
 - iv. 1x240 MVA (765kV) & 1x125MVA (400kV) bus reactors at Kurnool-III Pooling station.
 - v. Adequate space provision for future expansion.
- 5.4 In the joint study meeting, it was also brought out that for transfer of power from the proposed Munirabad/Koppal pooling station, system strengthening in Western Region would be required. Member (PS), CEA stated that issue of strengthening of WR system has been already sensitised to WR constituents.
- 5.5 Chief Engineer, CEA stated that for the Tirunelveli/Tuticorin area, it was found that Operation of Tuticorin Pooling Station – Dharmapuri (Salem) 765kV D/C line (presently operating at 400kV) at its rated voltage. (i.e 765kV) need to be reviewed for dispersal of power beyond 2000MW RE generation. As per the 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”. Accordingly, it was suggested that 5th ICT (500 MVA) at Tuticorin-II GIS S/s may be planned alongwith review of operation of above line (Tuticorin Pooling Station – Dharmapuri (Salem) line) at rated voltage i.e. 765kV for RE injection beyond 2000 MW.
- 5.6 Representative of TANTRANSOCO stated that the transmission system may not be implemented without LTA applications.
- 5.7 Representative of CTU stated that Solar potential zones in various districts of six (6) RE rich states were identified by SECI in association with MNRE for 50 GW quantum in phase-I and phase-II in time frame 2021-22. The information was finalized by SECI in consultation with Solar Power developers & MNRE. He added that 2.5GW of solar generation is envisaged in Kurnool area of Andhra Pradesh. To evacuate this additional quantum of power, following

modifications in the transmission system were proposed for Kurnool wind/solar energy zone:

- i) Establishment of 765/400/220kV 3x1500 MVA, 9x500 MVA Pooling station at suitable location in Kurnool Distt (Kurnool-III)
- ii) Kurnool-III PS - Kurnool(new) 765 kV D/c Line
- iii) Kurnool-III PS-Maheshwaram(PG) 765 kV D/c Line
- iv) 220kV line bays for interconnection of wind/solar projects (15 nos)
- v) 1x330 MVar (765kV) & 1x125MVar (400kV) bus reactor at Kurnool-III PS
- vi) 240 MVar Switchable line reactors at both ends of Kurnool-III PS – Maheshwaram(PG) 765 kV D/c Line

5.8 After detailed deliberations considering the power potential & expected availability of generation, following transmission system for evacuation of power from wind energy zones and phase-I of solar energy zones was agreed :

A. Tirunelveli and Tuticorin Wind Energy Zone (Tamil Nadu)(500MW):

- i. Addition of 1x500 MVA, 400/230kV ICT (4th) at Tuticorin-II GIS sub-station.
***Operation of Tuticorin Pooling Station – Dharmapuri (Salem) 765kV D/C line (presently operating at 400kV) at its rated voltage. (i.e 765kV) & 5th ICT (500 MVA) at Tuticorin-II PS would be reviewed for dispersal of more than 2000MW RE generation*

B. Karur / Tiruppur Wind Energy Zone (Tamil Nadu)(2500MW):

- i. Establishment of 5x500 MVA, 400/230 kV Karur Pooling Station (at a location in between Karur Wind zone and Tiruppur wind zone)
- ii. LILO of both circuits of Pugalur – Pugalur (HVDC) 400 kV D/c line (with Quad Moose ACSR Conductor) at Karur PS
- iii. 9 Nos. of 230kV line bays for interconnection of wind projects
- iv. 2x125 MVar, 400kV Bus reactors at Karur PS

C. Koppal Wind Energy Zone (Karnataka) (2500MW)

- i. Establishment of 5x500 MVA, 400/220kV pooling station near Munirabad /suitable location in Koppal distt.
- ii. Pooling station (near Munirabad /suitable location in Koppal distt.) - Munirabad 400 kV D/c Line (with Quad Moose ACSR conductor)
- iii. Pooling station (near Munirabad /suitable location in Koppal distt.) - Narendra (New) 400 kV D/c Line (with Quad Moose ACSR conductor)
- iv. 9 Nos of 220kV line bays for interconnection of wind projects
- v. 2x125 MVar,400kV bus reactor at Pooling station (near Munirabad /suitable location in Koppal distt.)
- vi. Adequate space provision for future expansion.

D. Kurnool Wind Energy Zone (3000MW) /Solar Energy Zone (AP)(1500MW):

- i. Establishment of 765/400/220kV 3x1500 MVA, 9x500 MVA Pooling station at suitable location in Kurnool Distt (Kurnool-III)
- ii. Kurnool –III PS - Kurnool(new) 765 kV D/c Line-
- iii. Kurnool –III PS-Maheshwaram(PG) 765 kV D/c Line
- iv. 220kV line bays for interconnection of wind projects (15 nos)
- v. 1x330 MVAr (765kV) & 1x125MVAr (400kV) bus reactor at Kurnool-III PS
- vi. 240 MVar Switchable line reactors at both ends of Kurnool-III PS – Maheshwaram(PG) 765 kV D/c Line

5.9 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 the CTU. The transformation capacity at various stations and certain elements could be required to be reviewed based on LTA applications. Accordingly, this broad master plan would be implemented in stages to serve RE integration.

6.0 Intra- state transmission projects proposed for Green Energy Corridor Ph-II in Karnataka

6.1 Director, CEA stated that in the 42nd meeting of SCPSPCR, KPTCL proposed following Intra-State transmission projects for evacuation of large scale RE generation

SI No	Project Description
1	Establishing 2X500 MVA, 400/220/110kV substation at Yalwar in B.Bagewadi Taluk, Bijapur district.
2	Establishing 2X500 MVA, 400/220kV substation at Lokapur in Bagalkot district.
3	Providing additional 400kV link with proposed 400/220 kV Doni sub-station by LILLO of existing Narendra- Davanagere 400 kV D/C line (with twin moose ACSR conductor) at Dhoni sub-station.
4	Establishing 2X100MVA, 220/110 kV substation at Ron in Gadag district.
5	Establishing 2X100MVA, 220/110 kV substation at Savalgi in Bagalkot district.
6	Establishing 2X100MVA, 220/66 kV substation at P.D.Kote in Chitradurga district.
7	Establishment of 2x100 MVA, 220/66 kV sub-station at Hanagal (New), Chitradurga District

8	LILO of 2nd circuit of the existing Mahalingpura - Kudachi 220 kV D/C line at Athani.
9	Conversion of existing Bidnal-Saundatti 220 kV S/C line and Saundatti -Mahalingpura 220kV S/C to 220 kV D/C line
10	Strengthening of Lingapura-Ittagi 220kV S/C line, Ittagi –Neelagunda 220kV S/C, Neelagunda –Guttur 220kV S/C line by replacing line with 220 kV D/C line (Twin Drake conductor).

6.2 However, in the said meeting, it was decided that due to large scale integration of renewable generation in SR, detailed study considering the proposals of renewable rich states of SR and CTU need to be carried out.

6.3 In the joint system study held on 10th and 11th May 2018, the proposed transmission system was studied in detail. Minutes of the joint study meeting is enclosed at Annexure –III. Gist of deliberations in the study meeting are as follows:

A. Establishment of 2x500 MVA, 400/220 kV sub-station at Yalwar, Bijapur District with following elements:

400 kV System:

- i. Narendra (New) Kudgi-Yalwar 400 kV D/C line (with Quad Moose ACSR Conductor)
- ii. Gulbarga- Yalwar 400 kV D/C line (with Quad Moose ACSR Conductor).
- iii. 2 X 500 MVA, 400/220 kV ICTs at Yalwar.
- iv. 2 X 125 Mvar bus reactors.

220 kV System:

- 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 sub-station at Yalwar.
- iii. B.Bagewadi -Yalwar 220 kV D/C line.

System study shows that power flows from proposed Yalwar sub-station toward Narendra. In case of outage of the proposed Yalwar –Narendra (New) 400kV D/C line, all the power will absorb in state network.

In the study meeting, the proposed 400/220 KV substation at Yalwar and associated transmission lines for evacuation of wind generation in Yalwar was agreed except Yalwar - Narendra (New) 400kV D/C line.

B. Establishment of 2x500 MVA, 400/220 kV sub-station at Lokapur, Bagalkot

400 kV System:

- i. LILO of both circuits of Narendra (New) –Narendra (PGCIL) 400 kV D/C line (with Quad Moose ACSR Conductor) at Lokapur
- ii. 2 X 500 MVA 400/220 kV ICTs.
- iii. 2 X 125 Mvar bus reactors.

220 kV System:

- i. LILO of both circuits of existing Gadag-Bagalkot 220 kV D/C line at Lokapur.
- ii. LILO of both circuits of Mahalingpura-Soundatti 220 kV D/C line at Lokapur.
- iii. Mughalkod.- Lokapur/Bagalkot 220 kV D/c Line.

The study result shows that power flows from Narendra (New) dispersed towards Kolhapur (PG). The congestion /transmission constraint observed in the system beyond Kolhapur (MSETCL) and Kolhapur (MSETCL) – Karad 400kV D/c line gets overloaded. Accordingly, it was decided to review the transmission system for Lokapur Wind Energy zone along with Koppal Wind Energy Zone seeking connectivity at ISTS.

C. Providing additional feed to 400/220 kV Dhoni sub-station by LILO of existing Narendra – Davanagere 400 kV Twin Moose D/C line at Dhoni.

The system study shows that additional feed to 400/220 kV Dhoni sub-station by LILO of existing Narendra – Davanagere 400 kV D/C line (with twin moose ACSR conductor) at Dhoni does not provide any additional benefit and hence, LILO of above line at Dhoni was not agreed.

D. Establishment of 2x100 MVA, 220/110 kV sub-station at Ron (New), Gadag District

220 kV System:

- i. Doni- Ron 220kV D/C line.
- ii. 2 X 100 MVA, 220/110 kV ICTs.

110 kV System:

- i. LILO of both circuits of existing Ron-Gajendragad 110 kV D/C line at Ron (New).
- ii. 110 kV LILO of DC line between Gadag and 110 kV Ron to proposed 220 kV Ron. (Existing SC line via Naregal and proposed ongoing 2nd circuit directly to 110 kV Ron).

E. Establishment of 2x100 MVA, 220/110 kV sub-station at Savalgi, Bagalkot District

220 kV System:

- i. LILO of both circuits of Kudgi-Vajramatti 220 kV D/C line at Savalgi.
- ii. 2x100 MVA, 220/110 kV transformers.

110 kV System:

- i. LILO of existing Todalbagi-Mamadapura 110 kV S/C line at Savalgi.
- ii. LILO of existing Bableshtar-Mamadapura 110 kV S/C line at Savalgi.

F. Establishment of 2x100 MVA, 220/66 kV sub-station at Hanagal (New), Chitradurga District

220 kV Transmission scheme:

- i. Jagalur - Hanagal 220 kV D/C line.
- ii. 2 X 100 MVA, 220/66 kV ICT's.

66 kV System:

- i. LILO of existing Gudikote-Hangal 66 kV S/C line at Hangal (New).
- ii. LILO of both circuits of Hangal -Rampura 66 kV D/C line at Hangal (New).
- iii. Hangal - Konasagara 66 kV S/C line on D/c towers.

G. Establishment of 2x100 MVA, 220/66 kV sub-station at PD Kote (New), Chitradurga District

220 kV System:

- i. LILO of both circuits of Hiriyur-Gowribidanur 220 kV D/C line at P.D.Kote (New).
- ii. 2 X 100 MVA, 220/66 kV ICT's.

66 kV System:

- i. LILO of both circuits of Hariyabbe-P.Kote 66 kV D/C line at P. D Kote (New).

ii. LILO of Hiriyur-Kalmaranahalli 66 kV S/C line at P. D Kote (New).

H. LILO of 2nd circuit of the existing Mahalingpura - Kudachi 220 kV D/C line at Athani.

I. Conversion of existing Bidnal-Saundatti 220 kV S/C line and Saundatti -Mahalingpura 220kV S/C to 220 kV D/C line

J. Strengthening of Lingapura-Ittagi 220kV S/C line, Ittagi –Neelagunda 220kV S/C, Neelagunda –Guttur 220kV S/C line by replacing line with 220 kV D/C line (Twin Drake conductor).

In the joint study meeting, transmission system proposals of KPTCL mentioned at D to J found to be in order and agreed.

6.4 After, deliberations transmission system proposals of KPTCL mentioned at D to J were agreed for implementation as intra-state scheme.

6.5 Regarding transmission schemes proposed at A&B, it was decided that the proposal needs to be discussed again in detailed study considering the proposals for wind/solar energy zones power evacuation with CEA, CTU and SR states.

6.6 Transmission scheme mentioned at C was not agreed.

New Transmission planning proposals by Karnataka

7.0 Establishment of 1x500 MVA, 400/220 kV Substation at Arasapadavu

7.1 Representative of KPTCL proposed to establish 1x500 MVA, 400/220 kV substation at Arasapadavu, Dakshina Kannada district with LILO of both circuit of UPCL-Shantigrama 400kV D/C (Quad Moose line with LILO distance of about 11km). He stated that Arasapadavu is proposed to extend connectivity to proposed EHT load of M/S MRPL and it will take the load of 220kV MSEZ and Kavoor substations, resulting in reduction in the load on 2x315 MVA, 400/220kV UPCL transformer and 220kV UPCL-Kemar line. With the proposed system there will be considerable reduction in system loss.

7.2 Director, CEA stated that N-1 criteria would not be fulfilled in the proposed scheme with 1x500 MVA transformer for which provision for one more 500MVA transformer may be kept.

7.3 After deliberations, establishment of 400/220 kV substation at Arasapadavu was agreed for implementation as an intra state scheme by KPTCL with following interconnecting system:

i. 2 X 500 MVA, 400/220 kV ICT at Arasapadavu

- ii. LILO of both circuits of UPCL- Hebbanahalli 400 kV D/C line at 400/220kV Arasapadavu sub-station.
- iii. LILO of both circuits of MSEZ – Kemar 220kV D/C line at Arasapadavu.
- iv. 1x125 MVA, 400kV bus reactor at Arasapadavu sub-station

Transmission planning proposals by Tamil Nadu

8.0 Establishment of 400/230kV substation at Vadamadurai

- 8.1 Representative of TANTRANSCO stated that to avoid overloading of Sembatty-Checkanurani 230kV feeder and also to reduce the overloading of auto transformers at Renganathapuram 230 kV S/S Vadamadurai 400/230kV S/S has been envisaged. This substation will cater the loads of the existing Sembatty 230 kV SS and the proposed Thummakundu 230 kV SS, Vedasandur SS & Palani 230 kV SS in Madurai Region. The proposed substation will have the following connectivity:
 - i. 2x500 MVA 400/230 kV ICT at Vadamadurai
 - ii. 2x125 MVA, 400kV Bus Reactors at Vadamadurai
 - iii. LILO of Karaikudi-Pugalur 400 kV S/C line at Vadamadurai
 - iv. LILO of Thappagundu – Anaikadavu 400 kV S/C line at Vadamadurai
- 8.2 Director, CEA stated that from study results, it was observed that with the proposed system there is not much reduction in the loading of Sembatty-Checkanurani 230kV lines and the loading on auto transformers at Renganathapuram 230 kV SS increases.
- 8.3 Chief Engineer, CEA stated that any new substation should have adequate provision for future expansion to avoid creation of new substation due to non-availability of space. The proposal should be complete with details of connectivity at all voltage levels. The 230kV connectivity should be provided with the proposal to justify the requirement of above substation. He further said that as the implementation of any substation will take 3-4 years so study should be carried out for 2022-23 time frame.
- 8.4 After deliberations, it was decided that CEA, CTU and TANTRANSCO may jointly study the scheme. The recommendations would be discussed in next meeting of standing committee.

9.0 Establishment of 400/110 kV substation at Vishwanathapuram

- 9.1 TANTRANSCO informed that for reducing the overloading of auto transformers of the existing Hosur 230 kV SS and the upcoming Uddanapally 230 kV SS and also to reduce the loading of certain 110 kV lines in that area,

Vishwanathapuram 400/110kV S/S has been envisaged. The proposed 400/110 kV S/S will be an alternate source for the associated 110 kV S/S in the Hosur – Krishnagiri area which is an industrial area and further industrial expansion is expected by way of proposed establishment of SEZ in future. Ensuring reliability of source in this area will reduce power interruption and avoid major revenue loss.

- 9.2 Details of proposed scheme as follows:
- i. Establishment of Vishwanathapuram 400/110kV S/S with 3x200 MVA 400/110 kV ICT
 - ii. LILO of Thiruvalem-Palavady 400 kV S/C line at Vishwanathapuram (with quad moose ACSR conductor)
 - iii. PGCIL Hosur(Shoolagiri)- Vishwanathapuram 400kV S/C line
 - iv. 1x80 MVA, 400kV line reactor for Vishwanathapuram –Thiruvalem 400kV S/C line.
 - v. 1x125 MVA, 400kV Bus reactor
- 9.3 Director (PSPA-II) CEA enquired about the load and downstream connectivity of Vishwanathapuram. TANTRANSCO informed that there will be about 360MW demand by 2020-21 in and around Vishwanathapuram area and 9 nos. of 110kV links would be required from Vishwanathapuram to existing substations.
- 9.4 Director(PSPA-II) CEA stated that for 360 MW load, three circuits of 400kV (with quad Moose ACSR conductor) are not justified. LILO of Thiruvalem-Palavady 400 kV S/C line will be sufficient for the load. He further stated that as load in the area is growing, and TANTRANSCO have already planned for 9 nos. of 110kV links to existing substation and some 110kV line will get connected to 230/110kV S/S. He suggested that TANTRANSCO may plan for 230kV connectivity also keeping in view for future expansion.
- 9.5 After deliberations, it was decided that CEA, CTU and TANTRANSCO may jointly study the scheme. The recommendations would be discussed in next meeting of standing committee.

10.0 Modification in approved 400/230-110 kV substation at Sholingur

- 10.1 Representative of TANTRANSCO informed that Sholingur has been already approved in the 37th meeting of the Standing Committee on Power System Planning of Southern Region held on 31st July 2014, with the following scheme:

- i) 2x315 MVA 400/230 kV ICTs and 2x200MVA 400/110 kV ICTs at Sholingur
 - ii) LILO of Sriperumbudur – Tiruvalam 400 kV S/C PGCIL line.
- 10.2 TANTRANSCO stated that as Shilongur is an Intrastate substation and proposed for change connectivity by LILO of Thiruvalam –Alamathy 400kV D/C intra state line Sholingur. Further, he proposed for enhancement in ICT capacity.
- 10.3 After deliberations, following revised scheme of 400/230-110 kV substation at Sholingur was agreed:
- i) LILO of both circuits of Thiruvalam –Alamathy 400kV D/C line at Sholingur
 - ii) 400/230 kV, 2x500 MVA ICT
 - iii) 400/110kV,3x200 MVA ICT
 - iv) 2x125 MVAr, 400kV Bus reactor

11.0 Revised Scheme for power evacuation scheme proposed for Udangudi TPP stage -1 2x660 MW

- 11.1 Representative of TANTRANSCO informed that the power evacuation system for the proposed state owned Udangudi power project (Stage —I)- 2X660 MW was approved in the 37th meeting of Standing on Power System Planning of Southern Region with associated transmission schemes as below:
- i. Udangudi –Kayathar 400kV D/C (Quad Moose).
 - ii. Udangudi-Samugarengapuram 400kV D/C line (Quad Moose).
 - iii. Udangudi- Ottapidaram 400kV D/C (Quad Moose).
- 11.2 He stated that considering pace of capacity addition of solar power over and above the already proposed wind generation in Kayathar-Tirunelveli necessitated to revisit the associated transmission schemes of Udangudi 2x660 MW power project. They had carried out load flow study for 2022-23-time frame and it was observed that due to pooling of thermal as well as renewable Energy generation at Kayathar 400 kV S/S, Kayathar-Kanarpatty 400 kV D/C line and Kanarpatty-Tirunelveli (Abhisekapatty) 400 kV lines are found to be overloaded. To mitigate this, the Udangudi power plant is connected to Virudhunagar 765/400 V S/S instead of Kayathar 400 kV S/S.
- 11.3 Director, CEA enquired that whether proposed 400kV Udangudi – Virudhunagar line would be a new line. TANTRANSCO clarified that 400kV Udangudi –Kayathar D/C line and 400kV Kaythar – Virudhunagar D/C lines

would be bypassed at Kaythar making 400kV Udangudi – Virudhunagar D/C direct line.

- 11.4 After deliberations, following revised ATS for the proposed thermal power plant at Udangudi (2x 660 MW) Stage-I was agreed:
- i. 400kV Udangudi – Virudhunagar 765/400 V S/S D/C line (with Quad Moose ACSR conductor).
 - ii. 400kV Udangudi-Samugarengapuram 400kV D/C line (with Quad Moose ACSR conductor).
 - iii. 400kV Udangudi- Ottapidaram D/C line (with Quad Moose ACSR conductor).

- 11.5 Further, it was agreed that Virudhnagar – Kayathar 400kV D/C line agreed in 42nd meeting of SCPSPSR and Udangudi – Kayathar 400kV D/C line would be modified (bypassing Kayathar) so as to make Udangudi – Virudhunagar 400kV D/C direct line.

12.0 Enhancement of 400/230 kV ICT capacity from 3 X 315 MVA to 3 X 500 MVA at the existing Sriperumbudur 400/230-110kV S/S

- 12.1 Representative of TANTRANSCO informed that combined Interconnecting transformer capacity at Sriperumbudur 400/230-110 kV S/S is 1345 MVA with 3 nos. of 400/230 kV, 315 MVA ICTs and 2 nos. 400/110 kV, 200 MVA ICTs. Further, he informed that the peak reached in the ICTs at Sriperumbudur 400/230-110 kV SS are as follows.

315 MVA, 400/230 kV ICT - 1 -	282 MVA
315 MVA, 400/230 kV ICT - 2 -	282 MVA
315 MVA, 400/230 kV ICT - 3 -	282 MVA
200 MVA, 400/110 kV ICT - 4 -	179 MVA
200 MVA, 400/110 kV ICT - 5 -	179 MVA

- 12.2 He added that sustained peak value of 3 nos. 315 MVA ICT is 756 MVA which is 80 % of its full load capacity. The ICT – 1 could not be loaded upto its full capacity due to internal technical problem. Hence ICT-1 and ICT 2 & 3 are in service with split bus arrangement. However, the sustained load in each ICTs is 250 MVA and are loaded upto 80% each at present.

- 12.3 In order to accommodate all the existing & future load demands, TANTRANSCO proposed to enhance 400/230 kV ICT from 3 X 315 MVA to 3 X 500 MVA at Sriperumbudur 400/230-110 kV SS. TANTRANSCO stated that space for erection of 400/230 kV, 500 MVA ICT is also available at Sriperumbudur 400/230-110 kV SS and proposed to implement new bay for 400/230kV, 500 MVA ICT and than replace 315 MVA ICT one by one .

- 12.4 After deliberations, members agreed with the proposal of TANTRANSCO.

13.0 Provision of 400 kV power evacuation scheme – Contingency arrangement for power evacuation of NCTPS Stage – III (1 X 800 MW)

13.1 TANTRANSCO informed that the erection works of North Chennai Stage – III (1 x 800 MW) Super Critical Thermal Power Project (NCTPS) are under progress and it will be ready for commissioning by August 2019. For evacuation of power from NCTPS Stage –III, the erection works for the following schemes are under progress :

- i. North Chennai 765/400 kV pooling station.
- ii. Ariyalur 765/400 kV substation.
- iii. North Chennai Pooling station - Ariyalur , 765 D/C line
- iv. NCTPS Stage III - North Chennai PS 765 kV D/C line.

13.2 TANTRANSCO stated that commissioning of Ariyalur 765/400 kV S/S and 765 kV D/C line from North Chennai 765/400 kV Pooling station to Ariyalur 765/400 kV S/S is delayed. Accordingly, following contingency measure has been proposed by them to evacuate the power from North Chennai Stage – III (1 X 800 MW) Super Critical Thermal Power Station:

- i) LILO of Manali – Alamathy 400 kV line at North Chennai 765/400 kV Pooling station.
- ii) This LILO arrangement would be made by utilizing a portion of 765 kV North Chennai PS – Ariyalur D/C line.

13.3 After deliberations, members agreed to the contingency arrangement for power evacuation of NCTPS Stage – III (1 X 800 MW) proposed by TANTRANSCO at para no. 13.2.

14.0 Proposal for the establishment of 400 kV Substation at Cuddalore instead of at Neyveli

14.1 Establishment of Neyveli 400/230 kV substation by upgradation of the Neyveli (TNEB) 230 kV S/S was approved in the 41st meeting of the Standing Committee on Power System Planning for Southern Region. The approved connectivity for the establishment of Neyveli 400/230 kV (TNEB) substation is as follows:

- i. New Neyveli Thermal power station - Neyveli (TNEB) 400 kV D/C Link.
- ii. Manalmedu- Neyveli (TNEB) 400 kV D/C Link.
- iii. 2 x 500 MVA, 400/230 kV ICTs
- iv. 2 X 125 MVAr bus Reactors

- 14.2 In the 42nd meeting of Standing Committee on Power System Planning for Southern Region, certain re-arrangement in the existing transmission system was agreed to control high short circuit fault level in Neyveli Generation complex. Due to this rearrangement, the already approved 400kV connectivity for Neyveli 400/230kV SS was modified as below.
“Modification in Neyveli(TNEB) – NNTPS 400 kV D/C line (agreed in 41st SCPSPSR) as Neyveli(TNEB) – Neyveli TS-II 400 kV D/C line with high capacity conductors (to be constructed by TANTRANSCO) “
- 14.3 TANTRANSCO, citing constraint in acquiring the land for the establishment of 400kV S/S at Neyveli, proposed establishment of 400/230-110 kV substation by upgradation of the existing Cuddalore 230 /110 kV substation instead of the already approved Neyveli 400/230 kV substation with following connectivity:
- i. Neyveli TS-II – Cuddalore 400 kV D/C Line.
 - ii. Manalmedu - Cuddalore 400 kV D/C Line.
 - iii. 2 x500 MVA, 400/230 kV ICTs
 - iv. 2x200 MVA, 400/110 kV ICTs
 - v. 2 X 125 MVA, 400kV bus Reactors
- 14.4 Director, CEA stated that in this case only substation location has been shifted but there is no change in electrical connectivity. Accordingly, there would not be any change in system conditions in the study time frame.
- 14.5 Representative of CTU requested TANTRANSCO to keep future space provision for two no. of 400kV bays for Neyveli TPS-II 2nd expn connectivity.
- 14.6 After deliberations, proposal of TANTRANSCO was agreed. TANTRANSCO have also to keep space provision for 2 nos. of 400kV bays at Cuddalore.

Transmission planning proposals by Andhra Pradesh

15.0 Proposal for erection of 220/33 kV Substation at Chinturu

- 15.1 Representative of APTRANSCO informed Kunavaram and Nellipaka Mandals of Andhra Pradesh are declared as submerged mandals under Polavaram Project and the loads of the said two Mandals will be shifted to Chinuturu due to relocation of villages, when the Polavaram Project is completed.
- 15.2 He further informed that presently, area is being fed from existing 132/33 substation at Yetapaka (Telangana State control). But the 33kV feeders from 132/33 kV S/S Yetapaka will submerge in the back waters of Polavaram Project. There is no other alternative supply available for 05 No's 33/11kV substations in this situation.

- 15.3 In view of this APTRANSCO proposed establishment of 220/33 kV Chinturu S/S with following connectivity:
- i) LILO of existing KTS - Lower Sileru -II 220 kV line at 220/33 kV Chinturu S/S(5 KM approx.).
- 15.4 After deliberations, the proposal of APTRANSCO was agreed. APTRANSCO have to include transformation capacity and connectivity at 220kV & 33kV level in the proposal.
- 16.0 Proposal for Revival of abandoned 220kV D/C line from Lower Sileru-Bommuru in East Godavari District.**
- 16.1 Representative of APTRANSCO informed that Lower Sileru Hydro Electric Scheme (LSPH, USPH & DCPH), is producing power by utilizing the water of Sileru river, which is available almost throughout the year and meeting the energy requirements of Andhra Pradesh State. Total Power being produced from Lower Sileru Power House is 460 MW (4x115 MW). The following connectivity exists with Lower Sileru Power House for evacuating power
- i) Lower Sileru -Bommuru 220 kV S/C Line
 - ii) Lower Siler- Donkaraya 220 kV S/C Line.
 - iii) Lower Sileru - Kothagudem I&II 220kV Lines under the owner ship of APTRANSCO & TSTRANSCO
 - iv) Lower Sileru - Barsoor I&II 220kV Lines under the owner ship of APTRANSCO & CSPTCL (Chhattisgarh).
Barsoor I & II feeders between Andhra Pradesh and Chhattisgarh are not being used since long time.
- 16.2 Total Power being produced from Upper Sileru Power House is 240 MW (4x60 MW). The following feeders are connected with Upper Sileru Power House.
- i) Upper Sileru - Donkaraya 220 kV S/C Line.
 - ii) Upper Sileru - Pendurthy 220 kV S/C Line.
 - iii) Upper Sileru - Balimela 220 kV S/C Line under the ownership of APTRANSCO and OPTCL (Odisha).
 - iv) Upper Sileru - Balimela 220 kV line is under standby mode.
- 16.3 Total Power being produced from Donkaraya Canal Power House is 25 (1x25 MW) The following connectivity exists with Donkaraya anal Power House,
- i) Donkaraya - Upper Sileru 220 kV S/C Line.
 - ii) Donkaraya - Lower Sileru 220 kV S/C Line.
- 16.4 Presently, the Power generated in the LSHES is being evacuated mainly through Lower Sileru - Bommuru (220 kV S/C line), Lower Sileru - Kothagudem I &II 220 kV lines and Upper_Sileru – Pendurthy 220 kV S/C line. The maximum Power evacuation capability of each line is around 180 M W.

- 16.5 Further, 220kV Lower Sileru –Kothagudem I&II line maintenance is to be attended by APTRANSCO and TSTRANSCO based on the state boundaries. Due to involvement of two agencies and line passing through deep forest, the restoration of the faults in the feeders are taking more time. Also, KTPS being a strong generating source, evacuating power over KTPS is becoming difficult, especially during peak hours, Power from KTPS being flown to Bommuru and Pendurthy feeders and making the lines overloaded. 220kV Lower Sileru-Bommuru S/C line is getting overloaded when the generation at Sileru basin exceeds 450 to 500 MW. Due to which full generation potential (730 MW) has not been utilized.
- 16.6 He further informed that there is a proposal for erection of two more new generating units of capacity 2x115 MW at Lower Sileru The loading on 220 kV Lower Sileru – Bommuru and 220 kV Upper Sileru – Pendurthy is very high if total power is to be evacuated from Lower Sileru Hydro Electric project.
- 16.7 Accordingly, APTRANSCO proposed for revival of abandoned 220 kV D/C Line from Lower Sileru to Bommuru for evacuating total power. On query regarding status of line, APTRANSCO has informed that some towers are already erected.
- 16.8 After deliberations, the proposal of APTRANSCO was agreed.
- 17.0 Creation of 220 kV level in the 400 kV GVK Power Plant and creation of 220 kV level at 400 kV Polavaram HEP in East Godavari district to extend power supply to the proposed 220/132/33 kV Ramachandrapuram S/S.**
- 17.1 Representative of APTRANSCO informed that following dedicated Transmission Scheme for evacuation of 960 MW (12 x 80 MW) power from Polavaram Hydro Electric Project (PHEP) of APGENCO in East Godavari district was agreed in 42nd meeting of SCPSPSR.
- i. KV Kota – PHEP 400kV D/C line (with quad Moose ACSR conductor) – 79km.
 - ii. 2 x 125 MVA, 400kV bus Reactor at Polavaram Hydro Electric Project.
- 17.2 APTRANSCO further proposed following 220 kV downstream evacuation system from 400 kV Polavaram Hydro Electric project and GVK power plant by providing 2x 500 MVA, 400/220kV at each location to overcome the overloading conditions in and around Ramachandra Puram area.
- i. 2 x 500 MVA, 400/220kV ICTs at PHEP.
 - ii. Polavaram- Pattiseema 220kV D/C line (Twin Moose ACSR,16 KM approx.)
 - iii. LILO of both circuits of Polavaram - Pattiseema 220kV D/C line at Purushothapatnam S/S (I KM approx.).

- iv. LILO of the both existing circuits of the Yemagiri - Samalkot 220 kV D/C line at Jegurupadu S/S (1 KM approx.)
 - v. 2x500 MVA, 400/220kV ICTs at GVK-2 Power Plant
 - vi. 2 x 100 MVA, 220/132 kV ICTs at Ramachandrapuram S/S
 - vii. GCK-2 Power Plant –Ramachandrapuram 220kV D/C line (single moose ACSR conductor - 25km)
 - viii. LILO of existing 132 kV RC Puram- Kakinada 132 kV D/C line at proposed at RC Puram - 0 .5 KM approx
 - ix. LILO of existing 132 kV RC Puram - Editha at proposed 220/132 kV S/S at RC Puram - 1 KM approx.
 - x. LILO of existing 132 kV RC Puram - Kothapeta at proposed 220/132 kV SS at RC Puram - 6 KM approx.
 - xi. Gollapalem - RC Puram 132 kV D/C line (18 KM approx.).
- 17.3 Member (PS), CEA advised that consolidated proposal should be proposed in Standing Committee.
- 17.4 After deliberations, scheme proposed by APTRANSCO at para no. 17.2 was agreed for implementation as an intra state system along with elements agreed in 42nd meeting of SCPSPSR..

18.0 Augmentation of ICT capacity from 2 x 315 MVA to 2 x 315 MVA + 1 x 500 MVA ICTs at Maradam (Garividi) 400/230kV S/S.

- 18.1 Representative of APTRANSCO informed that to meet the load demand and reliability at the Garividi area, APTRANSCO has proposed augmentation of ICT capacity from 2 x 315 MVA to 2 x 315 MV A + 1x 500 MVA ICTs at 400/220 kV Maradam (Garividi) S/S
- 18.2 After deliberations, proposal of APTRANSCO was agreed.

Transmission planning proposals in Telangana

19.0 400/220kV Khammam (PGCIL) S/S- Augmentation of Power Transformer capacity from 2x315 MVA+1x500MVA

- 19.1 Representative of the CTU informed that additional 500MVA ICT at Khammam had already been charged.
- 19.2 Members noted the same.

20.0 Extension of HT supply at 220kV level to Central Power Research Institute, Hyderabad (CPRI)

- 20.1 Director (PSPA-II), CEA informed that, in the 42nd meeting of Standing committee on power system planning in southern region Extension of HT

supply at 220kV level to CPRI, Hyderabad was agreed with LILO of one circuit Ghanapur - Hayathnagar 220kV line at M/s. CPRI for online short circuit test facility.

- 20.2 Representative of the TSTRANSCO stated that due to RoW issue in the Hayathnagar area, connectivity to CPRI through LILO of one circuit Ghanapur - Hayathnagar 220kV line at CPRI would not be possible.
- 20.3 TSTRANSCO proposed revised connectivity to CPRI through 220kV D/C radial line from Ghanapur (approx. length 9km).
- 20.4 Director, CEA stated that he had discussion with CPRI and they are agreeable to the revised proposal.
- 20.5 After deliberations, proposal of TSTRANSCO for connecting CPRI's online short circuit test facility at Hyderabad through 220kV D/C line from Ghanapur was agreed.

21.0 Construction of 400/220/132kV Substation at KTPP switchyard

21.1 Representative of TSTRANSCO proposed establishment of 400/220/132 kV S/S at KTPP switchyard with following connectivity:

- a) 400/220kV 2X500MVA ICTs & 220/132kV 2x160MVA ICTs.
- b) LILO of existing Pulukurthy - Bhimghanapur 220kV S/C line at proposed KTPP S/S (with Twin Moose ACSR conductor)- 25kM.
- c) LILO of existing Salivagu- Bhimghanapur 220kV S/C line at proposed KTPP S/S (with Twin Moose ACSR conductor)- 25kM.
- d) KTPP S/S -Manthani SS 220kV D/C line (with Single Moose ACSR conductor)- 34kM.
- e) KTPP S/S -Chelpur S/S 132kV D/C line (with Single Moose ACSR conductor)- 2kM.
- f) Upgradation of existing Nagaram – Warangalline 220kV D/C line with HTLS conductor.
- g) Jangaon S/S - Devannapet LI S/S 220kV D/C line (with Single Moose ACSR conductor)- 55kM.

21.2 Further, following connectivity was dropped:

- a. 220/132kV Venkatapur S/S and 220kV S/C line on D/C towers (with ACSR Single Moose) from 400/220kV Oglapur (Warangal PGCIL) SS to 220/ 132kV Venkatapur SS (42 KM) in Jayashanker Bhupalapally District (agreed in 42nd Standing Committee meeting on Power System Planning of Southern Region)
- b. 220 kV D/C line (with Single Moose ACSR conductor) from 400/220KV Oglapur (Warangal PGCIL) 55 to 220/11kV Devannapet L1 55- 30KM

(agreed in 41st Standing Committee meeting on Power System Planning of Southern Region).

- 21.3 Member (PS), CEA stated that STUs should plan their system comprehensively. Revision in connectivity continuously is not advisable.
- 21.4 Representative of CTU, stated that after dropping Oglapur –Venkatapur 220kV S/C line and Oglapur –Devanapet 220kV D/C line, 220 kV bay space will be available for connectivity in future. CTU also advised that one 125 MVar, 400kV bus reactor may be planned at KTPP S/S.
- 21.5 After deliberations, proposal of TSTRANSCO mentioned at para no. 21.1 &21.2 along with one 125MVar, 400kV bus reactor at KTPP was agreed.

22.0 Ratification for already charged LILO of both circuits 400kV Gajwel-Shankarpalli line at 400kV Narasapur S/S

- 22.1 Representative of TSTRANSCO stated that 400kV Narsapur S/S was approved in the 35th meeting of SCPSPSR. However, the connectivity to 400kV Narsapur S/S was changed during the study of proposal for connectivity of Telangana STPP (2x800 MW).
- 22.2 He informed that LILO of one circuit 400kV Gajwel-Shankarpalli line at 400kV Narasapur S/S was charged on dated 01.03.2017 and LILO of second circuit 400kV Gajwel-Shankarpalli line at 400kV Narasapur S/S was charged on dated 15.06.2018.
- 22.3 Members (PS), CEA advised all constituents to put up the agenda in Standing Committee meeting in advance to avoid post facto approval.
- 22.4 Members noted the same.

23.0 Ratifications of ICT Capacities in earlier approved 400kV Substation

- 23.1 TSTRANSCO requested for ratification of ICT Capacities in following 400kV Substation (already approved in Standing Committee meetings) with 220kV down Stream connectivity.

S. No	Name of the Substation	SC PSP SR	ICT capacity in MVA	Remark
1	400/220kV Nirmal	38 th	3x315	Charged with SRLDC permission subject to ratification. Further evacuation power from

				proposed additional 1x800MW 3 rd unit instead of 1x600 MW. The existing evacuation scheme approved for 3x600MW is sufficient for 2x600+1x800MW.
2	400/220/11kV Yellampalli	41 st	4x315	Charged with SRLDC permission subject to ratification
3	400/220kV Ramadugu S/S	41 st	2x500	400kV S/S were approved with 220kV down Stream connectivity without mentioning ICT capacity
4	400/220kV Rayadurg	41 st	2x500	
5	400/220kVMalkara m	41 st	4x315	Augmentation of Power Transformer at existing 400/220/132kV with 400/220kV 500MVA transformer (4 th ICT) was approved in the 40 th Standing committee. Whereas erection of 315 MVA instead of earlier approved 500MVA is under progress

23.2 Members (PS), CEA advised all constituents to put up the agenda in Standing Committee meeting in advance to avoid post facto approval.

23.3 Members noted the same.

24.0 Connectivity Transmission system agreed in earlier Connectivity/LTA meetings of SR

24.1 Representative of CTU stated that following dedicated transmission system was agreed and granted for various IPPs in earlier Connectivity/LTA meetings of Southern Region.

Sl.	Applicant	Location	Connectivity granted (MW)	Start Date as per application	Connectivity transmission system
1.	Samalkot power Limited – Gas	East Godavari, Andhra Pradesh	2214	Feb, 2017	Samalkot – Vemagiri-II (PG) 400 kV D/c Quad line along with bays at both ends
2.	Regen Wind Farm (Vagarami) Pvt. Ltd	Dindigul, Tamil Nadu	600	14 th March 2016	Regen PS – Pugalur 230 kV D/c (Twin Moose) line along with bays at both ends
3.	Renew Power Ventures Pvt. Ltd.	Karur, Tamil Nadu,	400	31 st March 2018	Renew Power Ventures Pvt. Ltd–Pugalur 230kV D/c line along with bays at Pugalur & generation switchyard

Upon notification of the Detailed Procedure for Grant of connectivity to projects based on renewable sources to ISTS on 15.05.2018 in the Petition No. 145/MP/2017 by CERC, the IPPs from Sl.No. 2-3 are deemed Stage-II grantees.

24.2 Further, the following dedicated transmission system for grant of Stage-II connectivity was agreed in the 24th Connectivity / LTA meeting of SR held on 11.07.2018.

Sl. No	Application No.	Applicant	Location	Date of Application	Quantum of Stage-I Sought / Granted (MW)	Stage-II Connectivity Sought (MW)	Start Date of Stage-II connectivity	Proposed location for Grant of Stage-II Connectivity	Dedicated Tr. System
Connectivity applications near Tirunelveli									
1.	1200001274	Orange Sironj Wind Power Pvt. Ltd.	Tuticorin, Tamil Nadu	25.05.2018	200	200	10.02.2019	Tuticorin-II GIS PS (erstwhile Tirunelveli GIS PS)	Orange Sironj – Tuticorin-II 230kV S/c line along with terminal bays at Tuticorin-II GIS & generation switchyard
2.	1200001366	Green Infra Renewable Energy Limited	Tuticorin, Tamil Nadu	04.06.2018	249.9	249.9	31.07.2018		Green Infra Renewable – Tuticorin-II 230kV S/c line along with terminal bays at Tuticorin-II GIS & generation switchyard

3.	1200 0014 18	Betam Wind Energy Private Limited	Tuticorin , Tamil Nadu	12.06 .2018	250.2	50.2	31.07. 2019		Betam Wind Energy – Tuticorin-II 230kV S/c line along with terminal bays at Tuticorin-II & generation switchyard
4.	1200 0014 35	Betam Wind Energy Private Limited	Tuticorin , Tamil Nadu	12.06 .2018		200	31.07. 2019		
Connectivity applications near Palakkad									
5.	12000 01447	Mytrah Energy (India) Private Limited	Coimb atore, Tamil Nadu	19.06. 2018	300	300	31.03. 2020	Palakkad (Existing)	Mytrah Energy – Palakkad 220kV S/c line along with terminal bays at Palakkad & generation switchyard
Connectivity applications near Pugalur									
6.	12000 01434	Sprng Renewabl e Energy Private Limited	Tirupur, Tamil Nadu	15.06. 2018	300	300	31.10. 2019	Pugalur (Existing)	Sprng Renewable – Pugalur 230kV S/c line along with terminal bays at Pugalur & generation switchyard

24.3 The details of LTA granted in 24th Connectivity / LTA meeting of SR held on 11.07.2018 are given below.

Sl.	Applicant	LTA quantum (MW)	Beneficiaries (MW)	Date of start of LTA
1.	Orange Sironj Wind Power Pvt. Ltd.	200	NR-100 MW + ER-100 MW,	22.02.2019
2.	Mytrah Energy India Pvt. Ltd.	175	ER-100 MW + NER-50 MW + NR-25 MW	50 MW – 30.09.2018 125 MW – 01.12.2018
3.	Green Infra Renewable Energy Ltd.	249.9	NR-149.9 MW + ER-100 MW	31.10.2018

24.4 The details of Stage-I connectivity granted to various IPPs in the 23rd & 24th Connectivity/LTA meetings of Southern Region were provided at Annexure-XIV of the Agenda.

24.5 Members noted the same.

25.0 Operational Feedback from POSOCO

25.1 Transmission Constraints:

i) 400kV Nellore Pooling Station- Nellore D/C line:

SRLDC informed that with full generation at SEPL (600W), MEPL (300 MW), SGPL (1320 MW) & SEIL (1320 MW), the 400kV Nellore PS-Nellore 400kV D/C line flow is usually on higher side and may violate the N-1 contingency criteria. The flow on these lines are expected to further increase with the commissioning of MEPL Stage-2 Units. In the 42nd Standing committee meeting, the re-arrangement to bypass 400kV Nellore PS – Nellore D/C at Nellore (PG) for making 400kV Nellore PS – Thiruvallam D/C to control line loading and also to control the short circuit levels of existing Nellore substation has been agreed. It is requested to expedite the commissioning of bypassing arrangement for establishment of Nellore PS – Thiruvallam 400kV quad D/C line.

ii) 400kV Hiriyur-Nelamangala DC line:

SRLDC informed that 400kV Hiriyur-Nelamangala D/C line is being loaded heavily during Peak wind period and During Full Generation of YTPS, BTPS, RTPS and Jindal in Karnataka area. SRLDC requested KPTCL to expedite the implementation of Transmission system planned for Evacuation of YTPS generation.

iii) 400kV Gooty- Nelamangala line & 400kV Gooty- Somanahalli line:

SRLDC informed that 400kV Gooty- Nelamangala line & 400kV Gooty-Somanahalli line flows are high due to non-commissioning of Yelhanka and Tumkur downstream. Loading on these lines have been partially relieved after 400kV Tumkur-Bidadi D/C line. KPTCL may expedite the implementation of Downstream network of Yelahanka SS and Tumkur SS

iv) 400kV Udumalpet-Palakkad DC line

SRLDC informed that 400kV Udumalpet-Palakkad D/C line flow is high and it is limiting constraint for S3 TTC. POWERGRID may expedite the commissioning 400kV Edamon-Cochin D/C line for relieving the constraints.

v) 220 kV Bangalore Metro Network:

220 kV Metro networks (Bangalore Urban area) are now operating in radial mode to prevent overloading of lines. The operation in radial mode decreases the reliability of supply. KPTCL has to strengthen the 220kV Network in Bangalore metro area to meet future loads

vi) Constraints in Nagjheri PH evacuation:

220kV Nagjheri – Ambewadi DC line, 220kV Ambewadi – Narendra D/C line, 220kV Kaiga – Kodalally S/C & 220kV Kadra – Kodalally S/C lines are severely over-loaded during full generation at Nagjheri PH. The committee recommended for Re-conductoring of the above lines with HTLS conductor.

vii) Overloading of 220 kV Shoolagiri- Hosur(TN)- Yerrandahalli –Somanahalli S/C line

TANTRANSCO informed that 230kV Shoolagiri-Hosur 2nd Circuit is under tendering stage and they will expedite for early commissioning.

viii) Constraints 220 kV Hyderabad Metro Network: 220kV Shankarpally – Gachibowli D/C line & 220kV Malkaram – Shapur Nagar D/C line are heavily loaded without N-1 security. TSTRANSCO informed that they are in the process of re-conductoring the highly loaded corridors.

25.2 **ICT Constraints:**

i) 400/220kV 2x315MVA ICTs at Gazuwaka SS:

CTU representative informed that the augmentation of 3rd ICT of 500 MVA has already been agreed in the 41st Standing Committee meeting and the implementation of the same has been entrusted to POWERGRID in the 2nd Empowered Committee on Transmission held in Aug, 2018. It was also informed that the award activities of the same are under progress.

ii) 400/220kV 3x315 MVA ICTs at Vemagiri SS:

APTRANSCO has to look into the matter and may plan for addition of ICTs.

iii) 400/220kV 3x500 MVA ICTs at Nelamangala SS, Somanahalli SS and Hoody SS:

KPTCL was requested to expedite implementation of 220kV evacuation/ transmission lines from 400/220kV Tumkur (Vasantnarsapur), 400/220kV

Yelahanka and 400/220kV Bidadi to relieve transformer loadings at Nelamangala SS, Somanahalli SS and Hoody SS

iv) 400/220kV 3x315 MVA ICTs at Shankarapalli SS:

TSTRANSCO informed that 4th ICT of 500 MVA at Shankarapalli SS is agreed in 41st Standing committee meeting and is at advanced stage of implementation.

v) 400/230kV 2X315MVA ICTs at Thiruvallam SS:

TANTRANSCO informed that 3rd ICT of 500MVA has already been agreed in 42nd meeting of Standing committee and the implementation activities are in progress.

vi) 400/220 kV 2X315 MVA ICTs at UPCL:

KPTCL informed that the proposal for establishment of 400/220kV substation at Arasapadavu put-up for discussion in the meeting, which shall also relieve the constraints at UPCL.

26.0 Non- operationalization of part LTA/LTA

26.1 Member Secretary, SRPC stated that the matter regarding sharing of ISTS Transmission charges was discussed in the 34th Meeting of SRPC held on 11th August, 2018. TANGEDCO had raised certain issues on this subject. After deliberations in the SRPC Meeting, it was agreed to conduct a Special Meeting to discuss various issues. Accordingly, a special Meeting on the matter was therefore held on 31st August, 2018 at Hyderabad. The main issues for discussion were associated with sharing of transmission charges by IPPs for whom LTA is granted by CTU and recovery of transmission charges on account of delay in SPDs commissioning in respect of ultra mega solar project at NP Kunta, Ananthapuramu District, Andhra Pradesh. In the case of Kudgi, it was seen that LTA had been operationalised from 1st August, 2017. However, the identified transmission elements were in place by September 2016. It was not understood why the LTA operationalization had not been carried out during September 2016 itself.

26.2 In the Special Meeting it was agreed by CTU that they would carry out studies for part/full operationalization of LTA in respect of NP Kunta and the process would be expedited. In the Special Meeting, CTU had also stated that as regards part operationalization of LTA, they need to approach the Standing Committee on Transmission. Constituents had expressed that consequence of non operationalization of LTA had financial impact on other DICs, in the POC regime. They had felt that there needs to be a stream lined system in place for operationalization of part LTA, without need to approach

the Standing Committee on Transmission on every occasion. Hence the criteria for operationalization of LTA/Part LTA may be deliberated in this Meeting

- 26.3 The committee opined that CTU shall operationalize the LTA for part or full quantum depending on the commissioning of the transmission system based upon the system studies and in accordance with the applicable CERC Regulations.
- 26.4 After deliberations, it was agreed that in future, CTU would conduct system studies and shall operationalize full or part LTA as per relevant CERC Regulations/detailed procedures without bringing the proposal before the Standing Committee on Transmission. CTU may however, consult CEA before such operationalization.

27.0 Phase-II Solar & Wind Energy Zone Transmission Schemes

- 27.1 CTU stated that Solar energy zones (SEZ) in various districts of six (6) RE rich states were identified by SECI in association with MNRE for 50 GW quantum. The information was finalized by SECI in consultation with Solar Power developers & MNRE.

Details of prioritized SEZs (50,000 MW) in two phases i.e. 2020 & 2021 as under:

State/District	Taluk/Tehsil	Ph-1(GW)		Total
		2020	2021	
Andhra Pradesh				
Kurnool	Gooty	2.5	0	2.5
Ananthpuram	Urvakonda	0	2.5	2.5
Subtotal		2.5	2.5	5
Karnataka				
Gadag		0	2.5	2.5
Bidar		0	2.5	2.5
Subtotal		0	5	5
Total		2.5	7.5	10

- 27.2 Further, prioritized wind energy zones (WEZ), which may come up by 2022 in wind resource rich states were identified. Subsequently, based on bidding timeline, SECI provided phasing details of prioritized WEZs (16,500 MW) in two phases i.e. 2020 & 2021 as under:

State/District	Taluk/Tehsil	Ph-1 GW (2020)	Ph-2 GW (2021)	Total(GW)
Tamil Nadu				
Karur		1.5	1	2.5
Tirunelveli		-	0.5	0.5
Subtotal		1.5	1.5	3
Andhra Pradesh				
Kurnool		2	1	3
Subtotal		2	1	3
Karnataka				
Koppal		2.5	-	2.5
Subtotal		2.5	-	2.5
Total		6.0	2.5	8.5

27.3 CTU proposed following Comprehensive transmission system for Solar & Wind Energy Zones in phase-II as under:

A. Composite scheme for Solar & Wind Energy Zone in Andhra Pradesh(3500 MW)

a) Ananthpur +Kurnool REZ (3500MW:2500 MW Solar & 1000 MW Wind), AP

- i) Establishment of 765/400/220kV 3x1500 MVA, 7x500 MVA Pooling station at suitable border location between Anantapur & Kurnool Distt
- ii) LILO of Kurnool-III PS - Kurnool(new) 765 kV D/c Line at Anantapur PS
- iii) Anantapur PS-Pavagada(PG) 400 kV D/c Line(HTLS)
- iv) 220kV line bays for interconnection of wind/solar projects (12 nos)
- v) 1x330 MVAr (765kV) & 1x125MVAr (400kV) bus reactor at Anantapur PS

B. Solar Energy Zone in Karnataka (5000 MW)

(a) Gadag SEZ (2500 MW)

- i) Establishment of 400/220kV 5x500 MVA Gadag Pooling Station(with provisions to upgrade to 765 kV)
- ii) Gadag PS-Koppal PS 400kV D/c Line(HTLS)
- iii) LILO of Tumkur (Vasanthnarsapura)-Narendra (New) 765 kV D/c Line(Ch. At 400 kV) at Gadag PS
- iv) 220kV line bays for interconnection of solar projects (8 nos)
- v) 1x125MVAr (400kV) bus reactor at Gadag PS

(b) Bidar SEZ (2500 MW)

- i) Establishment of 400/220kV 5x500 MVA Bidar Pooling Station
- ii) Bidar PS- Nizamabad(PG) 400 kV D/c Line(HTLS)
- iii) Bidar PS-Gulbarga(KPTCL) 400 kV D/c Line(HTLS)
- iv) 220kV line bays for interconnection of solar projects (8 nos)
- v) 1x125MVAr (400kV) bus reactor at Gadag PS

27.4 After deliberations, it was decided that due to requirement of large scale integration of renewable generation in SR in AP (3500 MW) and Karnataka (5000 MW) as indicated above, detailed study considering the proposals of renewable rich states of SR and CTU need to be carried out for above proposed system. The results of the study would be discussed in joint study meeting.

28.0 Status of Implementation of downstream network by State utilities associated with ISTS substation of POWERGRID

28.1 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 of downstream 220kV system needs to be commissioned.

28.2 The status of downstream system as informed by respective states is as follows:

Sl. No.	Name of Substation	MVA Capacity	220kV Bays	Expected Schedule of Substation	Remarks	Deliberations in 1 st SRSCCT
1.	Tumkur (Vasantnarsapur)	2x500 MVA	6	Commissioned	Construction of downstream T/L for 6 Nos 220 kV bays to be expedited by KPTCL.	<ul style="list-style-type: none"> • 4 Nos 220kV downstream T/L i.e. 2 to Anthranasahalli & 2 to Madhugiri-II expected by Sep/Oct'18. • Balance 2 Nos downstream T/L yet to be taken up
2.	Yelahanka	2x500 MVA	10	Commissioned	Construction of downstream T/L for 10 Nos (6 bays under ISTS) 220 kV bays to be expedited by KPTCL.	<ul style="list-style-type: none"> • 2 Nos 220kV downstream T/L cable to Yelahanka DG plant expected by Sep/Oct'18. • Balance 4 Nos downstream T/L yet to be planned
3.	Bidadi	2x500 MVA	6	Commissioned	Construction of downstream T/L for 4 Nos 220 kV bays to be expedited by KPTCL.	<ul style="list-style-type: none"> • 2 Nos 220kV downstream T/L to Magadi expected by Mar'19. • 2 Nos 220kV downstream T/L to Kumbalgodu expected by Mar'20.
4.	Hiriyur	2x315 MVA	6	Commissioned	Construction of downstream T/L for 2 Nos 220 kV bays to be expedited by KPTCL.	<ul style="list-style-type: none"> • 2 Nos 220kV downstream T/L i.e. 1 to Hiriyur(KPTCL) & 1 to Chitradurga expected by Mar'19.

5.	Hassan	2x315 MVA	6	Commissioned	Construction of downstream T/L for 2 Nos 220 kV bays to be expedited by KPTCL.	• 2 Nos 220kV downstream T/L i.e. LILO of Hassan(KPTCL) – Nittur S/c expected by Mar'19.
6.	Kolar	2x500 MVA	6	Commissioned	Construction of downstream T/L for 2 Nos 220 kV bays to be expedited by KPTCL.	• 2 Nos 220kV downstream T/L to Gollahalli expected by Mar'19.
7.	Hosur	2x315 MVA	6	Commissioned	Construction of downstream T/L for 1 Nos 230 kV bays to be expedited by TANTRANSCO.	• 1 Nos 230kV downstream T/L to Shoolagiri expected by Jun'19.
8.	Kozhikode	2x315 + 1x500 MVA	4	Commissioned	Construction of downstream T/L for 1 Nos 220 kV bay to be expedited by KSEB.	• 1 Nos 220kV downstream T/L to Kozhikode(KSEB) expected by Mar'19.

Members noted the same.

Annex-I

List of participants in the 1st Meeting of SR Standing Committee on Transmission held on 7th September, 2018 at Chennai, Tamil Nadu

Sl. No.	Name	Designation
Central Electricity Authority		
1.	P.S. Mhaske	Member (PS) - In chair
2.	S K Ray Mohapatra	CE(PSPA-II)
3.	B.S. Bairwa	Director (PSPA-II)
4.	Kanchan Chauhan	Assistant Director
SRPC		
1.	S R Bhatt	Member Secretary
2.	Anil Thomas	Executive Engineer
POSOCO, NLDC		
1.	S R Narasimhan	ED NLDC
2.	N. Nallarasana,	DGM
CTU		
1.	Subir Sen	COO(CTU-Planning)
2.	Anil Kr Meena	CM(CTU-Plg.)
3..	M. Dhayalan	CM/POWERGRID
4.	Venkatesh Gorli	Sr. Engr(CTU-Plg) POWERGRID
9.	Ankush Patel	Sr. Engr(GM)
POSOCO/SRLDC		
2	Abraham Varghese	DGM
3	Madhukar G	Manager
NLC India Ltd		
1	J Dhamasekasan	DGM/Comm
2.	D.S. Ramakrishnan	ADGM
APTRANSCO		
2	Y Adam	Dir
4	Y.V. Ramakrishna	ADE, SS
5	K Ramesh	ADE/PS

Sl. No.	Name	Designation
	KSEB	
1.	Vijya Kumari P.	Director (Trans)
4.	Bijju SS	AEE,PSE
	TSTRANSCO	
1.	N. Bhaskar	CE/SLDC/TSTRANSCO
2.	M. Sheshagiri	DE/SSII/ TSTRANSCO
	TANTRANSCO/TANGEDCO	
1.	S.Shanmugam	Managing Director
2.	T. Senthilvelan	Director (Trans.)
3.	M. A. Helen,	Director, Projects
4.	R.S Usha	CE,Planning
5.	C Veeramani	CR/reg
6.	D. Ravichandran	SE, System studies
7.	M. Sudarsan	EE, System studies
8.	R.Kathiravan	AEE
9.	G. Ramesh Kumar	AEE, System Studies
	KPTCL	
1.	A P Shiva Kumar	Director(Trans.)/KPTLC
3	D Chethan	EE,PSS/KPTCK
4.	Divya Prabha H	AEE/PSS/KPTCL