

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

सं.: 51/4/(41वीं)/वि.प्र.यो.मू- 2/2017/1569-82

दिनांक: 06 दिसंबर, 2017

No.: 51/4/(41st)/PSPA-II/2017/1569-82

Dated: 06th December, 2017

सेवा में /To,

संलग्न सूची के अनुसार
As per list enclosed

विषय: दक्षिणी क्षेत्र के लिए विद्युत प्रणाली योजना पर स्थायी समिति की 41 वीं बैठक का कार्यवृत्त।

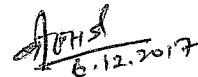
Subject: Minutes of 41st meeting of Standing Committee on Power System Planning for Southern Region.

महोदय(Sir)/महोदया(Madam),

दक्षिणी क्षेत्र के लिए विद्युत प्रणाली योजना पर स्थायी समिति की 41 वीं बैठक 22 सितंबर 2017 को चेन्नई (तमिलनाडु) में आयोजित की गई थी। इस बैठक के कार्यवृत्त की प्रति आपकी सूचना एवं आवश्यक कार्यवाही हेतु संलग्न है।

The 41st meeting of the Standing Committee on Power System Planning of Southern Region was held on 22nd September 2017 at Chennai (Tamilnadu). A copy of minutes of the meeting is enclosed for your information and necessary action.

भवदीय/Yours faithfully,



(बी.एस. बैरवा/B.S. Bairwa)

निदेशक/Director

Address List:

1.The Member Secretary, Southern Regional Power Committee, 29, Race Course Cross Road, Bangalore 560 009. FAX : 080-22259343	2.The Director (Projects), Power Grid Corp. of India Ltd. "Saudamini", Plot No.2, Sector-29, Gurgaon 122 001, Haryana. FAX : 95124-2571932
3. CEO, POSOCO, B-9, Qutub Institutional Area, Katwaria Sarai, New Delhi-110016	4. The Director (Transmission), Karnataka State Power Trans. Corp.Ltd., Cauvery Bhawan, Bangalore - 560 009. FAX : 080 -22228367
5.The Director (Transmission), Transmission Corp. of Andhra Pradesh Ltd., (APTRANSCO) Vidyut Soudha, Hyderabad – 500 082. FAX : 040-66665137	6. The Director (Grid Transmission and Management), Transmission Corp. of Telangana Ltd., (TSTRANSCO) Vidyut Soudha, Khairatabad Hyderabad – 500 082. FAX : 040-23321751
7.The Director (Trans. & System Op.), Kerala State Electricity Board, Vidyuthi Bhawanam, Pattom, Thiruvananthapuram - 695 004. FAX : 0471-2444738	8. Member (Distribution), Tamil Nadu electricity Board.(TNEB), 6 th Floor, Eastern Wing, 800 Anna Salai, Chennai - 600002. FAX : 044-28516362
9.The Director (Power), Corporate Office, Block – I, Neyveli Lignite Corp. Ltd., Neyveli, Tamil Nadu – 607 801. FAX : 04142-252650	10. The Superintending Engineer –I, First Floor, Electricity Department, Gingy Salai, Puducherry – 605 001. FAX : 0413-2334277/2331556
11. Director (Projects), National Thermal Power Corp. Ltd. (NTPC), NTPC Bhawan, Core-7, Scope Complex, Lodhi Road, New Delhi-110003. FAX-011-24360912	12. Director (Operations), NPCIL, 12 th Floor, Vikram Sarabhai Bhawan, Anushakti Nagar, Mumbai – 400 094. FAX : 022- 25991258

Copy to:

1.	COO(CTU-Plg), Power Grid Corp. of India Ltd. "Saudamini", Plot No.2, Sector-29, Gurgaon 122 001, Haryana. FAX : 95124-2571932	2. ED, SRLDC 29, Race Course Cross Road, Bangalore 560 009 FAX – 080-22268725
----	---	---

Minutes of 41st Meeting of the Standing Committee on Power System Planning in Southern Region (SCPSPSR) held on 22nd September, 2017 (Friday) at Chennai,

Member (PS) welcomed the participants and thanked CTU for hosting the meeting at Chennai. He stated that the transmission system is planned for meeting future load growth, evacuation of power from upcoming generating projects and improving the reliability and availability of transmission system with the objective to deliver uninterrupted and quality power to the consumer. He requested the committee members to have positive deliberations so that consensus could be reached on critical issues.

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

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

1.0 Confirmation of the minutes of 40th meeting of the Standing Committee

- 1.1 Director(PSPA-II) CEA stated that the minutes of 40th meeting of the Standing Committee on Power System Planning of Southern Region held on 19th November, 2016, were issued vide CEA's letter No. 51/4/(40th)/ PSPA-II 2016/ 92-103 dated 16th February 2017. Based on observations of APTRANSCO, the corrigendum was issued vide CEA's letter no. 51/4/(40th)/PSPA-II-2017/245-258 dated 17th March, 2017.
- 1.2 The minutes of 40th Standing Committee of Power System Planning of Southern Region along with the Corrigendum, as circulated were confirmed by the members.

Follow up issues of previous meetings of SCPSPSR

2.0 Temporary Rearrangement of 400 kV Vemagiri-I(AP)-Vemagiri-II(PG) D/C transmission line till the commissioning of "Strengthening of transmission system beyond Vemagiri" Scheme

- 2.1 Director (PSPA-II) CEA, informed that in the 39th Standing Committee Meeting PGCIL stated that in the absence of the transmission scheme covered under - "Strengthening of transmission system beyond Vemagiri" and with generation at East Coast, 400 kV Vemagiri-I(AP)-Vemagiri-II(PG) D/C line will be 'Limiting Constraint' and Total Transfer Capacity(TTC) for import of power to Southern Region gets adversely affected.
- 2.2 In the 39th SCM, to relieve overloading of Vemagiri-I(AP)-Vemagiri-II(PG), it was proposed that one circuit of Vemagiri(PG)-Vemagiri(AP) may be connected with KV Kota and other circuit may be connected to Vijayawada (PG). The issue was also discussed in the Joint Meeting of Southern Region held in Bangalore during 14-17 March, 2016 and in 40th Standing Committee meeting. However, the proposal was not agreed by APTRANSCO.

- 2.3 Director(PSPA-II) CEA, further informed that scheduled COD of transmission scheme covered under “Strengthening of transmission system beyond Vemagiri” transmission scheme is April 2019 and CTU had approached CEA for early commissioning of the scheme; therefore, the proposed rearrangement may remain in operation for a short period.
- 2.4 Representative of CTU informed that the overloading of Vemagiri-I(AP)-Vemagiri-II(PG) is primarily due to anticipated generation of East Coast(1200 MW) at Srikakulam. However, Commissioning of East Coast Generation at Srikakulam is delayed, hence the loading on Vemagiri-I(AP)-Vemagiri-II(PG) 400 kV D/c shall be within its thermal limits (under N-1 contingency) till East Coast Generation is commissioned.
- 2.5 After deliberations, it was agreed to drop the proposal of CTU for temporary Rearrangement of 400 kV Vemagiri-I(AP)-Vemagiri-II(PG) D/C transmission line.
- 2.6 Representative of CTU stated that as per the system studies, enhancement in TTC of about 300 MW between NEW-SR corridor is envisaged with the commissioning of transmission system covered under the scheme “Removal of 400 kV bay Constraints in Vemagiri” with limiting constraint as ICT (1500MVA) at 765/400 kV Vemagiri-II(PG) S/s under N-1 contingency.
- 2.7 Member Secretary(SRPC) informed that during meeting held at SRPC, Bengaluru on 01.09.2017, there was ambiguity regarding generation dispatches to be considered for calculation of TTC between NEW-SR corridor. Representative of SRLDC, POSOCO stated that the reason for ambiguity might be dispatch of more power than LTA/MTOA quantum granted to many generators.
- 2.8 Representative of CTU further stated that transmission system covered under the scheme - “Strengthening of transmission system beyond Vemagiri” is crucial for southern region and requested CEA to convene a meeting for early commissioning of the scheme with TSP.
- 2.9 After deliberations, members decided that the mismatch in studies should be resolved between CTU and POSOCO. In case the issue remains unresolved, a meeting can be held in CEA to finalize a common philosophy for studies. Further, it was agreed to hold a meeting in CEA for Early commissioning of transmission scheme covered under “Strengthening of Transmission system beyond Vemagiri” with CTU, LTTCs and the TSP.
- 3.0 Temporary arrangement at Bidadi GIS for connecting one circuit of 400kV Tumkur (Vasanthanarsapura)- Bidadi Quad D/C line with one circuit of 400kV Bidadi- Nelamangala D/C line.**
- 3.1 Director(PSPA-II) CEA stated that, in the 39th Standing committee meeting PGCIL had proposed the following arrangement for Bidadi GIS:
- a) For termination at Bidadi GIS, it is proposed to interconnect one circuit of Tumkur (Vasanthanarsapura)- Bidadi Quad line with one circuit of 400kV D/C

Bidadi- Nelamangala line and the remaining circuit from Tumkur (Vasanthanarsapura) will be terminated at Bidadi GIS utilizing the vacated bay.

- b) For termination at Tumkur (Vasanthanarsapura) S/S, available bays 400kV D/C Tumkur (Vasanthanarsapura)- Yelahanka line(as this line is stuck up in RoW issue) can be utilized for Tumkur (Vasanthanarsapura)- Bidadi Quad D/C line.

3.2 In the 40th GM(SR-II), Standing committee meeting POWERGRID informed that bays at Tumkur (Vasanthanarsapura) and Bidadi for Tumkur (Vasanthanarsapura) – Bidadi 400kV Quad D/C line would be ready by March, 2017 and this temporary arrangement would be restored after completion of the bays.

3.3 Representative of POWERGRID informed that 400 kV bays at Bidadi GIS and Tumkur for Tumkur (Vasanthanarsapura) – Bidadi 400 kV D/c(Quad) line were commissioned & the original arrangement was restored on 3rd April, 2017.

4.0 Edayarpalayam 400/230-110kV S/S under the scope of TANTRANSCO

4.1 Director(PSPA-II) CEA informed that in 38th SCSPSR, it was decided that establishment of Edayarpalayam 400/230-110 kV substation with 2x500MVA transformer and 2x125 MVA bus reactors will be in the scope of TANTRANSCO while Edayarpalayam – Myvady (Udumelpet) 400 kV D/C quad line will be in the scope of PGCIL. During 40th Standing Committee meeting TANTRANSCO requested for dropping /deleting “Edayarpalayam- Myvady 400 kV D/C quad line from the scope of PGCIL and instead of that Edayarpalayam – Anikadavu 400 kV D/C quad line shall be taken up by TANTRANSCO”. So that, the wind power generation injected in the Edayarpalayam 400kV S/S will be transmitted to the wind corridor of Thoppakundu- Anikadavu- Rasipalayam 400kV S/S.

4.2 Representative of TANTRANSCO had requested that the 400kV connectivity for the establishment of Edayarpalayam 400/230-110kV S/S may be revised as under:

Under PGCIL’s Scope

- i. PGCIL Myvadi –Edayarpalayam ,400kV D/C (Quad Conductor) line
- ii. Puglaur HVDC station- Edayarpalayam ,400kV D/ C (Quad Conductor) line

Under TANTRANSCO’s Scope

- i. LILO of Myvady- Anaikadavu 400kV S/C line at Edayarpalayam
- ii. 400kV D/C line from sanctioned Coimbatore 765/400kV S/S to Edayarpalayam
- iii. 3x315 MVA ,400/230kV ICTs instead of 2x500 MVA 400/230kV ICTs and 3x200 MVA, 400/110kV ICTs at Edayarpalayam

4.3 Representative of CTU stated that the proposed interconnection would result in there would be three circuits between Myvady and Edyarpalayam. But, considering load growth in Myvady and power flow in Edyarpalayam 400kV lines, one more circuit (3rd circuit) is not justified. CTU suggested that in place of proposed LILO arrangement, TANTRANSCO may explore possibility of interconnection between Anikadavu and Edyarpalayam substations.

- 4.4 Representative of POSOCO advised that reactive compensation is essential at substation linked with wind energy generation station and the reactor of adequate capacity should be provided. TANTRANSCO informed that reactors of 125MVAR each are being implemented at Anikadavu and Thappgundu substations.
- 4.5 Member (PS), CEA suggested that to take care of future load growth, transformers of 500 MVA capacity may be considered in place of 315MVA.
- 4.6 After deliberations, 400kV D/C line from sanctioned Coimbatore 765/400kV S/S to Edayarpalyam was agreed to be implemented by TANTRANSCO. However, the LILO of Myvady- Anaikadavu 400kV S/C line at Edayarpalyam was not agreed. It was decided that ICTs of 500MVA would be installed at Edayarpalyam in place of 315MVA. Further, TANTRANSCO was advised to carryout system studies to explore feasibility to connect Anikadavu and Edayarpalyam substations.

5.0 Transmission system for evacuation of power from Uppur TPS (2x800 MW) of TNEB in Tamil Nadu.

- 5.1 Director(PSPA-II) CEA informed that in the 40th meeting of SCSPSR, TANTRANSCO furnished the following Transmission system for evacuation of power from Uppur TPS (2x800 MW):

A. ATS for UPPUR – 2X800MW project:

- i) Uppur- Virudhunagar 765kV D/C line
- ii) 2X240MVAR, 765kV bus reactors at the Uppur 765kV switchyard.

B. Establishment of 765/400kV S/S in Virudhunagar (For Uppur ATS and Renewable Generation Pooling):

- i) 2X1500MVA, 765/400kV ICTs with the following 765kV and 400kV connectivity
- ii) 765kV Connectivity:
 - a) Virudhunagar- Coimbatore 765kV D/C line with 240MVAR, 765kV switchable line reactors at each line at both ends of each line.
 - b) Virudhunagar -Ariyalur 765 D/C line with 240MVAR, 765kV switchable line reactors at both ends of each line. The execution of line would be taken up with the Udangudi Thermal power projects (Stage II: 2X660MW & Stage III: 2X660MW).

iii) 400kV Connectivity:

- a) Virudhnagar- Kayathar 400kV D/C line (Quad Moose ACSR Conductor).
- b) Virudhnagar -Kamuthi 400kV D/C line (Quad Moose ACSR Conductor).
- c) Virudhnagar -Thappagundu 400kV D/C line (Twin Moose ACSR Conductor).

- 5.2 It was further informed that, a joint meeting of CEA, CTU and TANTRANSCO was held on 23.01.17 in CEA and system studies was carried out for 2020-21-time frame considering Tamil Nadu load as per draft 19th EPS. Different cases were also being studied to assess the impact of ± 800 kV Raigarh – Pugalur HVDC and Renewable Generation in Tamil Nadu. Study results indicate that Virudhnagar – Ariyalur 765 kV D/C line is not required for evacuation of 2 x 800 MW Generation at Uppur. It was also found that the proposed Transmission system will help in evacuation of Wind Generation in Virudhnagar/Kayathar area.
- 5.3 It was agreed that Virudhnagar – Ariyalur 765 kV D/C line may be dropped from the proposal. However, requirement of the said line may be reviewed after confirmation for implementation of Udangudi Generation Stage II & III (each 2 x 660 MW).
- 5.4 Representative of CTU stated that Virudhnagar- Coimbatore 765kV D/C is a long line and there would also be high injection of power from wind generations in nearby area of Virudhnagar. Therefore, line reactors of 240MVAR may not be adequate to meet the reactive compensation requirement.
- 5.5 After deliberations, members decided that joint study needs to be carried out with CEA to assess the reactive compensation requirement at both ends of proposed Coimbatore-Virudhnagar 765kV D/C line and the following system was agreed for evacuation of 2x 800 MW Generation at Uppur TPS (2x800 MW).
- A. ATS for UPPUR – 2X800MW project:
- i) Uppur- Virudhnagar 765kV D/C line
 - ii) 2X240MVAR, 765kV bus reactors at the Uppur 765kV switchyard.
- B. Establishment of 765/400kV S/S in Virudhnagar (For Uppur ATS and Renewable Generation Pooling):
- i) 2X1500MVA, 765/400kV ICTs with the following 765kV and 400kV connectivity
 - ii) 765kV Connectivity:
 - a) Virudhnagar- Coimbatore 765kV D/C line with adequate capacity of switchable line reactors at each line at both ends of each line.
 - b) The reactive compensation requirement (line and bus reactor) at both end would be studied jointly by CTU, TANTRANSCO and CEA
 - iii) 400kV Connectivity:
 - a) Virudhnagar- Kayathar 400kV D/C line (Quad Moose ACSR Conductor).
 - b) Virudhnagar -Kamuthi 400kV D/C line (Quad Moose ACSR Conductor).
 - c) Virudhnagar -Thappagundu 400kV D/C line (Quad Moose ACSR Conductor).

6.0 Power Evacuation scheme for SEPC-1X525 MW

- 6.1 Director (PSPA-II) CEA informed that, during the 38th meeting of SCPSPSR, power evacuation scheme of SEPC was discussed and it was decided that the transmission system agreed earlier for Udangudi (Stage I and II) generation project might be sufficient to evacuate power from Udangudi 2X660MW (Stage I) and SEPC (1X525 MW) generating station. In the joint meeting of CEA, CTU and TANTRANSCO on 23.01.17, study was carried out considering SEPC's generation and it was observed from results that there would be no problem for evacuation of power from SEPC's generating station.
- 6.2 Representative of TANTRANSCO stated that the establishment of Ottapidaram 400/230/110kV substation would take more than 2 years. However, SEPC would require start up power for its Auxiliaries by April 2018. The generating station is expected to be commissioned by October, 2018.
- 6.3 To meet the requirement of startup power for SEPC's power plant and initial evacuation of power, TANTRANSCO requested for revising the connectivity of SEPC's Power Plant (1X525 MW) with Thennampatty 400/230-110 kV Substation (in place of Ottapidaram 400/230/110 kV S/s) as temporary measure. The line length from SEPC's Power Plant -Thennampatty 400kV D/C will be approximately 70km and it would be constructed matching with the commissioning of SEPC – (1X525MW) Power Plant (April 2018). After commissioning the Ottapidaram 400kV substation, the above SEPC – Thennampatty 400kV D/C line would be made LILO at the Ottapidaram 400kV S/S thereby the original connectivity of SEPC Power Plant to Ottapidaram 400kV S/S (as approved in the Standing Committee) would be restored and the additional link line (approximately 40km) between Ottapidaram and Thennampatty 400kV substation which would be used for reliability purpose.
- 6.4 Representative of SRLDC, POSOCO stated that for drawl of startup power, there would not be any problem. However, in case of injection of power from SEPC generating station, there would be increase in injection at Tirunelveli and power flow would be towards Udumalpet and Udumalpet- Palakkad 400kV D/c line could be the limiting constraint.
- 6.5 After further discussion, the members agreed for the proposed interim arrangement connecting SEPC's Power Plant (1X525 MW) to Thennampatty 400/230/110 kV Substation) till commissioning of the Ottapidaram 400kV substation for drawl of startup power and initial evacuation of power. Further, it was decided that SEPC would back down generation if there is constraint at Tirunelveli area and Udumalpet-Palakkad 400kV D/C line. TANTRANSCO was also advised to expedite the construction of Ottapidaram substation.

7.0 Additional lines required by NPCIL for evacuation of power from Kudankulam Units 3&4

- 7.1 Director(PSPA-II) CEA informed that, during 36th meeting of SCPSPSR, for the evacuation of power from Kudankulam Units 3&4, the following ATS was evolved:

- (i) Kudankulam - Tuticorin 400kV D/C line (Quad Moose ACSR Conductor) for unit 3 & 4
 - (ii) With the final rearrangement, there will be three numbers of 400kV D/C lines (2 nos to Tirunelveli and 1 no to Tuticorin) that will emanate from both the plants i.e: KKNPP-1&2 and KKNPP-3&4.
- 7.2 Representative of TANTRASCO requested to consider proposal of constructing additional evacuation lines from Kudankulam Atomic Power plant to the nearby TANTRASCO's 400kV S/S [like Kayathar 400/ 230/110kV S/S (existing), Kanarpatty 400/230-110kV S/S (under construction), Pavoorchatram (Thennampatty) 400/230-110kV S/S (under construction), Ottapidaram 400/230-110kV S/S (planned)] for more reliability and operational flexibility.
- 7.3 Representative of CTU stated that presently there are four circuits of 400kV (Quad Moose ACSR Conductor) lines for evacuation of 2000MW of generation from Kudankulam generating station. These lines are adequate for even with N-2 contingency. He added that there is no need of additional lines for evacuation of power from Kudankulam generating station.
- 7.4 Representative of NPCIL stated that the expected commissioning schedule of U#3 is September 2022 and of U#4 is March 2023.
- 7.5 Further, representative of CTU informed that they had not received any LTA application from NPCIL for Kudankulam - 3 & 4 units. Any system strengthening would be planned on receipt of the LTA application based on proper studies.
- 7.6 After deliberations, members decided to drop the proposal of TANTRASCO for additional lines for evacuation of power from Kudankulam Units 3&4 of NPCIL.
- 8.0 Installation of 3rd ICTs at Madurai and Trichy 400/230kV substations**
- 8.1 Director(PSPA-II) CEA informed that, installation of 3rd ICTs at Trichy and Madurai were being implemented by POWERGRID under the schemes SRSS-XX and SRSS-XXIII respectively. During the 39th Meeting of Standing Committee held on 28.12.2015 Director(Trans), TANTRASCO made a request for early commissioning of these ICTs.
- 8.2 Representative of PGCIL informed that 3rd ICT at Trichy had been commissioned and 3rd ICT at Madurai would be commissioned by the end of October 2017. However, the 230kV network of TANTRASCO at Madurai substation was not ready.
- 8.3 Members advised TANTRASCO to expedite the work related to 230kV system at Madurai for utilization of 3rd ICT. Further, it was decided to review the progress of implementation of 230kV system in next SCM.
- 9.0 Provision of 220kV feeder at CPRI, Hyderabad for their online 350 MVA short circuit test facility**
- 9.1 Director(PSPA-II) CEA informed that, in the 40th Standing committee meeting, the proposal for establishment of 350 MVA short circuit test facility at their existing

UHVRL (Uppal, Hyderabad) for testing of distribution class transformers(33kV&11kV) was discussed. The facility will be getting power supply by LILO of Ghanapur-Hayathnagar 220kV line (LILO length 4Km) at CPRI, Uppal. The proposal was agreed in principle subject to joint studies by CEA, SRPC, CTU, SRLD/C and TSTRANSCO for impact on grid.

- 9.2 CPRI had conducted system studies to assess the impact of online short circuit test facility on the Ghanapur substation (located at about 15km from CPRI) and nearby Substation of TSTRANSCO in terms of nodal voltage drop due to establishment of 350 MVA online short circuit transformer testing facility at CPRI, Hyderabad and the report was submitted to CEA. Same was examined by CEA, CTU, POSOCO and TSTRANSCO and observation/comments were Communicate to CPRI.CPRI had responded to various queries/ Clarifications. TSTRANSCO has requested for revision in the study considering the length of 220kV underground cable between Ghanapur - Uppal (CPRI) and Hayathnagar-Uppal (CPRI). The revised study report was submitted vide email dated 28.08.2017. POSOCO had informed that there would be no detrimental impact on the grid due to this facility and TSTRANSCO had also conveyed their acceptance for creation of facility at CPRI.
- 9.3 Representative of CTU stated that there would not be any problem under the steady state studies. However, Hyderabad being a sensitive load center dynamics stability studies needs to be carried out to understand the impact on grid.
- 9.4 Representative of CPRI stated that maximum expected voltage drop on any node (substation) in the grid was not more than 10% in any of the test cases. Therefore, dynamic simulation study was not felt necessary.
- 9.5 After deliberations, members decided that CPRI would carry out the dynamics stability studies and submit the report to CEA. The report would be discussed in the joint meeting of CEA, CTU and POSOCO. In case, the dynamic stability study results are agreed in the joint meeting, CPRI may go ahead with implementation of the test facility.

Transmission planning proposals by Tamil Nadu

10.0 Transmission scheme modification of Manali & Korattur 400/230-110kV substation in Chennai Region

- 10.1 Representative of TANTRANSCO informed that during the 34th meeting of SCPSR held on 16.04.2012, establishment of Korattur and Manali 400/230-110kV substations were approved with the following connectivity:
 - i) Upgradation of existing Korattur 230/110kV S/S to 400/230/110kV GIS S/S with 2X315 MVA, 400/230kV ICT and 2X200MVA, 400/110kV ICT.
 - ii) Upgradation of existing Manali 230/110kV S/S to 400/230/110kV GIS S/S with 2X315 MVA 400/230kV ICTs and 2X200MVA, 400/110kV ICTs.
 - iii) LILO of one of the NCTPS (Stage II)-Alamathy 400kVD/C line at Korattur

400/230kV S/S.

- iv) Korattur- Manali 400kV D/C line with HTLS conductor.
 - v) Thervoikandigai-Korattur 400kV S/C line
 - vi) Thervoikandigai-Manali 400kV S/C line
- 10.2 Considering RoW issues TANTRANSCO vide their letter dated 28.12.2016 had requested CEA for revised connectivity for Korattur and Manali 400/230/110kV substations as follows
- i) One circuit of the NCTPS Stage II –Alamathy 400kV D/C line will get split so that the NCTPS II end will be connected to Manali 400kV SS and Alamathy 400kV end will be connected to Korattur 400kV SS.
 - ii) Korattur-Manali 400kV SC line instead of D/C line with HTLS conductor.
- 10.3 Further, due to delay in execution of Korattur 400kV S/S, TANTRANSCO vide their letter dated 20.01.2017 proposed revised interim connectivity for Manali by making LILO of one circuit of NCTPS Stage II –Alamathy 400kV D/C line at Manali 400kV S/S. TANTRANSCO assured that after the establishment of Korattur 400kV SS, the connectivity as proposed in letter dated 28.12.2016 would be restored.
- 10.4 Representative of TANTRANSCO stated that the ultimate transmission scheme would be as under:
- i) Upgradation of the existing Korattur 230/110kV S/S to 400/230/110kV GIS S/S with 2x315MVA, 400/230kV ICTs & 2x200MVA,400/110kV ICTs.
 - ii) Upgradation of the existing Manali 230/110kV S/S to 400/230/110kV GIS S/S with 2x315 MVA, 400/230kV ICTs & 2x200MVA,400/110kV ICTs.
 - iii) 400kV Alamathy –Korattur S/c line & 400kV NCTPS stage II –Manali S/C line by modifying one circuit of NCTPS Stage II –Alamathy 400kV D/C line
 - iv) Korattur –Manali 400kV S/C line with HTLS conductor.
 - v) 400kV Thervoikandigai-Korattur S/C line
 - vi) 400kV Thervoikandigai –Manali S/C line
- 10.5 Director (PSPA-II), CEA stated that CEA had given in-Principle approval for above revised Connectivity for commissioning of Manali 400/230/110kV substation.
- 10.6 Representative of POSOCO suggested that TANTRANSCO may consider making LILO of 2nd circuit of NCTPS- Alamathy 400kV D/C line at Thervoikandigai, to make direct connectivity with NCTPS. Member Secretary, SRPC stated that there was already much generation available at Thervoikandigai therefore, the LILO proposed by SRLDC may not be required.
- 10.7 It was suggested that to cater the future load growth transformer capacity of 500MVA may be implemented in place of 315 MVA. TANTRANSCO agreed for the same
- 10.8 After Deliberations, following was agreed:
- i) Upgradation of the existing Korattur 230/110kV S/S to 400/230-110kV GIS S/S with 2x500MVA, 400/230kV ICTs & 2x200MVA,400/110kV ICTs.

- ii) Upgradation of the existing Manali 230/110kV S/S to 400/230-110kV GIS S/S with 2x500 MVA, 400/230kVs ICTS & 2x200MVA,400/110kV ICTs.
- iii) 400kV Alamathy –Korattur S/c line & 400kV NCTPS (stage II) –Manali S/C line by modifying one circuit of NCTPS (Stage II) –Alamathy 400kV D/C line
- iv) Korattur –Manali 400kV S/C line (on the D/C tower) with HTLS conductor
- v) 400kV Thervoikandigai-Korattur S/C line (on D/C tower)
- vi) 400kV Thervoikandigai –Manali S/C line (on D/C tower)

11.0 Request for keeping Thappagundu and Anikadavu 400kV bays at Myvadi (Udumalpet) 400kV Substation under the control of TANTRANSCO

- 11.1 Representative of TANTRANSCO informed that in the 34th meeting of SCPSPSR held on 16th April, 2012, LILO of the Thappagundu-Anaikadavu 400kV D/C line at Udumalpet 400/230kV substation (PGCIL) was agreed. At Udumalpet 400/230kV substation, the 400kV bus with 3X315 MVA ICTs are owned by PGCIL and the 230kV bus and the associated 230kV feeders are owned by TANTRANSCO.
- 11.2 TANTRANSCO requested that in Udumalpet 400kV SS, the extended 400kV bus with the above Thappagundu and Anikadavu 400kV feeders, may be kept under the control of TANTRANSCO and PGCIL may be requested to hand over the bays after the completion of the works. Further in the event of requirement of 4th 400/230kV ICT or any other connectivity with Udumalpet 400kV SS due to load growth, it may be evolved from TANTRANSCO 400kV bus in future.
- 11.3 Representative of POWERGRID did not agree for the proposal.
- 11.4 On enquiry about requirement of LILO of Thappagunda-Anaikadavu 400 kV D/C line at Udumalpet, TANTRANSCO stated that this scheme was approved in 2012 and the work had already been started.
- 11.5 After Deliberations, the proposal of TANTRANSCO was not agreed.

12.0 Establishment of Konthagai 400/230/110kV substation in Madurai region

- 12.1 Representative of TANTRANSCO stated that Madurai area is a load center and would cater to the present/future requirement through 230kV sub-stations and one additional 400 kV substation is required in Madurai considering load growth in the area. He proposed for establishment of Konthagai 400/230/110kV substation with 2X315 MVA transformation capacity to feed the load of Madurai region with following Connectivity:

400kV Connectivity:

- a) LILO of one circuit of the Kaythar - Karaikudi 400kV D/C line (with Quad Moose ACSR Conducuted) at Konthagai.
- b) Virudhnagar (765/400kV substation) - Konthagai. 400kV D/C line

230kV Connectivity:

- a) LILO of Pasumalai-Anupankulam 230kV S/C line at Konthagai
 - b) LILO of Samayanllur-alagarkoil 230kV S/C line at Konthagai
 - c) K.Pudur –Konthagai 230kV line (S/C on D/C tower).
 - d) Thummakundu- Konthagai 230kV line (S/C on D/C tower).
- 12.2 Representative of CTU stated that the proposed Virudhanagar -Konthagai 400 kV D/C line, would enhance reliability. Further, CTU suggested for use of twin HTLS conductor (equivalent to Quad moose ACSR capacity) in this short line of 50-60km. TANTRANSCO agreed for the same.
- 12.3 On the issue of transformation capacity, it was suggested that transformers of 500 MVA capacity should be used for taking care of future load growth. TANTRANSCO agreed for the same.
- 12.4 After deliberations, members agreed with the proposal of TANTRANSCO with change in transformers capacity from 315 MVA to 500MVA.
- 13.0 NLCIL-NNTPP (2x500 MW) – Startup Power Requirement**
- 13.1 Director (PSPA-II), CEA informed that NLC India limited is constructing Neyveli New Thermal Power Plant (2x500 MW) at Neyveli, Tamilnadu. Connectivity of the plant with 400kVsystem was granted by PGCIL through LILO of Neyveli TS-II – Puducherry 400kV S/C at NNTPP switchyard. In February 2017, NLC had requested for connectivity for availing startup power supply through the LILO of 230kV Tie Lines I &II (connecting NLC TPS –II and TPS-I).
- 13.2 Representative of NLC stated that they had started availing startup power from STU and LILO of 230kV Tie Lines I &II (connecting NLC TPS –II and TPS-I) was not required. Accordingly, Members decided to drop this proposal.
- 14.0 Power evacuation Scheme of 500MW Kadaladi Ultra Mega Solar PV Power Project at Narippaiyur of Kadaladi Taluk in Ramnad district under state sector**
- 14.1 Representative of TANTRANSCO stated that 500MW “Kadaladi Ultra Mega Solar Power Project” at Narippaiyur of Kadaladi Taluk in Ramanathapuram District under State sector was expected to be commissioned by May 2019.TANTRANSCO proposed the following connectivity for evacuation of Kadaladi (500MW) Ultra Mega Solar Power Project:
- i) Kadaladi – Kamuthi 400kV D/c line (40kM)
 - ii) Kamuthi-Thappagundu 400kV D/c line
 - iii) LILO of Kamuthi-Thappagundu 400kV D/c line at Virudhnagar S/S (original connectivity of proposed Virudhnagar S/S
- 14.2 Director, PSPA-II stated that LILO of Kamuthi- Thappagundu 400 kV D/C line and Kamuthi- Thappagundu 400 kV D/C line at Virudhnagar S/S had already been approved under evacuation system for Uppur TPS (2x800MW).

- 14.3 Member secretary, SRPC stated that Kamuthi is connected with Karaikudi with 400kV D/C line. Further injection at Kamuthi would make the link critical. It was advised to expedite connectivity of Kamuthi from Virudhnagar and Ottapidaram.
- 14.4 Representative of CTU stated that there was already 600MW injection at Karaikudi (PG). To handle the injection of Kadaladi (500MW), there might be requirement of system strengthening at Karaikudi including reactors. Member Secretary, SRPC stated that Kadaladi (500 MW) being solar power, strengthening at Karaikudi may not be considered.
- 14.5 After Deliberations, Members agreed for following:
- a) Implementation of Kadaladi – Kamuthi 400kV D/C line by TANTRANSCO
 - b) Reactive compensation at Kadaladi and Kamuthi need to be provided by TANTRANSCO. The requirement of reactive compensation to be finalized in a joint meeting of CEA, CTU and TANTRANSCO.
 - c) LVRT should be implemented with the Kadaladi Ultra Mega Solar Power Project (500MW) as per CEA Regulations.

15.0 Power evacuation Scheme for the proposed Kundah PSHEP (4x125 MW) & Sillahalla Pumped storage HEP (2000MW) project in Coimbatore region

- 15.1 Representative of TANTRANSCO stated that Kundah Pumped Storage Hydro Electric project (4x125 MW) was proposed to be commissioned by the year 2020-21. Further, Sillahalla pumped storage Hydro Electric Project (2000 MW) was proposed in Nilgiris District to be executed in two stages with 4x250 MW in each stage. Execution of the Stage-I of the project is in the preliminary stage. The power evacuation lines of the above projects pass through erected in the reserve forest area. It would be difficult to get a new corridor in forest area. Hence, a comprehensive proposal for evacuation of power from these PSHEPs, even though the time period for the commissioning of the two projects are different was proposed.
- 15.2 TANTRANSCO made the following proposal:
- A. With commissioning of KPSHEP (4x125 MW):
- a) Establishment of 400/230 kV Substation with 3X315 MVA or 2X500 MVA ICTs at Parali (near existing Kundah PH III) with the following 400 kV and 230 kV connectivity.
 - b) 400 kV connectivity:
 - i) 400 kV D/C line from Parali 400/230 kV S/S up to location no. 57 (Hilly terrain area)
 - ii) 400 kV MC tower (with four circuits to accommodate 400 kV D/C line for Sillahalla PS project to come in future) from location no. 57 to Karamadai 400/230 kV S/S (Plains area).

(The lines will have HTLS conductor. The 400 kV D/C line will be erected utilizing the existing Kundah PH –III – Karamadai 230 kV SC line on SC tower by converting it in to 400 kV line)

c) 230 kV connectivity

- i) From KPSHEP (4x125 MW), 3 numbers of 230 kV lines to Parali 400/230 kV SS in multi circuit tower in addition to the existing Kundah PH II to Kundah PH III 230 kV S/C line utilizing that 230 kV corridor.
- ii) From existing Kundah PH III (3x60 MW) switchyard, 230 kV D/C line to Parali 400/230 kV SS.

B. With commissioning of Sillahalla Pumped Storage – Stage I HEP – 4x250MW:

- i) 400 kV D/C line from Silahalla PSHEP Stage I to Parali 400/230 kV SS.
- ii) 400 kV D/C line from Parali 400/230 kV to SS to Karamadai 400/230 kV SS shall be erected by utilising Kundah PH II – Arasur 230 kV SC corridor in hilly terrain.
- iii) 400 kV D/C line using the Multi circuit tower in plains from location 57 to Karamadal 400 KV substation to be commissioned matching with commissioning of Sillahalla PSHEP Stage-I (4x250 MW)

15.3 Representative of CTU stated that the total quantum of generation by 2022 would be high and impact on ISTS network needs to be studied.

15.4 After deliberations, members decided that detail study would be carried out jointly by CEA, CTU & TANTRANSCO and the proposal with study results would be discussed in next meeting of Standing Committee.

16.0 Upgradation of the existing Tharamani 230/110/33 kV substation instead of Mylapore 400/230kV substation

16.1 Representative of TANTRANSCO stated that in the 37th meeting of Standing Committee, upgradation of Mylapore 230kV GIS Substation was approved. However, this scheme could not be executed due to severe RoW issue in lying of 400kV UG cable. TANTRANSCO proposed to upgrade the exiting Tharamani 230/110/33kV substation into 400/230/110kV substation with 2x500 MVA, 400/230kV ICTs, 2x200MVA, 400/110kV ICTs and 2x125 MVA bus reactor by making LILO of the sanctioned Sholinganllur- Guindy 400kV S/C feeder at Tharamani (in place of Mylapore 400/230kV substation).

16.2 After deliberations, the members agreed for the proposal of TANTRANSCO for upgradation of Tharamani 230/110/33kV substation into 400/230-110kV substation with 2x500 MVA, 400/230kV ICTs, 2x200MVA, 400/110kV ICTs and 2x125 MVA bus reactor by making LILO of the sanctioned Sholinganllur- Guindy 400kV S/C feeder. Further, the upgradation of Mylapore substation agreed in 37th meeting of SCPSPSR, was dropped.

17.0 Overloading of NLC TS-II 2X250MVA, 400/230kV existing ICT

- 17.1 Representative of TANTRANSCO stated that the evacuation of power from 3 units of NLC TS-II power plant (3X210MW) is taking place at 230kV level and power evacuation from the remaining four units (4X210MW) is taking place at 400kV level totaling 1470MW of generation with 2X250MVA, 400/230kV ICT's. At present, the 2X250MVA ICTs are getting over loaded and SRLDC had suggested SPS to avoid over loading of this ICT's. Therefore, it was proposed to enhance the existing 2X250MVA ICTs capacity at NLC TS –II switchyard to 2X500MVA by NLC.
- 17.2 Representative of NLC stated that space required for 500MVA ICT is not available at NLCTS –II switchyard.
- 17.3 It was observed that TANTRANSCO had proposed a new substation at Neyveli and with this substation the overloading issue might get resolved.
- 17.4 In view of the above, upgradation of the existing 2X250MVA ICTs at NLC TS –II switchyard to 2X500MVA by NLC was not agreed.

18.0 Commissioning of 400/110kV 2nd ICT at Alamathy 400/230-110kV substation in Chennai.

- 18.1 Representative of TANTRANSCO stated that Establishment of Alamathy 400/230-110kV substation was approved in the Standing Committee Meeting on Power System Planning of Southern Region in the year 2000-2001. At the Alamathy 400kV substation, 3X315MVA 400/230kV ICTs and 1X200MVA, 400/110kV ICT were available. The existing 400/110kV ICT had reached maximum loading of 190MVA on 24.04.2016 and the average loading was 180MVA. Hence, 2nd 400/110kV ICT at Alamathy was commissioned in August 2017 to meet the load growth and to meet N-1 criteria. TANTRANSCO requested for ratification of the commissioning of 400/110kV, 2nd ICT at Alamathy 400/230-110kV substation.
- 18.2 Members Secretary, SRPC stated that the issue was not of emergency nature and installation of 2nd ICT should have been agreed in the Standing Committee. He added that post facto approval would set a wrong precedence.
- 18.3 Members strongly supported the views of Member Secretary SRPC and advised constituents to put up the agenda in Standing Committee meeting in advance to avoid post facto approval. However, as a special case and not to be used as precedence, the committee had agreed for approval of 400/110kV, 2nd ICT (400/110kV, 200MVA) at Alamathy 400/230/110kV substation.

19.0 Establishment of Koyambedu 400/230 kV substation.

- 19.1 Representative of TANTRANSCO had proposed for establishment of 400/230 kV substation at Koyambedu with 2x315MVA, 400/230 kV ICTs and 2x125 MVA r bus reactor by making LILO of any one circuit of the NCTPS Stage –II – Sunguvarchatram 400 kV D/C line with following connectivity:
- i. LILO of the Koyambedu – Guindy 230 kV S/C at Koyambedu.
 - ii. 230 kV S/C UG cable from the proposed Koyambedu (400/230kV) substation to Koyambedu CMRL (230/110 kV) substation.

- iii. 230 kV SC UG cable from the proposed Koyambedu 400/230 kV substation to Porur 230/110 kV substation
- 19.2 Representative of CTU enquired about provision for reactive compensation due to UG cable. TANTRANSCO stated that the length of UG cable was only 6 km and there would not be any requirement of reactive compensation.
- 19.3 It was suggested to change the transformation capacity from 315 MVA to 500 MVA.
- 19.4 After Deliberations, members agreed with the proposal of TANTRANSCO with change in transformers capacity from 315 MVA to 500MVA.
- 20.0 Modification in Associated Transmission System for NCTPS Stage –III (1x800 MW) and ETPS Replacement (1x660 MW)**
- 20.1 Representative of TANTRANSCO stated that in the 37th meeting of Standing committee on Power system planning in Southern Region, the following ATS for NCTPS Stage – III (1 X 800 MW) and ETPS Replacement (1X660MW) were approved-
 - A. ATS for NCTPS Stage – III (1 X 800 MW)
 - i. NCTPS (Stage III switchyard) -North Chennai Pooling station 765kV D/C line
 - ii. 1x240MVAR, 765kV Bus Reactor at generation switchyard
 - B. ATS FOR ETPS Replacement (1X660MW):
 - i. ETPS (Replacement switchyard) -North Chennai Pooling station 765kV D/C line
 - ii. NCTPS (Stage-III)-ETPS (replacement Switchyard)765kV D/C link for reliability.
 - iii. 1x240MVAR, 765kV Bus Reactor at generation switchyard.
- 20.2 Representative of TANTRANSCO had requested following modification to reduce cost of investment without losing reliability
 - i. NCTPS (Stage III switchyard) -North Chennai Pooling station 765kV S/C line for power evacuation
 - ii. ETPS (Replacement switchyard) -North Chennai Pooling station 765kV S/C line for power evacuation
 - iii. North Chennai (Stage III) - Ennore (Replacement) with 765 kV S/C lines (Hexa Zebra conductor) instead of 765 kV D/C lines for reliability purpose.
- 20.3 Regarding time frame of the generation Projects, TANTRANSCO informed that NCTPS stage III would be commissioned by 2019 and ETPS by 2020. It was also informed that there would be no further expansion of generating plants in future.
- 20.4 Representative of CTU stated that to evacuate power from NCTPS Stage III (800 MW) and ETPS REP (660 MW), immediate evacuation up to pooling point could have been planned with 400 kV system to optimize equipment costs, transmission line

costs etc. TANTRANSCO stated that it would not be possible to change the scope as work had already been started.

- 20.5 Director (PSPA-II), CEA enquired about the length of these transmission lines. TANTRANSCO informed that these lines are very short (about 5-6 km).
- 20.6 It was opined that in case of no further expansion of generation and sufficient reliability available in transmission system, Single circuit line might serve the purpose. However, for S/C lines Quad Bersimis conductor might be used.
- 20.7 After deliberations, members agreed for modifications proposed by TANTRANSCO at para 20.2.

21.0 Establishment of Manalmedu 400/230/110kV substation.

- 21.1 Representative of TANTRANSCO stated that to cater rapidly increasing demand of Trichy region a substation was planned as a system strengthening measure at 400 kV level in Thiruvarur and Nagapattinam area. TANTRANSCO proposed establishment of 400/230/110kV SS at Manalmedu with following provision:

A. ICT and Bus reactors:

- i) 2x500 MVA, 400/230 kV ICTs
- ii) 2 X 80MVAr bus Reactor
- iii) 2x200 MVA, 400/110 kV ICT

B. 400 KV CONNECTIVITY:

- i) Ariyalur (proposed 765/400 KV S/S) – Manalmedu 400 KV D/C Link.
- ii) Neyveli (TNEB) – Manalmedu 400 KV D/C Link.

C. 230KV CONNECTIVITY

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

- 21.2 TANTRANSCO stated that with the proposed 400/230 Substation would feed around four to five 230KV S/s (around 900 MVA) in that area. There was previously a 300 MW PPN generating station which was supporting the nearby 230 KV system which has now stopped. This connectivity would help in utilization of generated from thermal power stations at Chennai Region in Trichy region/area.
- 21.3 Representative of CTU suggested for implementation of reactors of 125MVAr capacity (in place of proposed 80 MVAr). TANTRANSCO agreed for the same.
- 21.4 After deliberations, members agreed to the proposal of TANTRANSCO with change in capacity of reactor from 80 MVAR to 125MVAR at Manalmedu.

22.0 Establishment of Neyveli 400/230 kV Substation - By Upgradation of the Neyveli (TNEB) 230 KV SS.

22.1 Representative of TANTRANSCO stated that they had observed overloading of 400/230 kV, 250 MVA ICTs at Neyveli TS II resulting in cascade tripping. Generation from Thermal power stations in Neyveli is the only source for the entire Villupuram and Trichy area where demand is growing rapidly. Therefore, TANTRANSCO had proposed establishment of a 400/230KV substation at Neyveli by upgradation of the proposed 230 kV Neyveli (TNEB) substation into 400 KV substation with following provision:

A. ICT and Bus reactors:

- i) 2 x315 MVA, 400/230 kV ICTs
- ii) 2 X 80MVAr bus Reactor

B. 400 KV CONNECTIVITY:

- i) New Neyveli Thermal power station- Neyveli (TNEB) 400 kV D/C Link.
- ii) Manalmedu- Neyveli (TNEB) 400 kV D/C Link.

22.2 Representative of CTU suggested for implementation of reactors of 125MVAr in place of proposed 80 MVAr. TANTRANSCO agreed for the same.

22.3 It was suggested that to cater the future load transformation capacity of 500MVA may be implement in place of 315 MVA. TANTRANSCO agreed for the same

22.4 After deliberations, members agreed to the proposal of TANTRANSCO with change in capacity of ICT from 315MVA to 500MVA and capacity of reactor from 80 MVAR to 125MVAR at Neyveli.

23.0 Enhancement of transformation capacity of 400/230kV transformer from 2 x 315 MVA to 2 X 500 MVA and that of 400/110 kV transformer from 2 x 200 MVA to 3 X 200 MVA at K.R.Thoppur (Salem-TNEB) 400/230 kV SS.

23.1 Representative of TANTRANSCO informed that K.R.Thoppur (Salem-TNEB) 400 kV substation was commissioned during the year 1988. The total transformation capacity at K.R.Thoppur 400/230/110 kV SS is 1030 MVA (400/230 kV, 2x315 MVA ICT + 400/110 kV, 2x200 MVA). The peak loading on transformer has reached as follows.

315 MVA, 400/230 kV ICT - 1	-	287.09 MVA
315 MVA, 400/230 kV ICT - 2	-	283.26 MVA
200 MVA, 400/110 kV ICT - 3	-	187.32 MVA
200 MVA, 400/110 kV ICT - 4	-	180.05 MVA

23.2 TANTRANSCO further informed considering loading on ICTs, it became difficult to carry out the maintenance activities. Therefore, it is essential to put additional ICT (3rd ICT) of 400/110kV, 200 MVA to reduce the overloading of existing 400/110kV ICTs. Further, due to space constraints erection of additional ICT (400/230 kV,315 MVA) would not be feasible. Accordingly, it was proposed to replace the (400/230

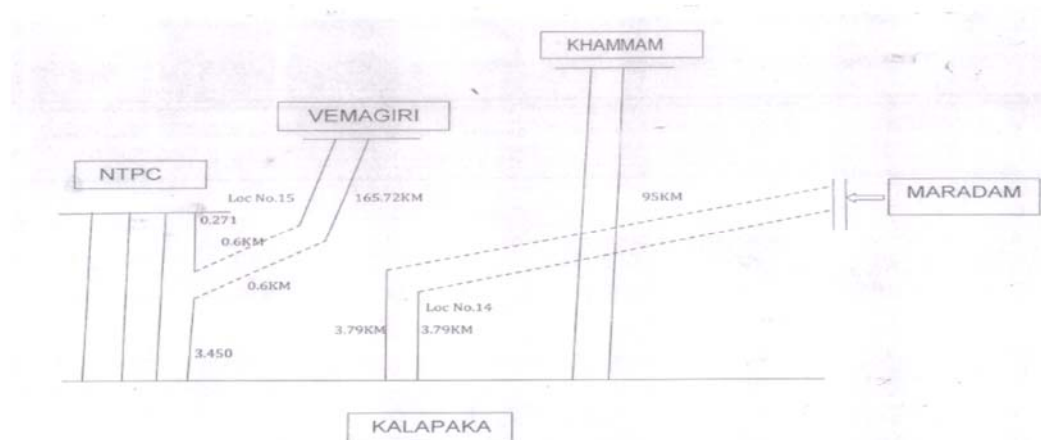
kV, 2 X 315 MVA) ICTs by (400/230kV, 2 X 500 MVA) to meet loadings on ICTs even under contingency conditions.

- 23.3 On the query about utilization of 315MVA Transformers, TANTRANSCO stated that they would be utilized at other locations.
- 23.4 After deliberations, Members agreed for following at K.R.Thoppur (Salem-TNEB) substation
- i) Replacement of 400/230 kV, 2 x 315 MVA ICTs by 400/230 kV 2 X 500 MVA
 - ii) Erection of 3rd ICT (1 X 200 MVA, 400/110 kV)
 - iii) Utilization of 400/220kV 2x315 MVA transformers at other location

Transmission planning proposals by Andhra Pradesh

24.0 Re-arrangement of Kalpaka – Garividi (Maradam) 400kV (Quad Moose) D/C line.

- 24.1 Representative of APTRANSCO stated that in the 36th Standing committee meeting, Garividi (Maradam)-Kalpaka 400kV D/C (quad moose) line was approved. However, due to severe ROW issue in Vennelapalem and Swayambhuvaram Villages, following re-arrangement was proposed for completion of the line
- i. The disconnection of the span between location no. 14 and 15 of the existing 400kV Kalpaka-Vemagiri D/C line.
 - ii. Converting one of the circuits of Kalpaka – Simadhiri (NTPC) 400kV D/C for LILO at Vemagiri and linking Maradam with Kalpaka at location no. 14, thereby establishing Kalpaka- Maradam 400kV D/C link as shown below



- 24.2 Director (PSPA-II) CEA informed that, the proposal was discussed in CEA and study was carried out and accordingly CEA had given in-principle approval for the above proposal.
- 24.3 On the query about progress of the work, representative of APTRANSCO stated that Garividi Substation along with Kalpaka –Garividi 400kV D/c line would be commissioned by January 2018.
- 24.4 Members agreed for following connectivity:
- i. 400kV Kalpaka –Garividi (Maradam) D/C line
 - ii. 400kV Vemagiri –Simhadri-I S/C line
 - iii. 400kV Kalpaka-Vemagiri S/C line
 - iv. 400kv Kalpaka- Simhadri lines (3 circuits)
- 25.0 Alternate proposal to make LILO of 220 kV Nannur (AP) – Regumanugadda (TL) 220kV S/C line at 220/11 kV Brahmanakotkur (AP) Substation in place of Nannur- Brahmanakotkur 220kV line.**
- 25.1 Representative of APTRANSCO stated that they had earlier planned 220kV line from 400/220kV Nannur SS to 220/11kV Brahmanakotkur SS for extension of power supply to 220/11kV Munchumari SS in Kurnool district. However, the work had been stopped as this line is passing near to the inner horizontal surface area and may cause obstruction for further expansion of the proposed Orvakal Green Field Airport in Kurnool district. therefore, it was proposed to make LILO of 220 kV Nannur (AP) – Regumanugadda (TL) line at 220/11 kV Brahmanakotkur (AP) Substation.
- 25.2 Director (PSPA-II) CEA informed that, the proposal was discussed in a meeting held in CEA on 10.07.2017 with APTRANSCO, TSTRANSCO and CTU. Thereafter, in principle approval was given by CEA for proposed LILO of Narnoor(AP)-Regumanugadda (Telangana) 220kV S/C line at Brahmanakotkur (AP).
- 25.3 Members approved the proposed LILO of 220 kV Nannur (AP) – Regumanugadda (TL) 220kV S/C line at 220/11 kV Brahmanakotkur (AP)
- 26.0 Extension of 398.7 MW of power supply to Chintalapudi Lift Irrigation Scheme at 220 kV and 132 kV level in three stages in West Godavari district.**
- 26.1 Representative of APTRANSCO proposed the following dedicated scheme for extension of 398.7 MW of power supply to Chintalapudi Lift Irrigation Scheme at 220 kV and 132 kV level in three stages in West Godavari district.
- For Stage - I (97.1 MW) & Stage – II (267 MW)
- i. Erection of 400/220 kV Substation at Guddigudem with 2 x 315 MVA PTRs transformer.
 - ii. Erection of 220/11 kV Substation at Thadipudi
 - iii. LILO of HNPCL - KV Kota 400 kV D/C line at proposed 400 kV Guddigudem S/S (1 KM approx.).
 - iv. Guddigudem (400/220 kV S/S)- Thadipudi (220/11 kV SS) 220 kV D/C line (18 KM approx.).

For Stage – III (34.6 MW)

- i. Erection of 132/11 kV Reddyganapavaram SS.
 - ii. Erection of 132/11 kV Routhugudem SS.
 - iii. KV Kota (220 /132 kV SS)- Reddyganapavaram (132/11 kV SS) 132 kV D/C line (30 KM approx.).
 - iv. Reddyganapavaram (132/11 kV SS) - Routhugudem (132/11 kV SS) 132 kV D/C line (4 KM approx.).
- 26.2 It was opined that the proposed system with load of 398.7 MW might not be able to fulfill N-1 Criteria. Representative of APTRANSCO responded that there is another 220kV line for feeding to the load to take care of N-1 criteria.
- 26.3 After deliberations, the proposal of APTRANSCO was agreed.
- 27.0 Replacement of Twin Moose conductor with high capacity conductor on existing VTS-IV – Sattenapalli 400kV D/C line (in place of proposed 2nd 400kV VTS-IV-Sattenapalli D/C line with Quad Moose conductor).**
- 27.1 Representative of APTRANSCO stated that in the 39th Standing Committee Meeting VTS–Sattenapalli 400kV D/C line (with quad moose conductor) was approved for evacuation of 1 x 800 MW power from APGENCO at Dr. NTPS, Vijayawada. However, due to Right of Way problems and up-coming new Capital Region area, it was not possible to construct above 400kV line. Accordingly, APTRANSCO proposed for replacement of twin Moose conductor with HTLS conductor on existing VTS-IV - Sattenapalli SS 400 kV D/C line (instead of erection of proposed 2nd VTS-IV to Sattenapalli D/C line with Quad Moose).
- 27.2 On the query of CTU regarding suitability of upgradation of switchgear rating (at both the end of said line) to match with requirement of HTLS conductor, APTRANSCO stated that upgradation of switchgear equipment (at both ends) have already been planned accordingly.
- 27.3 After further discussions, member agreed with the proposal of APTRANSCO.

Transmission planning proposals in Kerala

- 28.0 Requirement of two additional bays at Cochin East for upgradation of 110kV S/S at Aluva to 220kV by establishing 220kV link with 400kV substation at Cochin East (PGCIL)**
- 28.1 Representative of KSEB stated that the power from the Thrissur HVDC station (2000MW), was planned to be evacuated by LILO of 400kV Cochin East – Madakathara D/C line at Thrissur HVDC Station. Presently, 220kV downstream connectivity from Cochin East (Pallikkara) 400kV Substation is only towards 220kV Substations of KSEBL at Kalamassery and Bhramapuram. KSEBL further stated that in the 39th meeting of SCSPSR, upgradation of 110kV Substation at Aluva to 220 kV by constructing Kalamassery –Aluva 220kV D/C line was agreed. However, considering the difficulty in obtaining RoW clearance for the proposed 220kV line

from Kalamassery to Aluva and in order to establish connectivity at 220kV level from a 400kV Substation, KSEB has proposed the following:

- (i) Cochin East (Pallikkara) - Aluva 220kV D/Cline (In the scope of KSEB)
- (ii) Drop the Kalamassery –Aluva 220 kV D/C line (Agreed in 39th meeting of SCSPSR).
- (iii) 2 no. of 220kV bays at 400/220kV substation at Cochin East (Pallikkara) of POWERGRID (to be implemented under ISTS).

28.2 Representative of POWERGRID informed that prima-facie space is available for construction two nos of 220 kV bays at 400/220kV substation at Cochin East (PGCIL)

28.3 After deliberations, the proposal of KSEB was agreed.

29.0 400kV Udupi (UPCL)-Kasargode D/C line

29.1 Director (PSPA-II), informed that Udupi PCL (Manglore) – Kasargode – Kozhikode (Areekode) 400kV (Quad) D/c link along with 400/220 kV Substation at Kasargode was agreed in the 35th meeting of Standing Committee (SCM) on Power System Planning of Southern Region held on 04.01. 2013. In the 31st meeting of Empowered Committee (EC) held on 25.02.2013 the above 400kv links along with 400/220 kV Substation at Kasargode was recommended for implementation through TBCB subject to obtaining

- (i) commitment from the Kerala Government that the land compensation only for tower footing should be paid in the Right of Way (RoW)
- (ii) commitment from Udupi Power Corporation Limited(UPCL)to provide two no. of 400 kV bays at Mangalore (UPCL) switchyard.

29.2 During the 36th SCM held on 4.9.2013, it was informed that Kerala State Government had given the commitment for compensation of RoW suggested in EC meeting. However, UPCL informed that no space was available to erect two additional bays and as per their PPA any additional expenditure on account of maintenance of the above bays needs to be approved by their buyers.

29.3 During the 38th SCM held on 07.03.2015, it was intimated that bays could be constructed at UPCL switchyard by extending its generation switchyard and dismantling of some civil structures (based on site visit). KPTCL had opined that with the construction of Udupi – Kasargode 400kV D/c line (with Quad Moose ACSR conductor), the Udupi – Hasan 400kV D/c line will be underutilized. Regarding inclusion of two line bays at Udupi switchyard, KPTCL agreed to intimate their views after getting the views of the ESCOMs. Accordingly, it was decided that implementation of the UPCL- Kasargode 400kV D/C line can be initiated after considering views of Karnataka ESCOMS, if communicated within a month.

29.4 The matter was again discussed in the 39th SCM held on 28th& 29th December 2015 wherein it was agreed that only Udupi –Kasargode 400kV D/C line will be implemented as per tariff policy of Government of India as ISTS project. Further, it

was also agreed that Kasargode – Kozhikode (Areekode) 400kv D/c line would be implemented as intra-state transmission project to be implemented by Kerala state.

29.5 In the 40th SCM, held on 19th November 2016, KSEBL had proposed new transmission system as a state project under Wayanad – Kasargode Green Power Corridor Project. In this project the location of 400kV Substation at Kasargode was changed from Mylatty to Cheemeni. In this reference, following was agreed for connectivity to Kasargode (Cheemeni).

- (i) Construction of Substation at Kasargode (Cheemeni) [with 2x500MVA, 400/220kV and 2 x 200MVA 220/110kV]
- (ii) 220kV connectivity from 400/220kV Substation at Kasargode (Cheemeni) to existing 220kV substations at Kanhirode, Thaliparamba, Ambalathara and Mylatty.
- (iii) Construction of 400kV Switching Station at Wayanad (Kattikulam)
- (iv) Connectivity between 400kV Switching Station at Wayanad (Kattikulam) and 400kV Substation Kasargode (Cheemeni).

29.6 Director (PSPA-II), CEA further informed that, there being change in the earlier agreed transmission network, a meeting was held in CEA on 28.08.2017. In the joint meeting, system studies were carried out by considering the KSEB's proposal as well as proposal of Udupi Power Corporation Limited (UPCL) for evacuation of power from their proposed additional generating (2x800 MW) units and following was agreed:

- (i) There is requirement of additional (i.e. 2nd) double circuit outlets from Udupi switchyard. Replacing existing conductors of 400kV D/C Udupi-Hassan line by HTLS conductors proposed by KPTCL would not serve the purpose of evacuation of total power generated at Udupi (2x600 MW + 2x800 MW) under N-1 Criteria.
- (ii) A team comprising of officers from KPTCL, KSEBL and UPCL would visit UPCL generation switchyard to assess the space availability to accommodate additional bays including Bus Reactor bays to establish 400 kV D/C Link between Udupi & Kasargode.

29.7 Representative of KSEB stated that team comprising of officers from KPTCL, KSEBL and UPCL had visited UPCL generation switchyard to explore feasibility of space for proposed extension. The team had observed the following:

- (i) Sufficient space is available for accommodating the two line bays for Udupi - Kasargode 400 kV D/C Line and two bus reactor (2x125MVAR) bays at Udupi generation switchyard.
- (ii) UPCL had agreed and proposed to extend the bus by providing bus sectionaliser for phase-2 expansion.
- (iii) UPCL had also agreed to provide space for switchable line reactor if required.

- 29.8 After deliberations, Members agreed for construction of already approved Udupi PCL (Manglore) – Kasargode 400 kV D/C Line (with Quad Moose ACSR conductor) alongwith Kasargode 400/220Kv, 2x500MVA substation under ISTS and to drop Kasargode – Kozhikode (Areekode) 400kV (Quad) D/c line (with Quad Moose conductor) (Agreed in 35th meeting of SCSPSR)

Transmission planning proposals by Karnataka

30.0 Evacuation of power from proposed additional generating units (2x 800 MW) generation of UPCL.

- 30.1 Representative of KPTCL stated that the following power evacuation system for the additional 2 nos of 800 MW units was planned:

- i) UPCL-TK Halli 400kV D/C line (with Quad Moose ACSR Conductor)
- ii) Establishment of 400/220kV ,2x500 MVA TK Halli S/S.
- iii) TK Halli - Somanahalli 400kV D/C line (with Quad Moose ACSR Conductor)

- 30.2 KPTCL further informed that the proposed transmission scheme involves construction of line between UPCL and TK Halli 400 kV D/C which passes through the Western Ghats comprising of dense forest and eco-sensitive zone for a distance of about 55 km. In view of various environmental and execution related issues and to avoid uncertainties in getting forest clearance and timely completion of the project the proposed evacuation scheme for additional 2 X 800 MW units of M/s UPCL was revised as follows.

- i. LILO of existing 400 kV UPCL-Hassan (Shantigram) D/C line at proposed 400 kV Hebbanahalli sub-station (400 kV Hebbanahalli s/s was approved under Yethinahole Drinking Water supply Project Scheme) and Re-conductoring with HTLS conductor from UPCL to Hebbanahalli sub-station.
- ii. Establishing 2 X 500 MVA, 400/220 kV sub-station at TK Halli.
- iii. Hebbanahalli -TK Halli 400 kV D/C line (Quad Moose conductor).
- iv. TK Halli - Somanahalli 400 kV D/C line (Quad Moose conductor)

- 30.3 Director (PSPA-II), CEA informed that in a meeting held in CEA on 28.08.2017 regarding Udupi-Kasargode line, the system studies were carried out by considering KSEB's proposal and KPTCL's power evacuation scheme for UPCL from proposed additional two generating units (2x800 MW) and it was found that there is requirement of additional (i.e. 2nd) double circuit outlets from Udupi switchyard to meet N-1 criteria. Replacement of existing conductors of Udupi-Hassan 400kV D/C line by HTLS conductors would not serve the purpose of evacuation of total power generated at Udupi (2x600 MW + 2x800 MW) under N-1 Criteria.

- 30.4 It was opined that since additional circuit from Udupi Switchyard i.e. implementation of Udupi PCL (Manglore) – Kasargode 400 kV Quad D/C Line had been agreed in this meeting at agenda item 29.0, no other evacuation system is required.
- 30.5 Member Secretary (SRPC) stated that proposed LILO of UPCL-Shantigram (Hassan) 400kV D/C line at Hebbanahalli is not an evacuation scheme and it could be proposed as system strengthening scheme separately by KPTCL.
- 30.6 After deliberations, members agreed that the power evacuation scheme proposed by KPTCL, is not required. However, KPTCL may consider their proposal, as System Strengthening Scheme, if required and put up in next Standing Committee meeting.
- 31.0 Installation of 400kV 2x125 MVAR bus reactor at UPCL switchyard**
- 31.1 Representative of KPTCL stated that installation of 400kV, 2x125 MVAR bus reactor at UPCL (2x600MW) switchyard was agreed in the 39th meeting of the Standing Committee. Joint studies were not carried out while approving the reactor, KPTCL enquired about the necessity of installing 2x125 MVAR bus reactor at UPCL switchyard.
- 31.2 It was informed that the requirement was assessed based on system studies, therefore, it was decided that the decision taken in 39th Standing Committee Meeting may be implemented.
- 32.0 Proposal for establishing 2 X 500 MVA, 400/220 kV sub-station at Huliurdurga in Tumkur district**
- 32.1 Representative of KPTCL stated that to relieve loads of 400 kV Nelamangala & Bastipura sub-stations and provide reliable power supply to the 220 kV sub-stations in the vicinity. Establishment of 2 X 500 MVA, 400/220 kV sub-station at Huliurdurga in Tumkur district has been proposed with following transmission scheme.
- (i) LILO of Nelamangala – Bastipura(Mysore) 400 kV D/C line (with Twin Moose conductor) at Huliurdurga
 - (ii) 2 X 500 MVA, 400/220 kV ICTs
 - (iii) LILO of proposed 220 kV Anchepalya – Nagamangala S/C line at Huliurdurga with conversion of SC to D/C line.
- 32.2 Representative of CTU stated that state should ensure establishment of OPGW communication link and terminal equipment of proper rating and protection coordination.
- 32.3 After deliberation, the proposal of KPTCL was agreed by members.
- 33.0 Approval for establishing 400/220/66kV sub-station at Yethinhole in Sakaleshpura taluk, Hassan district**
- 33.1 KPTCL had informed that M/s. Karnataka Neeravari Nigama Ltd., (M/s. KNNL) a Govt. of Karnataka undertaking has requested KPTCL for arranging power supply to an extent of 219.44 MW (188.99 MW at 220kV voltage level and 30.45 MW at 66kV Voltage level) for “Yethinahole Integrated drinking water supply Project” to provide

drinking water supply to Districts of Kolar and Chikkaballapur in Karnataka by diverting water from Netravati River flowing in the western Ghats of Karnataka.

33.2 Accordingly, KPTCL proposed following transmission scheme for granting connectivity with the Grid to the said project:

- i. Establishment of 400/220 KV, 4x167 MVA sub-station near Hebbanahalliby LILO of UPCL-Shantigram (Hassan) 400kV D/C line
- ii. Establishment of 220/66 KV, 2x50 MVA sub-station in the downstream to feed the consumer stations of M/s. KNNL

33.3 After deliberations, the transmission scheme proposed by KPTCL was agreed.

34.0 Establishing 400/220 kV sub-station, (3 x 500 MVA) at Mylasandra (Electronic City) in Bangalore

34.1 Representative of KPTCL informed that establishment of 400/220 kV sub-station (3 x 500 MVA) at Mylasandra (Electronic City) in Bangalore was already approved with LILO of 400 kV Somanahalli-Kolar S/C line at (Twin Moose) Mylasandra. The load in and around Mylasandra would be around 1000MW.

34.2 In view of substantial load growth in the Mylasandra area, KPTCL had requested for strengthening of upstream lines to 3 X 500 MVA, 400/220 kV Mylasandra sub-station by converting 400 kV Somanahalli-Kolar S/C Twin Moose line along with LILO portion to D/C quad moose conductor.

34.3 KPTCL further informed that land had been acquired for Mylasandra substation and tendering process has been completed.

34.4 Representative of POSOCO stated that long shut down of Somanahalli-Kolar 400kV line is not possible and reconstruction would be very difficult due to RoW Constraint.

34.5 Representative of KPTCL suggested to replace twin moose conductor with HTLS conductor. Representative of CTU suggested that detail study is required for meeting N-1 criteria. It was also suggested to explore the possibility of VSC based HVDC link.

34.6 After further deliberations, members decided that CEA, CTU, POSOCO and KPTCL may carry out System Studies jointly and explore various alternate options.

35.0 Evacuation of power from Combined Cycle gas based power plant (2 X 700 MW) of M/s Karnataka Power Corporation Ltd., (KPCL) at Bidadi

35.1 KPTCL informed that KPCL had approached them for evacuation of power from Gas Based Combined Cycle power plant (2 X 700 MW) at Bidadi. Government of Karnataka had accorded approval to allocate the entire power generated from Bidadi Combined Cycle Power Plant to Bangalore Electricity Supply Company Ltd., (BESCOM). The 400kV switchyard of KPCL generation and 400/220 kV PGCIL sub-station at Bidadi are located adjacent to each other. Therefore, possibility of evacuation of power from the proposed generating station was considered at 400 kV

level by connecting the power station with the existing 400/220 kV Bidadi sub-station of PGCIL.

35.2 It was further informed that there is uncertainty about the implementation of gas based combined cycle power plant of M/s Karnataka Power Corporation Ltd. (KPCL) at Bidadi.

35.3 After deliberation, it was decided to defer the proposal due to uncertainty over the implementation of power plant.

36.0 Reactive power compensation at 400kV sub-stations at Davanagere and Talaguppa

36.1 Representative of KPTCL stated that in the 39th meeting of standing committee on power system planning of southern region, bus reactors of 125 MVar (400kV) capacity were agreed at Talaguppa and Davanagere substation to mitigate the high voltage problem. However existing bus reactors of 63 Mvar (400kV) capacity at these substations, were not considered for the study of reactive compensation. KPTCL requested for clarification on additional requirement of reactive compensation at Talaguppa and Davanagere Substation.

36.2 POSOCO clarified that high voltage is being experience at both substations during the light load conditions, additional reactors of 125 MVAR (400kV) would be required at Talaguppa and Davanagere.

36.3 Members agreed with already approved additional reactors of 1x125 MVAR (400kV) each at Talaguppa amd Devangere 400/220kV Substations.

37.0 Upgradation of existing 220kV Substation to 400/220kV GIS Substation (2x500MVA) at Peenya in Bengaluru city

37.1 Representative of KPTCL stated that to reduce loads of Nelamangala 400 kV substation and to relieve overloading of 220kV lines feeding Peenya, they were planning to upgrade the 220kV Substation at Peenya in Bengaluru City to 2 x 500 MVA, 400/220 kV GIS sub-station and construct Nelamangala –Peenya 400 kV D/C line (with Quad Moose conductor). With upgradation of existing substation at Peenya to 400kV there would be considerable reduction in system losses with improved reliability in power supply to the 220 kV sub-stations in the ring mains of Bengaluru city.

37.2 The proposed scheme was as under:

- i) Upgradation of existing 220kV substation to 400/220 kV GIS sub-station at Peenya in Bengaluru City with 2x500 MVA, 400/220 kV transformers.
- ii) Peenya –Nelamangala 400kV D/C (with Quad Moose line conductor)
- iii) Bus extension to 220 kV Peenya (Existing)
- iv) Peenya-NRS 220 kV D/C line.

37.3 After further deliberations, members agreed with the proposal of KPTCL.

38.0 Inclusion of Rampura limits – Jagalur 400kV D/C line and strengthening of Gadag-Lingapura 220kV D/C line under ‘Green Energy Corridor’

- 38.1 Representative of KPTCL stated that in the 39th meeting of Standing committee, establishment of 2 X500 MVA, 400/220 kV sub-station at Jagalur in Jagalur Taluk, Davanagere district" was approved along with LILO of Bellary Pooling Station (BPS) – C.N.Halli 400kV D/C link (with Quad Moose ACSR conductor) at Jagalur. Multi circuit tower would be used for a length of 40kms from proposed 400/220kV Jagalur substation. It was also informed that the commissioning of 400 kV CN Halli S/s might be delayed. However, the work of establishing 400/220 kV Jagalur sub-station is in advance stage of completion and is expected to be commissioned by December, 2017. The LILO of BPS-C.N. Halli D/C line (near Rampura limits) at Jagalur 400kV substation.
- 38.2 Load flow study results shows that in the absence of C.N.Halli substation and under system light load conditions (2018-19) due to large quantum of RE generations in the vicinity of Jagalur, power to the extent of 260 MW would be evacuated through between Jagalur-BPS 400 kV D/C line.
- 38.3 KPTCL further informed that a transmission scheme "Establishing 2 X 500 MVA, 400/220 kV sub-station at Jagalur in Jagalur Taluk, Davanagere district" which was a part of Green Energy Corridor scheme with project cost of Rs 484.36 Crores, was approved by CEA. The project was awarded at Rs 229.55 Crores, an amount much below the cost approved by CEA. This was mainly due to modified/reduction in LILO distance of 400 kV BPS-CN-Halli DC line at 400 kV Jagalur sub-station from 40 km to 0.88 km.
- 38.4 Since the 400 kV Rampura limits-Jagalur D/C line (from Bellary Pooling station) is facilitating for reliable evacuation of RE generations in the vicinity of Jagalur and also due to decrease in the actual DPR cost of Jagalur 400 kV sub-station, KPTCL proposed that the 400 kV D/C line with Quad Moose conductor for a distance of 65 km with DPR cost of Rs 168.04 Crores may be included under the package of Green Energy Corridor scheme "Establishing 2 X 500 MVA, 400/220 kV sub-station at Jagalur in Jagalur Taluk, Davanagere district".
- 38.5 KPTCL further informed that the project of establishing 400/220 kV Doni sub-station (in Gadag district) with LILO of Guttur (Davanagere) - Guddadahalli (Munirabad) 400kV S/C line (with Twin Moose conductor) at 400 kV Doni sub-station was approved for total project cost of Rs. 132.49 Crores by CEA under Green Energy Corridor scheme. The project was awarded for Rs 176.38 Crores. The 220 kV connectivity was approved with LILO of Gadag-Lingapura 220 kV D/C line with Drake conductor at Doni.sub-station. Gadag being the wind energy rich zone, many upcoming wind generators were proposed to be connected to 220 kV and 110 kV downstream stations of 220/110 kV Gadag sub-station to an extent of about 520 MW (Including existing WPP). KPTCL proposed for inclusion of strengthening the 220 kV D/C line with Drake conductor between Gadag to Lingapura switching station at proposed 400/220 kV Dhoni sub-station in the Green Corridor scheme.

- 38.6 Members were of the opinion that the proposals of KPTCL were of the nature of financial restructuring. Thus, it is not in the purview of standing committee on power system planning.

Transmission planning proposals in Telangana

- 39.0 (a) Revised proposal for connectivity of Telangana STPP (2x800 MW),**
(b) proposal for erection of 400/220/132kV Rayadurg SS,
(c) LILO of both circuits of 400kV Mamidipalli-Dindi D/C line at upcoming 400kV Maheshwaram SS and
(d) Dichpally - Nirmal 400kV D/C line (with Quad Moose conductor) to meet the requirement of additional outlet for SCCL power plant (2x600 MW)

39.1 Representative of TSTRANSCO stated that transmission scheme for Kaleshwaram Lift Irrigation Project was discussed and agreed in the 37th meeting of SCSPSR and some modification in the scheme was approved in 40th meeting of SCSPSR. Further, the evacuation scheme of Telangana STPP (2x800 MW) was agreed in the 40th meeting of SCSPSR. TSTRANSCO in March 2017, had approached CEA for some modifications in the above schemes.

39.2 Director (PSPA-II), CEA stated that a meeting was held on 11th April, 2017 in the CEA, with representatives from TSTRANSCO and POWERGRID. After carrying out system studies, CEA, had given in-principle approval to TSTRANSCO to carry out following transmission scheme/work:

A. New Work:

- 1) LILO of both circuits of Dindi – Mamdipalli 400kV D/C line at Maheshwaram 400/220kV S/S of TSTRANSCO.
- 2) Dichpally - Nirmal 400kV D/C line (with Quad moose ACSR conductor).

B. Change in the Scope of earlier agreed schemes:

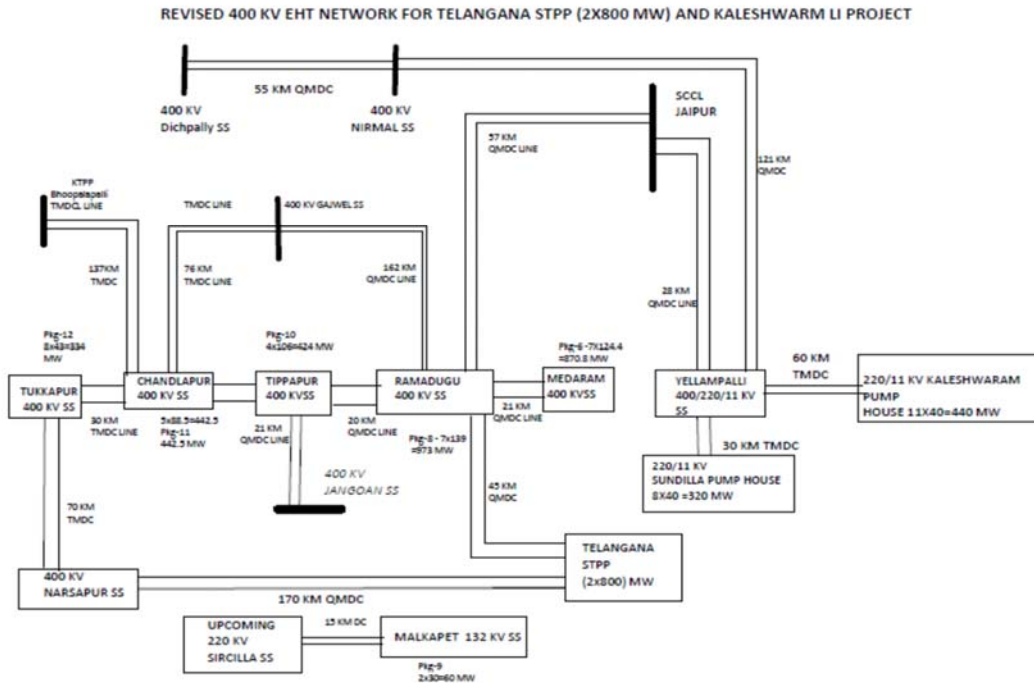
- 1) Transmission system for Telangana STPP (2x800):
 - i. Telangana STTP Stage-I (2x800 MW) - Ramadugu (LI SS) 400kV D/C Line (with Quad Moose Conductor)
 - ii. LILO of both circuits of Durshed-Sircilla 220kV D/C line at 400/220 Ramadugu SS.
 - iii. LILO of 220kV Malyalpalli –Bheemgal S/C at 400/220kV Ramadugu SS
 - iv. Telangana STPP -Narsapur S/S 400kV D/C line (with Quad Moose ACSR Conductor)
 - v. Erection of 400/220/132kV Rayadurg Substation
 - vi. Manikonda (Kethireddypalli) SS -Rayadurg SS 400kV D/C line
 - vii. LILO of Shapur Nagar – Gachibowli 220kVD/C at 400/220/132KV Rayadurg SS
 - viii. LILO of Erragadda – Gachibowli 220kV S/C at 400/220/132kV Rayadurg SS

- ix. LILO of Miyapur – Gachibowli 220kV S/C at 400/220/132kV Rayadurg SS
- x. Narsapur - Borampet 220 kV D/C line (with Single Moose ACSR conductor)
- xi. Borampet - Miyapur 220 kV D/C line (with Single Moose ACSR conductor)
- xii. Borampet - Shapur Nagar 220 kV D/C line (with Single Moose ACSR conductor).
- xiii. Rayadurg – Madhapur 132kV D/C line
- xiv. Rayadurg - Jubilee Hills 132kV D/C line
- xv. LILO of 132kV Erragada – Shivarampally S/C line at 400/220/132kV Rayadurg Substation
- xvi. 1x125 MVAR 400kV bus reactor at Telangana STPP (2x800 MW), Ramagundam

2) Kaleshwaram Lift Irrigation Project:

- i. Erection of 400 kV S/S at Ramadugu, Karimnagar Dist Pkg-8
- ii. Erection of 400 kV S/S at Medaram, Karimnagar Dist Pkg-6
- iii. Erection of 400 kV S/S at Tippapur, Karimnagar Dist Pkg-10
- iv. Erection of 400 kV S/S at Tukkapur, Medak Dist Pkg-12
- v. Erection of 400 kV S/S at Chandlapur, Medak Dist Pkg-11
- vi. Erection of 400/220 kV S/S at Yellampalli, Karimnagar Dist
- vii. Erection of 220 kV S/S at Yellampalli Pump House, Karimnagar Dist
- viii. Erection of 220 kV S/S at Sundilla Pump House, Karimnagar Dist
- ix. Erection of 220 kV S/S at Kaleshwaram Pump House, Karimnagar Dist
- x. Erection of 132 kV S/S at Malakpet, Karimnagar Dist Pkg-9
- xi. LILO of both circuits of SCCL Jaipur – Gajwel 400 kV D/C line (with Quad Moose ACSR conductor)
- xii. Ramadugu (LI S/S) -Medaram LI S/S 400 kV D/C line (with Quad Moose ACSR conductor)
- xiii. Ramadugu LI SS - Tippapur LI SS 400 kV D/C line (with Quad Moose ACSR conductor)
- xiv. Tippapur LI SS - Chandlapur LI SS 400 kV D/C line (with Quad Moose conductor)
- xv. LILO of both circuits of KTHPP – Gajwel 400 kV D/C line (Twin Moose) at Chandlapur LI SS
- xvi. Chandlapur LI SS -Tukkapur (LI SS) 400 kV D/C line (Twin Moose)
- xvii. Tukkapur LI SS - 400 kV Narsapur SS 400 kV D/C line (Twin Moose)
- xviii. LILO of both circuits of SCCL-Nirmal 400kV D/C line at 400kV Yellampalli LI SS
- xix. Yellampalli SS - Sundilla pump house 220 kV D/C line
- xx. Yellampalli LI - Kaleshwaram pump house 220 kV D/C line (Twin Moose)
- xxi. Sircilla SS - Malakpet SS 132 KV D/C line.
- xxii. 1x125 MVAR,400kV bus reactor at Chadulapur 400kV LI SS

39.3 Final schematic diagram of 400kV system of above scheme would be as given under:



39.4 Member agreed with the revised scheme of TSTRANSCO as detailed in para 39.2

40.0 Augmentation of Power Transformer at existing 400/220/132 kV Malkaram SS and 400/220 kV Shankarpally SS with 400/220 kV, 500 MVA transformer (4th ICT)

40.1 Representative of TSTRANSCO stated that the loadings on existing 400/220kV, 3x315 MVA ICTs at 400/220/132 kV Malkaram SS and 400/220 kV Shankarpally SS had reached 85% & 70%. TSTRANSCO had approached CEA in February, 2017 with the proposal for augmentation of ICT at above existing Substations with 500 MVA, 400/220kV Transformer (4th one) to meet the forthcoming additional agricultural load.

40.2 Director (PSPA-II), CEA informed that a meeting was held in CEA on 11th April, 2017, with representatives from TSTRANSCO and POWERGRID. After carrying out system studies, CEA, has given in-principle approval to TSTRANSCO for augmentation of following Transformers:

- (i) 1x 500MVA 400/220kV transformer (4th one) at Malkaram S/S
- (ii) 1x 500MVA 400/220kV transformer (4th one) at Shankarpally S/S

40.3 Representative of CTU suggested that TSTRANSCO should ensure adequate outlets of 220 kV level from these substations. Representative of TSTRANSCO stated that there were 10 nos. of 220 kV outlets at Malkaram 4 outlets from Shankarpally. However, Malkaram to Shapur Nagar and Gachi Bowli were critically loaded and TSTRANSCO was planning to reconductor these lines with high capacity conductors. CTU suggested that reconductoring may not be required if sufficient outlets were provided, in that case, load redistribution would be the better option. TSTRANSCO

stated that Shapurnagar being industrial area, load redistribution would be a complex task.

- 40.4 Members agreed with the proposal of TSTRANSCO.
- 41.0 400/220kV Asupaka S/S with 2x315 MVA and LILO of one circuit of 400kV Kalpaka –Khammam D/C Line at Asupaka**
- 41.1 Representative of TSTRANSCO stated that APTRANSCO (before bifurcation of states) had envisaged 400/220kV Sub-station at Asupaka (2x315 MVA) with LILO of one circuit of 400kV Kalpaka - Khammam D/C Line at Asupaka SS and following 220kV downstream connectivity to meet the Lift Irrigation (LI) loads under Indira Sagar Rudramakota Lift Irrigation Scheme:
- i) Asupaka - Medipally 220kV D/C line (12.01km)
 - ii) Asupaka - Bandarugudem 220kV D/C line (14.84km)
 - iii) 220/11kV Medipally Substation (2x25MVA)
 - iv) 220/11kV Asupaka SS (3x50MVA)
 - v) 220/11kV Bandarugudem SS (3x50MVA)
- 41.2 After formation of Telangana State, the works in 220kV substations at Medipally and Bandarugudem were stopped as the intake pump house and gravity canal etc came under the geographical limits of Andhra Pradesh. But work at Asupaka was in progress. For effective utilization of 400/220kV Asupaka Substation which came under newly created Telangana state, TSTRANSCO revised 220/132kV downstream connectivity as follows:
- i) Upgradation of existing 132/33kV Aswaraopet SS to 220kV with 2x100MVA, 220/11kV transformer.
 - ii) Asupaka -Aswarapet 220kV D/C (20km)
 - iii) Stringing of 2nd circuit on the existing Aswaraopet - B.Gangaram 132kV S/C Line on D/C tower (30km).
- 41.3 TSTRANSCO had approached CEA in May 2017 with request for approval to charge 400/220kV Asupaka S/S (with 2x315 MVA ICTs) with LILO of one circuit of Kalpaka –Khammam Line 400kV D/C Asupaka Substation.
- 41.4 Director (PSPA-II), CEA informed that a meeting was held in CEA with CTU, TSTRANSCO & APTRANSCO on 10th July 2017, wherein it was agreed in principle to allow TSTRANSCO to charge 400kV Asupaka S/S (2x315MVA,400/220kV) and LILO of one circuit of Kalpaka-Khammam 400Kv D/c Line at Asupaka. Further, CTU was advised to carry out the study for reactive compensation requirement at 400kV Asupaka Substation for line charging and over voltage control.
- 41.5 Representative of CTU stated that they had carried out charging studies and it was observed that total rise in voltage without reactor while charging from Kalpaka end was 19.7kV. Therefore, it was suggested to provide 1x63 MVA (400kV) Switchable line reactor at Asupaka substation. Further, to control high voltage under light load condition bus reactor of 1x80 MVA,400kV was also to be provided. TSTRANSCO agreed for the same.

41.6 Member (Power System), CEA stated that as Asupaka substation was not agreed in any standing committee meeting. He suggested to avoid such pro facto approvals in future.

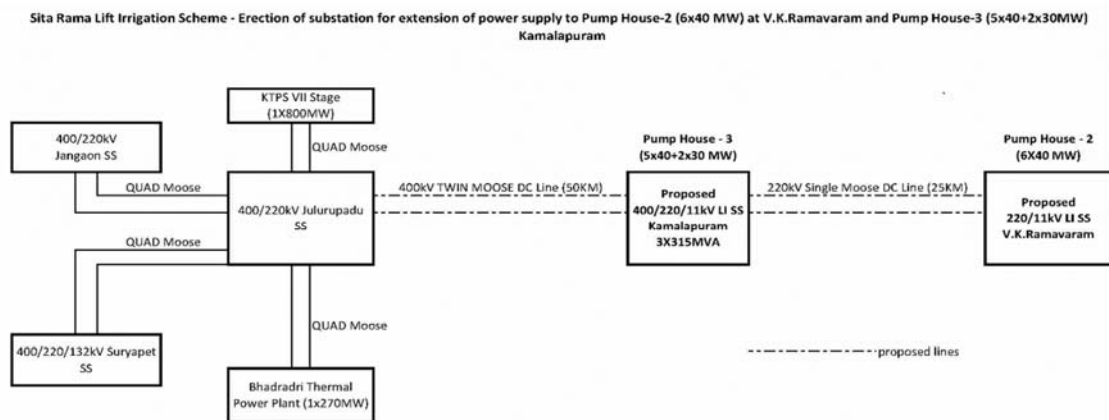
41.7 Members agreed with the proposal of TSTRANSCO.

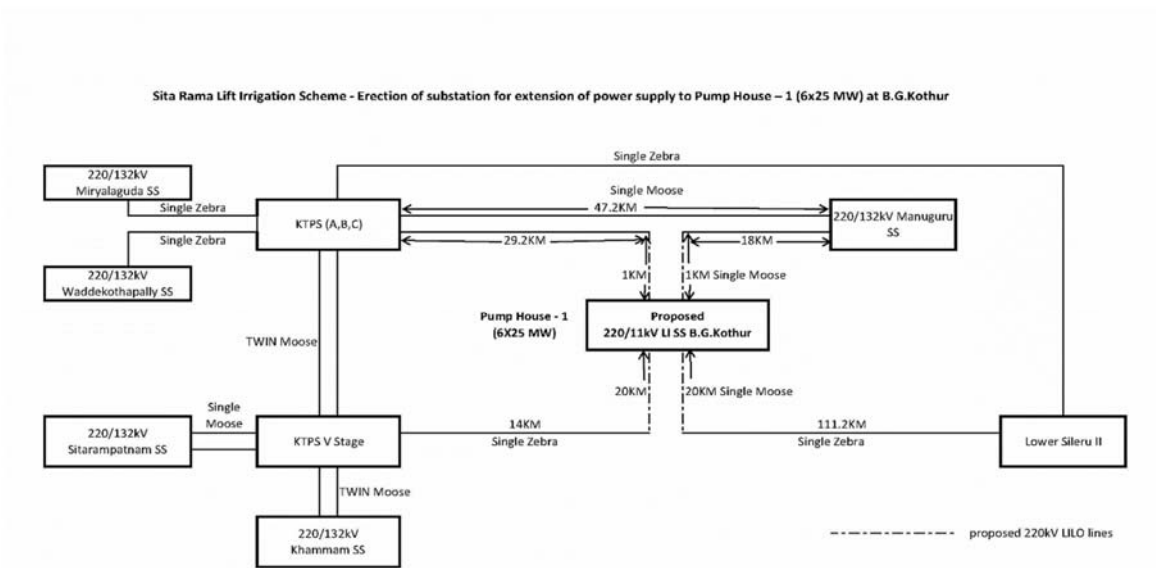
42.0 Sita Rama Lift Irrigation Scheme – Erection of Substations for extension of power supply to (a) Pump House – 1 (6x25 MW) at B.G. Kothur (V) Ashwapuram(M) (b) Pump House -2 (6x40 MW) at V.K. Ramavaram (V) Mulakalapally (M) and (c) Pump House 3 (5x40+2x30MW) at Kamalapuram(V) Chandrugonda(M) in Bhadradi Kothagudem District

42.1 Representative of TSTRANSCO had proposed following scheme to extend power supply to Pump House – 1 (6x25 MW) at B.G. Kothur (V) Ashwapuram(M) and Pump House -2 (6x40 MW) at V.K. Ramavaram (V) Mulakalapally (M) and Pump House 3 (5x40 MW+2x30 MW) Kamalapuram(V) Chandrugonda(M) in Bhadradi Kothagudem District under Sita Rama Lift Irrigation Scheme:

- i. 220/11kV SS at Pump House – 1 (6x25 MW) at B.G. Kothur(V) Ashwapuram (M) in Bhadradi Kothagudem District
- ii. 220/11 kV SS at Pump House – 2 (6x40 MW) at V.K. Ramavaram (V) Mulakalapally (M) in Bhadradi Kothagudem District
- iii. 400/220/11kV SS (3x315 MVA) at Pump House 3 (5x40 MW+2x30 MW) Kamalapuram(V) Chandrugonda(M) in Bhadradi Kothagudem District
- iv. LILO of one circuit of KTPS – Manuguru 220 kV D/C Line to Proposed Pump House -1 at B.G. Kothur (about 1 km).
- v. LILO of KTPS V – Lower Sileru II 220 kV S/C Line to Proposed Pump House -1 at B.G. Kothur (about length of 20 km).
- vi. Julurupadu (400/220kV S/S) - Pump House -3 (at Kamalapuram) 400kV D/C line for a length of 50 km.
- vii. Pump House -3 (at Kamalapuram) -Pump House -2 (at V.K. Ramavaram) 220 kV D/C line (with Single Moose) for length about 25km.

42.2 The Schematic diagram of the above scope is shown below:





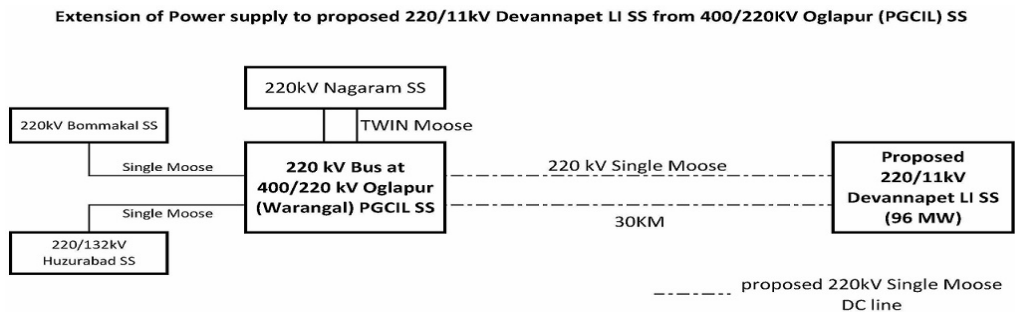
42.3 Members agreed with the above scheme (mentioned at para 42.1) proposed by TSTRANSCO.

43.0 Extension of Power supply under Phase-III, J.Chokka Rao Devadula Godavari Lift Irrigation Scheme – Construction of 220/11kV Substation Devannapet at Warangal Urban District and 220 kV D/C line (with Single Moose ACSR conductor from 400/220KV Oglapur (PGCIL) SS to proposed 220/11kV Devannapet LI SS

43.1 Representative of TSTRANSCO had proposed following transmission system to extend the power supply at 220kV level to shaft 13 (near at Devannapet (V) @ km. 49.060) for package-III Pump House in Warangal Rural District under Phase-III of J.Chokka Rao Devadula Godavari Lift Irrigation Scheme:

- a) 220/11kV substation at Devannapet
- b) Oglapur (PGCIL)- Devannapet LI SS 220kV D/C line (with Twin Moose Conductor) about 30kms

43.2 The Schematic diagram of the above scope is as given below:



- 43.3 Representative of POWERGRID informed that prima-facie space is available for construction two nos of 220 kV bays at 400/220Kv at Oglapur/Warangal (POWERGRID). With regard to ownership, TSTRANSCO informed that the 2no. 220 kV bays at Warngal S/s of POWERGRID for termination of this line would be under the scope of TSTRANSCO.
- 43.4 After deliberation the proposal of TSTRANSCO was agreed. Further, the 220kV bays at 400/220kV substation at Warangal of POWERGRID would be implemented by TSTRANSCO.

Agenda by CTU :

- 44.0 Revision of connectivity with 230 kV S/c line with high capacity conductor suitable to carry 300 MW at nominal voltage from Suzlon Wind farms at Chandragiri, Kumarapuram and Kadambur.**
- 45.0 New transmission system approved for grant of connectivity to applications.**
- 46.0 Dedicated Transmission Lines for Connectivity proposed for discussion in 22nd connectivity/LTA meeting of SR constituents**
- 47.0 Dedicated Transmission Lines for Connectivity agreed in earlier meetings**

The agenda items from 44.0 to 47.0 were withdrawn by the CTU.

- 48.0 Replacement of 400/220kV 2x315 MVA ICTs at Gazuwaka with 400/220kV, 2x500 MVA ICTs**
- 48.1 Representative of CTU stated that overloading of 400/220kV, 2x315 MVA ICTs at Gazuwaka and non-fulfilment of N-1 contingency criteria were raised by APTRANSCO and POSOCO. The matter was also discussed in the 39th meeting of Standing committee of SR held on 28-29 Dec' 15 and it was informed that space was not available for installation of additional ICT at Guzuwaka. During 31st SRPC meeting held on 25.02.2017, it was proposed to replace existing transformers with 2x500 MVA ICTs.
- 48.2 During this meeting, POWERGRID informed that space has been identified at Gazuwaka to accommodate additional 500 MVA ICT at Gazuvaka.
- 48.3 After deliberations members agreed for an additional 400/220kV, 1x500 MVA ICT at Gazuwaka substation as ISTS.
- 49.0 Operational Feedback from POSOCO**

Transmission Constraints:

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

SRLDC informed that 400kV Nellore PS-Nellore D/C line is getting severely loaded most of the time without N-1 security. The flow on these lines will further increase with commissioning of MEPL Stage-2 Units. CTU informed that 400kV Nellore PS-Nellore D/C lines have to be opened to control short circuit level of Nellore SS. CTU

recommended to open both the lines. Also informed that 765kV Nellore PS-Kurnool D/C line and 400kV Nellore PS-Gooty D/C line is sufficient for evacuation of Power from Nellore Complex.

ii. 400kV Hiriyur-Nelamangala D/C line:

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

iii. 400kV Vemagiri-Gazuwaka D/C Line:

SRLDC informed that 400kV Vemagiri-Gazuwaka D/C Line getting heavily loaded and it is limiting constraint for New Grid-SR TTC. CTU may expedite the Transmission system beyond Vemagiri to increase the Import of SR.

iv. 400kV Udumalpet-Palakkad DC line

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

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 radial operation decreases the reliability of supply. KPTCL has to strengthen the 220kV Network in Bangalore metro area to meet future loads

vi. Overloading of 220 kV Shoolagiri- Hosur(TN)- Yerrandahalli –Somanahalli SC line

TANTRANSCO informed that 230kV Shoolagiri-Hosur 2nd Circuit is under tender stage and commissioning of line will be expedite.

vii. Overloaded 220kV Lines in Tamil Nadu:

230kV Madurai - Sembatty S/C line, 230kV Madurai - Theni S/C , 230kV Pugalur - Mywadi S/C, 230kV Pudanchandai-Pugalur lines are getting loaded heavily. TANTRANSCO informed that 230kV Kinnimangalam & 230kV savasapuram will relieve these line loadings.

viii. Constraints in wind Evacuation:

230kV Veerannam-Abhishekpatti, 230kV Karaikudi-Pudukottai line are loaded heavily during high Wind season/period.

TANTRANSCO informed that with commissioning of Kamuthi 400kV SS, Flow on 230kV Karaikudi-Pudukottai, line will be reduced. Also, with commissioning of Kanarpatty 400kV SS and associated network and 2nd circuit of 230kV Veerannam-Abhishekpattiline D/C line, the loading on 230kV Veerannam-Abhishekpatti line will get relieved.

ICT Constraints:

- i. 400/220kV 2x315MVA ICTs at Gazuwaka SS:
CTU informed that space is available for one transformer and installation of 400/220kV, 1x500MVA ICT has been agreed in 41st Standing committee meeting.
- ii. 400/220kV 3x315 MVA ICTs at Vemagiri SS:
APTRANSCO has to look into the issue and may plan additional ICTs/ replacement of ICT by higher capacity.
- iii. 400/220kV 3x500 MVA ICTs at NelamangalaSS, Somanahalli SS Hoody SS:
KPTCL was requested to expedite execution of 220kV Evacuation Transmission lines from 400kV Yelahanka and 400kV Bidadi to relieve Loading on Transformer at Nelamangala SS, Somanahalli SS and Hoody SS
- iv. 400/230kV 2x315 MVA ICTs at Trichy SS:
3rd 400/230kV, 500 MVA ICT has already been commissioned
- v. 400/230kV 2x315 MVA ICTs at Madurai SS:
3rd 400/230, 500 MVA ICT has already been commissioned but 230kV Bays are not ready (TANTRANSCO).
- vi. 400/220kV 2x315 MVA ICTs at Narendra SS:
CTU informed that at 400kV Narendra SS 315 MVA ICTs will be replaced with 500 MVA ICTs.
- vii. 400/220kV 3x315 MVA ICTs at Shankarapalli SS:
4th 400/220kV,500 MVA ICT at Shankarapalli SS is agreed in 41st Standing committee meeting.

50.0 2000 MW HVDC corridor to the State of Kerala – assessing evacuation capability and Transformer augmentation needs.

- 50.1 Representative of KSEB stated that in the 39th standing committee meeting the following proposals were agreed
- i) Construction of a 400kV substation at Kottayam with four 400kV Line bays, six 220kV line bays and two transformer bays with 2 X 315MVA 400/220kV ICT's.
 - ii) The 400kV connectivity will be established by LILO of both circuits of Tirunelveli – Cochin East 400kV D/c line (with Quad Moose.Conductor)
 - iii) 220kV connectivity to be established to existing Substations at Poovanthuruth, Sabarigiri and proposed 220kV substation at Ettumanoor.
 - iv) Additional connectivity for LILO of Idukki – New Pallom 220kV line also to be explored.
- 50.2 In addition to the above, following schemes for 220kV network were also agreed in the 39th meeting of Standing Committee.

- i) **220kV Substation at Eramalloor, (in Alleppey)** with 220/110kV, 2X100MVA transformers and with four 220kV line bays.
 - Connectivity was planned by construction of a 220kV D/c feeder from Brahmapuram. Additional interconnectivity with the 220kV Substation Punnapra was also planned by upgrading existing 110kV transmission system to 220/110kV MCMV system.
 - ii) **220kV Substation, Ettumanoor, (in Kottayam)** with 220/110kV, 2X100MVA transformers and with four 220kV line bays.
 - Connectivity was planned as LILO of existing 220kV Pallom-Ambalamugal and Sabarigiri-Ambalamugal feeders. The station will be interconnected to existing 66kV substation, Ettumanoor after upgrading to 110kV.
- 50.3 Representative of KSEB stated that based on field feasibility assessment studies carried out, 220kV connectivity from 400kV Kottayam proposed to be revised as follows:
- a) Ettumanoor – Kottayam 220kV D/c line.
 - b) Thuravoor (Eramalloor) – Kottayam 220kV D/c line.
 - c) 220kV connectivity to existing 220kV substations at Poovanthuruthu and Ambalamughal by LILO of existing 220kV Pallom – Ambalamughal feeder to 400kV Substation Kottayam.
- 50.4 Further, construction of 220kV Substation Thuravur (Pallippuram), (in Alleppey) with 220/110kV, 2x200MVA transformers and with four 220kV line bays (including spare 2 bays) was proposed by KSEB in lieu of approved 220kV Eramallur substation. 220kV connectivity to the proposed Thuravur substation would be from proposed 400kV Substation, Kottayam. Additional interconnectivity with the 220kV Substation Punnapra at a later stage by upgrading existing 110kV transmission system to 220/110kV MCMV system.
- 50.5 KSEB also proposed modification in 220kV connectivity of 220kV Substation, Ettumanoor. The revised connectivity would be through 220kV D/c line from Kottayam 400kV Substation.
- 50.6 Members agreed with the modifications suggested by KSEB as at para 50.3 to 50.5. Further, it was agreed that down below network from these substations shall be constructed by KSEB as per their requirement.
- 51.0 Proposal for Erection of 125 MVAR (400Kv) Bus reactors at other end of Substation (s) connected with Srisailam Left Bank Hydro Electric Station (SLBHES) instead of placing at SLBHES**
- 51.1 In the 39th Standing committee meeting installation of the 1x125MVAR,400Kv Bus reactor at Srisailam Left Bank Hydro Electric Station(SLBHES) GIS substation was approved. Representative of TSTRANSCO stated that during the 31st TCC& 32nd SRPC meetings held on 21/22.08.2017, it was informed that erection of GIS Bus reactor was not feasible due to space constraint in 400 kV GIS of SLBHES. Hence it

was decided that installation of Bus reactors would be examined at other end of line from SLBHES.

- 51.2 After deliberations, it was agreed that TSTRANSCO will submit requisite data for system study to CTU. The CTU, after carrying out studies, will forward the results to CEA and TSTRANSCO. The requirement would be further discussed and finalized in a joint meeting.

Annex-I

List of participants in the 41st meeting of Standing Committee on Power System Planning of Southern Region held on 22nd September, 2017 at Hyderabad

Sl. No.	Name	Designation
Central Electricity Authority		
1.	P.S. Mhaske	Member (PS) - In chair
2.	B.S. Bairwa	Director (PSPA-II)
3.	Kanchan Chauhan	Assistant Director
4.	Pranay Garg	Assistant Director
MoP		
1.	Irfan Ahmed	Director (T)
SRPC		
1.	S R Bhatt	Member Secretary
2.	Anil Thomas	Executive Engineer
POSO, NLDC		
1.	N. Nallarasan,	DGM
POWERGRID		
1	Subir Sen	COO(CTU-Planning)
2	Mukesh Khanna	AGM (CTU-Plg.), PGCIL
3	A. Surendiran	AGM/POWERGRID
4	V Rajesh	DGM/POWERGRID
5	V M S Prakash Y	Dy Mgr (CTU-Plg.)
POSO/SRLDC		
1.	G. Anubhasan	GM/HoR
2	Madhukar G	Manager
3	Pradeep Reddy	Sr. Engineer
NPCIL		
1.	K D Singh	CE(E&T), NPCIL
NLC India Ltd		
1	S Ravi	DGM/Plg.TPS-II
2.	D.S. Ramakrishnan	ADGM

Sl. No.	Name	Designation
APTRANSCO		
1.	S. Subramanyam	Director (Proj.)
2.	K. Nirmala	DE, SS
3.	Y.V. Ramakrishna	ADE, SS
KSEB		
1.	Vijya Kumari P.	Director (Trans)
2.	Anand S.R.	Dy CE(Grid)/KSEBL
3..	Bijju SS	AEE,PSE
TSTRANSCO		
1.	A Sreenivasa Reddy	SE/PS/TSTRANSCO
2	J Ajay Kum	DR/System studies
3	M. Sheshagiri	DE/SSII/ TSTRANSCO
TNEB		
1.	T. Senthilvelan	Director (Trans.)
2.	M. A. Helen,	Director, Projects
3	R.S Usha	CE,Planning
4.	D. Ravichandran	SE, System studies
5.	M. Sudarsan	EE, System studies
6	T Sumuthi	EE/SS/TANGEDCO
7	G. Ramesh Kumar	AEE, System Studies
KPTCL		
1.	H Nagesh	Director(Trans.)/KPTLC
2.	Hanuman Harayappa	CEE(P&C)/KPTCL
3	D Chethan	EE,PSS/KPTCK
4.	Divya Prabha H	AEE/PSS/KPTCL
CPRI		
1.	Meera KS	Additional Director/CPRI
2.	S Sidharava Reddy	JD CPRI
3	Dr. Manohar Singh	Engr. Officer