

सेंट्रल ट्रांसमिशन यूटिलिटी ऑफ इंडिया लिमिटेड
CENTRAL TRANSMISSION UTILITY OF INDIA LIMITED
(Wholly Owned Subsidiary of Power Grid Corporation of India Limited)
(A Government of India Enterprise)

Annexure II

Ref.: C/CTU/W/03/NCT

16th November 2021

Sh. Ishan Sharan
Chief Engineer & Member Secretary (NCT)
Central Electricity Authority
Sewa Bhawan, R.K.Puram,
New Delhi-110 066.

Sub: New ISTS for deliberations in the NCT meeting- reg.

Sir,

The "System Strengthening in Gujarat associated with the integration of RE projects from Khavda potential REZ" was agreed in the 3rd meeting of WRPC(TP) held on 14.06.2021 as per the scope of work mentioned at **Annexure-I**. The scheme was further deliberated in the 5th NCT meeting held on 25.08.2021 & 02.09.2021 wherein based on observations received from GETCO regarding shifting the location of the substation from Kosamba to South Gujarat, it was decided to review the scheme.

Subsequently, based on inputs received from GETCO, the scheme was further deliberated amongst CEA, CTU, POSOCO & GETCO in the 1st Joint Study Meeting on Transmission Planning for Western Region held on 05.11.2021 and it was decided to phase the schemes with minor modifications based on ATC requirement of GETCO as well as system strengthening requirements associated with the integration of RE projects from Khavda potential RE zone as per details given at **Annexure-II {a[(II) & (iii)] and b}**. Further, to meet short-term ATC requirements of Gujarat, 3rd 765/400kV ICT at Vadodara [**Annexure-II a(i)**] was also agreed in the above meeting.

In this regard, it is to mention that in a meeting held on 02.11.2021 at MoP (copy of MOM enclosed) regarding resource adequacy plan for the state of Gujarat, Transmission Network Expansion schemes involving 3rd 765/400kV ICT at Vadodara S/s and network augmentation in South Gujarat were decided to be implemented in a compressed schedule to meet the short term as well as long term ATC requirements of the state of Gujarat.

Accordingly, the "Transmission Network Expansion in Gujarat to increase its ATC from ISTS (Part A)" scheme, covering 3rd 765/400kV ICT at Vadodara has been approved by CTU with the compressed implementation time-frame of Apr'22 under RTM to the original asset owner (POWERGRID). Further, the 765/400/220kV Navsari (New) S/s in South Gujarat and associated transmission system has been planned under "Transmission Network Expansion in Gujarat to increase its ATC from ISTS (Part B)" scheme with a compressed schedule of Jun'23 [i.e. implementation time frame of 15 months with 3 months time for the award from Dec'21].

In view of the above, it is suggested that the "Transmission Network Expansion in Gujarat to increase its ATC from ISTS (Part B & C)" and "Transmission Network Expansion in Gujarat associated with the integration of RE projects from Khavda potential RE zone" as mentioned in Annexure-II may be taken up for deliberations/recommendations/approval in the NCT meeting in Nov'21.

Thanking you,

Yours faithfully,



(Partha Sarathi Das)
Sr. General Manager

Copy to:

1. Member Secretary Western Regional Power Committee MIDC Area, Marol, Andheri East, Mumbai 400 093	2. Managing Director Gujarat Energy Transmission Corp. Ltd, Sardar Patel Vidyut Bhawan, Race Course, Vadodara -390 007
3. Director (Operation) Maharashtra State Electricity Transmission Co. Ltd., 4 th Floor, "Prakashganga", Plot No. C-19, E- Block, Bandra – Kurla Complex, Bandra (East), Mumbai- 400051	4. Director (SO) POSOCO 9 th Floor, IFCI Towers, 61, Nehru Place, New Delhi – 110019
5. Chief General Manager (I/c) Western Regional Load Despatch Centre F-3, M.I.D.C. Area, Marol, Andheri East, Mumbai-400 093	

System Strengthening in Gujarat associated with integration of RE projects from Khavda potential RE zone

- i. Banaskantha – Ahmedabad 765 kV D/c line (~200 km length) with 330MVA, 765 kV Switchable line reactor on each ckt at Ahmedabad S/s end.
- ii. Establishment of 2x1500 MVA, 765/400 kV & 2x500 MVA, 400/220 kV Kosamba S/s with 2x330 MVA 765 kV and 1x125 MVA 400 kV Bus reactor. [with 110MVA & 80 MVA, 765kV single phase reactor units (spare units for bus/line reactor) and 1x500 MVA, 765/400 kV single phase spare transformer].
- iii. Kosamba - Kala (GIS) 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage) (~180 km length) with 50MVA switchable line reactors on each ckt at both ends
- iv. Kosamba – Magarwada (GIS) 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage) (~140 km length) with 63MVA switchable line reactors on each ckt at Magarwada end.
- v. Kosamba – Padghe (GIS) 765 kV D/c line (~270-280 km length) with 330 MVA, 765 kV Switchable line reactor on each ckt at Kosamba S/s end and 240 MVA, 765 kV Switchable line reactor on each ckt at Padghe (GIS) S/s end.
- vi. Augmentation of transformation capacity at Padghe (GIS) 765/400 kV substation by 1x1500 MVA ICT.
- vii. Augmentation of transformation capacity at Banaskantha 765/400 kV S/s by 1x1500 MVA ICT.
- viii. Banaskantha – Sankhari 400 kV 2nd D/c line

Note:

- As Kala and Magarwada are located close to each other, majority of common stretch of Kosamba – Kala and Kosamba – Magarwada 400 kV D/c line may be constructed using Multi-circuit towers in order to save RoW and hence both the 400 kV lines may be kept part of the same package.
- Implementation of item no. (vii) & (viii) to be done in matching time frame of establishment of Prantij 400/220 kV and Sankhari- Prantij 400 kV D/C line by GETCO.
- Implementation of 4 nos. of 220 kV outlets from Kosamba 765/400/220 kV s/s to be implemented by GETCO in matching time frame of Kosamba 765/400/220 kV substation (with 4 nos. 220 kV line bays for 220 kV outlets)
- The above scheme needs to be implemented in the matching time frame of Transmission scheme for evacuation of 8 GW RE power from Khavda RE park (Phase-A).

a) Transmission Network Expansion in Gujarat to increase its ATC from ISTS

i. Part A

- Augmentation of transformation capacity at Vadodara 765/400/220kV S/s by 1x1500MVA, 765/400kV ICT (3rd) along with associated 765kV ICT bay*
**Out of the 2 nos. 400kV line bays already constructed by POWERGRID for DGEN – Vadodara line, 1no. line bay to be utilized for 765/400kV ICT (3rd) at Vadodara*

Implementation Time-frame: Apr'22 (as decided in meeting held on 02.11.2021 regarding resource adequacy plan for the state of Gujarat)

ii. Part B

- Establishment of 2x1500 MVA, 765/400 kV & 3x500 MVA, 400/220 kV Navsari(New) (South Gujarat) S/s (GIS) with 2x330 MVar 765 kV and 1x125 MVar 400 kV Bus reactor. [with 110MVar 765kV single phase reactor units (spare units for bus/line reactor) and 1x500 MVA, 765/400 kV single phase spare transformer].
- Navsari(New) (South Gujarat) (GIS) - Kala (GIS) 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage) (~110 km length) with 63MVar switchable line reactor on each ckt at Kala (GIS) end
- Navsari(New) (South Gujarat) (GIS) – Magarwada (GIS) 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage) (~80 km length)
- Navsari(New) (South Gujarat) (GIS) – Padghe (GIS) 765 kV D/c line (~200 km length) with 330 MVar, 765 kV Switchable line reactor on each ckt at Navsari(New) (South Gujarat) end.
- Augmentation of transformation capacity at Padghe (GIS) 765/400 kV substation by 1x1500 MVA ICT.

Implementation Time-frame: Jun'23

Note:

- Navsari(New) (South Gujarat) S/s shall be establishment as GIS substation to reduce the land requirement as there may be issues in getting contiguous land in this area which is industrial in nature as well as densely populated.
- As Kala and Magarwada are located close to each other, majority of common stretch of Kosamba – Kala and Kosamba – Magarwada 400 kV D/c line may be constructed using Multi-circuit towers in order to save RoW.
- GETCO shall implement the following downstream system in matching time-frame of Navsari(New) (South Gujarat) S/s:

220kV Interconnections (Navsari(New) (South Gujarat) S/s) [Under Intra-state]

- LILO of both circuits of 220 KV D/C Navsari – Chikhli line at Navsari(New) (South Gujarat) (GIS) substation along with associated line bays at both ends
- LILO of both circuits of 220 KV D/C Navsari – Nasik line at Navsari(New) (South Gujarat) (GIS) substation along with associated line bays at both ends

iii. Part C

- Augmentation of transformation capacity at Banaskantha 765/400 kV S/s by 1x1500 MVA ICT.
- Banaskantha – Sankhari 400 kV 2nd D/c line (~26 km length)

Implementation Time-frame: Matching with establishment of Prantij 400/220 kV and Sankhari- Prantij 400 kV D/C line by GETCO (presently expected by Mar'25).

b) Transmission Network Expansion in Gujarat associated with integration of RE projects from Khavda potential RE zone

- Banaskantha – Ahmedabad 765 kV D/c line (~200 km length) with 330MVA_r, 765 kV Switchable line reactor on each ckt at Ahmedabad S/s end.
- Augmentation of transformation capacity at Navsari(New) (South Gujarat) 765/400 kV S/s by 1x1500 MVA ICT.

Implementation Time-frame: Matching with Khavda Phase-A (Ph-II) (5GW) scheme. NCT has recommended a time-line of 24 months from SPV Transfer for Khavda Phase-A (Ph-II) (5GW) scheme.



सं. 22-1306/32/2021-ओएम
भारतसरकार
Government of India
विद्युत् मंत्रालय
Ministry of Power
श्रमशक्तिभवन, रफीमार्ग, नयीदिल्ली-110 001
Shram Shakti Bhawan, Rafi Marg, New Delhi-110 001

Dated 08th November, 2021

OFFICE MEMORANDUM

Subject:- Minutes of the meeting taken by Secretary (P) on 2nd November, 2021 regarding to discuss the Resource Adequacy Plan.-reg.

Please find enclosed herewith a copy of the minutes of the meeting on the above subject held on 02.11.2020 under the Chairmanship of Secretary (P) for necessary action.

Encl: as above

for Under Secretary (OM)

Tele/Fax: 23719229

Email id:-opmonitor-power@nic.in

Distribution: As per list annexed

Copy to:

Sr. PPS to Secy (P)/PPS to AS(VKD)/ Sr. PPS to JS (OM)/PS to Chief Engineer(SKK)/PS to DS (OM)

Minutes of the meeting held on 02.11.2021 on Resource Adequacy Plan

A meeting was held under the chairmanship of Secretary (P) to discuss the issues related to Resource Adequacy Plan for the State of Gujarat. Gujarat has submitted to increase the available transfer capacity (ATC) to draw more power from outside the State.

2. Gujarat had suggested to work out differential ATC in different time slots that is Solar hours and non-solar hours. This issue has been resolved in consultation with WRLDC and accordingly the drawl ATC limit of Gujarat has been increased to 9900 MW during non-solar hours and 9500 MW during solar hours.

3. In addition to this Gujarat had suggested for reverse power flow on \pm 500 kV Mundra-Mohindergarh HVDC line. This issue was deliberated and POSOCO informed that at present they are operating this link on floating mode (i.e. zero power flow) in order to maximize the ATC for Gujarat. on attempt to reverse the flow, the failures of equipment was observed at Mohindergarh S/S. The representative of Adani Transmission Limited (ATL) inform that the failure occur three times and at present the order for the equipment has been placed with SEIMENS. The delivery is expected in 5-6 months. M/s ATL has also been advised to analyse the reasons for repeated failure of this equipment. M/s ATL should expedite the procurement of spare parts. The reversal of Power flow should start from April 2022.

[Action : M/s ATL]

4. Gujarat has also suggested LILO of 400 kV s/c Vadavi-Zerda line at 765 kV Banaskantha (PG) substation. The interim arrangement of LILO of this line should be completed by February, 2022 and the commissioning of the bay at Banaskantha by POWERGRID should be expedited and commissioned by May, 2022.

[Action: Powergrid]

5. Gujarat has further suggested to augment a 3rd ICT of 1500 MVA at 765 kV Vadodara sub-station. Since this project cost is less than 100 crore, it has to be expeditiously approved by CTU before 30th November, 2021 and POWERGRID should commission this on an urgent basis by April, 2022.

[Action: CTU/Powergrid]

6. Under the long term measures Gujarat has suggested expeditious implementation of following sub-stations planned as a part of Khavda RE Park:

- (i) 765/400 kV Ahmedabad substation
- (ii) 765/400/220 kV Kosamba substation in South Gujarat area

Since these sub-station are at planning stage. NCT must meet in November, 2021 to consider these sub-stations. The work may be given in Regulated Tariff Mechanism to POWERGRID and compressed time schedule latest by 15th December, 2021.

[Action : CTU/NCT]

7. The suggestions given by Gujarat and its implementation as per the timelines above will enable ATC to increase from 10,000 MW to 13,000 MW, which would be sufficient to meet the demand of Gujarat upto 2023. Gujarat had not submitted any proposal so far to meet the future requirement beyond 2023.

8. Gujarat was requested to work out a long term plan for at least 5-6 years so that the augmentation of transmission line can be planned and implemented ahead of the requirement. Secretary (P) will review the long term plans of Gujarat in December, 2021.

[Action: Govt. of Gujarat]

9. Gujarat also requested to operationalize Sardar Sarovar Plant in the pump storage mode around 1200 MW during peak hours. It was informed that Madhya Pradesh had certain issues w.r.t. this which needs to be resolved. A meeting at the level of Secretary (P) will be convened in this regard. Gujarat informed that in order to meet their future demand, they are also planning for energy storage system, solarisation of agriculture feeders etc.

[Action : Gujarat]

10. It was also suggested that Gujarat can also avail the RE bundling scheme of MoP to save coal and also for reduction in the cost of Power.

[Action : Govt. of Gujarat]

The meeting ended with a Vote of Thanks to the Chair.

Distribution List

Ministry of Power

1. Shri Alok Kumar, Secretary
2. Shri Ghanshyam Prasad, Joint Secretary (OM)
3. Shri Arun Kumar Garg, Deputy Secretary (OM)
4. Shri Naresh Kumar, SO, OM Division

Govt. of Gujarat

5. Ms. Mamta Verma, Principal Secretary (Energy)
6. Ms. Shahmeena Husain, MD, GUVNL

CEA

7. Shri A. Balan, Member (Planning)
8. Shri Hemant Jain, Chief Engineer (GM & NPC)
9. Ms. Ammi R Toppo, Director (IRP)

POSOCO

10. Shri K.V.S.Baba, Chairman & Managing Director
11. Shri. S.R.Narasimhan, Dir (System Operation)

POWERGRID

12. Shri Abhay Choudhary, Director (Project)

CTUIL

13. Shri P. C. Garg, CEO
14. Shri Ashok Pal, ED

GETCO, Gujarat

15. Shri Upender Pandey, MD
16. Shri Dipak H. Patel

M/s Adani Transmission Limited

17. Shri Anil Sardana
18. Shri Sameer Ganju
19. Shri M.R. Krishna Rao

Annexure-IV

Detailed Scope of works of the ISTS schemes submitted by CTUIL for information/approval/recommendation of NCT vide letter dated 16.11.2021 and agreed/recommended by NCT.

1) Transmission Network Expansion in Gujarat to increase ATC from ISTS: Part A

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Augmentation of transformation capacity at Vadodara 765/400 kV S/s by 1x1500 MVA, 765/400 kV ICT (3 rd)	765/400 kV, 1500 MVA ICT: 1 no. 765 kV ICT bay – 1no.

Note:

- (i) Out of the 2 nos. 400kV line bays already constructed by POWERGRID for DGEN – Vadodara line, 1no. line bay to be utilized for 765/400kV ICT (3rd) at Vadodara
- (ii) **Implementation Time-frame:** Apr'22 (as decided in meeting held on 02.11.2021 regarding resource adequacy plan for the state of Gujarat)

2) Transmission Network Expansion in Gujarat to increase ATC from ISTS: Part B

Sl.No.	Scope of the Transmission Scheme	Capacity /km
	Establishment of 765/400/220 kV Navsari (new) (South Gujarat) S/s (GIS) Space provisions for Future Scope 765/400 kV ICT: 4 nos. 400/220 kV ICT: 4 nos. 765 kV line bays : 8 nos. 400 kV line bays: 6 nos. 220 kV line bays: 16 nos.	765/400 kV, 1500 MVA- 2 nos. (7 X 500 MVA inc 1 spare unit) 400/220 kV, 500 MVA- 3 nos. 765 kV ICT bays- 2 nos. 765 kV GIS line bays -2 (for Phadge line) 400 kV ICT bays- 5 nos. 400 kV line bays – 4 nos. (for Kala and Magarwada lines) 220 kV ICT bays- 3 nos.

		<p>765 kV, 330 MVA_r BR – 2 nos. (7 X 110 MVA_r inc. 1 switchable spare unit)</p> <p>1X 80 MVA_r single phase switchable spare unit (for Ahmedabad – Navsari (New) (South Gujarat) 765 kV D/c line)</p> <p>765 kV Bus Reactor bays – 2 nos.</p> <p>400 kV, 125 MVA_r Bus Reactor- 1</p> <p>400 kV Bus Reactor bay- 1 no.</p>
2.	Navsari (new) (South Gujarat) (GIS)- Kala (GIS) 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage) with 63MVA _r switchable line reactor on each ckt at Navsari (new) (GIS) end.	<p>110 km</p> <p>400 kV GIS line bays- 2 nos. (at Kala)</p> <p>63 MVA_r, 400 kV SLR along with switching eqpts.- 2 nos.</p>
3.	Navsari(New) (South Gujarat) (GIS) – Magarwada (GIS) 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage)	<p>80 km</p> <p>400 kV GIS line bays- 2 nos. (at Magarwada)</p>
4.	Navsari (New) (South Gujarat) (GIS) – Padghe (GIS) 765 kV D/c line with 330 MVA _r , 765 kV Switchable line reactor on each ckt at Navsari(New) (South Gujarat) end.	<p>200 km</p> <p>765 kV GIS line bays -2 (at Padghe)</p> <p>765 kV, 330 MVA_r SLR – 2 nos (6 X 110 MVA_r)</p>
5.	<p>Augmentation of transformation capacity at Padghe (GIS) 765/400 kV substation by 1x1500 MVA ICT.</p> <p>The available spare equipped bays (765kV bay: existing & 400kV bay: under construction under WRSS XIX scheme) at Padghe(GIS) S/s shall be utilised for the subject ICT</p>	<p>765/400 kV, 1500 MVA- 1 no</p>

Note:

- (i) Navsari (New) (South Gujarat) S/s shall be establishment as GIS substation to reduce the land requirement as there may be issues in getting contiguous land in this area which is industrial in nature as well as densely populated.
- (ii) Augmentation of transformation capacity at Navsari(new) (GIS) 765/400 kV substation by 1x1500 MVA ICT (3rd) along with its associated bays to be implemented in matching time frame of Khavda Phase-A (Ph-II) (5GW) scheme as a part of the scheme “Transmission Network Expansion in Gujarat associated with integration of RE projects from Khavda potential RE zone”.
- (iii) As Kala and Magarwada are located close to each other, majority of common stretch of Kosamba – Kala and Kosamba – Magarwada 400 kV D/c line may be constructed using Multi-circuit towers in order to save RoW.
- (iv) **Implementation Time-frame:** June 2023
- (v) GETCO shall implement the following downstream system in matching time-frame of Navsari(New) (South Gujarat) S/s:

220kV Interconnections Navsari (New) (South Gujarat) S/s) [Under Intra-state]

- a) LILO of both circuits of 220 KV D/C Navsari – Chikhli line at Navsari(New) (South Gujarat) (GIS) substation along with associated line bays
- b) LILO of both circuits of 220 KV D/C Navsari – Nasik line at Navsari(New) (South Gujarat) (GIS) substation along with associated line bays

3) Transmission Network Expansion in Gujarat to increase ATC from ISTS: Part C

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Augmentation of transformation capacity at Banaskantha 765/400 kV S/s by 1x1500 MVA ICT	765/400 kV, 1500 MVA ICT: 1 no. 765 kV ICT bay – 1no 400 kV ICT bay– 1 no
2.	Banaskantha – Sankhari 400 kV 2 nd D/c line	26 km 400 kV line bays- 4 nos (2 nos at Banaskantha and 2 nos at Sankhari

Implementation Time-frame: Matching with establishment of Prantij 400/220 kV and Sankhari- Prantij 400 kV D/C line by GETCO (presently expected by Mar’25).

4) Transmission Network Expansion in Gujarat associated with integration of RE projects from Khavda potential RE zone

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Banaskantha – Ahmedabad 765 kV D/c line with 330MVA, 765 kV Switchable line reactor on each ckt at Ahmedabad S/s end	200 km 765 kV, 330 MVA SLR along with switching eqpts.– 2 nos (6 X 110 MVA) 765 kV line bays- 4(2 nos. at Banaskantha and 2 nos. at Ahmedabad)

Implementation Time-frame: Matching with Khavda Phase-A (Ph-II) (5GW) scheme. NCT has recommended a time-line of 24 months from SPV Transfer for Khavda Phase-A (Ph-II) (5GW) scheme.

I/18964/2021(1)

Annexure V

भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

केन्द्रीय विद्युत प्राधिकरण

Central Electricity Authority

विद्युत प्रणाली योजना एवं मूल्यांकन-I प्रभाग

Power System Planning & Appraisal-I Division

सेवा में / To

1. COO (CTUIL), Saudamini, Plot No. 2, Sector - 29, Gurugram - 122001
2. Director (Operations), PTCUL, Vidyut Bhawan, Saharanpur Road, Majra, Dehradun - 248002

विषय/Subject: Joint site visit of Rampura (Kashipur) (PTCUL) substation for availability of space for installation of switchable line reactors on 400kV D/C Khandukhal (Srinagar) - Rampura (Kashipur) line at Kashipur end

महोदय / Sir,

A Joint site visit of Rampura (Kashipur) 400/220kV substation was carried out on 15.11.2021 by team comprising of officers from CEA, CTUIL and PTCUL for checking the availability of space for installation of switchable line reactors on 400kV D/C Khandukhal (Srinagar) - Rampura (Kashipur) line at Kashipur end. The brief report of the joint site visit is enclosed herewith.

Encl: As above

भवदीय / Yours faithfully,

Signature Not Verified
Digitally signed by NITIN
DESWAL
Date: 2021.12.04 13:00:59 IST

(नितिन देसवाल/Nitin Deswal)

सहायक निदेशक/Asst. Director, के.वि.प्रा/CEA

प्रतिलिपि/ Copy to (for information)-

1. PPS to Member (PS), CEA
2. Sh. Ravinder Gupta (Chief Engineer), CEA & Member Secretary (NCT)

I/18964/2021(1)

Joint site visit of Rampura (Kashipur) (PTCUL) substation for checking the availability of space for installation of switchable line reactors on Khandukhal (Srinagar) - Rampura (Kashipur) 400 kV D/c line at Kashipur end

1. Background

In the 3rd NRPC(TP) meeting, implementation of Khandukhal(Srinagar) - Rampura (Kashipur) 400 kV D/c line was agreed to be taken up under central sector as an ISTS scheme with the matching time frame of commissioning of Vishnugad Pipalkoti HEP of THDC or Tapovan Vishnugad HEP of NTPC, whichever is earlier.

Subsequently, the scheme was taken up for discussions in 5th meeting of NCT and 80 MVAR switchable line reactor in each circuit at any end of Khandukhal(Srinagar) - Rampura (Kashipur) 400kV D/c line with inter-tripping arrangement were proposed due to the change in the line length to 195 km from the earlier noted line length of 150 km.

CEA vide e-mail has requested PTCUL to confirm the availability of space for construction of 400 kV bays along with space for installation of switchable line reactor at Khandukhal (Srinagar) and Rampura (Kashipur) 400 kV sub-stations. PTCUL has informed that two number of bays were existing at Khandukhal (Srinagar) for termination of above line, however, there was no space for reactors at Khandukhal (Srinagar) S/s. Regarding, availability of space at Kashipur S/s, it was informed that the space at Kashipur S/s needs to be checked. PTCUL has also submitted the SLD and layout of the 400kV Srinagar and Kashipur substations.

In the 6th meeting of National Committee on Transmission (NCT) held on 29.10.2021, it was proposed to have joint site visit of Rampura (Kashipur) substation for checking the availability of space for installation of switchable line reactors on Khandukhal (Srinagar) - Rampura (Kashipur) 400kV D/C line at Kashipur end. Therefore, a team comprising of officers from CEA, CTUIL and PTCUL visited the Rampura (Kashipur) Substation on 15.11.2021. The list of members of the joint site visit and is enclosed as Annex 1.

2. Observations

The following are the major observations of Joint site visit of Rampura (Kashipur) Substation for availability of space for installation of switchable line reactors at Kashipur end on 400kV D/C Khandukhal (Srinagar) - Rampura (Kashipur) line:

- (i) Adequate space is available at Kashipur S/s for fixed 80 MVA line reactor in each circuit of Khandukhal(Srinagar) - Rampura (Kashipur) 400kV D/c line. The switchable line reactors can also be accommodated. SLD of the 400kV the Rampura (Kashipur) substation is enclosed at Annexure-II.
- (ii) At 400kV level, Rampura (Kashipur) S/s is having one and half breaker scheme with Double bus (Main-I and Main-II). In the substation, inter alia, one complete dia is existing, for termination of one 315MVA 400/200kV ICT (2nd) (already in place) and one 400kV circuit from Srinagar with switchable line reactor. Further, adjacent to above, space is available for another 400kV dia, which would accommodate 1 no. 400kV line bay with switchable line reactor (for line from Srinagar) and 315MVA, 400/200kV (3rd) ICT.
- (iii) The 400kV line bay equipment in the above mentioned existing dia are having rating of

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2000A. As the 400kV Khandukhal(Srinagar) - Rampura (Kashipur) D/c line is proposed with Twin HTLS conductor, therefore, the existing line bay equipment for complete dia needs to be upgraded with rating of 3150A.

- (iv) PTCUL informed that the 3rd 315MVA, 400/200kV ICT at Rampura (Kashipur) is presently under tendering. As per the tender document, the bay equipment would be of 2000 A rating. PTCUL was advised to modify the tender document, so as to have the complete dia with same equipment rating corresponding to 3150A.
- (v) The existing 400kV buses (both Main-I and Main-II) at Rampura (Kashipur) are with Quad conductor. Since, two nos. of 400kV lines with Twin HTLS conductor would be terminating there, upgradation of that section of existing 400kV buses may be done, if required.

3. Conclusions

80 MVAR switchable line reactor in each circuit of 400kV Khandukhal (Srinagar) - Rampura (Kashipur) D/c line at Kashipur end is proposed. Further, necessary bay up gradations at 400kV Rampura (Kashipur) substation would be required and the same would be under the ISTS scope.

The bay equipments of the bay for the 3rd 315MVA, 400/200kV ICT at Rampura (Kashipur) being implemented by PTCUL should have the rating of 3150A and PTCUL is advised to take necessary action in this regard.

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I/18964/2021(1)

Annex-1**List of members of the joint site visit of Kashipur S/s on 15.11.2021**

	Name (Sh/Smt/Ms)	Designation
	CEA	
1)	Manjari Chaturvedi	Director
2)	Nitin Deswal	Asst. Director
	CTUIL	
3)	KK Sarkar	Sr. GM
	PTCUL	
4)	Rajiv Gupta	C.E (Project), Kumaon
5)	D.P. Singh	SE (T&C), Haldwani
6)	Prajwal Kumar Bhaskar	SE (O&M), Kashipur
7)	Rakesh Kumar	Ex. Engr. Kashipur S/s

ISTS Schemes approved by CTU (costing upto Rs 100 Cr) for implementation under RTM vide OM dated 16.11.2021

Sr. No.	Name of the transmission scheme	Implementing Agency	Broader scope of works	Estimated Cost Rs. Cr.
Northern Region				
1.	Implementation of 220 kV bays for RE generators and 400/220kV ICTs at Bikaner-II PS	Bikaner-II Bhiwadi Transco Ltd. (a subsidiary of Power Grid Corporation of India Ltd.) [now known as POWERGRID Bikaner Transmission System Ltd.]	ICT augmentation at Bikaner-II PS and associated line bays. Implementation timeframe: ICT-1 : March'23 ICT-II: April' 23 Total 4 Line bays: 1 no of bay: March'2023 1 no of bay: April'2023 2 no. of bays: Dec' 2023	70
2.	Augmentation of transformation capacity at 400/220 kV Ludhiana (PG) Substation	Power Grid Corporation of India Ltd.	Replacement of 315 MVA, 400/220 kV ICT by 500 MVA, 400/220kV ICT. Implementation timeframe: 15 months from issue of OM by CTU	14
3.	Augmentation of Transformation capacity at 400/220 kV Kurukshetra (PG) & Patiala (PG) Substations	Power Grid Corporation of India Ltd.	ICT augmentations at Kurukshetra (PG) & Patiala (PG) S/s. Implementation timeframe: Kurukshetra ICT: 15 months from issue of OM by CTU Patiala ICT: May'2023	54
Southern Region				

4.	Requirement of 765 kV spare (1-Ph) Reactors unit at 765kV Warangal New (Part-A)	Warora Kurnool Transmission Ltd. (a subsidiary of Adani Transmission Ltd)	Augmentation spare 80 MVAR 1-Ph reactor at 765 kV Warangal New S/s. Implementation timeframe: 15 months from issue of OM by CTU	5.5
5.	Requirement of 765 kV spare (1-Ph) Reactors unit at 765kV Chilkaluripeta (Part-B)	POWERGRID Southern Interconnector Transmission System Ltd. (a subsidiary of Power Grid Corporation of India Ltd.)	Augmentation spare 80 MVAR 1-Ph reactor at 765 kV Chilkaluripeta S/s. Implementation timeframe: 15 months from issue of OM by CTU	5.5
6.	Scheme to bypass NGR to use Switchable Line Reactor as Bus Reactor at 765kV Chilkaluripeta	POWERGRID Southern Interconnector Transmission System Ltd. (a subsidiary of Power Grid Corporation of India Ltd.)	NGR bypass arrangement to use switchable line reactors as bus reactors. Implementation timeframe: 6 months from issue of OM by CTU	0.32
7.	1 no. 400 kV bay at 765/400 kV Kurnool (New) Substation	Power Grid Corporation of India Ltd.	1 no. 400 kV bay Implementation timeframe: October'2022	9
Eastern Region				
8.	Eastern Region Expansion Scheme-XXVI (ERES-XXVI)	Power Grid Corporation of India Ltd.	ICT augmentation at Ranchi (PG) Implementation timeframe: 15 months from issue of OM by CTU	27
North-Eastern Region				
9.	Additional scope under NERSS-XIII	Power Grid Corporation of India Ltd.	Up-gradation of CT to 1200 A at Imphal (PG) S/s	0.10

			Implementation timeframe: In matching timeframe to SCoD of NERSS-XIII i.e. Sep' 2022	
Western Region				
10.	Transmission network expansion in Gujarat to increases its ATC from ISTS (Part-A)	Power Grid Corporation of India Ltd.	ICT augmentation at Vadodara 765/400/220 kV S/s. Implementation timeframe: April'2022	70