

**Central Electricity Authority
System Planning & Project Appraisal Division
Sewa Bhawan, R.K. Puram, New Delhi – 110066.**

No. 51/4/SP&PA-2008/ 141-50

Date: March 14, 2008

To

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.The Director (Transmission), Transmission Corp. of Andhra Pradesh Ltd., Vidyut Soudha, Hyderabad – 500 082. FAX : 040-66665137	4.The Director (Transmission), Karnataka State Power Transmission Corp.Ltd., Cauvery Bhawan, Bangalore 560 009. FAX : 080 -22228367
5.The Member (Transmission), Kerala State Electricity Board, Vidyuthi Bhawanam, Pattom, P.B. No. 1028, Thiruvananthapuram - 695 004. FAX : 0471-2444738	6. Member (Distribution), Tamil Nadu electricity Board (TNEB), 6 th Floor, Eastern Wing, 800 Anna Salai, Chennai - 600002. FAX : 044-28516362
7.The Director (Power), Corporate Office, Block – I, Neyveli Lignite Corp. Ltd., Neyveli , Tamil Nadu – 607 801. FAX : 04142-252650	8.The Superintending Engineer –I, First Floor, Electricity Department, Gingy Salai, Puducherry – 605 001. FAX : 0413-2334277/2331556
9. Director (Projects), National Thermal Power Corp. Ltd. (NTPC), NTPC Bhawan, Core-7, Scope Complex, Lodhi Road, New Delhi-110003. FAX-011-24360912	10. Director (Operations), NPCIL, 12 th Floor, Vikram Sarabhai Bhawan, Anushakti Nagar, Mumbai – 400 094. FAX : 022- 25991258

Sub: 25th meeting of the Standing Committee on Power System Planning of Southern Region
- Agenda Note for the meeting.

Sir,

25th meeting of the Standing Committee on Power System Planning of Southern Region is scheduled to be held on **March 28th 2008 (Friday) at 10 00 Hrs. at Hyderabad.** Agenda note of the meeting is enclosed.

As there are a number of issues to be taken up and Long Term Open Access cases would also be discussed, the meeting would continue after lunch time. You may, therefore, make travel programme accordingly.

Kindly make it convenient to attend the meeting.
Venue of the meeting would be conveyed shortly.

Yours faithfully,

Encl: Agenda Note

(Pardeep Jindal)
Director I/c (SP&PA-III)
(Telephone No. 011 26732325)

**Agenda Note for 25th Meeting of
Standing Committee on Power System Planning in Southern Region (SCPSPSR)**

Time: March 28, 2008 (Friday), 10 00 Hrs

Venue: at Hyderabad

1.0 Confirmation of the minutes of 24th meeting of the Standing Committee

The minutes of the 24th meeting held on June 18, 2007 at Bangalore, was circulated vide our letter No.51/4/SP&PA/2007/625-635 dated 17-07-2007.

KSEB, vide their letter No. CP/LFS/SRPC/SC-Corrections/2007-08/70 dated 04.08.2007 had sought amendment to para 15.2 of the minutes regarding termination of Tirunelveli – Edamon 400kV D/C line. The matter was also raised by KSEB in the 5th meeting of SRPC, wherein Member (PS) had clarified the issue and had said that minutes were in line with the decision arrived at in the 24th meeting.

Minutes as circulated may be confirmed.

2.0 Review of Progress on Earlier Agreed Transmission Schemes

2.1 Status of under construction / approved schemes

The under construction schemes along with their revised targets of completion, as submitted by PGCIL in the 24th meeting of Standing Committee is as given below:

<u>Sl. No.</u>	<u>Name of Scheme</u>	<u>Revised Target</u>
1.	System Strengthening Scheme in Southern Region – V	June 2007
2.	System Strengthening scheme in Southern Region- VI	Dec. 2007
3.	Neyveli TS-II Expansion Transmission System	Feb. 2009
4.	Kaiga U 3&4 Transmission System	Sept. 2007/ Dec. 2007
5.	Kudankulam Transmission System	Dec. 2008
6.	System Strengthening scheme in Southern Region- VII	Dec. 2008

POWERGRID may update the progress of under construction schemes.

2.2 Advancement of Warangal 400 kV S/S

In the 24th meeting of Standing Committee APTRANSCO had requested POWERGRID to advance the completion of Warrangal 400kV S/S to meet their requirement. POWERGRID was agreeable to the proposal provided APTRANSCO was willing to pay transmission charges for the period of advancement. Response of APTRANSCO awaited on the issue.

2.3 Kalpakkam PFBR 500 MWe ATS

ATS for the Kalpakkam PFBR was agreed in the 21st meeting of the Standing Committee. For implementation of this system, POWERGRID has requested BHAVINI to communicate the commissioning schedule of the generation project. BHAVINI / NPCIL may intimate the commissioning schedule of the generation project along with progress details.

2.4 Augmentation of Talcher II Transmission scheme

The scheme agreed in the SRPC includes the following works:-

- (i) Talcher II – Rourkela 400kV Quad D/C
- (ii) Talcher II – Berhampur – Gazuwaka 400kVD/C with switching station at Berhampur

The Empowered Committee (constituted for identifying transmission projects for execution through tariff based competitive bidding), has identified this scheme to be executed through tariff based competitive bidding and for steering the process, Government of India has entrusted this project to the SPV of REC. The SPV is preparing to issue the RfQ for this scheme shortly.

2.5 Requirement of Reactors to contain over voltages in the Southern Region

The scheme of provision of reactors to contain over voltages in Southern Region was deliberated in the 22nd, 23rd and 24th meeting and was approved by SRPC in the 5th meeting held on 25.08.2007. The finalized scheme is as follows:

- POWERGRID - 11 nos. of reactor (7 bus reactors + 4 line reactors)
- NTPC – 2 nos. of bus reactors
- NPCIL – 1 no. of bus reactor
- NLC – 2 nos. of bus reactors
- APTRANSCO - 4 nos. of reactor (3 bus reactors + 1 line reactors)
- KPTCL – 5 nos. of bus reactors.

For the scheme to be effective it is required that all the identified reactors may be commissioned in same time frame. Progress made on installation of these reactors may be given by respective utilities.

2.6 Shifting of 3rd 400/220 kV, 315 MVA Transformer

PGCIL has informed that that they were yet to receive report on technical compatibility from KSEB and also the time schedule for the return of the transformer. The issue was also discussed in the 6th SRPC meeting, wherein, Chairman KSEB had confirmed that the loaned asset would be returned by KSEB by September 2009 as mutually agreed between PGCIL and KSEB. KSEB/PGCIL may intimate the progress on the technical compatibility the transformers and progress on implementation.

2.7 Termination of Tirunelveli –Edamon 400kV circuit under Kudankulam evacuation system at Edamon

The issue of termination of Tirunelveli – Edamon 400kV D/C line (to be initially operated at 220kV) was discussed in the previous meeting and subsequently in the 6th SRPC meeting held on Feb 15, 2008, in which it was agreed that both the feeders would be terminated at the Edamon bus with an arrangement to connect one feeder to one circuit of Edamon-Pothencode 220kV line by bypassing the Edamon S/S.

PGCIL/KSEB may inform about progress of the scheme.

2.8 Transmission System for Evacuation of Power from Nagarjuna TPS (1015 MW) in Karnataka, of M/s Nagarjuna Power Corporation Ltd

The transmission system for evacuation of power from this project in the context of the LTOA application was discussed in the 24th standing committee meeting. According to the minutes of these discussions, circulated by POWERGRID, the evacuation scheme is as follows:

Transmission system for Nagarjuna TPS to be taken as dedicated transmission system for NPCL to be owned, operated and maintained by M/s NPCL:

- a) NPCL switchyard – Hassan 400 kV D/C line
- b) Provision of 1X315 MVA, 400/220 kV transformer at NPCL switchyard
- c) 220 kV D/C transmission line from NPCL switchyard to local substation

The following transmission system to be taken up as regional strengthening scheme:

- (i) Hassan – Mysore 400 kV D/C line.

KPTCL and POWERGRID may inform about progress of these schemes.

3.0 Transmission System for Vallur TPS (formerly known as North Chennai JV TPS) (2x500 MW).

The transmission system for Vallur TPS (1000 MW) JV of NTPC and TNEB was evolved in the 22nd Standing Committee meeting. The evacuation system was revised in the 23rd and 24th Standing Committee meeting and was approved by SRPC in the 5th meeting held on 25.08.2007 at Trivandrum. The following evacuation system was agreed:

- i) LILO of Alamathy-Sriperumbudur 400 kV D/C line at Chennai JV TPS.

NTECL (NTPC Tamilnadu Energy Company Ltd.) vide their letter dated 27-11-2007 had informed that the capacity of the project has now been enhanced from 2X500 MW to 3X500 MW with the following allocations – Tamil Nadu (1125 MW), Karnataka (187.5 MW), Kerala (112.5 MW), Puducherry (75 MW). The allocation, however, is yet to be confirmed by Ministry of Power/GOI.

For evolving the revised ATS for the generation project NTPC/TNEB/JV may intimate the time schedule of the project commissioning and the allocation confirmed by Ministry of Power, GOI. Southern Region states may send their requirements for transformation capacities/ substations.

Members may discuss.

4.0 Transmission System for Tuticorin TPS (2x500 MW)

Following transmission system for Tuticorin TPS (1000 MW) of JV of NLC and TNEB was agreed in the 23rd meeting:

- i) Tuticorin JV TPS –Madurai 400 kV D/C Quad.
- ii) 2x315 MVA 400/220kV ICT at Tuticorin TPS JV.
- iii) LILO of 2 nos. of 220 kV circuits at Tuticorin TPS JV.

POWERGRID/ NLC/TNEB/JV may intimate the progress of the above transmission scheme.

Allocation of 25% of power from the generation project to beneficiaries other than TNEB is yet to be firmed up. NLC/TNEB/JV may intimate the allocation confirmed by Ministry of Power, GOI so that supplementary transmission scheme corresponding this allocation could be evolved.

5.0 Approval of modifications in the originally approved evacuation scheme of RGCCPP sought by KSEB.

CEA had given approval for LILO of one circuit of Kayamkulam-Pallom 220 kV D/C line and LILO of one circuit of Kayamkulam-Edamon 220 kV D/C line at Edappon 220 kV S/S and Kundara 220 kV S/S respectively.

Subsequently KSEB in consultation with PGCIL had decided to connect Edappon 220 kV S/S also by LILO of other circuit of Kayamkulam-Edamon 220 kV D/C line instead of Kayamkulam-Pallom 220 kV D/C line. KSEB seeks the approval of the committee.

Members may discuss and concur.

6.0 Transmission system for evacuation of power from Kothagudam TPS (1X500 MW) in Andhra Pradesh

APTRANSCO have informed that APGENCO's Kothagudam TPS Stage-IV (1x500 MW) is programmed for commissioning by December 2009. For evacuation of power from this project, they have proposed following transmission system:

- (i) KTPS Stage-IV - Khammam, 400 kV D/C line, 105 km
- (ii) 1X315 MVA, 400/220 kV ICT at KTPS.

For above transmission requirements, APTRANSCO has requested for allocation of 2 nos. of 400 kV bays at the Khammam 400/220 kV S/S of POWERGRID for the 400 kV D/C line from KTPS.

Studies conducted by CEA indicate that the 220kV lines emanating from existing Kothagudam generation get over loaded, especially the Kothagudam-Khammam 220kV D/C line carrying load flow of 440 MW. The loading further increases under outage of one circuit of the KTPS-Khammam 400kV D/C line. APTRANSCO would need to strengthen the 220kV network in this area.

Members may discuss and concur.

7.0 Proposals sent by Karnataka for placing it before the Standing Committee.

Chief Engineer (Planning & Cord.), KPTCL has sent following six proposals for discussion in the Standing Committee:

7.1 Establishment of Basvana Bagewadi 400/220 kV S/S with inter-link line to Maharashtra : KPTCL has informed that M/s PTC Ltd and M/s Jewargi Power Private Limited (JPPL) were intending to set up generation plants of 1000 MW and 1320 MW capacity in Bidar and Gulbarga districts, respectively. They have also said that about 1500 MW out of these new capacity additions would flow to Maharashtra. For transmission of power, they have proposed a new 400/220kV S/S at Basvana Bagewadi and 400kV ISTS interlink line to Sholapur in Maharashtra.

In this regard, CEA has suggested to KPTCL that - for tying up the transmission system requirements for evacuation of power from these projects, the generation companies would need to apply seeking long term open access (LTOA). For the power to be absorbed in Karnataka, they would need to apply for LTOA to the State Transmission Utility of Karnataka i.e. KPTCL and for the 1500 MW of power which they intend to sell to Maharashtra, they should apply to the Central Transmission Utility i.e. PGCIL. Based on their application(s) for LTOA, transmission addition requirements

in Karnataka state grid, regional grids of Southern and Western regions and requirements for enhancing transmission capacity of SR-WR inter-regional links would be assessed, and would be considered by the Standing Committees of Southern and Western regions for firming up the transmission schemes. KPTCL was also requested to furnish data for studies and examination of their proposal. Response from KPTCL regarding LTOA application status or system data is awaited.

7.2 Establishment of 400kV D/C line from Shanthigram(Hassan) to Basthipura(Mysore) as regional strengthening scheme: KPTCL have proposed Hassan –Mysore 400kV D/C line. It may be noted that a Hassan-Mysore 400kV D/C line has already been agreed as regional transmission system in the 24th meeting of this committee held in June 18, 2007 and also agreed by all the constituents as a regional strengthening scheme in the 6th meeting of SRPC. The scheme is already being tied up. As such, the purpose of KPTCL's proposal at this stage is not clear.

7.3 Construction of two number of 400kV D/C lines from Raichur TPS to Yelahanka, and HVDC link from vicinity of Raichur TPS to Bangalore: KPTCL have informed that KPCL is establishing two generating stations at Edlapur and Yaramaras near Raichur TPS. To evacuate power from these generating stations of KPCL and the private sector projects in Bidar and Gulbarga districts, they have proposed that Raichur-Yelahanka 400kV 2xD/C (with quad conductor) lines be established. KPTCL has also proposed an HVDC link from vicinity of Raichur TPS to Bangalore.

These transmission addition proposals are basically for the requirement of Karnataka's State grid development. KPTCL may present their studies/proposals. As this network would have major implications for parallel regional network, KPTCL should formulate their proposal based on detailed system studies coordinating the regional grid. Prima-facie, establishment of HVDC line of such short length would generally not be economically viable. KPTCL may submit the techno-economic viability of the proposal.

7.4 Establishing a HVDC link from Northern Grid to Southern Grid: KPTCL have expressed that peak power requirements of Northern and Southern grids are occurring in different seasons, therefore, an HVDC link between Northern and Southern grids may be examined.

The proposal of KPTCL sent to CEA is not based on supporting study. Exchange between SR and NR can take place through displacement via ER WR and as such, prima-facie the proposal of KPTCL seems redundant.

7.5 Establishing a 400kV S/S near Parappana Agrahara in Bangalore South taluk: KPTCL have informed that they have carried out load flow studies for Bangalore outer ring and proposed a 400kV S/S near Parappana Agrahara in Bangalore South taluk for reliable power supply to load pockets and to ensure loss reduction and grid stability. KPTCL have suggested 600-800 MW load for a 400kV S/S. It may be noted that, a 400kV S/S for cities like Bangalore where demand density is quite high, is normally for supply of 900-1100 MW per 400kV S/S. Already six numbers of 400kV S/Ss in/around Bangalore are existing/planned (existing are - Nelamangla, Hoody, Somanahalli and Kolar, and planned are – Bidar and Yelahanka) , which include two of KPTCL and rest four as regional S/Ss. As such, the proposal of KPTCL seems an over provision.

8.0 Evacuation of Power from Kaiga complex

NPCIL had informed that an additional generation of 2X700 MWe is expected to be operational by 2015-16. To evacuate the power from Kaiga complex (Kaiga 1 to 6 i.e., 2280 MWe) PGCIL had expressed that laying of new transmission lines and reconductoring of the existing 400kV lines with higher capacity conductors would be difficult, in view of difficulty because of problem in obtaining forest clearance and due to backing down of generation at Kaiga complex during construction period. NPCIL have now suggested use of FACTS technology (TCSC and FSC) for upgradation of capacity of existing 400 kV lines emanating from Kaiga i.e., provision of 50% series compensation on Kaiga-Narendra and Kaiga-Davanagere 400 kV D/C lines.

This proposal would require detailed system studies evaluating effectiveness of FACTS devices and their impact on the grid and the Atomic power generators as well as detailed examination of procedures for dismantling/Reconductoring (if needed) and backing down of Kaiga generation during construction work, timing of construction, alternate arrangements to meet system demand etc. It is also important to confirm real schedule of commissioning of the 2x700 MW units. A committee with participation from CEA, SRPC, CTU, NPCIL, SRLDC and KPTCL may be constituted to look into these aspects. The members may discuss.

9.0 Transmission System for Evacuation of Power from Simhadri-II TPS (2x500 MW) of NTPC

Simhadri Stage-II TPS (1000 MW) of NTPC is targeted for 2010-11. The tentative allocation of power from this project, as informed by NTPC is – Andhra Pradesh (398 MW), Karnataka (175 MW), Kerala (77 MW), Tamilnadu (190 MW), Pondicherry (10 MW) and Unallocated (150 MW).

In the 24th standing committee meeting the evacuation system was discussed and in view of Vizag TPS 2x525 MW generation of AP getting rescheduled and not yet firmed up, it was decided that a part of the transmission capacity of Vizag – Vemagiri 400kV D/C line of APTRANSCO would be utilized for power evacuation from Simhadri-II, which, APTRANSCO had built keeping in view 2x525 MW Vizag TPS. It was also decided that when Vizag TPS generation is firmed up or any new generation comes up in that area, APTRANSCO line could be spared and, another line could be taken up as a regional system strengthening scheme. And, till such time NTPC should apply for open access from APTRANSCO. APTRANSCO vide their letter dated 15th and 21st February, 2008 have given 'in principle' agreement for utilization of existing network built by APTRANSCO for evacuation of power from Simhadri Stage-II subject to the payment of transmission charges and SLDC charges by NTPC or beneficiaries as determined by AP State Electricity Regulatory Commission from time to time. It is suggested that NTPC should now take up necessary action for obtaining Open Access of the APTRANSCO lines.

10.0 Transformation Capacity Additions in Southern Region

In the previous meeting some new transformation capacity additions required in view of share from Simhadri-II TPS and North Chennai JV TPS were also discussed. The State representatives had suggested Pendurthi in Andhra Pradesh, Bidadi and Yelahanka in Karnataka, and Singarapet and Karmadai in Tamil Nadu. Bidadi (400/220kV S/S, 7x167 MW with LILO of one circuit of Nelamangla – Somanahalli 400kV D/C line at Bidadi) and Yelahanka were been confirmed and agreed as regional system strengthening schemes. Subsequently, TNEB has proposed augmentation of

transformer capacity at Arasur and Madurai S/Ss, which is to be considered by the Standing Committee. Similar strengthening schemes with new 400kV S/Ss or transformer capacity augmentations in AP and Kerala were yet to be confirmed by these states. Capacity of Yelahanka S/S and associated transmission lines are also to be firmed up.

Members may confirm the proposals and the same may be discussed.

11.0 Proposals of Tamil Nadu for placing it before the Standing Committee.

- (i) Establishment of Sunguvarchatram, Sholinganallur 400kV S/S and associate lines**
- (ii) Tirunelveli (to evacuate power from wind projects in south of Tamil Nadu) 400/230 kV S/S**
- (iii) Transmission Systems Associated with Generation projects by TNEB.**

11.1 The transmission proposals of TNEB for establishment of their Sunguvarchatram and Sholinganallur 400kV S/S with associate lines and the transmission requirements to evacuate power from wind projects in south of Tamil Nadu with establishment of a 400/230kV S/S near Tirunelveli (PGCIL) S/S and associated 400kV lines were discussed in the 23rd Standing Committee. Pugalur – Sunguvarchatram / Melakottaiyur(PG) 400kV D/C Quad line was agreed to be established by opening the Sunguvarchatram – Melakottaiyur link thus making connection between Pugalur – Sunguvarchatram and Pugalur - Melakottaiyur. In the 24th Standing Committee meeting while deliberating on the issue it was observed that, as the Sunguvarchatram – Melakottaiyur link was with Twin conductors and the line coming from Pugalur was with quad conductors, therefore, the above line might not have desired transmission capacity. CEA suggested that the 400kV D/C Quad line from Pugalur might be terminated at an intermediate 400kV S/S at Singarapet, from where connections might be established up to Sunguvarchatram / Melakottaiyur. In the meeting TNEB informed that there might be right-of-way problem in linking Sholinganallur 400kV S/S of TNEB with Melakottaiyur 400kV S/S of PGCIL. Therefore it was decided to review the arrangements in a joint study at CEA with TNEB. Studies were carried out at CEA, New Delhi in July 2007 jointly with TNEB. The studies also included transmission system requirements for additional wind power projects near Kayathar and evacuation of power from TNEB's Tuticorin TPS Stage-IV(2x500 MW), Mettur TPS Stage-III (1x500 MW), North Chennai Stage-II (1x500 MW) and Ennore TPS Annex (500 MW).

Results of the studies are given at Appendix-I.

11.2 Works to be implemented by POWERGRID as Southern Region System Strengthening schemes in Tamil Nadu :

In addition to the transmission schemes of TNEB as given the above study report, following transmission system have also been proposed as Regional System Strengthening schemes:

1. Establishment of 400/230 kV SS at Singarapet with 2 x 315 MVA ICT
2. Hosur - Singarapet 400 kV D/C line
3. LILO of the both the Pugalur – Sholiganallur (Ottiampakkam) DC Quad line at Singarapet 400 kV SS with Quad conductor

4. Augmentation of ICT capacity in the regional 400 kV S/S (s). TNEB has proposed augmentation at Madurai, Arasur. Decision in this regard may be taken in the next meeting of the Standing Committee on Power System Planning in SR.

11.2 POWERGRID has expressed that the Kanarpapatty (Tamil Nadu Wind) – Tirunelveli (PGCIL) line may be made as S/C instead of D/C as only one spare bay would be available their due to large number of line terminations at Tirunelveli.

11.3 Members may discuss.

12.0 Transmission system for Evacuation of Power from Wind Power Projects (WPP) and Requirements of Grid connectivity of WPP

Wind power projects are being set up at a much faster rate now, especially in Southern and Western Regions. CEA's Manual on Transmission Planning Criteria that was brought out in 1994 does not deal very effectively the requirements of transmission system for evacuation and grid connectivity of WPPs and thus need to be updated to include various requirements specific to absorption of green power from the WPPs in the grid. The special characteristics of wind power generation are –

- (i) Low PLF,
- (ii) Random nature of generation,
- (iii) Generation not generally available with peak load requirement.

Accordingly, the evacuation system requirement for wind power generation needs to be reviewed with respect to the requirement of thermal/nuclear power generation, which are generally base load stations.

One of these is requirement of reliability of inter-connecting transformers (ICT) between the WPPs and evacuation level voltage for connecting to State Grid. Considering special nature of generation of WPPs, it would be appropriate to consider the group of WPPs connecting to Grid as a consolidated unit and the ICT at the connecting substation of State Grid be treated similar to a Generator Transformer (GT) for the purpose of assessing reliability requirements. Also, the transmission planning criteria of N-1 may not be necessarily applied for the transmission system requirements/deign within the network connecting the group of WPPs i.e. before interface with the state grid.

Members may discuss. Members may also discuss various other transmission assessment requirements specific to absorption of green power from the WPPs in the grid.

Report on System Studies for evolving Transmission Schemes in Tamil Nadu

System studies were carried out in CEA during July 09, 2007 to July 13, 2007 jointly by CEA and TNEB for evolving transmission systems for following transmission schemes:

- I) Transmission System for evacuation of power from Wind projects in Tirunelveli/Kayathar area in Tamil Nadu.
- II) Transmission System for evacuation of power from Tuticorin TPS Stage-IV (2x500 MW) of TNEB.
- III) Transmission System for evacuation of Power from Mettur TPS Stage-III (1x500 MW) of TNEB.
- IV) Transmission System for evacuation of Power from North Chennai TPS Stage-II (1x500 MW) of TNEB.
- V) Transmission System for evacuation of Power from Ennore TPS Annex (1x500 MW) of TNEB

Based on the studies, following transmission systems were emerged:

- (I) **Transmission System for evacuation of power from wind projects in Tirunelveli/Kayathar area in Tamil Nadu: (Refer Exhibit-I)**
 - 1. Kanarapatty (TN Wind) - Kayathar 400 KV, 400 kV D/C Twin Moose line.
 - 2. Kayathar - Karaikudi , 400 kV D/C Quad line
 - 3. Karaikudi - Pugalur 400 kV D/C Quad line
 - 4. Establishment of 400/230-110 kV S/S with 2x315 MVA 400/230 kV ICT, and 2x200 MVA 400/110 kV ICT at Kayathar and associate 230 KV and 110 KV link lines.
 - 5. Pugalur – Sholinganallur (Ottiampakkam), 400 kV D/C Quad line. (instead of connecting one of the D/C Quad circuit of Pugalur to SVChattram and another circuit of Pugalur to Melakottaiyur, as envisaged earlier. With this, the LILO of the S.P.Pudur – Melakottaiyur 400 kV S/C line at SVChattram 400 kV S/S (TNEB) would be retained)
- (II) **Transmission System for evacuation of power from Tuticorin TPS Stage-IV (2x500MW) : (Refer Exhibit-I)**
 - 1. Tuticorin TPS - Karaikudi 400 kV D/C Quad line
 - 2. Tuticorin TPS - Kayathar 400 kV D/C Quad line .
- (III) **Transmission System for evacuation of power from Mettur TPS Stage-III (1x500MW): (Refer Exhibit-I)**
 - 1. Mettur TPS - Arasur 400 kV D/C line
 - 2. Mettur TPS - Singarapet 400 kV D/C line
 - 3. Establishment of 400/230 kV S/S with 2x315 MVA ICT at Mettur TPS S/S and associate 230 kV link lines.
- (IV) **Transmission System for evacuation of power from North Chennai TPS St.-II (1x500 MW): (Refer Exhibit-I)**
 - 1. LILO of the one circuit of the Alamathy – SVChattram 400 kV D/C line (already proposed) at North Chennai TPS project.

**(V) Transmission System for evacuation of power from Ennore TPS Annex (1x500 MW):
(Refer Exhibit-I)**

1. LILO of the second circuit of the Alamathy – SVChattram 400 kV D/C line (already proposed) at Ennore TPS Annex project.

⇒ The LILO of Alamathy – SVChattram 400 kV D/C line for North Chennai TPS and Ennore TPS Annex projects, would be carried out by selecting a suitable site for a 400kV S/S at the LILO point. The new substation would be taken-up soon in the next phase.

**(VI) Works to be implemented by POWERGRID as Southern Region System Strengthening schemes in Tamil Nadu :
(Refer Exhibit-I)**

In addition to the above transmission schemes of TNEB, the following transmission system have also been proposed as Regional System Strengthening schemes:

5. Establishment of 400/230 kV SS at Singarapet with 2 x 315 MVA ICT
6. Hosur - Singarapet 400 kV D/C line
7. LILO of the both the Pugalur – Sholiganallur (Ottiampakkam) DC Quad line at Singarapet 400 kV SS with Quad conductor
8. Augmentation of ICT capacity in the regional 400 kV S/S (s). TNEB has proposed augmentation at Madurai, Arasur. Decision in this regard may be taken in the next meeting of the Standing Committee on Power System Planning in SR.

