Agenda for 2nd Meeting of North Eastern Region Standing Committee on Transmission (NERSCT) for planning of transmission system

1. Confirmation of minutes of the 1st meeting of North Eastern Region Standing Committee on Transmission (NERSCT)

1.1. The minutes of the 1st meeting of North Eastern Region Standing Committee on Transmission (NERSCT) for planning of Transmission held on 29.11.2018 at Guwahati (Assam) were circulated vide CEA's letter no. I/3859/2019 dated 30.01.2019. Subsequently, a corrigendum was issued vide letter no. I/5995/2019 dated 11.07.2019 based on the comments received from NERPC.

1.2. Members may like to confirm the minutes of 1st meeting of NERSCT along with the corrigendum.

2. Installation of 420kV, 80MVAr bus reactor at Ranganadi HEP

2.1. In the 07th meeting of Standing Committee on Power System Planning of North Eastern Region (SCPSPNER), it was agreed that NEEPCO would install 1x80MVAR, 420kV Bus reactor along with associated GIS Bay at Ranganadi.

2.2. Further, in the 1st meeting of North Eastern Region Standing Committee on Transmission (NERSCT), SE, NERPC opined that the proposed reactor at Ranganadi might be installed by transmission utility. Further, it was pointed out that there is space constraint at Ranganadi for installation of bus reactor. In the meeting, it was also agreed that POSOCO would provide the voltage profile inputs at Ranganadi end to CEA & CTU, and based on the inputs, the proposal of installation of 420kV, 80MVAr bus reactor at Ranganadi HEP end would be reviewed.

2.3. A joint study meeting was held on 05.08.2019 (MoM is enclosed at **Annexure-I**), wherein NERLDC presented the voltage profile for the period: April 2018 to April 2019. As per the voltage profile, for about 13-14% of time, the voltage at Ranganadi bus was above 420kV and for about 97-98% of the time, the bus voltage was above 400kV.

2.4. From the load flow studies, it was observed that installation of 80MVAR Bus reactor would lead to a reduction of 4kV, whereas installation of 125MVAR Bus reactor would lead to a reduction of 5kV in voltage. However, due to potential transportation issues, 80 MVAr bus reactor would be installed at Ranganadi.

2.5. Accordingly, it was recommended that 80MVAr bus reactor needs to be installed at Ranganadi HEP by NEEPCO using GIS bays.

2.6. Members may discuss.

3. Interconnection of 132kV substations in upper Assam (below Brahmaputra) with neighbouring substations in Arunachal Pradesh

3.1. In the 1st meeting of NERSCT, requirement of AGBPP (Kathalguri) – Namsai 132 kV link or other alternative proposal of Arunachal Pradesh was discussed and following alternative interconnections at higher voltage levels were suggested:

a) Tinsukia – Namsai 220kV D/c line or

b) AGBPP (Kathalguri) – Namsai 220kV D/c line

3.2. In the above meeting, AEGCL informed that the due to space constraint 220kV bays cannot be constructed at Tinsukia S/s. Accordingly, AGBPP (Kathalguri) – Namsai 220kV D/c line is the feasible option. AEGCL further proposed that the one connection from Jonai (Assam) to Pasighat (Arunachal Pradesh) may also be established for supply power to Arunachal Pradesh. DoP, Arunachal Pradesh proposed that the interconnection could alternatively be terminated at Niglok (Arunachal Pradesh). Accordingly, the proposal of AEGCL and DoP, Arunachal Pradesh regarding Jonai (Assam) to Pasighat (AP) and Niglok (AP), alongwith reactive compensation was referred for study by CEA / CTU. A joint study meeting was held on 05.08.2019 (MoM is enclosed at **Annexure-I**), wherein following were agreed:

(i) Establishment of 220/132kV, 2x100MVA substation at Namsai (New) (Arunachal Pradesh) under ISTS along with following scope:

a) 220kV, 1x31.5MVAr bus reactor

b) Kathalguri (NEEPCO) – Namsai (New) 220kV D/c line

c) 2 no. 220kV lines bays at Kathalguri (NEEPCO)

d) Namsai (POWERGRID) – Namsai (New) 132kV D/c (Zebra) line

e) 2 no. 132kV line bays at Namsai (POWERGRID) S/s

(ii) Interconnections from Jonai or any other point in Assam to Niglok or Passighat in Arunachal Pradesh would be considered with comprehensive proposal of AEGCL.

3.3. Subsequently, NEEPCO vide email dated 06-09-2019 has informed that there is shortage of space in Kathalguri switchyard for accommodating the proposed 2 no. of 220kV bays.

3.4. Members may discuss.

4. Requirement of reactive compensation at Umtru S/s of MePTCL

4.1. In the 1st meeting of NERSCT, the following was agreed:

a) LILO of Kahilipara (Assam) – Umtru (Meghalaya) 132kV D/c lines at Killing S/S (Meghalaya) of MePTCL would be implemented by MePTCL as intrastate scheme of Meghalaya

b) Recondutoring of Umtru – Kahilipara and Umtru – Sarusajai 132kV D/c line with HTLS conductor by AEGCL and MePTCL as intra-state scheme in respective territory along with required strengthening of bay equipment and towers.

c) Study of reactive compensation requirement at Umtru S/s would be discussed in joint study.

4.2. A joint study meeting was held on 05.08.2019. During load flow studies, it was observed that after LILO of Kahilipara - Umtru 132kV D/c lines at Killing S/S of MePTCL, there is improvement of 1kV in the voltage level at Umtru S/s. Meghalaya informed that there is no voltage regulation issue at Umtru S/s.

4.3. As the voltage at Umtru S/s is normal and there would be improvement in voltage after LILO of Kahilipara (Assam) – Umtru (Meghalaya) 132kV D/c lines at Killing S/S (Meghalaya), it was recommended that additional reactive compensation is not required at Umtru S/s.

4.4. Members may discuss.

5. Proposed scheme for relieving congestion in Agia substation of Assam

5.1. In the 1st meeting of NERSCT, the representative of AEGCL informed that load in 220kV substation at Agia has increased due to additional loading on Agia (Assam) - Mendipather (Meghalaya) 132kV line and AEGCL has no tariff benefit due to PoC mechanism. Further, AEGCL proposed that for reducing loading on lines connected with Agia (Assam) substation and enhancing the reliability of power supply in the western parts of Meghalaya, a 220kV substation either in West Garo Hills district or in the East Garo Hills district of Meghalaya is required.

5.2. Accordingly, following intra-state system strengthening in Meghalaya was proposed:

a) Establishment of 220/132kV, 2x160MVA substation at Nangalbibra

b) Mawngap-Nangalbibra 220kV D/c line

5.3. However, MePTCL proposed for additional 400kV link as Meghalaya is fed from only Byrnihat S/s at 400 kV level. Further, AEGCL informed that BTPS-Agia 220kV line is already critically loaded and in case of additional feed from Agia, this line needs to be reconductored. Accordingly, the issue was referred to joint study.

5.4. A joint study meeting was held on 05.08.2019 wherein the following scheme were agreed:

a) Establishment of 220/132kV, 2x160MVA substation at Nangalbibra – under ISTS.

Note: *Sufficient space provision for 400kV up-gradation in future need to be kept at this substation.*

b) Bongaigaon – Nangalbibra 400kV D/c line (initially operated at 220kV) – under ISTS

c) 2 no. 400kV line bays to be vacated after shifting of Alipurduar – Bongaigaon line to Bornagar may be used for termination of the proposed Bongaigaon – Nangalbibra 400kV D/c line **OR** 2 no. new 220kV line bays at Bongaigaon S/s – under ISTS

d) Hatsinghmari (Assam) – Phulbari (Meghalaya) 132kV D/c line – under ISTS

e) Mawngap (Meghalaya) – Nangalbibra (Meghalaya) 220kV D/c line – By MePTCL under intra-state scheme

5.5. Members may discuss.

6. Strengthening of southern part of NER Grid

6.1. In the 1st meeting of NERSCT, representative of POSOCO had stated that outage of Silchar S/s had happened in past due to flooding, therefore some permanent arrangement is required to cater to such natural calamity. POSOCO proposed bypassing 400kV Silchar and forming 400 kV Palatana – Byrnihat S/C and 400 kV Palatana – Azara S/C or 400 kV upcoming ring in NER (400 kV Palatana- Surajmaninagar- P.K.Bari-SilcharPalatana & 400 kV Silchar- Misa - New Mariani- New Kohima- Imphal- Silchar). However, the proposal of POSOCO was not agreed, as per CEA's Manual on Transmission Planning Criteria, outage of 400kV substation has not been mandated under reliability criteria.

6.2. In the above meeting, CTU proposed bypassing PK Bari-Silchar and SilcharImphal 400kV D/c lines (via Silchar Switchyard) under exigencies. The issue was referred for feasibility and reactive compensation to Joint Study.

6.3. A joint study meeting was held on 05.08.2019. In the meeting, CTU stated that the Silchar(Assam)-PK Bari (Tripura) 400kV D/c line (130km) and Silchar(Assam) - Imphal (Manipur) 400kV D/c line (170km) can be bypassed through tie-breaker and by bypassing these lines, PK Bari – Imphal (via Silchar) line 400 kV D/c line can be operated. During planning for 400kV operation of Silchar-Imphal line (initially operated at 132kV), line reactors were not planned at any end. During line charging studies while commissioning of 400kV line, it was observed that on charging of one circuit of Silchar-Imphal line, the source rise at Silchar end is expected to be about 14-15kV and line rise of about 6-7kV, resulting in total rise of about 21-22kV. At present, there is only one 80MVAr bus reactor at Imphal and there are no line reactors at Imphal end.

6.4. It was opined that the proposed bypassing arrangement is to cater to natural calamity. However, during such exigencies, even the bypassing arrangement may not work as the bypassing is proposed through switchyard.

6.5. CTU stated that even without bypassing arrangement, additional reactive compensation may still be required at Imphal end, as Silchar-Imphal line is a long line. As mentioned above, without line reactors rise of about 21-22kV is observed during line charging. As such in NER, over voltage is observed at most of the substations at 400kV level. Accordingly, it is proposed to install line reactors at Imphal end in about 170km long Silchar-Imphal line. Either 63MVAr (56% compensation) or 80MVAr (70% compensation) fixed LR can be installed. With 63MVAr line reactor, the rise reduces from about 22kV to about 6kV and with 80MVAr the same reduces to about 2kV.

6.6. CTU also mentioned that with proposed bypassing arrangement, the length of PK Bari – Imphal line (formed after bypassing PK Bari – Silchar and Silchar – Imphal) becomes about 300km and situation of over voltage further aggravates. On charging of one circuit of PK Bari – Imphal, it is observed that voltage rise at PK Bari end is about 15-16kV and line rise is about 22-23kV i.e. total rise would be about 39kV. With the above proposed 63MVAr line reactor at Imphal end, the total voltage rise would be about 19kV and that with 80MVAr would be about 15kV.

6.7. POSOCO informed that as of now, there are no operational difficulties faced while operating Silchar-Imphal line.

6.8. Accordingly, it was decided that the proposal of bypassing arrangement would be taken up for discussion in the meeting of NERSCT.

6.9. Members may discuss.

7. Reconductoring of Dimapur-Imphal and Leimatak (Loktak)-Jiribam 132kV lines

7.1. In the 1st meeting of NERSCT, Manipur had proposed reconductoring of Dimapur (Nagaland)-Imphal(Manipur) and Leimatak (Loktak, Manipur)-Jiribam (Manipur) 132kV ISTS transmission lines. Further, it was opined that with implementation of under construction 400kV lines, reconductoring of Dimapur-Imphal and Leimatak (Loktak)-Jiribam 132kV lines may not be required. However, MSPCL emphasized that in case of outage of both ckts of 400kV Silchar – Imphal line, problem may arise in meeting the load in Imphal area. Accordingly, the issue of reconductoring of Dimapur-Imphal and Leimatak (Loktak)-Jiribam 132kV lines was referred for review in joint study.

7.2. A joint study meeting was held on 05.08.2019. In the meeting, CTU stated that Silchar – Imphal line is now being operated at 400kV level and New Kohima – Imphal 400kV D/c line is scheduled to be commissioned in July'20. After commissioning of this 400kV line, power flow on Dimapur-Imphal and Leimatak (Loktak)-Jiribam 132kV lines are observed to be well within limits.

7.3. Further, Manipur emphasized that the Dimapur – Imphal and Loktak – Jiribam 132kV lines were commissioned in 1997 and 1989 respectively and being very old are prone of outage. He also stated that load in that area is increasing and it would be difficult to cater the load through these old lines. New Kohima-Imphal 400kV D/c line may not be commissioned before 3 years, due to severe RoW problems.

7.4. After deliberations, it was agreed that reconductoring of Dimapur-Imphal and Leimatak (Loktak)-Jiribam 132kV lines along with strengthening of towers and other line accessories are required.

7.5. Members may discuss.

8. Alternative transmission line for evacuation of power from Tuirial HEP (60MW) of NEEPCO

8.1. Tuirial HEP with installed capacity of 60MW has been commissioned and 100% power is allocated to Mizoram. Tuirial-Kolasib 132kV S/C line (implemented by P&E Dept., Govt. of Mizoram) and Tuirial-Sihhmui 132kV D/c line (to be implemented by NEEPCO/ P&E Dept., Govt of Mizoram) were planned for evacuation of power from Tuirial HEP (60MW). Since, the Tuirial-Sihhmui 132kV D/c line could not be implemented, entire power from Tuirial HEP is being evacuated through Tuirial-Kolasib 132kV S/C line.

8.2. For reliable evacuation of entire power of Tuirial HEP, NEEPCO had informed that in the meeting held on 17-02-2017 between NEEPCO & Secretary, Power & Electricity Department, Govt. of Mizoram, it was decided to explore the possibility of LILO of

Jiribam – Aizawl (Luangmual) 132kV S/C line at Tuirial HEP and the line would be constructed by Mizoram.

8.3. In the 1st NERSCT, representative of NEEPCO informed that NEEPCO and DoP, Mizoram had visited the site. However, issues could not be resolved.

8.4. Further, in the 1st NERSCT, it was suggested that NEEPCO may discuss with Mizoram again and inform the progress to CEA. Thereafter, the matter would be discussed in the next meeting of NERSCT.

8.5. Power & Electricity Dept., Govt. of Mizoram and NEEPCO may update on the matter.

9. Transmission System for Dikshi HEP (24MW) in West Kameng, Arunachal Pradesh

9.1. In the 1st NERSCT, following transmission system for evacuation of power from Dikshi HEP (24MW) in West Kameng, Arunachal Pradesh was agreed:

Transmission element

a) 132kV S/C Dikshi switchyard to Tenga switching station - 10.5 Kms

b) 132kV D/C Tenga switching station to Nechipu LILO connection (on Balipara-Khupi 132kV line) - 21.5 km

Substations

c) 132 kV Tenga switching station with 4 no. of bays

9.2. It was also decided that to control the voltages at Tenga switching station, 145kV, 1x5MVAR bus reactor would be required. DoP, Arunachal Pradesh may inform the implementing agency of bus reactor. It was also decided that the DoP, Arunachal Pradesh would confirm utilisation of 4th bay at Tenga switching station.

9.3. DoP, Arunachal Pradesh may update the status.

10. Re-conductoring of the 132 kV line from Khliehriat to Panchgram by HTLS conductor-Agenda by MePTCL

10.1. MePTCL has informed that the 132 kV Khliehriat - Panchgram S/c line connects the 132 kV Khliehriat substation in Meghalaya and the 132 kV Panchgram substation in Assam. It is an ISTS line between Assam and Meghalaya, owned by respective state utilities on each side, and the line was commissioned in 1983 (more than 35 years in operation). Presently, the loading of the line (ACSR Panther conductor) is restricted to 50MW only. The status/load ability of the 132 kV Khliehriat – Lumshnong – Panchgram line was discussed in the 98th OCC & 22nd PCC meeting of NERPC held on 10th June 2014 at Guwahati, whereby, AEGCL informed that the line is very old and cannot be loaded beyond 50 MW and since then the loading of the line was restricted within 50 MW.

10.2. Accordingly, the proposal for re-conductoring with HTLS conductor by MePTCL was discussed the 18th TCC and 18th NERPC held on 10th & 11th October 2017 for Meghalaya portion.

10.3. MePTCL proposed that NERSCT may approve the up-gradation of 132 kV Khliehriat-Panchgram line with HTLS conductor and the upgradation of work would be implemented by MePTCL.

10.4. Members may discuss.

11. Re-conductoring and strengthening of the 132 kV D/C line from Umiam Stage-I to Umiam Stage-III by HTLS conductor-Agenda by MePTCL

11.1. MePTCL has informed that the 132 kV D/c line from Umiam Stage-I to Umiam Stage-III power station was commissioned in the year 1979. The line is in operation for more than 35 years and has been crossed its useful life. Presently, the loading of the line (ACSR Panther conductor) is restricted to 60MW only. The number of fault like de-capping, snapping of conductors is rising every year and at times hydel power stations have to back down there generation due to restriction of the transmission lines loading, thereby affecting the power supply to the state capital. As such, re-conductoring of the line with HTLS conductor is required to enhance the transmission capacity for relieving congestion for evacuation of power generated by these hydel power stations during the high monsoon and avoid frequent failure of the line and to ensure quality power supply.

11.2. The proposal for re-conductoring with HTLS conductor by MePTCL was discussed in the 18th TCC and 18th NERPC held on 10th & 11th October 2017.

11.3. MePTCL proposed that NERSCT may approve the re-conductoring and strengthening of the 132 kV D/C line Umiam stage-I to Umiam stage-III by HTLS conductor because line is about 35 year old and it has been crossed its useful life.

11.4. Members may discuss.

12. Modifications in enhancement of Intra-state Transmission system of Assam-Agenda by AEGCL

12.1. AEGCL have informed that as per the vision of Govt. of India “24x7 Power for all” and 13th Five Year Plan, AEGCL has submitted proposal for **“Enhancement of Intra State Transmission System”** the components of which had been approved in the 1st NERSCT meeting and by CEA vide its letter No. CEA-PS-12-16/13/2018-PSPA-II Division dated 11.01.2019. Out of 24 (twenty four) nos. of approved substations and its associated transmission lines, AEGCL, after discussion with the primary funding authority (Asian Infrastructure Investment Bank, Beijing), has decided to carry out the execution in two phases.

12.2. The 1st phase consists of 15 nos. of new substations along with the associated transmission lines (viz. Sl. Nos.1,2,3,4,7,9,11,12,14,16,17,19,21,23,24 as per the letter of approval from CEA vide No. CEA-PS-12-16/13/2018-PSPA-II Division dated 11.01.2019. The remaining 9 nos. of substations shall be considered in the 2nd phase.

12.3. As of now, AEGCL has finalized land and started preliminary works like Route Survey, Soil investigation and Preparation of Master plan for the 15 nos. of substations in 1st phase as mentioned above. While carrying out the Preliminary Route Survey, the surveyor as well as AEGCL field offices have suggested some modifications to avoid

tough Right of Way (RoW) as per site location. Considering the aforementioned modifications on the earlier approved DPR, system studies has been carried out by Planning& Engineering (P&E) Wing of AEGCL. The details of proposed modifications in "Enhancement of Intra-state Transmission system of Assam" is given at **Annexure-II.** All other project components as agreed in the 1st meeting of NERSCT will remain unchanged.

12.4. Members may discuss.

13. New Proposals of Assam considering load forecast for the year 2030-Agenda by AEGCL.

13.1. AEGCL have informed that to ensure universal access to affordable, reliable and modern energy services under **"SUSTAINABLE DEVELOPMENT GOAL -7"** the Govt. of Assam envisages a proposal for electrification of 87 lakhs households by the year 2030. The inference from the indicated graph is that by the year 2027, this household number is at least 81 lakh. Now, assuming an average load connectivity of 1kW per household (after duly considering the diversity factor at a maximum of 2.00), the domestic load will be a minimum of 4050 MW by the year 2027. About 1012 MW (one fourth of this domestic load) may be considered as commercial and small scale industrial load. There will be at least 500MW of additional load for the development of industrial belt proposed by the Govt. of Assam, during this period. This adds up to 4050 + 1012 + 500 = 5562 MW. Thus, the state demand will approach at least 5500 MW by the year 2027. At a conservative growth of demand @ 5.5% per annum the demand is likely to touch 6450 by the year 2030.

13.2. To cater to this load growth up to 2030, AEGCL has prepared a DPR for establishment of 28 new sub-stations and associated lines for expansion of its network for meeting the demand of more than 6000MW by the year 2030.

13.3. In addition to the 28 nos. of substations and associated transmission lines, for achieving better connectivity of the new proposed network with the existing network as well as greater stability of the new proposed system, AEGCL have also proposed three new transmission lines.

13.4. The list of proposed 28 nos. of new substations and associated transmission lines along three new transmission lines is enclosed as **Annexure –III.**

13.5. Members may discuss.

14. Operational Constraints in North Eastern Region - Agenda by POSOCO

14.1. POSOCO have informed that following operational constraints had observed in NER:

a) Transmission line constraints
b) ICT Constraints
c) High voltage at Node

14.2. Details of each operational constraints are given at **Annexure-IV. POSOCO may present.**

14.3. Member may discuss.

15. Establishment of 7x167 MVA, 400/220 kV GIS substation at New Kohima in place of conventional substation under NERSS-VI

15.1. The issue of changing of conventional S/s at 400/220 kV New Kohima to GIS S/s under NERSS-VI was discussed in the meeting chaired by Member (Power System), CEA on 28.05.2018. The 400/220 kV substation at New Kohima is being implemented by M/s Kohima Mariani Transmission Limited (KMTL).

15.2. Due to hilly terrain and constraint in availability of land for 400/220 kV New Kohima S/s, following were agreed in the meeting:

(i) KMTL shall establish a 7x167 MVA, 400/220 kV GIS substation at New Kohima in place of conventional substation with no implication on cost, tariff and time schedule of transmission project.

(ii) The switching scheme for GIS substation would be same as indicated for AIS in TSA/RFP document.

(iii) The modifications in the transmission scheme (NERSS-VI) would be ratified in next standing committee of power system for NER.

15.3. Members may concur.

16. Downstream system development by STUs from the various commissioned and on-going ISTS substations

16.1. The downstream 220kV or 132kV system to be developed by ISTS licensee/ STUs from the various commissioned /on-going ISTS substations is as below:

Sl. No.	ISTS S/s	Voltage ratio, Trans. Cap	Voltage level (kV)	Total no. of Bays	Lines emanating from S/s	No. of circuit	Status of Line	Remarks
1	Surajmaninagar	400/132kV, 2x315MVA	132	2 - (RfP Schedule Jul 2020)	Surajmaninagar (TSECL) – Surajmaninagar (TBCB)	2	Tripura to update	NERSS-V
2	P. K. Bari	400/132kV, 2x315MVA	132	2 - (RfP Schedule Jul 2020)	P. K. Bari (TSECL) – P. K. Bari (TBCB)	2	Tripura to update	NERSS-V
3	New Mariani	400/220kV, 2x500MVA	220	Jul 2020	New Mariani – Mariani	2	Assam to update	NERSS-VI
4	New Kohima	400/220kV, 2x500MVA	220	2 - (RfP Schedule Jul 2020)	New Kohima (TBCB) – New Kohima (Nagaland)	2	Nagaland to update	NERSS-VI

16.2. DoP Nagaland, vide letter No. CEL/TB/NERSS/692 dated 11th October 2019 informed that it is not possible for DoP Nagaland to develop the downstream transmission system element on its own with no funding arrangement from the state resources.

16.3. Members may update.

17. Re-routing of 132 kV D/C Transmission Line from R.C Nagar (AGTCCPP, NEEPCO) to P.K Bari (TSECL) under TBCB through existing TSECL Bodhjungnagar 132 kV Sub-station

17.1. In the 1st NERSCT, representative of TSECL informed that R.C Nagar (NEEPCO) to P.K Bari (TSECL) 132kV D/c line is being implementing under TBCB. Bodhjungnagar S/s is only 1km away from AGTPP (NEEPCO). TSECL proposed for rerouting of under construction AGTCCPP (NEEPCO) – P.K. Bari (TSECL) 132 kV D/c line through 132 kV Bodhjungnagar Substation (TSECL) with associated bays to prevent intra-state grid congestion.

17.2. It was suggested that AGTPP (NEEPCO) - P.K Bari (TSECL) 132kV D/c line is already under implementation under TBCB and change in scope scheme would involve commercial, regulatory and contractual issues. Therefore, it may not be advisable to reroute the line under the scope of the TSP implementing this project under TBCB.

17.3. In the 1st NERSCT, it was agreed that the proposal of TSECL may be explored for implementation under inter-state or intra-state transmission system strengthening and matter would be discussed in next meeting of NERSCT.

17.4. Members may discuss.

18. Modifications in NERSS-V scheme and Surajmaninagar- Comilla (North) 400 kV link

18.1. The following system was agreed in the 5th SCM of NER held on 08-08-2015 to meet the growing demand of the State of Tripura and to provide alternate evacuation path to Palatana (726MW) generation project:

Under the scope of ISTS / Implementation through TBCB

- New 400/132kV, 2x315MVA substations each at Surajmani Nagar and PK Bari (through TBCB)
- Surajmani Nagar – PK Bari 400kV D/c line (through TBCB)
- Termination of Palatana – Surajmani Nagar & PK Bari – Silchar (POWERGRID) 400kV D/c lines (presently operated at 132kV) at 400kV buses of respective substation (under scope of POWERGRID) along with associated bays for 400kV operation of the lines.

Under the scope of TSECL

- Surajmani Nagar (ISTS) – Surajmani Nagar (TSECL) 132kV D/c line with high capacity/ HTLS (equivalent of single moose) (by TSECL)
- P.K. Bari (ISTS) – P.K. Bari (TSECL) 132kV D/c line with high capacity/ HTLS (equivalent of single moose) (by TSECL)

18.2. The major portion of the project (ISTS) is being executed by NER II Transmission Limited with completion by July 2020.

18.3. In the 2nd meeting of Empowered Committee on Transmission held on 06.08.2018 following Indian Portion for 500MW HVDC back -to -back station at North Comilia

(Bangladesh) for transfer of power through Surjamaninagar (India)-North Comilia (Bangladesh) was agreed for implementation under RTM

(a) Operation of Surajmaninagar (TSECL) - North Comilia 400kV D/c line (presently operated at 132kV) at 400kV through termination at 400kV bus of Surajmaninagar S/s - implementation under RTM by POWERGRID

(b) 2 nos. 400kV line bays at Surajmaninagar S/s for termination of Surajmaninagar (TSECL) - North Comilia 400kV D/C line – implementation under RTM by the owner of the ISTS substation i.e. NER II Transmission Ltd. an ISTS Transmission Licensee.

18.4. Further, in the 1st meeting of NERSCT following were agreed:

(i) Modification in part scope of the scheme – "POWERGRID works associated with NERSS-V" (**Subject to views of TSECL**)

Earlier scope:

- Additional 400kV D/c line at Surajmani Nagar end for termination of Palatana – Surajmani Nagar 400kV D/c line (op. at 132kV) line at 400kV Surajmani Nagar (ISTS) S/s

Revised scope:

- LILO of Palatana – Surajmani Nagar (TSECL) 400kV D/c line (op. at 132kV) at Surajmani Nagar (ISTS) S/s and operation of Palatana – Surajmani Nagar (ISTS) section at rated voltage level of 400kV & operation of Surajmani Nagar (TSECL) – Surajmani Nagar (ISTS) section at 132kV (with provision to operate the line at 400kV level in future, as and when required).

(ii) Upgradation of 132kV Surajmani Nagar (TSECL) S/s to 400kV level, can be examined when TSECL submits relevant study alongwith system data and load growth/generation addition planned in Tripura.

18.5. Subsequently, "System study report considering Present and Future Load Growth Projection for the State of Tripura" was submitted by TSECL through email on 23-Jan-2019. Further, MoP vide letter dated 07.02.2019 directed CEA to discuss with TSECL for their proposal for up-gradation of TSECL's 132 kV Surajamaninagar S/s into 400 kV substation and submit its report/recommendation to MoP. A study report on Tripura's proposal for upgradation of TSECL's 132kV Surajamaninagar substation into 400kV substation was submitted to MoP vide CEA letter dated 06.06.2019. In the report , it was submitted that following 400kV transmission system strengthening works will be required:

(i) By Tripura State Electricity Corporation Limited (TSECL)

a. Upgradation of existing 132kV substation at Surajamaninagar of TSECL to 400/132 kV, 7x105MVA (1-phase) (Tripura/TSECL should also plan suitable 132kV outgoing transmission lines at this upgraded sub-station and also at the under construction Surajamaninagar ISTS)

(ii) Under ISTS

a. Surajamaninagar (TSECL) – Surajamaninagar (ISTS) 400kV D/C line

b. 2 nos. of 400 kV bays at Surajamaninagar (TSECL)

c. 2 nos. of 400 kV bays at Surajamaninagar (ISTS)

18.6. In 17th Indo-Bangladesh JSC/JWG meeting held on 26th August, 2019 in Dhaka, Bangladesh, following were decided:

a) Operation of Surajmaninagar-Comilla 400 kV D/c line (presently operated at 132 kV level) as its rated voltage along with 500 MW HVDC terminal at Comilla would not be required considering technical and financial grounds. Hence, further works related to this project on the both sides may be dropped.

b) In future JSC, only working of these transmission lines would be monitored.

18.7. Members may discuss.

19. Implementation of 132kV line bay at Palatana generation switchyard

19.1. Palatana – Surajmaninagar 400kV D/c line (presently operating at 132 kV) has been commissioned as part of Palatana-Bongaigaon transmission system. At present, 2 nos. 132kV line bays are available at Palatana end. Palatana – Udaipur 132kV S/c line of Tripura has been terminated in one bay and one ckt. of Palatana – Surajmaninagar D/c line is terminated in the other bay. Other ckt. of Palatana – Surajmaninagar D/c line is yet to be connected at Palatana end.

19.2. In the 1st NERSCT, representative of TSECL informed that they are constructing Monarchak – Surajmaninagar 132kV D/c line. However, due to severe RoW issues, the line is getting delayed and at least 6 months are required to complete the line. After completion of the line, Palatana – Udaipur 132kV S/c line would be opened to enable termination of 2nd circuit of Palatana – Surajmaninagar line at Palatana end.

19.3. In respect of opening of Palatana – Udaipur 132kV S/c line for termination of 2nd circuit of Palatana – Surajmaninagar line at Palatana end, in the 1st NERSCT, it was agreed to retain the connection of Palatana – Udaipur line in Surajmaninagar line bays at Palatana end for additional six months (upto May 2019). It was emphasized that Tripura may expeditiously complete the Monarchak – Surajmaninagar line to avoid further time extension.

19.4. TSECL may update on the matter.

20. Utilisation of spare 132kV ISTS bays at Silchar (POWERGRID), P.K.Bari (TSECL), Palatana (OTPC), and Surajmaninagar (TSECL)

20.1. After operation of Silchar – Imphal 400kV D/c lines (initially operated at 132kV) at rated voltage level of 400kV and upon operation of Palatana – Surajmaninagar and Silchar – P.K.Bari 400kV D/c lines (initially operated at 132kV) at rated voltage level of 400kV, following 132kV ISTS bays are / would be vacant, which could be utilised by NER states for construction of new outlets:

Substation	Upgraded 400kV line	No. of vacant bays	Bays vacant from	New transmission line for termination in	Expected commissioning

				vacant bays	
Silchar 400/132kV (POWERGRID)	Silchar – Imphal	2 *(Imphal end bays have already been utilised for termination of 400/132kV, 2x315MVA ICTs)*	Jan 2019	Silchar – Ghungur 132kV S/c Silchar – Udarbond 132kV S/c	Dec 2021
Silchar 400/132kV (POWERGRID)	Silchar – P.K.Bari	2	Expected from Jul 2020	-	AEGCL may identify.
P.K.Bari (TSECL) 132kV S/s	Silchar – P.K.Bari	2	Expected from Jul 2020	P.K.Bari (ISTS) – P.K.Bari (TSECL) 132kV D/c line	TSECL may update.
Palatana (OTPC)	Palatana – Surajmaninagar	2	Expected from Jul 2020	-	TSECL may identify.
Surajmaninagar (TSECL) 132kV S/s	Palatana – Surajmaninagar	2	Expected from Jul 2020	-	TSECL may identify.

20.2.AEGCL and TSECL may update on the matter.

ANNEXURE-I

सत्यमेव जयते

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केंद्रीय विद्युत प्राधिकरण
Central Electricity Authority
विद्युत प्रणाली योजना एवं मूल्यांकन प्रभाग -II
Power System Planning & Appraisal Division-II

सेवा में

As per list of Addresses

विषय: Minutes of the meeting of Joint System Study on issues referred by North Eastern Region Standing Committee on Transmission (NERSCT) in its 1st meeting.

महोदय,

A meeting was held on 5th August, 2019 at Gurugram, Haryana for joint study on the issues referred by NERSCT in its 1st meeting.

The minutes of the meeting are enclosed herewith.

भवदीय,

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

सेवा भवन, आर. के. पुरम-I, नई दिल्ली-110066 टेलीफैक्स: 011-26198092 ईमेल: cea-PSPA-II2@gov.in वेबसाइट: www.cea.nic.in
Sewa Bhawan, R.K Puram-I, New Delhi-110066 Telefax: 011-26198092 Email: cea-PSPA-II2@gov.in Website: www.cea.nic.in

List of Addresses:

1	The Member Secretary, North Eastern Regional Power Committee(NERPC), Meghalaya State Housing Finance Co-Operative Society Ltd. Building Nongrim Hills, Shillong (Meghalaya) – 793003	2	COO(CTU-Planning), Power Grid Corporation of India Ltd., "Saudamini" Plot no-2, Sector-29, Gurgoan- 122001, Haryana
3	Executive Director National Load Despatch Centre B-9, Qutab Institutional Area New Delhi-110016	4	Executive Director , North Eastern Load Despatch Centre (NERLDC), Power System Corporation Operation Limited (POSOCO) POWERGRID Complex, Dongteih, Lower Nongrah, Lapalang, Shillong- 793006, Meghalaya, India
5	Engineer-in-Chief Power & Electricity Department, Govt. of Mizoram, Tuikhuahtlang, Aizawl (Mizoram)	6	The Managing Director, Assam Electricity Grid Corporation Limited, Bijulee Bhawan; Paltan Bazar, Guwahati (Assam) – 781001.
7	The Managing Director, Manipur State Power Company Ltd. (MSPCL), Electricity Complex, Patta No. 1293 under 87(2), Khwai Bazar, Keishampat, District – Imphal West, Manipur – 795001	8	The Chief Engineer (Power), Vidyut Bhawan, Department of Power, Zero Point Tinali, Itanagar (Arunachal Pradesh) – 791111.
9	The Chairman-cum-Managing Director, Tripura State Electricity Corporation Limited, Bidyut Bhavan, Banamalipur, Agartala, Tripura.	10	The Chief Engineer, Department of Power, Nagaland, Kohima
11	The Chairman-cum-Managing Director, Meghalaya Power Transmission Corporation Limited, Lum Jingshai, Short Round Road, Shillong (Meghalaya) – 793001.		

Copy to:

PPS to Member (PS), Central Electricity Authority, Sewa Bhawan, R. K. Puram, New Delhi

Minutes of the meeting of Joint Study on issue referred by 1st NERSCT held on 05.08.2019 at Gurugram

List of the participants is enclosed at **Annexure-I.**

Director (PSPA-II) welcomed Sh. A.K. Thakur, MS (NERPC) and other participants. Thereafter, the following agenda points were deliberated.

1. Installation of 420kV, 80MVAr bus reactor at Ranganadi HEP

1.1. Director (PSPA-II), CEA stated that in the 07th meeting of Standing Committee on Power System Planning of North Eastern Region (SCPSPNER) held on 17.05.2018, it was agreed that NEEPCO would install 1x80MVAR, 420kV Bus reactor along with associated GIS Bay by NEEPCO at Ranganadi.

1.2. In the 1st meeting of North Eastern Region Standing Committee on Transmission (NERSCT), SE, NERPC opined that the proposed reactor at Ranganadi might be installed by transmission utility. Further, it was pointed out that there is space constraint at Ranganadi for installation of bus reactor. In the meeting, it was also agreed that POSOCO would provide the voltage profile inputs at Ranganadi end to CEA & CTU, and based on the inputs, the proposal of installation of 420kV, 80MVAr bus reactor at Ranganadi HEP end would be reviewed.

1.3. NERLDC presented the voltage profile for the period: April 2018 to April 2019 (attached at Annexure-II). As per the voltage profile, for about 13-14% of time, the voltage at Ranganadi bus was above 420kV and for about 97-98% of the time, the bus voltage was above 400kV.

1.4. SE (NERPC) stated that as per the information received from NEEPCO, there is no space constraint in Ranganadi. However, it was opined that there may be transportation problem in large size reactor. He enquired whether the installation of reactor can be taken under ISTS.

1.5. Director (PSPA-II), CEA stated that as discussed earlier in the 1st meeting of NERSCT, installation of reactor at Ranganadi is technically required and it has to be installed by Generator. However, NEEPCO can apply for generation tariff revision to CERC.

1.6. From the load flow studies, it was observed that installation of 80MVAR Bus reactor would lead to a reduction of 4kV whereas installation of 125MVAR Bus reactor would lead to a reduction of 5kV in voltage. However,due to transportation problem, it is agreed that 80 MVAr bus reactor would be installed at Ranganadi.

1.7. Accordingly, it was agreed that 80MVAr bus reactor needs to be installed at Ranganadi HEP by NEEPCO using GIS bays.

2. Interconnection of 132kV substations in upper Assam (below Brahmaputra) with neighbouring substations in Arunachal Pradesh

2.1. Director (PSPA-II), CEA stated that in the 1st meeting of NERSCT, requirement of AGBPP (Kathalguri) – Namsai 132 kV link or other alternative proposal of

Arunachal Pradesh was discussed and following alternative interconnections at higher voltage levels were suggested:

a) Tinsukia – Namsai 220kV D/c line or

b) AGBPP (Kathalguri) – Namsai 220kV D/c line

2.2. In the above meeting, AEGCL informed that the due to space constraint 220kV bays cannot be constructed at Tinsukia S/s. Accordingly, AGBPP (Kathalguri) – Namsai 220kV D/c line is the feasible option. AEGCL further proposed that the one connection from Jonai (Assam) to Pasighat (Arunachal Pradesh) may also be established for supply power to Arunachal Pradesh. DoP, Arunachal Pradesh proposed that the interconnection could alternatively be terminated at Niglok (Arunachal Pradesh).

2.3. Accordingly, the proposal of AEGCL and DoP, Arunachal Pradesh regarding Jonai (Assam) to Pasighat (AP) and Niglok (AP), alongwith reactive compensation was referred for study by CEA / CTU.

2.4. CTU informed that in the study, 132kV Roing (Arunachal Pradesh) to Chapakhowa (Assam) D/c line is considered. However, inside Arunachal Pradesh, the total line length of 132kV S/c corridor from Roing to Deomali is about 350km. Therefore voltage profile for this long radial interconnection between Roing (Arunachal Pradesh) to Chapakhowa (Assam) may not be stable.

2.5. CTU further stated that outage of Deomali ICT (there is only one ICT at Deomali) or Deomali-Khonsa line, results into very low voltage and ultimately system collapses. Thus, an additional feed to this long link is required. CTU proposed to establish Kathalguri-Namsai 220kV D/c line along with upgradation of Namsai S/s to 220kV. With this interconnection, about 70MW flows towards Namsai, in case of outage of Deomali-Khonsa line or Deomali ICT.

2.6. DoP, Arunachal Pradesh proposed that additional links from Jonai (Assam) to Pasighat (AP) and Niglok (AP) may also be considered.

2.7. AEGCL also proposed connectivity to Arunachal Pradesh from between Jonai S/s or Silapathar S/s. He stated that they had made a comprehensive plan for upto 2030.

2.8. Director (PSPA-II) stated that as Jonai (Assam) S/s have not yet been planned, the proposed connectivity between Assam and Arunachal Pradesh would be considered with comprehensive proposal of Assam.

2.9. CTU suggested that DoP, Arunachal Pradesh may explore the possibility of connection between Naharlagun (old) to Naharlagun (new) to improve system reliability.

2.10. After deliberations, the following were agreed:

(i) Establishment of 220/132kV, 2x100MVA substation at Namsai (New) (Arunachal Pradesh) under ISTS along with following scope:

a) 220kV, 1x31.5MVAr bus reactor

b) Kathalguri (NEEPCO) – Namsai (New) 220kV D/c line

c) 2 no. 220kV lines bays at Kathalguri (NEEPCO)

d) Namsai (POWERGRID) – Namsai (New) 132kV D/c (Zebra) line

e) 2 no. 132kV line bays at Namsai (POWERGRID) S/s

(ii) Interconnections from Jonai or any other point in Assam to Niglok or Passighat in Arunachal Pradesh would be considered with comprehensive proposal of AEGCL.

3. Requirement of Reactive compensation at Umtru S/s of MePTCL:

3.1. Director (PSPA-II), CEA stated that in the 1st meeting of NERSCT, the following was agreed

a) LILO of Kahilipara (Assam) – Umtru (Meghalaya) 132kV D/c lines at Killing S/S (Meghalaya) of MePTCL would be implemented by MePTCL as intra-state scheme of Meghalaya

b) Recondutoring of Umtru – Kahilipara and Umtru – Sarusajai 132kV D/c line with HTLS conductor by AEGCL and MePTCL as intra-state scheme in respective territory along with required strengthening of bay equipment and towers.

c) Study of reactive compensation requirement at Umtru S/s would be discussed in joint study.

3.2. From the load flow studies, it was observed that after LILO of Kahilipara - Umtru 132kV D/c lines at Killing S/S of MePTCL, there is improvement of 1kV in the voltage level at Umtru S/s.

3.3. Representatives of Meghalaya stated that there is no voltage regulation issue at Umtru S/s.

3.4. As the voltage at Umtru S/s is normal and there would be improvement in voltage after LILO of Kahilipara (Assam) – Umtru (Meghalaya) 132kV D/c lines at Killing S/S (Meghalaya), it was agreed that additional reactive compensation is not required at Umtru S/s.

4. Proposed scheme for relieving congestion in Agia substation of Assam

4.1. Director (PSPA-II), CEA stated that in the 1st meeting of NERSCT, the representative of AEGCL informed that load in 220kV substation at Agia has increased due to additional loading on Agia (Assam) - Mendipather (Meghalaya) 132kV line. Further, AEGCL has no tariff benefit due to PoC mechanism.

4.2. AEGCL proposed that for reducing loading on lines connected with Agia (Assam) substation and enhancing the reliability of power supply in the western parts of Meghalaya, a 220kV substation either in West Garo Hills district or in the East Garo Hills district of Meghalaya is required.

4.3. Accordingly, following intra-state system strengthening in Meghalaya was proposed:

(a) Establishment of 220/132kV, 2x160MVA substation at Nangalbibra

(b) Mawngap-Nangalbibra 220kV D/c line

4.4. However, MePTCL proposed for additional 400kV link as Meghalaya is fed from only Byrnihat S/s at 400 kV level. Further, AEGCL informed that BTPS-Agia 220kV line is already critically loaded and in case of additional feed from Agia, this line needs to be reconductored. Accordingly, the issue was referred to joint study.

4.5. CTU suggested that in order to relieve loading on BTPS – Agia 220kV D/c and Agia – Mendipathar 132kV S/c lines, a new substation of 220kV or 400kV in western part of Meghalaya at Nangalbibra may be planned with connectivity from Bongaigaon. The new substation will also provide alternate supply to state from ISTS, apart from Byrnihat. However, Mawngap-Nangalbibra 220kV link would also be required for reliable power supply in Meghalaya.

4.6. From the studies, it was observed that with proposed 400kV system viz. Bongaigaon – Nangalbibra 400kV D/c line (about 140km), about 300MW flows to Nangalbibra. It relieves loading on BTPS – Agia 220kV D/c line by about 50MW and on Agia ICTs by about 50-60MW.

4.7. In case of 220kV system viz. Bongaigaon – Nangalbibra 400kV D/c line (initially operated at 220kV), about 215MW flows to Nangalbibra. It relieves loading on BTPS – Agia 220kV D/c line by about 40MW and on Agia ICTs by about 40-50MW.

4.8. Director (PSPA-II) stated that line from Bongaigaon to western part of Meghalaya would require Brahmaputra river crossing. It would be appropriate to cross the river at 400kV parameters. Accordingly, line can be built of 400kV (charged at 220kV initially).

4.9. Further, AEGCL informed that they are establishing Hatsinghmari 132/33kV, 2x25MVA new substation along with Agia – Hatsinghmari 132kV S/c line (110km).

4.10. MePTCL informed that the Phulbari 132kV S/s is being established under NERPSIP, which is about 10km from the Hatsinghmari S/s. They further informed that Phulbari S/s is about 150km from Nangalbibra. MePTCL proposed 132kV interconnection from Hatsinghmari to Phulbari so as provide double feed to both the 132kV substations and also improve reliability of power supply.

4.11. After detailed discussion following scheme was agreed:

(a) Establishment of 220/132kV, 2x160MVA substation at Nangalbibra – under ISTS.

Note: *If 220kV system is implemented as ISTS (under TBCB), sufficient space provision for 400kV up-gradation in future need to be kept at TBCB substation.*

(b) Bongaigaon – Nangalbibra 400kV D/c line (initially operated at 220kV) – under ISTS

(c) 2 no. 400kV line bays to be vacated after shifting of Alipurduar – Bongaigaon line to Bornagar may be used for termination of the

proposed Bongaigaon – Nangalbibra 400kV D/c line **OR** 2 no. new 220kV line bays at Bongaigaon S/s – under ISTS

(d) Hatsinghmari (Assam) – Phulbari (Meghalaya) 132kV D/c line – under ISTS

(e) Mawngap (Meghalaya) – Nangalbibra(Meghalaya) 220kV D/c line – By MePTCL under intra-state scheme

5. Strengthening of southern part of NER Grid

5.1. Director (PSPA-II), CEA stated that in the 1st meeting of NERSCT, representative of POSOCO had stated that outage of Silchar S/s had happened in past due to flooding, therefore some permanent arrangement is required to cater to such natural calamity. POSOCO proposed bypassing 400kV Silchar and forming 400 kV Palatana – Byrnihat S/C and 400 kV Palatana – Azara S/C or 400 kV upcoming ring in NER (400 kV Palatana- Surajmaninagar- P.K.Bari- Silchar- Palatana & 400 kV Silchar- Misa - New Mariani- New Kohima- Imphal- Silchar). However, the proposal of POSOCO was not agreed, as per CEA's Manual on Transmission Planning Criteria, outage of 400kV substation has not been mandated under reliability criteria.

5.2. In the above meeting, CTU proposed bypassing PK Bari-Silchar and Silchar-Imphal 400kV D/c lines (via Silchar Switchyard) under exigencies. The issue was referred for feasibility and reactive compensation to Joint Study.

5.3. CTU stated that the Silchar(Assam)-PK Bari (Tripura) 400kV D/c line (130km) and Silchar(Assam) - Imphal (Manipur) 400kV D/c line (170km) can be bypassed through tie-breaker and by bypassing these lines, PK Bari – Imphal (via Silchar) line 400 kV D/c line can be operated. Further, CTU stated that during planning for 400kV operation of Silchar-Imphal line (initially operated at 132kV), line reactors were not planned at any end. During line charging studies while commissioning of 400kV line, it was observed that on charging of one circuit of Silchar-Imphal line, the source rise at Silchar end is expected to be about 14-15kV and line rise of about 6-7kV, resulting in total rise of about 21-22kV. At present, there is only one 80MVAr bus reactor at Imphal and there are no line reactors at Imphal end.

5.4. It was opined that the proposed bypassing arrangement is to cater to natural calamity. However, during such exigencies, even the bypassing arrangement may not work as the bypassing is proposed through switchyard.

5.5. CTU stated that even without bypassing arrangement, additional reactive compensation may still be required at Imphal end, as Silchar-Imphal line is a long line. As mentioned above, without line reactors rise of about 21-22kV is observed during line charging. As such in NER, over voltage is observed at most of the substations at 400kV level. Accordingly, it is proposed to install line reactors at Imphal end in about 170km long Silchar-Imphal line. Either 63MVAr (56% compensation) or 80MVAr (70% compensation) fixed LR can be installed. With 63MVAr line reactor the rise reduces from about 22kV to about 6kV and with 80MVAr the same reduces to about 2kV.

5.6. CTU also mentioned that with proposed bypassing arrangement, the length of PK Bari – Imphal line (formed after bypassing PK Bari – Silchar and Silchar – Imphal) becomes about 300km and situation of over voltage further aggravates. On charging of one circuit of PK Bari – Imphal, it is observed that voltage rise at PK Bari end is about 15-16kV and line rise is about 22-23kV i.e. total rise would be about 39kV. With the above proposed 63MVAr line reactor at Imphal end, the total voltage rise would be about 19kV and that with 80MVAr would be about 15kV.

5.7. On enquiry from Director (PSPA-II), CEA, POSOCO informed that as of now, there are no operational difficulties faced while operating Silchar-Imphal line.

5.8. Accordingly, it was decided that the proposal of bypassing arrangement would be taken up for discussion in the meeting of NERSCT.

6. Reconductoring of Dimapur-Imphal and Leimatak (Loktak)-Jiribam 132kV lines

6.1. Director (PSPA-II), CEA stated that in the 1st meeting of NERSCT, Manipur had proposed reconductoring of Dimapur(Nagaland)-Imphal(Manipur) and Leimatak (Loktak, Manipur)-Jiribam (Manipur) 132kV ISTS transmission lines. Further, it was opined that with implementation of under construction 400kV lines, reconductoring of Dimapur-Imphal and Leimatak (Loktak)-Jiribam 132kV lines may not be required. However, MSPCL emphasized that in case of outage of both ckts of 400kV Silchar – Imphal line, problem may arise in meeting the load in Imphal area. Accordingly, the issue of reconductoring of Dimapur-Imphal and Leimatak (Loktak)-Jiribam 132kV lines was referred for review in joint study.

6.2. Representative of CTU stated that Silchar – Imphal has been commissioned and New Kohima – Imphal 400kV D/c line is scheduled to be commissioned in July'20. After commissioning of this 400kV line, power flow on Dimapur-Imphal and Leimatak (Loktak)-Jiribam 132kV lines are observed to be well within limits.

6.3. Manipur emphasized that the Dimapur – Imphal and Loktak – Jiribam 132kV lines were commissioned in 1997 and 1989 respectively and being very old are prone of outage. He also stated that load in that area is increasing and it would be difficult to cater the load through these old lines. Further, New Kohima-Imphal 400kV D/c line may not be commissioned before 3 years, due to severe RoW problems.

6.4. After deliberations, it was agreed that reconductoring of Dimapur-Imphal and Leimatak (Loktak)-Jiribam 132kV lines along with strengthening of towers and other line accessories are required.

7. Construction of a new 400kV substation in upper Assam area (above Brahmaputra)

7.1. In the 1st meeting of NERSCT, the issue of establishment of 400kV S/s in upper Assam was discussed and the following connectivity was proposed in upper Assam area (above Brahmaputra).

(a) Biswanath Chariali – Gogamukh 400kV D/c (Twin Lapwing) line using one of the 400kV D/c line of Biswanath Chariali – Lower Subansiri 2xD/c (Twin Lapwing) lines

(b) Gogamukh – Bihpuria 220kV D/c line

(c) LILO of North Lakhimpur – Dhemaji 132kV S/c line at Gogamukh

7.2. However, AEGCL wanted further deliberations on the same and the issue was referred for Joint Study.

7.3. AEGCL informed that they have developed a comprehensive plan for providing reliable power supply to areas of upper Assam for 2022 and 2030 time-frames. The plan inter alia includes creation of various new 400kV and 220kV substations in upper Assam area like 400 kV S/s at Silapathar and Namrup(Naharkatia) for 2030 in upper Assam. Proposed 400 kV Silapathar S/s would be connected to 400 kV Mariani S/s (existing) through Silapathar- Namrup (Naharkatia)- Mariani S/s link.

7.4. Director (PSPA-II) stated that the proposal of AEGCL has not been received by CEA.

7.5. AEGCL was advised to provide the study report for proposed power supply arrangement in upper Assam, as per their plan.

8. Allotment of two no. of 400kV line bays at Biswanath Chariali HVDC Station for Assam

8.1. AEGCL informed that they have developed a comprehensive plan for providing reliable power supply to areas of upper Assam for 2022 and 2030 time-frames. The plan inter alia includes creation of various new 400kV and 220kV substations in upper Assam area like 400 kV S/s at Silapathar and Namrup(Naharkatia) for 2030 in upper Assam. Proposed 400 kV Silapathar S/s would be connected to 400 kV Mariani S/s (existing) through Silapathar- Namrup (Naharkatia)- Mariani S/s link.

8.2. Director (PSPA-II) stated that the proposal of AEGCL has not been received by CEA.

8.3. AEGCL was advised to provide the study report for proposed power supply arrangement in upper Assam, as per their plan.

***

ANNEXURE-I

List of Participants:

Sl. No.	NAME	DESIGNATION
Central Electricity Authority		
1	B.S. Bairwa	Director (PSPA-II)
2	Satyendra Kr. Dotan	Dy. Director (PSPA-II)
3	Deepanshu Rastogi	Asst. Director (PSPA-II)
NERPC		
1	A.K. Thakur	Member Secretary
2	B. Lyngkhoi	Superintendent Engineer
POWERGRID		
1	Ashok Pal	CGM (CTU-Plg)
2	Manish R. Keshari	Dy. Manager (CTU-Plg)
3	Anupam Kumar	Dy. Manager (CTU-Plg)
4	Dwaipayan Sen	Dy. Manager (CTU-Plg)
NERLDC/POSOCO		
1	Palash Jyoti Borah	Dy.Manager
AEGCL		
1	A.Bhattacharjee	AGM
2	G.K. Bhuyan	DGM
3	Neelkamal Sharma	Asst.Manager
MSPCL		
1	S. Priyananda Singh	DGM/TD-I
2	N. Jasobanta Singh	DGM
DOP, Arunachal Pradesh		
1	T.K. Tara	SE(E),Transmission
2	H.R. Bado	SE(E),Plg
3	Om Narain Tewari	OSD
MePTCL		
1	A. Kharpan	CE (Trans)

Annexure-II.

1. AGOMONI SUBSTATION :

Sl No.	As per Approved DPR *(CEA letter No. CEA-PS-12-16/13/2018-PSPA-II Division dtd 11.01.2019)*			Revised Proposal			Justification for the change proposal
	Scope of work	**Route Length (KM)**	**Type of Conductor**	**Scope of work**	**Route Length (KM)**	**Type of Conductor**	
3	**Establishment of new 220/132 kV (2 X 160 MVA) and 132/33 kV (2 X 50 MVA) GIS Substation at Agamoni**			**Establishment of new 220/132 kV (2 X 160 MVA) GIS at Gossaigaon instead of Agomoni**			i. <u>Availability of Land</u>: At 132/33kV, 2x16MVA Gossaigaon Grid substation of AEGCL, about 0.33 acre (1338 sq metre) of AEGCL's owned unutilised land is available where the new 220/132kV Gossaigaon GIS is proposed to be constructed. ii. <u>Reduction in Route Length:</u> The route length of LILO of both ckt of Alipurduar (PGCIL) - Bongaigaon (PGCIL) D/C line at Agomoni (AEGCL- New) is reduced to 3KM from 25KM , which minimises not only the cost of construction of 220kV LILO but also ROW issues. iii. <u>Necessity of 132kV Substation at Agomoni:</u> The 33kV feeders of APDCL (Distribution Company of Assam) are required for catering the demand at surroundings localities of Agomoni. However, the GIS is converted to AIS as there is sufficient land available for 132kV AIS at Agomoni.
	220 kV:			**220 kV:**			
	LILO of both ckt of Alipurduar(PGCIL) - Bongaigaon (PGCIL) D/C line at Agamoni (AEGCL- New)	25 kM	ACSR Zebra	LILO of both ckt of Alipurduar (PGCIL) - Bongaigaon (PGCIL) D/C line at Gossaigaon(AEGCL- New)	3 kM	ACSR Zebra	
	132 kV:			**132 kV:**			
	LILO of Gossaigaon - Gauripur S/C (AEGCL- Existing) Line at Agamoni (AEGCL- New)	10 kM	**HTLS**	**Establishment of new 132/33 kV (2 X 50 MVA) AIS Substation at Agamoni**			
	Load	16 MW	Load	LILO of Gossaigaon - Gauripur S/C (AEGCL- Existing) Line at Agamoni (AEGCL- New)	10 kM	**HTLS**	
				Load	16 MW	Load	

2. GHUNGUR (Silchar-2) GIS :

Sl No.	As per Approved DPR *(CEA letter No. CEA-PS-12-16/13/2018-PSPA-II Division dtd 11.01.2019)*			Revised Proposal			Justification for the change proposal
	Scope of work	**Route Length (KM)**	**Type of Conductor**	**Scope of work**	**Route Length (KM)**	**Type of Conductor**	
9	**Establishment of new 132/11 kV (2 X 31.5 MVA) GIS Substation at Ghungur (Silchar-2)**			**Establishment of new 132/33 kV (2 X 50 MVA) GIS Substation at Ghungur (Silchar-2)**			i. Suitability in Power Evacuation at 33kV Level: APDCL has requested AEGCL to change downstream voltage level from 11kV to 33kV, which APDCL will be more suitable in evacuating power from the proposed substation. 33kV sub-transmission line from this proposed substation to various load centres of rural areas will reduce the transmission losses to a great extent.
	132 kV:			**132 kV:**			
	Ghungur (AEGCL- New) - Silchar (PGCIL)- S/C Line	10 kM	XLPE Armoured Al Cable	Ghungur (AEGCL- New) - Silchar (PGCIL)- S/C Line	10 kM	XLPE Armoured Al Cable	
	Load	20 MW		Load	20 MW		

3. ZOO ROAD GIS :

Sl No.	As per Approved DPR *(CEA letter No. CEA-PS-12-16/13/2018-PSPA-II Division dtd 11.01.2019)*			Revised Proposal			Justification for the change proposal
	Scope of work	**Route Length (KM)**	**Type of Conductor**	**Scope of work**	**Route Length (KM)**	**Type of Conductor**	
11	**Establishment of new 132/11 kV (2 X 31.5 MVA) GIS Substation at Zoo Road**			**Establishment of new 132/33 kV (2 X 50 MVA) GIS Substation at Zoo Road**			i. Availability of Land: The land of proposed new 132kV Zoo Road GIS is provided by APDCL free of cost inside their campus of existing 2x10MVA, 33/11kV Zoo Road Substation ii. Suitability in Power Evacuation at 33kV
	132 kV:			**132 kV:**			
	Zoo Road (AEGCL-New) – Gauhati Medical	8 kM	XLPE Armoured Al	Zoo Road (AEGCL-New) – Gauhati Medical	8 kM	XLPE Armoured	

	College(GMC) (AEGCL-Existing) S/C Line		Cable	College(GMC) (AEGCL-Existing) S/C Line		Al Cable	Level: APDCLhas requested AEGCL to change downstream voltage level from 11kV to 33kV, which APDCL will be more suitable in evacuating power from the proposed substation.
	Load	25 MW		Load	25 MW		

4. CHHAYGAON GIS :

Sl No.	As per Approved DPR *(CEA letter No. CEA-PS-12-16/13/2018-PSPA-II Division dtd 11.01.2019)*			Revised Proposal			Justification for the change proposal
	Scope of work	**Route Length (KM)**	**Type of Conductor**	**Scope of work**	**Route Length (KM)**	**Type of Conductor**	
12	**Establishment of new 132/33 kV (2 X 50 MVA) GIS Substation at Chhaygaon**			**Establishment of new 220/33 kV (2 X 100 MVA) GIS Substation at Chhaygaon**			i. Availability of Land: The land for construction of new Chhaygaon GIS is finalised at Industrial Growth Centre(IGC), Chhaygaon by AIIDC (Assam Industrial Infrastructure Development Corporation) under Industry Deptt of Govt of Assam. The land is provided by AIIDC in the interest of reliable power supply to their existing and upcoming small scale industries. ii. Catering of Future Load Growth with minimum ROW: The location is a load centre for many upcoming industries of AIIDC. Setting up of 220/33kV GIS inside AIIDC campus , will minimise RoW issues of drawing 33kV lines from a grid substation located at a far distance. iii. Reduction of Route Length: The proposed 132 kV D/C
	132 kV:			132 kV:			
	Chhaygaon (AEGCL-New) - Boko (AEGCL-Existing) D/C Line	20 kM	AAAC Panther	LILO of 220kV Mirza(Azara) – Boko (AEGCL-Existing) line at Chayygaon	3 kM	AAAC Zebra	
	Load	28 MW	Load	Load	28 MW		

							transmission line of route length of 20km from 220kV Boko substation to feed 132kV Chhaygaon substation as approved in the DPR is replaced by LILO of 220kV Mirza(Azara) – Boko line at 220kV Chhaygaon GIS. This reduces not only the RoW issues of 132kV DC line but also the cost of construction. iv. <u>Non-availability of Space for Bay at Boko GSS:</u> In addition to the above, the survey has revealed that sufficient space is not available for construction of the earlier proposed feeder bays at Boko GSS.

5. NAGAON-2 GIS :

Sl No.	As per Approved DPR *(CEA letter No. CEA-PS-12-16/13/2018-PSPA-II Division dtd 11.01.2019)*			Revised Proposal			Justification for the change proposal
	Scope of work	**Route Length (KM)**	**Type of Conductor**	**Scope of work**	**Route Length (KM)**	**Type of Conductor**	
17	**Establishment of new 132/33 kV (2 X 50 MVA) GIS Substation at Nagaon-2**			**Establishment of new 220/33 kV (2 X 100 MVA) GIS Substation at Nagaon-2**			i. <u>Availability of Land</u>: The land for construction of new Nagaon -2 GIS is finalised at Laogaon at Northern part of Nagaon town. The land is provided by APDCL. ii. <u>Reduction of Route Length:</u> The LILO of one circuit of 220kV Samaguri – Jawaharnagar line to this proposed Nagaon -2 GIS is found to be the most suitable instead of 132 kV DC line from 220kV Samaguri substation of route length 41kms. The
	132 kV:			**220 kV:**			
	132kV Samaguri (AEGCL-Existing) – Nagaon-2 (AEGCL-New) D/C Line	41 kM	AAAC Panther	LILO of one circuit of Samaguri (AEGCL-Existing) –Jawaharnagar (AEGCL-Existing) 220kV D/C Line at Nagaon-2 (AEGCL-New)	1 kM	AAAC Zebra	
	Load	25 MW		Load	25 MW		

							route of of 220kV LILO is 1km only iii. Minimization of RoW issues: It will also minimise RoW issues of crossing National Highways, Railways and densely populated villages near Nagaon town. iv. Non-availability of Space for Bay at Samaguri GSS: In addition to the above, the survey has revealed that sufficient space is not available for construction of the earlier proposed feeder bays at Samaguri GSS.

6. Bay Extension of 132 bays at Samaguri (2 bays) & Boko (2 bays):

As per Approved DPR		Revised Proposal		Justification for the change proposal
Scope of work	**No. of Bays**	**Scope of work**	**No. of Bays**	
Two nos. of 132kV Line Bays for Boko- Chayygaon D/C Line & Two nos. of 132kV Line Bays for Samaguri-Nagaon-2 D/C Line	**4**	**Two nos. of 132kV Line Bays for Boko-Chayygaon D/C Line & Two nos. of 132kV Line Bays for Samaguri-Nagaon-2 D/C Line**	**0**	This is due to change in location of LILO point as described in Sl Nos. 4, 5 as mentioned above

Summary of Cost estimate deviation due to the revised proposal(considering modifications in 5 Substations viz. Sl nos. 3,9,11,12,17)

S. No	Name of substation	Cost estimate as per approved DPR (Rs. in Lakhs)	Cost estimate as per Revised proposal (Rs. in Lakhs)	± Deviations (Rs. in Lakhs)
		A	B	B-A
1	Agomoni			
	SS (220kV + 132kV)	15705.17	16332.65	627.48
	TL (220 kV)	2800.28	672.07	-2128.21

2	Ghungur (Silchar) (SS)	6116.82	7023.97	907.15
3	Zoo Road (SS)	6116.82	7023.97	907.15
4	Chhaygaon			
	SS	7023.97	9878.06	2854.09
	TL	1610.47	336.03	-1274.44
5	Nagaon -2			
	SS	7023.97	9878.06	2854.09
	TL	3301.47	112.01	-3189.46
6	132 bays at Samaguri (2 bays) & Boko (2 bays)	771.12	0	-771.12
			TOTAL DEVIATION	786.730
			% Variation	0.17%

In addition to the above proposals, based on the land identified for the Substation and the preliminary survey works carried out, it is further proposed that the Morigaon Substation as detailed below, may be changed from 132/33kV GIS to 132/33kV AIS.

7. MORIGAON Substation :

Sl No.	As per Approved DPR *(CEA letter No. CEA-PS-12-16/13/2018-PSPA-II Division dtd 11.01.2019)*			Revised Proposal			Justification for the change proposal
	Scope of work	**Route Length (KM)**	**Type of Conductor**	**Scope of work**	**Route Length (KM)**	**Type of Conductor**	
16	**Establishment of new 132/33 kV (2 X 50 MVA) GIS Substation at Morigaon**			**Establishment of new 132/33 kV (2 X 50 MVA) AIS Substation at Morigaon**			i. Availability of Land: The land identified for construction of new Morigaon Substation is at a remote location. Thus there is sufficient land available for construction of 132/33kV AIS instead of GIS.
	132 kV:			**132 kV:**			
	132kV Baghjap(AEGCL-	20 kM	AAAC	132kV Baghjap(AEGCL-	20 kM	AAAC	ii. Ease in Operations and Maintenance in

	Existing) – Morigaon(AEGCL-New) D/C Line		Panther	Existing) – Morigaon(AEGCL-New) D/C Line		Panther	AIS at Remote Substations: In case of substations at remote locations, AIS is more suitable from operations and maintenance point of view as the power restoration works in case of outages can be done easily with the existing manpower that is more acquainted with AIS system.
	Load	15 MW		Load	15 MW		

Summary of Cost estimate deviation due to the revised proposal(considering modifications in 6 Substations viz. Sl nos. 3,9,11,12,17,16) i.e. including proposed 132/33kV Morigaon AIS

S. No	Name of substation	Cost estimate as per approved DPR	Cost estimate as per Revised proposal	± Deviations
		A	B	B-A
1	Agomoni			
	SS (220kV + 132lV)	15705.17	16332.65	627.48
	TL (220 kV)	2800.28	672.07	-2128.21
2	Ghungur (Silchar) (SS)	6116.82	7023.97	907.15
3	Zoo Road (SS)	6116.82	7023.97	907.15
4	Chhaygaon			
	SS	7023.97	9878.06	2854.09
	TL	1610.47	336.03	-1274.44
5	Nagaon -2			
	SS	7023.97	9878.06	2854.09
	TL	3301.47	112.01	-3189.46
6	132 bays at Samaguri (2 bays) & Boko (2 bays)	771.12	0	-771.12
7	Morigaon (SS)	7023.97	5001.64	-2022.33
			TOTAL DEVIATION	-1235.600
			% Variation	-0.27%

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Breakup of changes in Cost estimate due to the revised proposal:

1. AGOMONI SUBSTATION :

Deviations in Cost Estimate

Substation Part : Due to conversion of 132/33kV , 2x50MVA GIS substation to AIS Substation at Agomoni, cost estimate has been revised as follows :

	As per Approved DPR *(CEA letter No. CEA-PS-12-16/13/2018-PSPA-II Division dtd 11.01.2019)*					Revised Proposal				
S. No	Name of Substation	AIIB Component (Rs in Lakhs)	Counterpart funding (Rs in Lakhs)	Non-admissible funding (Rs in Lakhs)	Grand Total (Rs in Lakhs)	Name of Substation	AIIB Component (Rs in Lakhs)	Counterpart funding (Rs in Lakhs)	Non-admissible funding (Rs in Lakhs)	Grand Total (Rs in Lakhs)
1.11	Establishment of new 220/132 kV (2 X 160 MVA) and 132/33 kV (2 X 50 MVA) GIS Substation at Agamoni	12000.13	2319.03	1386.01	15705.17	Establishment of new 220/132 kV (2 X 160 MVA) GIS at Gossaigaon	8855.20	1693.75	782.06	11331.01
						Establishment of new 132/33 kV (2 X 50 MVA) AIS Substation at Agamoni	3659.18	707.14	635.33	5001.64

Transmission Part : Due to change in LILO point of both ckt of Alipurduar (PGCIL) - Bongaigaon (PGCIL) D/C line at Gossaigaon (AEGCL- New), route length has been reduced to 3KM from 25KM. The cost variation is as follows:

	As per Approved DPR *(CEA letter No. CEA-PS-12-16/13/2018-PSPA-II Division dtd 11.01.2019)*							Revised Proposal						
S. No	Name of line	Route Length in KM	Type of Ckt	)AIIB Components (Rs	hs)Counterpart Funding	(Rs in Non-admissible	s) Grand Total (Rs in	Name of line	Route Length in KM	Type of Ckt	)AIIB Components (Rs	hs)Counterpart Funding	(Rs in Non-admissible	s) Grand Total (Rs in
1.09	220KV LILO of both ckt of Alipurduar (PGCIL) - Bongaigaon(PGCIL) D/C Line at Agamoni (AEGCL-New)	25	D/C	1787.67	345.47	667.14	2800.28	220KV LILO of both ckt of Alipurduar (PGCIL) – Bongaigaon (PGCIL) D/C Line at Agamoni (AEGCL-New)	3	D/C	429.04	82.91	160.11	672.07

2. GHUNGUR (Silchar-2) GIS

Deviations in Cost Estimate

There will be changes in the cost estimate of substation for conversion of 132//1kV, 2x31,5MVA to 132/33kV, 2x50MVA . However, cost of construction of transmission line will remain same.

	As per Approved DPR *(CEA letter No. CEA-PS-12-16/13/2018-PSPA-II Division dtd 11.01.2019)*					Revised Proposal				
S.	Name of Substation	AIIB	Counterpart	Non-	Grand	Name of	AIIB	Counterpart	Non-	Grand Total

No		Component (Rs in Lakhs)	funding (Rs in Lakhs)	admissible funding (Rs in Lakhs)	Total (Rs in Lakhs)	Substation	Component (Rs in Lakhs)	funding (Rs in Lakhs)	admissible funding (Rs in Lakhs)	(Rs in Lakhs)
1.23	Establishment of new 132/11 kV (2 X 31.5 MVA) GIS Substation at Ghungur (Silchar-2)	4528.99	875.23	712.61	6116.82	Establishment of new 132/33 kV (2 X 50 MVA) GIS Substation at Ghungur (Silchar-2)	5235.12	1011.69	777.16	7023.97

3. ZOO ROAD GIS

Deviations in Cost Estimate

There will be changes in the cost estimate of substation for conversion 132//1kV, 2x31.5MVA to 132/33kV, 2x50MVA. However, cost of construction of transmission line will remain same.

	As per Approved DPR *(CEA letter No. CEA-PS-12-16/13/2018-PSPA-II Division dtd 11.01.2019)*					Revised Proposal				
S. No	Name of Substation	AIIB Component (Rs in Lakhs)	Counterpar t funding (Rs in Lakhs)	Non-admissible funding (Rs in Lakhs)	Grand Total (Rs in Lakhs)	Name of Substation	AIIB Component (Rs in Lakhs)	Counterpart funding (Rs in Lakhs)	Non-admissible funding (Rs in Lakhs)	Grand Total (Rs in Lakhs)
1.24	Establishment of new 132/11 kV (2 X 31.5 MVA) GIS Substation at Zoo Road	4528.99	875.23	712.61	6116.82	Establishment of new 132/33 kV (2 X 50 MVA) GIS Substation at Zoo Road	5235.12	1011.69	777.16	7023.97

4. CHHAYGAON GIS

Deviations in Cost Estimate

Substation Part : Due to conversion of 132/33kV , 2x50MVA substation to 220/33kV, 2x100MVA SS , cost estimate has been revised as follows :

	As per Approved DPR *(CEA letter No. CEA-PS-12-16/13/2018-PSPA-II Division dtd 11.01.2019)*					Revised Proposal				
S. No	Name of Substation	AIIB Component (Rs in Lakhs)	Counterpart funding (Rs in Lakhs)	Non-admissible funding (Rs in Lakhs)	Grand Total (Rs in Lakhs)	Name of Substation	AIIB Component (Rs in Lakhs)	Counterpart funding (Rs in Lakhs)	Non-admissible funding (Rs in Lakhs)	Grand Total (Rs in Lakhs)
1.10	Chhaygaon, 2x50MVA GIS, 132/33kV	5235.12	1011.69	777.16	7023.97	Chhaygaon, 2x100MVA GIS, 220/33kV	6135.25	1185.64	2557.17	9878.06

Transmission Line Part: Instead of 132kV DC line from 220kV Boko subsatation as approved in DPR , it is proposed to feed the proposed substation by LILOing 220kV Azara – Boko line at Chhaygaon SS . Variation in cost estimate is shown below:

	As per Approved DPR *(CEA letter No. CEA-PS-12-16/13/2018-PSPA-II Division dtd 11.01.2019)*							Revised Proposal						
S. No	Name of line	KM Route Length in	Type of Ckt	AIIB Components	undingCounterpart	ing Non-admissible	akhs) Grand Total	Name of line	KM Route Length in	Type of Ckt	AIIB Components	Counterpart Funding Lakhs)	ing Non-admissible	Grand Total (Rs in Lakhs)
1.15	Boko - Chaygaon 132kV DC line for new 132kV Chhaygaon SS	20	D/C	1001.73	193.58	415.16	1610.47	LILO of 220kV Azara - Boko(AEGCL-Existing) -S/C Line at Chhaygaon (AEGCL- New)	3	D/C	214.52	41.46	80.06	336.03

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5. NAGAON-2

Substation Part : Due to conversion of 132/33kV , 2x50MVA substation to 220/33kV, 2x100MVA SS , cost estimate has been revised as follows

	As per Approved DPR *(CEA letter No. CEA-PS-12-16/13/2018-PSPA-II Division dtd 11.01.2019)*					Revised Proposal				
S. No	Name of Substation	AIIB Component (Rs in Lakhs)	Counterpart funding (Rs in Lakhs)	Non-admissible funding (Rs in Lakhs)	Grand Total (Rs in Lakhs)	Name of Substation	AIIB Component (Rs in Lakhs)	Counterpart funding (Rs in Lakhs)	Non-admissible funding (Rs in Lakhs)	Grand Total (Rs in Lakhs)
1.14	Nagaon -2 , 2x50MVA GIS, 132/33kV	5235.12	1011.69	777.16	7023.97	Nagaon -2 , 2x100MVA GIS, 220/33kV GIS, 220/33kV	6135.25	1185.64	2557.17	9878.06

Transmission Line Part : The proposed 132 kV D/C transmission line of route length of 41km from 220/132kV Samaguri substation to feed 132kV Nagaon-2 substation as approved in the DPR is replaced by LILO of 220kV Samaguri – Jawaharnagar line at 220kV Nagaon-2 GIS. This reduces not only the RoW issues of 132kV DC line but also the cost of construction.

	As per Approved DPR *(CEA letter No. CEA-PS-12-16/13/2018-PSPA-II Division dtd 11.01.2019)*							Revised Proposal						
S. No	Name of line	Route Length in KM	Type of Ckt	AIIB Components (Rs	Counterpart Funding	Non-admissible (Rs in	Grand Total (Rs in	Name of line	Route Length in KM	Type of Ckt	AIIB Components (Rs	Counterpart Funding	Non-admissible (Rs in	Grand Total (Rs in
1.19(a)	132KV Samaguri-	41	D/	2053.55	396.85	851.07	3301.47	LILO of	1	D/C	71.51	13.82	26.69	112.01

	Nagaon Line D/C Line for new 132/33KV Nagaon 2 S/S		C					Samaguri (AEGCL-Existing) – Jawaharnagar (AEGCL-Existing) 220kV D/C Line at Nagaon-2 (AEGCL-New)						

6. Bay Extension of 132 bays at Samaguri (2 bays) & Boko (2 bays):

As per Approved DPR						Revised Proposal					
Name of Existing Substation where Bay Extension is required	No of Bays	AIIB Component (Rs in Lakhs)	Counterpart funding (Rs in Lakhs)	Non-admissible funding (Rs in Lakhs)	Grand Total (Rs in Lakhs)	Name of Existing Substation where Bay Extension is required	No of Bays	AIIB Component (Rs in Lakhs)	Counterpart funding (Rs in Lakhs)	Non-admissible funding (Rs in Lakhs)	Grand Total (Rs in Lakhs)
Two nos. of 132kV Line Bays for Boko-Chayygaon D/C Line & Two nos. of 132kV Line Bays for Samaguri-Nagaon-2 D/C Line	4	600.92	116.12	54.08	771.12	Two nos. of 132kV Line Bays for Boko-Chayygaon D/C Line & Two nos. of 132kV Line Bays for Samaguri-Nagaon-2 D/C Line	0	0.00	0.00	0.00	0.00

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7. MORIGAON SUBSTATION

Deviations in Cost Estimate

There will be changes in the cost estimate of substation for conversion of 132/33kV, 2x50MVA GIS to 132/33kV, 2x50MVA AIS. However, cost of construction of transmission line will remain same.

	As per Approved DPR *(CEA letter No. CEA-PS-12-16/13/2018-PSPA-II Division dtd 11.01.2019)*					Revised Proposal				
S. No	Name of Substation	AIIB Component (Rs in Lakhs)	Counterpart funding (Rs in Lakhs)	Non-admissible funding (Rs in Lakhs)	Grand Total (Rs in Lakhs)	Name of Substation	AIIB Component (Rs in Lakhs)	Counterpart funding (Rs in Lakhs)	Non-admissible funding (Rs in Lakhs)	Grand Total (Rs in Lakhs)
1.19	Morigaon, 2x50 MVA, 132/33kV AIS	5235.12	1011.69	777.16	7023.97	Morigaon, 2x50 MVA, 132/33kV AIS	3659.18	707.14	635.33	**5001.64**

Annexure-III.

A. DETAILS OF SUBSTATION AND LINES (New proposal up to year 2030)	
Sl No	Scope of work
1	**Establishment of new 400/220kV GIS at Khumtai with associated lines**
	400kV Lines:
	400kV D/C Biswanath Chariali (PGCIL) - Khumtai
	LILO of both ckt of 400kV new Mariani (PGCIL) - Misa (PGCIL) at new Khumtai (AEGCL)
	220kV Lines :
	220kV DC from newly proposed 400kV Khumtai GIS (AEGCL) - 220kV GIS Khumtai (AEGCL)
2	**Establishment of new 400/220/132kV AIS at Gogamukh with associated lines**
	400kV Lines:
	LILO of both ckt of 400kV Biswanath Chariali (PGCIL) - Subansiri (PGCIL) at Gogamukh (AEGCL)
	220kV Lines :
	220kV DC Gogamukh (AEGCL) - Bihpuria (AEGCL)
	220kV DC Gogamukh (AEGCL) - Simen Chapori (AEGCL)
	132kV Lines :
	LILO of one ckt of North Lakhimpur (Nalkata) (AEGCL) - Dhemaji (AEGCL) DC line at Gogamukh.
3	**Establishment of new 400/220 AIS at Simen Chapori with associated lines**
	400kV Lines:
	400kV DC New Simen Chapori (AEGCL) - New Gogamukh (AEGCL)
	400kV DC New Simen Chapori (AEGCL) - New Naharkatia (AEGCL) crossing Bramhputra River
4	**Establishment of new 400/220kV GIS at Naharkatia with associated lines**
	400kV Lines:
	400kV DC Naharkatia (AEGCL) - New Mariani (PGCIL) . 2 nos 400kV line bays at new Mariani (PGCIL) may be reserved for AEGCL.
5	**Establishment of new 220/132kV AIS at Silapathar with associated lines**
	220kV Lines :
	LILO of one ckt of Gogamukh (AEGCL) - Simen Chapori (AEGCL) DC line at Silapathar
	132kV Lines :
	132kV DC new Silapathar (AEGCL) - Silapathar (AEGCL existing)
6	**Establishment of new 220/132kV AIS at Diphu with associated lines**
	220kV
	220kV DC new Diphu - Mariani (AEGCL) line
	220kV DC Shankardevnagar (existing AEGCL) - Diphu (AEGCL) line
7	**Establishment of new 220/132kV GIS at Haflong with associated lines**
	220kV Lines :
	220kV DC new Haflong - Diphu (AEGCL) line
8	**Establishment of new 220/132kV GIS at Silcoorie with associated lines**
	220kV Lines :
	220kV DC Silcoorie - Haflong (AEGCL) line

9	**Establishment of new 220/132kV GIS at Dhaligaon with associated lines**
	220kV Lines :
	LILO of one ckt of 220kV Rangiya - Salakati (AEGCL)DC line at Dhaligaon
10	**Establishment of new 220/132kV GIS at Barnagar with associated lines**
	220kV Lines :
	LILO of one ckt of 220kV Rangiya - Salakati (AEGCL)DC line at Barnagar
11	**Establishment of new 220/132kV GIS at Amguri with associated lines**
	220kV Lines :
	LILO of one ckt of 220kV Namrup - Mariani (AEGCL)DC line at Amguri
12	**Establishment of new 220/132kV GIS at Borgang with associated lines**
	220kV Lines :
	LILO of one ckt of 220kV Sonabil - Bihpuria (AEGCL) DC line at Borgang
13	**Establishment of new 132/33kV AIS at Tikrikilla with associated lines**
	132kV lines
	LILO of 132kV Agia - Hatsingimari (AEGCL) SC line at Tikrikilla
14	**Establishment of new 132/33kV AIS at North Salmara with associated lines**
	132kV Lines :
	LILO of one ckt of 132kV APM - Salakati (AEGCL) DC line at North Salmara
15	**Establishment of new 132/33kV AIS at Doulasal with associated lines**
	132kV lines
	LILO of one ckt of 132kV Barpeta - Amayapur (AEGCL) DC line at Doulasal
16	**Establishment of new 132/33kV AIS at Dumunichouki with associated lines**
	132kV lines
	132kV Sipajhar (AEGCL existing) - Dumunichouk DC line
17	**Establishment of new 132/33kV AIS at Belsiri with associated lines**
	132kV lines
	132kV Dhekiajuli (AEGCL existing) - Belsiri DC line
18	**Establishment of new 132/33kV AIS at Jamugurihat with associated lines**
	132kV lines
	LILO of 132kV Sonabil - Pavoi (AEGCL) SC line at Jamugurihat
19	**Establishment of new 132/33kV AIS at Ghilamara with associated lines**
	132kV lines
	LILO of 132kV Nalkata -Dhemaji (AEGCL) SC line at Ghilamara
20	**Establishment of new 132/33kV AIS at Jonai with associated lines**
	132kV lines
	132kV Simen chapori (AEGCL) - Jonai (AEGCL new) DC line at Jonai
21	**Establishment of new 132/33kV GIS at Digboi with associated lines**
	132kV lines
	LILO of 132kV Tinsukia - Rupai (AEGCL) SC line at Digboi
22	**Establishment of new 132/33kV GIS at Duliajan with associated lines**
	132kV lines
	LILO of 132kV Tinsukia - Namrup (AEGCL) SC line at Duliajan

23	**Establishment of new 132/33kV AIS at Dikhoumukh with associated lines**
	132kV lines
	132kV Dikhoumukh - Sivsagar (AEGCL existing) DC line at Dikhoumukh
24	**Establishment of new 132/33kV AIS at Kampur with associated lines**
	132kV lines
	LILO of one ckt of 132kV Samaguri - Shankardevnagar (AEGCL) DC line at Kampur
25	**Establishment of new 132/33kV GIS at Kalain with associated lines**
	132kV lines
	LILO of 132kV Panchgram - Lumshnong (ISTL) SC line at Kalain
26	**Establishment of new 132/33kV GIS at Udarbond with associated lines**
	132kV lines
	132kV Srikona (PGCIL) - Udarband (new AEGCL) DC line at Udarband
27	**Establishment of new 132/33kV GIS at Patharkandi with associated lines**
	132kV lines
	LILO of 132kV Durllavcherra (AEGCL) - Dharmanagar (ISTL) SC line at Patharkandi
	132kV Karimganj (AEGCL) - Patharkandi SC line at Patharkandi (new AEGCL)
28	**Establishment of new 132/33kV GIS at Lala with associated lines**
	132kV lines
	132kV Hailakandi (AEGCL) - Lala DC line at Lala (new AEGCL)
B	**ADDITIONAL NEW LINES**
1	220kV Amingaon -Mirza (Azara) DC line across Bramhaputra along with 132kV DC Hazo - Azara line on multicircuit towers
2	220kV Rowta (AEGCL -existing) - Sonabil (AEGCL- existing) DC line
3	132kV Nalkata - Dhemaji DC line (one ckt LILO at Ghilamara (AEGCL new) and other ckt LILO at Gogamukh (AEGCL-new)

Annexure-IV.

Operational Constraints in NER

a) **Transmission Line Constraints**

Sl. No	Corridor	Description of the constraints	Suggested Measures
1	220 kV BTPS-Salakati I & II lines (POWERGRID)	During April, May & June'19, loading of these elements was less than 200 MW due to low demand, however during the previous quarters of 2018-19, loading of these elements together was more than 200 MW, thus not satisfying the N-1 contingency criterion. Tripping of one of these lines will result in reduction in reliability in NER Grid.	400/220 kV, 315 MVA ICT I at BgTPP is under manufacturing stage. After commissioning of this ICT connected with 220 kV BTPS (Assam) will relieve constraints in these lines.
2	132 kV Biswanath Chariali (PG) – Biswanath Chariali (Pavoi) (AEGCL) I & II lines (POWERGRI	During April 25%, May 19% and June 41% of time, loading of these elements together was more than 80 MW, thus not satisfying N-1 contingency criterion. Tripping of any of these lines may result Grid disturbance in downstream area of Pavoi	To address this constraint, 132 kV Biswanath Chariali – Itanagar line has been approved by Joint Standing Committee of ER and NER on 03.01.2014. LILO of one circuit of 132 kV Biswanath Chariali (PG) – Itanagar at Gohpur was

	D)	& Gohpur after cascaded triping.	approved in 6th Standing Committee of NER held at Imphal on 03.10.16 & 17th NERPC meeting on 04.10.16. The project is under execution by Sterlite Grid 4 and expected to be completed by Jul 2019. After commissioning of these lines, there will be enhancement in drawl capability in Arunachal Pradesh power system as well as reliability of supply will increase.
3	220 kV Misa-Samaguri I &II lines (POWERGRID)	During April 0.35%, May 0.88% and June 13% of time, loading of these elements together was more than 200 MW, thus not satisfying N-1 contingency criterion. Tripping of any of these lines will result in reduction of reliability in NER Grid.	As per 1st meeting of NERSCT held on 29.11.2018, Assam is establishing 2x500 MVA, 400/220kV S/s at Sonapur S/S through LILO of Byrnihat – Silchar 400kV S/C line.

b) **ICT Constraints**

Sl. No	ICT	Description of the constraints	Suggested Measures
1	220/132 kV, 160 MVA ICT at Kopili	N-1 criteria is not satisfied.	220/132 kV, 2nd ICT 160 MVA at Kopili expected to be commissioned by July'19 as

			per 156 th OCC Minutes. Commissioning of this ICT would address the constraint in the ICT
2	400/132 kV, 2x125 MVA ICT at Palatana	During April 28%, May 30% and June 32% of time, loading of these elements was more than 119 MW. Tripping of one ICT at Palatana will result in reduction of reliability in NER.	Commissioning of 400/132 kV Surjamaninagar (TBCB) Sub-station with 400/132 kV, 2x315 MVA ICTs at Surjamaninagar (TBCB) exceuted by Sterlite Grid 4 and upgradation of existing 132 kV Palatana – Surjamaningar (TSECL) D/C to 400 kV level is to be expedited.
3	220/132 kV, 2x50 MVA ICTs at Salakati	During April, May & June'19, loading of these elements was less than 47.5 MW due to low demand,however during the previous quarters of 2018-19, loading of these elements together was more than 47.5 MW, thus not satisfying the N-1 contingency criterion.	Enhancement of capacity of ICTs at Salakati is required to address this constraint.

c) **Nodes Experiencing High Voltage**

Sl. No.	Node	Description of the constraints	Suggested Measures
1	Ranganadi (NEEPCO)	During April 36 %, May 12% and June 15 % of time, 400 kV bus voltage of this node was more than 420 kV.	NERLDC emphasised need of operation of RHEP units on synchronous condenser mode. As per 158 OCC meet, NEEPCO informed that there has been no response from

			BHEL regarding operation of RHEP units on synchronous condenser. Member Secretary, NERPC stated that at present it seems that Synchronous Condenser operation of RHEP seems unlikely. After detailed deliberation it was decided that the Final Estimate for 80MVAR Bus Reactor at RHEP is to be prepared by NEEPCO immediately and put up for approval in the next TCC/RPC meeting.
2	Balipara (POWERGRID)	During April, May & June'19, 400 kV Bus voltage of this node was more than 400 kV for considerable time.	It was agreed in 5th and 7th Standing Committee Meeting of NER for installation of 420 kV, 80 MVAR Bus Reactor by NEEPCO at Ranganadi Bus with GIS bays
3	Misa (POWERGRID)	During April 1.3 %, May 0.12% and June 0.02 % of time, 400 kV bus voltage of this node was more than 420 kV	It was agreed in 5th and 7th Standing Committee Meeting of NER for installation of 420 kV, 80 MVAR Bus Reactor by NEEPCO at Ranganadi Bus with GIS bays
4	Biswanath Chariali (POWERGRID)	During April, May & June'19, 400 kV Bus voltage of this node was more than 400 kV for considerable time.	It was agreed in 5th and 7th Standing Committee Meeting of NER for installation of 420 kV, 80 MVAR Bus Reactor by NEEPCO at Ranganadi Bus with GIS bays
5	Palatana (OTPC)	During April 0.97 %, May 0.13% and June 0 % of	420 kV, 63 MVAR line reactor of Palatana-Silchar-I at 400 kV

		time, 400 kV bus voltage of this node was more than 420 kV	Palatana was under outage since 25.04.2019.
6	Silchar (POWERGRID)	During April 0.03 %, May 0% and June 0.03 % of time, 400 kV bus voltage of this node was more than 420 kV	420 kV, 63 MVAR line reactor of Palatana-Silchar-I at 400 kV Palatana was under outage since 25.04.2019.
7	Bongaigaon (POWERGRID)	During April, May & June'19, 400 kV Bus voltage of this node was more than 400 kV for considerable time.	It was agreed in 5th and 7th Standing Committee Meeting of NER for installation of 420 kV, 80 MVAR Bus Reactor by NEEPCO at Ranganadi Bus with GIS bays
8	BgTPP (NTPC)	During April, May & June'19, 400 kV Bus voltage of this node was more than 400 kV for considerable time.	It was agreed in 5th and 7th Standing Committee Meeting of NER for installation of 420 kV, 80 MVAR Bus Reactor by NEEPCO at Ranganadi Bus with GIS bays.
9	Byrnihat (MePTCL)	During April 0.69%, and May 0.27% of time, 400 kV bus voltage of this node was more than 420 kV	The 63 MVAR Bus Reactor at Byrnihat is under prolonged outage. Bus Reactor at Byrnihat may mitigate the high voltage problem. In 158th OCC Meeting, NERPC informed that 80 MVAR Bus Reactor at Byrnihat was approved.