



भारत सरकार  
Government of India  
विद्युत मंत्रालय  
Ministry of Power  
उत्तर क्षेत्रीय विद्युत समिति  
Northern Regional Power Committee

दिनांक: 13<sup>th</sup> फरवरी, 2026

सेवा में / To,

उ.क्षे.वि.स. एवं टीसीसी के सभी सदस्य (संलग्न सूचीनुसार)  
Members of NRPC & TCC (As per List)

**विषय: एनआरपीसी की विशेष बैठक (23.02.2026) (ऑनलाइन माध्यम) की कार्यसूची।**  
**Subject: Agenda of Special Meeting of NRPC on 23.02.2026 through online mode -reg.**

महोदय / महोदया,

एनआरपीसी की विशेष बैठक दिनांक **23.02.2026 (12:30 PM)** को वीडियो कॉन्फ्रेंसिंग के माध्यम से आयोजित की जाएगी। बैठक की कार्यसूची संलग्न है।

कृपया बैठक में भाग लेना सुविधा जनक बनाएं। मीटिंग लिंक अलग से साझा किया जाएगा।

**Special Meeting** of NRPC is scheduled to be held on **23.02.2026 (12:30 PM)** via video-conferencing. The agenda for the meeting is enclosed.

Kindly make it convenient to attend the meeting. Meeting link shall be shared separately.

भवदीय

Yours faithfully

DHARMEND ER KUMAR MEENA  
Digitally signed by  
DHARMENDER  
KUMAR MEENA  
Date: 2026.02.13  
17:34:03 +05'30'  
(डी. के. मीना)  
अधीक्षण अभियंता (प्रचालन)

Copy to:

1. Sh. Shailendra Kumar, IAS, Chairperson, NRPC and Financial Commissioner (Additional Chief Secretary), to Government of J&K, Power Development Department, UT of J&K ([power.department@jk.gov.in](mailto:power.department@jk.gov.in)).
2. Sh. G.P. Singh Arora, IAS, Chairperson, TCC and Managing Director, JPDCL ([md-jpdcl@jk.gov.in](mailto:md-jpdcl@jk.gov.in)).

*Special NRPC Meeting (23<sup>rd</sup> February, 2026)–Agenda*



**उत्तर क्षेत्रीय विद्युत समिति**  
**NORTHERN REGIONAL POWER COMMITTEE**



**Agenda of**  
**Special Meeting of**  
**Northern Regional Power Committee**

**Date: 23<sup>rd</sup> February 2026**

**Time: 12:30 PM**

**Via: Video Conferencing**

*Special NRPC Meeting (23<sup>rd</sup> February, 2026)–Agenda***Agenda for Special NRPC Meeting****Introduction**

A Special Meeting of NRPC is scheduled on 23.02.2026 through VC (online mode) to discuss the ISTS proposals furnished by the CTUIL.

**A.1 Transmission scheme for evacuation of power as part of Rajasthan REZ Ph-IV (Part-6: 6GW) (Bikaner Complex) (Bikaner V: 6GW)**

A.1.1 Transmission scheme for evacuation of power as part of Rajasthan REZ Ph-IV (Part-6: 6GW) (Bikaner Complex) (Bikaner V: 6GW) was discussed in 56th TCC/81st NRPC meeting held on 30-31th Oct'25. The scheme was agreed in 40th CMETS-NR meeting held on 12.09.25 and 47th CMETS-ER meeting held on 30.09.25. Details of scheme enclosed in **Annexure-I**.

A.1.2 In the NRPC meeting it was highlighted that an EHVAC system has been evolved from Bikaner-V PS to various load centers in NR. The broad feature of scheme is as under:

- a) Evacuation of 6 GW RE power from Bikaner V PS on EHVAC system which will take less implementation time than a HVDC system
- b) Resolve the issue of critical loading of 765kV Bikaner - Moga D/c line as well as issue of higher angular separation (>20 degree) under N-1/N-1-1 contingency
- c) Resolve the issue of critical loading of 765kV Aligarh - Greater Noida line
- d) Provide supply to Mohali region to resolve the power deficit situation in Punjab based on the request of PSTCL. This will also improve ATC/TTC limits of Punjab.
- e) Feed RE power to new load centres of Punjab, Delhi and UP to cater to future load demand
- f) Feed the RE power to Greater Noida complex as per requirement of UPPTCL

A.1.3 In the 81st NRPC meeting, Member Secretary(MS), ERPC stated that a comprehensive scheme may be submitted by CTU as the present scheme has implications on the Eastern region also. MS, ERPC stated that this scheme has

*Special NRPC Meeting (23<sup>rd</sup> February, 2026)–Agenda*

been presented for the first time and there was not sufficient time for detailed deliberation, as it was only recently discussed in the OCC meeting of ERPC. Therefore, additional time is required to assess the entire scheme.

A.1.4 CTU stated that the scheme had already been discussed with Eastern Region constituents during the CMETS-ER meeting; however, it can be discussed again with ERPC and any required modifications can be discussed before submission to the NCT. Furthermore, any delay in approving the transmission system will further constrain RE generation, which is already an issue in the current scenario. Based on deliberation, it was concluded that:

- *Forum advised that a separate meeting under Member (Power System), CEA may be convened within next two weeks by CTU along with concerned stakeholders and the outcome of the meeting shall be discussed at NRPC/ERPC forum before taking it to the NCT meeting.*
- *CTU and STU may do necessary studies & take up corrective measures in matching timeframe of the proposed scheme to address the observation raised by GRID-INDIA.*

A.1.5 Subsequently, CTUIL reviewed the studies for additional interconnection to Eastern region. In the revised studies, in place of LILO of both ckts of 400kV Balia – Patna D/c line at Asana S/s , a direct interconnection between Asana S/s & Nawada S/s through 765kV D/c line is considered. Balance scheme remains the same as agreed in CMETS-NR and CMETS-ER meetings earlier. Revised study files were also circulated on 21.11.2025.

A.1.6 For deliberation on revised proposal towards eastern region, a meeting was convened on 27.11.25 under Chairmanship of Member(PS), CEA. In the meeting MS, ERPC stated that proposed connection towards Nawada would help ER states in import of RE power from Rajasthan complex. The proposal is in order and shall be discussed in ensuing ERPC meeting for approval for ER portion.

A.1.7 Further in meeting Grid-India highlighted the following major issues in Northern region:

- Higher load consider in Scenario 7 as per LGB
- Severe low voltage issue in NR Grid in Solar maximized scenarios
- High voltage issues in winter night off peak scenario
- High fault level on Various substation in Rajasthan & Punjab

*Special NRPC Meeting (23<sup>rd</sup> February, 2026)–Agenda*

- Higher angular separation in 400kV Kishenpur -Moga D/c line in N-1 contingency
- N-1 violation issues pertaining to Intra State lines/ICTs (STU network) in NR
- Overloading of some of the 400/220kV ICTs and 220kV lines
- N-1 non-compliance of inter-state ICTs and higher angular separation of various lines in N-1 and N-1-1 contingency

A.1.8 Grid-India emphasized that above issues may be discussed and resolved as part of Grid strengthening scheme and may be taken up in matching timeframe of proposed Transmission scheme from Bikaner complex.

A.1.9 Member(PS), CEA directed that CEA, CTU and Grid-India to carry out joint studies separately and mitigate issues highlighted by Grid-India.

A.1.10 Subsequently, a joint study meeting was held on 23.12.2025 & 24.12.2025 to discuss Intra-state transmission schemes proposed by RVPN, Transmission Resource Adequacy report of Rajasthan and various issues highlighted by Grid-India during the earlier discussions of Transmission scheme for evacuation of power as part of Rajasthan REZ Ph-IV (Part-6 : 6GW) (Bikaner Complex) (Bikaner V: 6GW). The Gist of the study meeting, as consented by Member (PS), CEA is attached (**Annexure-II**).

A.1.11 In the meeting, to mitigate high and low voltage issues in Northern region, static and dynamic compensation (SynCON/STATCOM) at various pooling stations i.e. Bhadla-III, Fatehgarh-IV PS(Sec-2), Agra, Orai, Amargarh, Aligarh, Patran, Sonipat, Wagoora, Jhatikra and Mandola was agreed. Further to mitigate high short circuit level at various RE pooling stations and load serving stations, it was decided that remedial measures for high fault levels to be taken in phase-wise manner. Subsequently, drawee substations & few RE PS are to be considered in Phase-I & RE Injection substations are considered in Phase-II.

A.1.12 For the higher angular separation issues under N-1 in various lines highlighted by Grid-India, it was decided in the meeting that some of lines i.e 400 kV Kishenpur – Moga line & Bhiwani - Moga line & 400 kV Moga - Fatehabad D/c line are considered in phase-I (with resolution in Feb/Mar month CMETS-NR meeting), whereas for other lines, lines will be LILoed as part of future schemes planned by CTUIL.

*Special NRPC Meeting (23<sup>rd</sup> February, 2026)–Agenda*

A.1.13 Various other comments of Grid-India were also deliberated in meeting regarding N-1 non-compliance issues of ICTs and 400kV lines in Northern region. Details are enclosed in **Annexure-II**.

A.1.14 As per the discussion in joint study meeting, revised files after incorporating study related comments of CEA and Grid-India were circulated on 16.01.26. The scheme to be put up to RPC for its concurrence. The revised proposal is already agreed in 55th TCC/ERPC meeting held on 16-17th Dec'25. Result of system studies are enclosed in **Exhibit-I**. Further, for various other Grid related issues highlighted in the Joint study meeting by Grid-India, measures were deliberated and agreed. The Grid strengthening schemes will be taken up separately and appropriately for stakeholder consultation.

***Decision required from Forum:***

*NRPC to finalize the views on the above CTUIL proposals*

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**NRPC Members for FY 2025-26**

S. No.	NRPC Member	Category	Nominated/ Notified/Delegated Member	E-mail
1	Member (GO&D), CEA	Member (Grid Operation & Distribution), Central Electricity Authority (CEA)	Member (GO&D), CEA	<a href="mailto:member.god@cea.nic.in">member.god@cea.nic.in</a>
2	NLDC	National Load Despatch Centre	Director (System Operation)	<a href="mailto:rk.porwal@grid-india.in">rk.porwal@grid-india.in</a>
3	NRLDC	Northern Regional Load Despatch Centre	Executive Director	<a href="mailto:mkagarwal@grid-india.in">mkagarwal@grid-india.in</a>
4	CTUIL	Central Transmission Utility	Chief Operating Officer	<a href="mailto:drozakar@powergrid.in">drozakar@powergrid.in</a>
5	PGCIL	Central Government owned Transmission Company	Director (Operations)	<a href="mailto:naveensrivastava@powergrid.in">naveensrivastava@powergrid.in</a>
6	NTPC	Central Generating Company	Director (Finance)	<a href="mailto:jaikumar@ntpc.co.in">jaikumar@ntpc.co.in</a>
7	BBMB		Chairman	<a href="mailto:cmn@bbmb.nic.in">cmn@bbmb.nic.in</a>
8	THDC		CGM (EM-Design)	<a href="mailto:rrsemwal@thdc.co.in">rrsemwal@thdc.co.in</a>
9	SJVN		CMD	<a href="mailto:sectt.cmd@sjvn.nic.in">sectt.cmd@sjvn.nic.in</a>
10	NHPC		Director (Technical)	<a href="mailto:sadhikari@nhpc.nic.in">sadhikari@nhpc.nic.in</a>
11	NPCIL	Director (Finance)	<a href="mailto:df@npcil.co.in">df@npcil.co.in</a>	
12	Delhi SLDC	State Load Despatch Centre	General Manager	<a href="mailto:gmsldc@delhisldc.org">gmsldc@delhisldc.org</a>
13	Haryana SLDC		Chief Engineer (SO&C)	<a href="mailto:cesocomml@hvpn.org.in">cesocomml@hvpn.org.in</a>
14	Rajasthan SLDC		Chief Engineer (LD)	<a href="mailto:ce.ld@rvpn.co.in">ce.ld@rvpn.co.in</a>
15	Uttar Pradesh SLDC		Director	<a href="mailto:directorsldc@upslcd.org">directorsldc@upslcd.org</a>
16	Uttarakhand SLDC		Chief Engineer	<a href="mailto:anupam_singh@ptcul.org">anupam_singh@ptcul.org</a>
17	Punjab SLDC		Chief Engineer	<a href="mailto:ce-sldc@punjabslcd.org">ce-sldc@punjabslcd.org</a>
18	Himachal Pradesh SLDC		Managing Director	<a href="mailto:mdhpsldc@gmail.com">mdhpsldc@gmail.com</a>
19	DTL	State Transmission Utility	CMD	<a href="mailto:cmd@dtl.gov.in">cmd@dtl.gov.in</a>
20	HVPNL		Managing Director	<a href="mailto:md@hvpn.org.in">md@hvpn.org.in</a>
21	RRVNL		CMD	<a href="mailto:cmd.rvpn@rvpn.co.in">cmd.rvpn@rvpn.co.in</a>
22	UPPTCL		Managing Director	<a href="mailto:md@upptcl.org">md@upptcl.org</a>
23	PTCUL		Managing Director	<a href="mailto:md@ptcul.org">md@ptcul.org</a>
24	PSTCL	State Generating Company	CMD	<a href="mailto:cmd@pstcl.org">cmd@pstcl.org</a>
25	HPPTCL		Managing Director	<a href="mailto:md.tcl@hpmail.in">md.tcl@hpmail.in</a>
26	IPGCL		Managing Director	<a href="mailto:md.ipgpp@nic.in">md.ipgpp@nic.in</a>
27	HPGCL		Managing Director	<a href="mailto:md@hpgcl.org.in">md@hpgcl.org.in</a>
28	RRVUNL		CMD	<a href="mailto:cmd@rrvunl.com">cmd@rrvunl.com</a>
29	UPRVUNL	Director (Technical)	<a href="mailto:director.technical@uprvunl.org">director.technical@uprvunl.org</a>	
30	UJVNL	Managing Director	<a href="mailto:mdujvnl@ujvnl.in">mdujvnl@ujvnl.in</a>	
31	HPPCL	Managing Director	<a href="mailto:md@hppcl.in">md@hppcl.in</a>	
32	PSPCL	State Generating Company & State owned Distribution Company	CMD	<a href="mailto:cmd-pspcl@pspcl.in">cmd-pspcl@pspcl.in</a>
33	DHBVN	State owned Distribution Company (alphabetical rotational basis/nominated by state govt.)	Managing Director	<a href="mailto:md@dhbvn.org.in">md@dhbvn.org.in</a>
34	Ajmer Vidyt Vitran Nigam Ltd.		Managing Director	<a href="mailto:MD.AVVNL@RAJASTHAN.GOV.IN">MD.AVVNL@RAJASTHAN.GOV.IN</a>
35	Purvanchal Vidyt Vitaran Nigam Ltd.		Managing Director	<a href="mailto:nomination_awaited(md@puvvnl.in)">nomination_awaited(md@puvvnl.in)</a>
36	UPCL		Managing Director	<a href="mailto:md@upcl.org">md@upcl.org</a>
37	HPSEB	Managing Director	<a href="mailto:md@hpseb.in">md@hpseb.in</a>	
38	Prayagraj Power Generation Co. Ltd.	IPP having more than 1000 MW installed capacity	Head (Commercial & Regulatory)	<a href="mailto:sanjay.bhargava@tatapower.com">sanjay.bhargava@tatapower.com</a>
39	Aravali Power Company Pvt. Ltd.		CEO	<a href="mailto:brahmaijg@ntpc.co.in">brahmaijg@ntpc.co.in</a>
40	Apraava Energy Private Limited		CEO	<a href="mailto:nirai.gupta@apraava.com">nirai.gupta@apraava.com</a>
41	Talwandi Sabo Power Ltd.		Head Regulatory & Policy Advocacy	<a href="mailto:arun.kumar@vedanta.co.in">arun.kumar@vedanta.co.in</a>
42	Nabha Power Limited		CEO	<a href="mailto:sk.narang@larsentoubro.com">sk.narang@larsentoubro.com</a>
43	MEIL Anpara Energy Ltd		COO & WTD, Executive Director	<a href="mailto:anandkumar.singh@meilanparapower.com">anandkumar.singh@meilanparapower.com</a> <a href="mailto:arun.tholia@meilanparapower.com">arun.tholia@meilanparapower.com</a>
44	Rosa Power Supply Company Ltd		Station Director	<a href="mailto:Hirday.tomar@relianceada.com">Hirday.tomar@relianceada.com</a>
45	Lalitpur Power Generation Company Ltd		Managing Director	<a href="mailto:vksbankoti@bajajenergy.com">vksbankoti@bajajenergy.com</a>
46	MEJA Urja Nigam Ltd.		CEO	<a href="mailto:hoppmeja@ntpc.co.in">hoppmeja@ntpc.co.in</a>
47	Adani Power Rajasthan Limited		Chief Operating Officer (O&M)	<a href="mailto:sudip.nag@adani.com">sudip.nag@adani.com</a>
48	JSW Energy Ltd. (KWHEP)		Head Regulatory & Power Sales	<a href="mailto:iyotiprakash.panda@jsw.in">iyotiprakash.panda@jsw.in</a>
49	Transition Cleantech Services Private Limited	IPP having less than 1000 MW installed capacity (alphabetical rotational basis)		<a href="mailto:nomination_awaited(pkmaujia@evrenenergy.com)">nomination_awaited(pkmaujia@evrenenergy.com)</a>
50	UT of J&K	From each of the Union Territories in the region, a representative nominated by the administration of the Union Territory concerned out of the entities engaged in generation/ transmission/ distribution of electricity in the Union Territory.	Chief Engineer, JKSPDCL/JKPDD	<a href="mailto:cejkpd2@gmail.com/sojppdd@gmail.com">cejkpd2@gmail.com/sojppdd@gmail.com</a>
51	UT of Ladakh		Chief Engineer, LPDD	<a href="mailto:cepdladakh@gmail.com">cepdladakh@gmail.com</a>
52	UT of Chandigarh		Executive Engineer, EWEDC	<a href="mailto:seelo-chd@nic.in">seelo-chd@nic.in</a>
53	NVVN	Nodal Agency appointed by the Government of India for coordinating cross-border power transactions	NVVN and PTC are two nodal agencies in Northern Region. Since PTC is already a member in this year for trader category, it is listed at serial no. 56.	<a href="mailto:ceonvvn@ntpc.co.in">ceonvvn@ntpc.co.in</a>
54	TPDDL	Private Distribution Company in region (alphabetical rotational basis)	Head-Operations	<a href="mailto:nomination_awaited(ceo.office@tatapower-ddl.cpm)">nomination_awaited(ceo.office@tatapower-ddl.cpm)</a>
55	Gurgaon Palwal Transmission Limited	Private transmission licensee (nominated by central govt.)	AVP-O&M	<a href="mailto:lokendra.ranawat@indgrid.com">lokendra.ranawat@indgrid.com</a>
56	PTC	Electricity Trader (nominated by central govt.)	CEO	<a href="mailto:cmd@ptcindia.com">cmd@ptcindia.com</a>
57	ReNew Power Private Limited	RE Generating Company having more than 1000 MW installed capacity	CEO	<a href="mailto:sumant@renew.com">sumant@renew.com</a>
58	NTPC Green Energy Limited		CEO	<a href="mailto:rajivgupta@ntpc.co.in">rajivgupta@ntpc.co.in</a>
59	Azure Power India Pvt. Limited		CEO	<a href="mailto:sunil.gupta@azurepower.com">sunil.gupta@azurepower.com</a>
60	Avaada Energy Private Limited		CEO	<a href="mailto:kishor.nair@avaada.com">kishor.nair@avaada.com</a>
61	Adani Green Energy Limited		COO	<a href="mailto:chaitanya.sahoo@adani.com">chaitanya.sahoo@adani.com</a>

**Transmission scheme for evacuation of power as part of Rajasthan REZ Ph-IV (Part-6: 6GW) (Bikaner Complex) (Bikaner V: 6GW)**

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
1	<p>Establishment of 765/400 kV, 6x1500 MVA &amp; 400/220 kV, 8x500 MVA Bikaner-V Pooling Station along with 2x240 MVar (765kV) &amp; 2x125 MVar (420kV) Bus Reactors at a suitable location near Bikaner</p> <p><b><u>Future provisions (excl. scope of present scheme):</u></b></p> <ul style="list-style-type: none"> <li>➤ 765 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 400 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 400 kV line bays –4 Nos.</li> <li>➤ 765 kV Bus Reactor along with bays: 1 No</li> <li>➤ 400 kV Bus Reactor along with bays: 1 No.</li> <li>➤ 400/220 kV ICT along with bays-2 Nos.</li> <li>➤ 400 kV Sectionalization bays: 1 set</li> <li>➤ 220 kV line bays for connectivity RE Applications -4 Nos.</li> <li>➤ 220kV Sectionalization bay: 2 sets</li> <li>➤ 220 kV BC (2 Nos.) &amp; TBC (2 Nos.)</li> <li>➤ 1 No. of Syncon units* at 400kV level along with 1 nos. of 400kV bay</li> <li>➤ 1 No. of Syncon units* at 220kV level along with 1 nos. of 220kV bay</li> </ul> <p>*1 No. of SynCon unit comprises dynamic support of +300MVar/-200MVar (Minimum) &amp; Short circuit contribution at PCC of 1200MVA (Minimum) (Value of inertia (MW-secs) shall be provided in RfP document)</p>	<p>Bikaner-V PS - AIS</p> <ul style="list-style-type: none"> <li>• 765/400 kV 1500 MVA ICTs- 6 Nos. (19x500 MVA including one spare unit)</li> <li>• 400/220 kV 500 MVA ICTs- 8 Nos.</li> <li>• 765kV line bays – 4 nos. (for 765kV interconnection with Pallu S/s)</li> <li>• 400kV line bays – 4 nos. (for 400kV interconnection with LILO of one D/c of 400kV Bikaner II PS- Khetri 2xD/c line)</li> <li>• 765kV ICT bays – 6 nos.</li> <li>• 400 kV ICT bays- 14 Nos.</li> <li>• 220 kV ICT bays - 8 Nos.</li> <li>• 240 MVar Bus Reactor-2 Nos. (7x80 MVar, including one spare unit)</li> <li>• 765 kV Bus reactor bays-2 Nos.</li> <li>• 125 MVar Bus Reactor-2 Nos.</li> <li>• 400 kV Bus reactor bays- 2 Nos.</li> <li>• 400kv line bays– 3 Nos. (for RE interconnection)</li> <li>• 220KV line bays – 10 Nos. (for RE interconnection)</li> <li>• 220kV Sectionalization bay: 1 set</li> <li>• 220 kV BC (2 Nos.) &amp; TBC (2 Nos.)</li> <li>• 400kV sectionaliser bay- 1 Set</li> </ul>
2	<p>STATCOM (2x+300MVar) along with MSC (4x125 MVar) &amp; MSR (2x125 MVar) at Bikaner-V PS</p>	<ul style="list-style-type: none"> <li>• STATCOM (2x+300MVar) along with MSC (4x125 MVar) &amp; MSR (2x125 MVar)</li> <li>• 400 kV bays: 2 Nos. (for STATCOM)</li> </ul>
3	<p>LILO of one double ckt of 400kV Bikaner II PS- Khetri (Twin HTLS) 2xD/c line at Bikaner-V PS</p>	<p>Length-45km (Quad) (LILO length)</p>

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
	along with 50 MVAR switchable line reactor for each circuit at Bikaner-V PS end	<ul style="list-style-type: none"> <li>• 420 kV, 50 MVAR switchable line reactors at Bikaner-V PS end– 2 Nos.</li> <li>• Switching equipment for 420kV, 50MVAR switchable line reactors at Bikaner-V PS end – 2 Nos.</li> </ul>
4	<p>Establishment of 765/400 kV, 2x1500 MVA S/s at suitable location near Pallu (Distt. Hanumangarh) along with 2x240 MVAR (765kV) &amp; 2x125 MVAR (420kV) Bus Reactors</p> <p><b><u>Future provisions (excl. scope of present scheme):</u></b></p> <ul style="list-style-type: none"> <li>➤ 765 kV line bays along with switchable line reactor –2 nos.</li> <li>➤ 765/400 kV 1500 MVA ICTs- 2 Nos.</li> <li>➤ 400 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 400 kV line bays –4 Nos.</li> <li>➤ 765 kV Bus Reactor along with bays: 1 No</li> <li>➤ 400 kV Bus Reactor along with bays: 1 No.</li> <li>➤ 400 kV Sectionalization bays: 1 set</li> <li>➤ 400/220 kV ICT along with bays-5 Nos.</li> <li>➤ 220 kV line bays -8 Nos.</li> <li>➤ 220kV Sectionalization bay: 1 set</li> <li>➤ 220 kV BC (2 Nos.) &amp; TBC (2 Nos.)</li> <li>➤ STATCOM (2x±300MVAR) along with MSC (4x125 MVAR) &amp; MSR (2x125 MVAR) along with 400kv bays (2nos.)</li> <li>➤ 2 No. of Syncon units* at 220kV level along with 2 nos. of 220kV bay</li> </ul> <p>*1 No. of SynCon unit comprises dynamic support of +300MVAR/-200MVAR (Minimum) &amp; Short circuit contribution at PCC of 1200MVA (Minimum) (Value of inertia (MW-secs) shall be provided in RfP document)</p>	<p>Pallu S/s - AIS</p> <ul style="list-style-type: none"> <li>• 765/400 kV 1500 MVA ICTs- 2 Nos. (7x500 MVA including one spare unit)</li> <li>• 765kV line bays – 12 nos. (for 765kV 2xD/c interconnection each with Bikaner-IV PS, Panipat S/s and LILO of both ckts of 765kV Bikaner – Moga D/c line)</li> <li>• 400kV line bays – 2 nos. (for 400kV interconnection with Hanumangarh S/s)</li> <li>• 765kV ICT bays – 2 nos.</li> <li>• 400 kV ICT bays- 2 Nos.</li> <li>• 240 MVAR Bus Reactor-2 Nos. (7x80 MVAR, including one spare unit)</li> <li>• 765 kV Bus reactor bays-2 Nos.</li> <li>• 125 MVAR Bus Reactor-2 Nos.</li> <li>• 400 kV Bus reactor bays- 2 Nos.</li> </ul>
5	765 kV Bikaner-V PS – Pallu 2xD/c line	Line Length -120 km
6	LILO of both ckts of 765kV Bikaner – Moga D/c line at Pallu S/s along with 240MVAR switchable line reactor for each circuit at Pallu S/s end of 765kV Pallu-Moga D/c line	<p>Length-50km (LILO length)</p> <ul style="list-style-type: none"> <li>• 765 kV, 240 MVAR switchable line reactors at Pallu S/s end– 2 Nos.</li> </ul>

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
		<ul style="list-style-type: none"> <li>• Switching equipment for 765kV, 240MVAr switchable line reactors at Pallu S/s end – 2 Nos.</li> </ul>
7	400 kV Pallu – Hanumangarh (RVPN) D/c (Quad) line	<p>Line Length -80 km</p> <ul style="list-style-type: none"> <li>• 400kV line bays – 2 nos. (at Hanumangarh (RVPN) S/s)</li> </ul>
8	<p>Establishment of 765/400 kV, 3x1500 MVA S/s at suitable location near Panipat (Distt. Panipat) along with 2x240 MVAr (765kV) &amp; 2x125 MVAr (420kV) Bus Reactors</p> <p><b><u>Future provisions (excl. scope of present scheme):</u></b></p> <ul style="list-style-type: none"> <li>➤ 765 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 765/400 kV 1500 MVA ICTs- 3 Nos.</li> <li>➤ 400 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 400 kV line bays –4 Nos.</li> <li>➤ 765 kV Bus Reactor along with bays: 1 No</li> <li>➤ 400 kV Bus Reactor along with bays: 1 No.</li> <li>➤ 400 kV Sectionalization bays: 1 set</li> <li>➤ 400/220 kV ICT along with bays-5 Nos.</li> <li>➤ 220 kV line bays -8 Nos.</li> <li>➤ 220kV Sectionalization bay: 1 set</li> <li>➤ 220 kV BC (2 Nos.) &amp; TBC (2 nos.)</li> <li>➤ STATCOM (2x±300MVAr) along with MSC (4x125 MVAr) &amp; MSR (2x125 MVAr) along with 400kv bays (2nos.)</li> <li>➤ 2 No. of Syncon units* at 400kV level along with 2 nos. of 400kV bays</li> </ul> <p>*1 No. of SynCon unit comprises dynamic support of +300MVAr/-200MVAr (Minimum) &amp; Short circuit contribution at PCC of 1200MVA (Minimum)) (Value of inertia (MW-secs) shall be provided in RfP document)</p>	<p>Panipat S/s - AIS</p> <ul style="list-style-type: none"> <li>• 765/400 kV 1500 MVA ICTs- 3 Nos. (10x500 MVA including one spare unit)</li> <li>• 765kV line bays –8 nos. (for 765kV 2xD/c interconnection each with Pallu S/s and Bulandshahr S/s)</li> <li>• 400kV line bays – 4 nos. (for 400kV interconnection with Mohali and Mandola S/s)</li> <li>• 765kV ICT bays – 3 nos.</li> <li>• 400 kV ICT bays- 3 Nos.</li> <li>• 240 MVAr Bus Reactor-2 Nos. (7x80 MVAr, including one spare unit)</li> <li>• 765 kV Bus reactor bays-2 Nos.</li> <li>• 125 MVAr Bus Reactor-2 Nos.</li> <li>• 400 kV Bus reactor bays- 2 Nos.</li> </ul>

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
9	765 kV Pallu-Panipat 2xD/c line along with 240 MVAR switchable line reactor for each circuit at each end	Length-280km <ul style="list-style-type: none"> <li>• 765 kV, 240 MVAR switchable line reactors at Pallu S/s end– 2 Nos.</li> <li>• 765 kV, 240 MVAR switchable line reactors at Panipat S/s end– 2 Nos.</li> <li>• Switching equipment for 765kV, 240MVAR switchable line reactors at Pallu S/s end – 2 Nos.</li> <li>• Switching equipment for 765kV, 240MVAR switchable line reactors at Panipat S/s end – 2 Nos.</li> </ul>
10	Establishment of 400/220kV, 3x500 MVA S/s at suitable location near Mohali (Distt. Mohali district) along with 2x125 MVAR (420kV) Bus Reactors  <u><b>Future provisions (excl. scope of present scheme):</b></u> <ul style="list-style-type: none"> <li>➤ 400 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 400 kV line bays –2 Nos.</li> <li>➤ 400 kV Bus Reactor along with bays: 1 No.</li> <li>➤ 400/220 kV ICT along with bays-3 Nos.</li> <li>➤ 400 kV Sectionalization bays: 1 set</li> <li>➤ 220 kV line bays -4 Nos.</li> <li>➤ 220kV Sectionalization bay: 1 set</li> <li>➤ 220 kV BC (2 Nos.) &amp; TBC (2 Nos.)</li> <li>➤ 2 No. of Syncon units* at 400kV level along with 2 nos. of 400kV bays</li> </ul> <p>*1 No. of SynCon unit comprises dynamic support of +300MVAR/-200MVAR (Minimum) &amp; Short circuit contribution at PCC of 1200MVA (Minimum)) (Value of inertia (MW-secs) shall be provided in RfP document)</p>	<ul style="list-style-type: none"> <li>• 400kV line bays – 4 nos. (for 400kV interconnection with Panipat S/s &amp; LILO of one circuit of 400kV Patiala-Panchkula D/c line)</li> <li>• 400kV ICT bays – 3 nos.</li> <li>• 220 kV ICT bays- 3 Nos.</li> <li>• 125 MVAR Bus Reactor-2 Nos.</li> <li>• 400 kV Bus reactor bays- 2 Nos.</li> <li>• 220 kV line bays -6 Nos. (as informed by PSTCL in meeting)</li> </ul>
11	LILO of one circuit of 400kV Patiala-Panchkula D/c line at Mohali	Length-30km (LILO length)

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
12	400 kV Panipat S/s – Mohali D/c (Quad Moose) line along with 80 MVA (420kV) switchable line reactor for each circuit at Mohali end (155km)	Line Length-155km (Quad) <ul style="list-style-type: none"> <li>• 420 kV, 80 MVA switchable line reactors at Mohali S/s end– 2 Nos.</li> <li>• Switching equipment for 420kV, 80MVA switchable line reactors at Mohali S/s end – 2 Nos.</li> </ul>
13	400 kV Panipat S/s – Mandola D/c (Quad) line	Line Length-75km (Quad) <ul style="list-style-type: none"> <li>• 400kV line bays at Mandola S/s – 2 nos.</li> </ul>
14	<p>Establishment of 765 kV S/s at suitable location near Bulandshahr (Distt. Bulandshahr) along with 2x330 MVA (765kV) Bus Reactors</p> <p><b><u>Future provisions (excl. scope of present scheme):</u></b></p> <ul style="list-style-type: none"> <li>➤ 765 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 765/400 kV 1500 MVA ICTs- 4 Nos.</li> <li>➤ 400 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 400 kV line bays –4 Nos.</li> <li>➤ 765 kV Bus Reactor along with bays: 1 No</li> <li>➤ 400 kV Bus Reactor along with bays: 1 No.</li> <li>➤ 400 kV Sectionalization bays: 1 set</li> <li>➤ 400/220 kV ICT along with bays-5 Nos.</li> <li>➤ 220 kV line bays -8 Nos.</li> <li>➤ 220kV Sectionalization bay: 1 set</li> <li>➤ 220 kV BC (2 Nos.) &amp; TBC (2 nos.)</li> <li>➤ 2 No. of Syncon units* at 400kV level along with 2 nos. of 400kV bays</li> </ul> <p><b>M,</b></p> <p>*1 No. of SynCon unit comprises dynamic support of +300MVA/-200MVA (Minimum) &amp; Short circuit contribution at PCC of 1200MVA (Minimum)) (Value of inertia (MW-secs) shall be provided in RfP document)</p>	Bulandshahr S/s – AIS <ul style="list-style-type: none"> <li>• 765kV line bays –10 nos. (for 765kV 2xD/c interconnection with Panipat S/s, 765kV D/c interconnection with Lucknow-II S/s &amp; Noida sec-148 (UPPTCL) S/s and LILO of 765kV Aligarh – Gr. Noida line)</li> <li>• 330 MVA Bus Reactor-2 Nos. (7x110 MVA, including one spare unit)</li> <li>• 765 kV Bus reactor bays-2 Nos.</li> </ul>
15	765 kV Panipat- Bulandshahr 2xD/c line along with 240 MVA switchable line reactor for each circuit at Bulandshahr end	Line Length-150km

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
		<ul style="list-style-type: none"> <li>• 765 kV, 240 MVAR switchable line reactors at Bulandshahr S/s end– 4 Nos.</li> <li>• Switching equipment for 765kV, 240MVAR switchable line reactors at Bulandshahr S/s end – 4 Nos.</li> <li>• 1x80 MVAR, 765kv reactor spare unit</li> </ul>
16	LILO of 765kV Aligarh – Gr. Noida line at Bulandshahr S/s (Lilo length-30km)	Length-30km (LILO length)
17	765 kV Bulandshahr - Noida sec-148 (UPPTCL) D/c line	Line Length- 50km • 765kV line bays at Noida sec-148 S/s(UPPTCL) – 2 nos.
18	<p>Establishment of 765/400 kV, 2x1500 MVA Lucknow-II S/s at suitable location near Lucknow along with 2x330 MVAR (765kV) &amp; 2x125 MVAR (420kV) Bus Reactors</p> <p><b><u>Future provisions (excl. scope of present scheme):</u></b></p> <ul style="list-style-type: none"> <li>➤ 765 kV line bays along with switchable line reactor –8 nos.</li> <li>➤ 765/400 kV 1500 MVA ICTs- 4 Nos.</li> <li>➤ 400 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 400 kV line bays –4 Nos.</li> <li>➤ 765 kV Bus Reactor along with bays: 1 No</li> <li>➤ 400 kV Bus Reactor along with bays: 1 No.</li> <li>➤ 400 kV Sectionalization bays: 1 set</li> <li>➤ 400/220 kV ICT along with bays-5 Nos.</li> <li>➤ 220 kV line bays -8 Nos.</li> <li>➤ 220kV Sectionalization bay: 1 set</li> <li>➤ 220 kV BC (2 Nos.) &amp; TBC (2 nos.)</li> <li>➤ 2 No. of Syncon units* at 400kV level along with 2 nos. of 400kV bays</li> </ul> <p>*1 No. of SynCon unit comprises dynamic support of +300MVAR/-200MVAR (Minimum) &amp; Short circuit contribution at PCC of 1200MVA (Minimum)) (Value of inertia (MW-secs) shall be provided in RfP document)</p>	<p>Lucknow-II S/s – AIS</p> <ul style="list-style-type: none"> <li>• 765/400 kV 1500 MVA ICTs- 2 Nos. (7x500 MVA including one spare unit)</li> <li>• 765kV line bays –4 nos. (for 765kV D/c interconnection each with Asana &amp; Bulandshahr S/s)</li> <li>• 400kV line bays – 2 nos. (for 400kV interconnection with Gonda (UPPTCL) S/s)</li> <li>• 765kV ICT bays – 2 nos.</li> <li>• 400 kV ICT bays- 2 Nos.</li> <li>• 330 MVAR Bus Reactor-2 Nos. (7x110 MVAR, including one spare unit)</li> <li>• 765 kV Bus reactor bays-2 Nos.</li> <li>• 125 MVAR Bus Reactor-2 Nos.</li> <li>• 400 kV Bus reactor bays- 2 Nos.</li> </ul>

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
19	765 kV Bulandshahr – Lucknow-II D/c line along with 330 MVA switchable line reactor for each circuit at each end	Line Length- 350km <ul style="list-style-type: none"> <li>• 765 kV, 330 MVA switchable line reactors at Bulandshahr S/s end– 2 Nos.</li> <li>• Switching equipment for 765kV, 330MVA switchable line reactors at Bulandshahr S/s end – 2 Nos.</li> <li>• 765 kV, 330 MVA switchable line reactors at Lucknow-II S/s end– 2 Nos.</li> <li>• Switching equipment for 765kV, 330MVA switchable line reactors at Lucknow-II S/s end – 2 Nos.</li> </ul>
20	400 kV Lucknow-II – Gonda D/c (Quad Moose) line	Line Length- 160km <ul style="list-style-type: none"> <li>• 400kV line bays at Gonda S/s(UPPTCL) – 2 nos.</li> </ul>
21	Establishment of 765/400 kV, 2x1500 MVA S/s at suitable location near Asana Village (Chandauli District) along with 2x330 MVA (765kV) & 2x125 MVA (420kV) Bus Reactors  <u><b>Future provisions (excl. scope of present scheme):</b></u> <ul style="list-style-type: none"> <li>➤ 765 kV line bays along with switchable line reactor –8 nos.</li> <li>➤ 765/400 kV 1500 MVA ICTs- 4 Nos.</li> <li>➤ 400 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 400 kV line bays –4 Nos.</li> <li>➤ 765 kV Bus Reactor along with bays: 1 No</li> <li>➤ 400 kV Bus Reactor along with bays: 1 No.</li> <li>➤ 400 kV Sectionalization bays: 1 set</li> <li>➤ 400/220 kV ICT along with bays-5 Nos.</li> <li>➤ 220 kV line bays -8 Nos.</li> <li>➤ 220kV Sectionalization bay: 1 set</li> <li>➤ 220 kV BC (2 Nos.) &amp; TBC (2 nos.)</li> <li>➤ 2 No. of Syncon units* at 400kV level along with 2 nos. of 400kV bays</li> <li>➤ STATCOM (2x+300MVA) along with MSC (4x125 MVA) &amp; MSR (2x125 MVA) along with 400kv bays (2nos.)</li> </ul>	Asna (Chandauli) S/s – AIS <ul style="list-style-type: none"> <li>• 765/400 kV 1500 MVA ICTs- 2 Nos. (7x500 MVA including one spare unit)</li> <li>• 765kV line bays –2 nos. (for 765kV D/c interconnection each with Lucknow-II S/s)</li> <li>• 400kV line bays – 8 nos. (for LILO of both ckts of 400kV Varanasi – Biharsharif D/c line &amp; LILO of both ckts of 400kV Balia – Patna D/c line)</li> <li>• 765kV ICT bays – 2 nos.</li> <li>• 400 kV ICT bays- 2 Nos.</li> <li>• 330 MVA Bus Reactor-2 Nos. (7x110 MVA, including one spare unit)</li> <li>• 765 kV Bus reactor bays-2 Nos.</li> <li>• 125 MVA Bus Reactor-2 Nos.</li> <li>• 400 kV Bus reactor bays- 2 Nos.</li> </ul>

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
	*1 No. of SynCon unit comprises dynamic support of +300MVAR/-200MVAR (Minimum) & Short circuit contribution at PCC of 1200MVA (Minimum)) (Value of inertia (MW-secs) shall be provided in RfP document)	
22	765 kV Lucknow-II-Asana D/c line along with 330 MVAR switchable line reactor for each circuit at each end	Line Length- 350km <ul style="list-style-type: none"> <li>• 765 kV, 330 MVAR switchable line reactors at Asana S/s end– 2 Nos.</li> <li>• Switching equipment for 765kV, 330MVAR switchable line reactors at Asana S/s end – 2 Nos.</li> <li>• 765 kV, 330 MVAR switchable line reactors at Lucknow-II S/s end– 2 Nos.</li> <li>• Switching equipment for 765kV, 330MVAR switchable line reactors at Lucknow-II S/s end – 2 Nos.</li> </ul>
23	LILO of both ckts of 400kV Varanasi – Biharsharif D/c line at Asana S/s along with 80 MVAR switchable line reactor for each circuit at Asana end of 400kV Asana- Biharsharif section	Length-25km (LILO length) <ul style="list-style-type: none"> <li>• 420 kV, 80 MVAR switchable line reactors at Asana S/s end– 2 Nos.</li> <li>• Switching equipment for 420kV, 80MVAR switchable line reactors at Asana S/s end – 2 Nos.</li> </ul>
24	LILO of both ckts of 400kV Balia – Patna D/c line at Asana S/s along with 80 MVAR switchable line reactor for each circuit at Asana end of 400kV Patna-Asana D/c line	Length-100km (LILO length) <ul style="list-style-type: none"> <li>• 420 kV, 80 MVAR switchable line reactors at Asana S/s end– 2 Nos.</li> <li>• Switching equipment for 420kV, 80MVAR switchable line reactors at Asana S/s end – 2 Nos.</li> </ul>



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**Transmission scheme for evacuation of power as part of Rajasthan REZ Ph-IV (Part-6 : 6GW)  
(Bikaner Complex) (Bikaner V: 6GW)**

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**From** PSPA I Division CEA <cea-pspa1@gov.in>

**Date** Thu 2/5/2026 6:29 PM

**To** COO-CTU <coo-ctu@ctuil.in>; Sandeep Kumawat {संदीप कुमावत} <sandeepk@powergrid.in>

**Cc** Member System <memberscea@nic.in>; Ammi Ruhama Toppo <ammi\_rt@nic.in>; Nitin Deswal <nitindeswal@nic.in>; SHOBHNA SINGH <shobhnasingh@cea.nic.in>; rk porwal <rk.porwal@posoco.in>; somara lakra <somara.lakra@grid-india.in>; bikaskjha <bikaskjha@grid-india.in>; Gaurav Malviya <gauravmalviya@grid-india.in>; Gaurav Singh <gauravsingh@grid-india.in>; Priyam Jain <priyam.jain@grid-india.in>; Manish Ranjan Keshari {मनीष रंजन केशरी} <manish.keshari@powergrid.in>; Madhusudan Meena {मधुसूदन मीना} <madhusudanmeena@powergrid.in>; Narendra Sathvik Ranganath . {नरेंद्र सात्विक आर} <rnsathvik@powergrid.in>

1 attachment (290 KB)

Gist Study Meeting Bikaner V Trans Scheme.pdf;

Madam/Sir,

This has reference to the subject matter wherein on the request of CTUIL & based on the deliberations held in RPC meeting regarding the subject transmission scheme; a meeting under Member (Power System), CEA was held on 01.12.2025.

In the meeting, Member (PS) opined that CEA, CTU and Grid-India to carry out joint studies separately and mitigate issues highlighted by Grid-India. Subsequently, joint study meetings were held on 23.12.2025 & 24.12.2025 to discuss issues highlighted by Grid-India during the earlier discussions of Transmission scheme.

The Gist of the study meeting, as consented by Member (Power System), CEA is attached. CTUIL is requested to take further necessary action in this regard.

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Regards,

O/o Chief Engineer,  
Power System Planning & Appraisal - I (PSPA-I) Division,  
Central Electricity Authority  
Ministry of Power  
Govt. of India  
011-26732305

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---- On Fri, 21 Nov 2025 18:26:59 +0530 Sandeep Kumawat {संदीप कुमावत} <sandeepk@powergrid.in> wrote ---

## **Gist of the meeting regarding Transmission scheme for evacuation of 6 GW RE power from Bikaner complex (Bikaner V PS)**

### **Background**

A Transmission scheme has been evolved for evacuation of 6 GW RE power from Bikaner complex (Bikaner V PS) in Rajasthan.

An EHVAC system has been evolved from Bikaner-V PS to various load centers in NR. The broad feature of scheme is as under:

1. For evacuation of 6 GW RE power from Bikaner V PS on EHVAC system which will be take lesser implementation time than HVDC system
2. Resolve the issue of critical loading of 765kV Bikaner - Moga D/c line as well as issue of higher angular separation (>20 degree) under N-1/N-1-1 contingency
3. Resolve the issue of critical loading of 765kV Aligarh - Greater Noida line
4. Provide supply to Mohali region to resolve the power deficit situation in Punjab based on the request of PSTCL. This will also improve ATC/TTC limits of Punjab.
5. Feed the RE power to new load centres of Punjab, Delhi and UP to cater the future load demand
6. Feed the RE power to Greater Noida complex as suggested by UPPTCL

The scheme comprises EHVAC system with evacuation of 6 GW RE power from Bikaner-V PS as well as about 3GW additional power (to relive overloading of 765kV Bikaner Moga D/c line and 765kV Aligarh-G'noida line) to various load centers of NR (Punjab, Haryana, UP) and ER. As part of scheme, STATCOM is also proposed at Bikaner-V PS and space for SynCon/STATCOMs shall be kept a spart of future scope on various intermediate substations.

Studies were carried out in 2029-30, time frame in various scenarios (solar maximized, evening peak and night off peak scenarios). Study files were circulated on 29.07.25. To deliberate on above proposal, joint study meeting was held on 18.08.25 with all stakeholders. Grid-India vide email 11.08.25 provided their observations on studies as well as on transmission scheme. Major observations of Grid-India and resolution suggested by CTU is as under:

- Severe low voltage issue in NR Grid in Solar maximized scenarios & High fault level on Various substation in Rajasthan: Separate network studies to be carried out by CTU in consultation with CEA and Grid India.
- Higher angular separation in 400kV Kishenpur - Moga D/c line in N-1 contingency: Feasibility of upgradation of 400kV Kishenpur - Moga at 765kV level is being carried out in future planning studies with envisaged hydro generation in J&K and solar injection at Moga.
- Planning of dynamic compensation as part of scheme: Incorporated as part of present and future scope.

- High loading on 400kV Agra (PG) - Agra (UPPTCL) line: Based on loading data, reconductoring proposal for 400kV Agra (PG)-Agra (UPPTCL) line to be taken up.
- N-1 violation issues pertaining to Intra State lines/ICTs (STU network) in NR: STUs may take remedial measures for identified STU lines/ICTs which are under N-1 violation. Overloading of some of the 400/220kV ICTs and 220kV lines (breaching thermal limit in N-1 scenarios) & N-1 noncompliance issues at Kankroli, Bhinmal and Chittorgarh S/s - High loading & stability issue is observed due to nearby PSP generators for which system is yet to be planned by RVPN. Loadings will be reviewed for Chittorgarh ICTs (Banswara) which is under approval by RVPN
- Overloading of 400kV Bikaner - Sikar D/c line in planning files: proposal will be examined with all possible alternatives and will be deliberated in discussion with CEA, Grid-India and RVPN.
- N-1 non-compliance of Ramgarh 765/400kV ICTs, 400kV Bhiwani (PG) – Bhiwani line (On opening of Bhiwani-Moga line) and high loading of 400/220kV Saharanpur ICT: ICT augmentation at Ramgarh S/s is taken up in ensuing CMETS-NR meeting (subsequently approved in 37<sup>th</sup> NCT meeting) whereas ICT augmentation at Saharanpur S/s shall be taken up after reviewing the real time loading data and approval of Leh RE park scheme (5GW). Regarding 400kV Bhiwani (PG) – Bhiwani line, CTU will examine the loading and take up the suitable measures

The comprehensive scheme was agreed in 40<sup>th</sup> CMETS-NR meeting held on 12.09.25 and 47<sup>th</sup> CMETS-ER meeting held on 30.09.25.

Tentative timeframe of scheme: 24 months from SPV transfer with an Estimated cost: Rs 27,000 Cr.

The Scheme was further deliberated in 56<sup>th</sup> TCC & 81<sup>st</sup> NRPC Meeting held on 30-31<sup>st</sup> Oct'25. In the meeting NRLDC stated that CTU had informed during the CMETS-NR meeting that all the issues highlighted by Grid-India would be addressed progressively and that appropriate remedial measures would be implemented so these solutions remain in matching timeframe of transmission scheme.

In the meeting, CTU stated that studies for reactive compensation and high loading of ISTS lines as well as higher angular separation (Kishenpur-Moga) are undergoing. Studies for high short circuit levels will be carried out in next 1-2 months after receipt of data. CTU stated that applications have already been received for RE Bikaner-V totaling 6 GW, with a scheduled completion in 2027–28. The proposal has been submitted for technical approval and will subsequently be forwarded for ERPC approval.

MS, ERPC stated that a comprehensive scheme may be submitted by CTU as the present scheme has implications on the Eastern region also. MS, ERPC stated that this scheme has been presented for the first time and there was not sufficient time for detailed deliberation, as it was only recently discussed in the OCC meeting of ERPC. Therefore, additional time is required to assess the entire scheme.

CTU stated that the scheme had already been discussed with Eastern Region constituents during the CMETS-ER meeting; however, it can be discussed again with ERPC any required

modifications can be discussed before submission to the NCT. Furthermore, any delay in approving the transmission system will further constrain RE generation, which is already an issue in the current scenario. Based on deliberation, it was concluded that:

- *Forum advised that a separate meeting under Member (Power System), CEA may be convened within one month by CTU with concerned stakeholders and outcome of CMETS meeting shall be discussed at NRPC/ERPC forum of respective region at the earliest.*
- *CTU and STU may do necessary studies & take up corrective measures in matching timeframe of the proposed scheme to address the observation raised by GRID-INDIA.*

Subsequently, CTUIL reviewed the studies for additional interconnection to Eastern region. In the revised studies, LILO of both ckts of 400kV Balia – Patna D/c line at Asana S/s was not considered and in place of above LILO arrangement, a direct interconnection between Asana to Nawada S/s through 765kV D/c line was considered. Balance scheme remains the same as agreed in CMETS-NR and CMETS-ER meeting earlier. Revised study files were also circulated on 21.11.25.

**Detailed scheme is as under:**

**Transmission scheme for evacuation of power as part of Rajasthan REZ Ph-IV (Part-6: 6GW) (Bikaner Complex) (Bikaner V: 6GW)**

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
1	<p>Establishment of 765/400 kV, 6x1500 MVA &amp; 400/220 kV, 8x500 MVA Bikaner-V Pooling Station along with 2x240 MVar (765kV) &amp; 2x125 MVar (420kV) Bus Reactors at a suitable location near Bikaner</p> <p><b><u>Future provisions (excl. scope of present scheme):</u></b></p> <ul style="list-style-type: none"> <li>➤ 765 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 400 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 400 kV line bays –4 Nos.</li> <li>➤ 765 kV Bus Reactor along with bays: 1 No</li> <li>➤ 400 kV Bus Reactor along with bays: 1 No.</li> <li>➤ 400/220 kV ICT along with bays-2 Nos.</li> <li>➤ 400 kV Sectionalization bays: 1 set</li> <li>➤ 220 kV line bays for connectivity RE Applications -4 Nos.</li> <li>➤ 220kV Sectionalization bay: 2 sets</li> <li>➤ 220 kV BC (2 Nos.) &amp; TBC (2 Nos.)</li> <li>➤ 1 No. of Syncon units* at 400kV level along with 1 nos. of 400kV bay</li> </ul>	<p>Bikaner-V PS - AIS</p> <ul style="list-style-type: none"> <li>• 765/400 kV 1500 MVA ICTs- 6 Nos. (19x500 MVA including one spare unit)</li> <li>• 400/220 kV 500 MVA ICTs- 8 Nos.</li> <li>• 765kV line bays – 4 nos. (for 765kV interconnection with Pallu S/s)</li> <li>• 400kV line bays – 4 nos. (for 400kV interconnection with LILO of one D/c of 400kV Bikaner II PS- Khetri 2xD/c line)</li> <li>• 765kV ICT bays – 6 nos.</li> <li>• 400 kV ICT bays- 14 Nos.</li> <li>• 220 kV ICT bays - 8 Nos.</li> <li>• 240 MVar Bus Reactor-2 Nos. (7x80 MVar, including one spare unit)</li> <li>• 765 kV Bus reactor bays-2 Nos.</li> <li>• 125 MVar Bus Reactor-2 Nos.</li> <li>• 400 kV Bus reactor bays- 2 Nos.</li> </ul>

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
	<p>➤ 1 No. of Syncon units* at 220kV level along with 1 nos. of 220kV bay</p> <p>*1 No. of SynCon unit comprises dynamic support of +300MVar/-200MVar (Minimum) &amp; Short circuit contribution at PCC of 1200MVA (Minimum)) (Value of inertia (MW-secs) shall be provided in RfP document)</p>	<ul style="list-style-type: none"> <li>• 400kv line bays– 3 Nos. (for RE interconnection)</li> <li>• 220KV line bays – 10 Nos. (for RE interconnection)</li> <li>• 220kV Sectionalization bay: 1 set</li> <li>• 220 kV BC (2 Nos.) &amp; TBC (2 Nos.)</li> <li>• 400kV sectionaliser bay- 1 Set</li> </ul>
2	STATCOM (2x+300MVar) along with MSC (4x125 MVar) & MSR (2x125 MVar) at Bikaner-V PS	<ul style="list-style-type: none"> <li>• STATCOM (2x+300MVar) along with MSC (4x125 MVar) &amp; MSR (2x125 MVar)</li> <li>• 400 kV bays: 2 Nos. (for STATCOM)</li> </ul>
3	LILO of one double ckt of 400kV Bikaner II PS- Khetri (Twin HTLS) 2xD/c line at Bikaner-V PS along with 50 MVar switchable line reactor for each circuit at Bikaner-V PS end of 400kV Bikaner-V-Khetri D/c line	<p>Length-45km (Quad) (LILO length)</p> <ul style="list-style-type: none"> <li>• 420 kV, 50 MVar switchable line reactors at Bikaner-V PS end– 4 Nos.</li> <li>• Switching equipment for 420kV, 50MVar switchable line reactors at Bikaner-V PS end – 4 Nos.</li> </ul>
4	<p>Establishment of 765/400 kV, 2x1500 MVA S/s at suitable location near Pallu (Distt. Hanumangarh) along with 2x240 MVar (765kV) &amp; 2x125 MVar (420kV) Bus Reactors</p> <p><b><u>Future provisions (excl. scope of present scheme):</u></b></p> <ul style="list-style-type: none"> <li>➤ 765 kV line bays along with switchable line reactor –2 nos.</li> <li>➤ 765/400 kV 1500 MVA ICTs- 2 Nos.</li> <li>➤ 400 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 400 kV line bays –4 Nos.</li> <li>➤ 765 kV Bus Reactor along with bays: 1 No</li> <li>➤ 400 kV Bus Reactor along with bays: 1 No.</li> <li>➤ 400 kV Sectionalization bays: 1 set</li> <li>➤ 400/220 kV ICT along with bays-5 Nos.</li> </ul>	<p>Pallu S/s - AIS</p> <ul style="list-style-type: none"> <li>• 765/400 kV 1500 MVA ICTs- 2 Nos. (7x500 MVA including one spare unit)</li> <li>• 765kV line bays – 12 nos. (for 765kV 2xD/c interconnection each with Bikaner-IV PS, Panipat S/s and LILO of both ckts of 765kV Bikaner – Moga D/c line)</li> <li>• 400kV line bays – 2 nos. (for 400kV interconnection with Hanumangarh S/s)</li> <li>• 765kV ICT bays – 2 nos.</li> <li>• 400 kV ICT bays- 2 Nos.</li> <li>• 240 MVar Bus Reactor-2 Nos. (7x80 MVar, including one</li> </ul>

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
	<ul style="list-style-type: none"> <li>➤ 220 kV line bays -8 Nos.</li> <li>➤ 220kV Sectionalization bay: 1 set</li> <li>➤ 220 kV BC (2 Nos.) &amp; TBC (2 Nos.)</li> <li>➤ STATCOM (2x±300MVar) along with MSC (4x125 MVar) &amp; MSR (2x125 MVar) along with 400kv bays (2nos.)</li> <li>➤ 2 No. of Syncon units* at 220kV level along with 2 nos. of 220kV bay</li> </ul> <p>*1 No. of SynCon unit comprises dynamic support of +300MVar/-200MVar (Minimum) &amp; Short circuit contribution at PCC of 1200MVA (Minimum)) (Value of inertia (MW-secs) shall be provided in RfP document)</p>	spare unit) <ul style="list-style-type: none"> <li>• 765 kV Bus reactor bays-2 Nos.</li> <li>• 125 MVar Bus Reactor-2 Nos.</li> <li>• 400 kV Bus reactor bays- 2 Nos.</li> </ul>
5	765 kV Bikaner-V PS – Pallu 2xD/c line	Line Length -120 km
6	LILO of both ckts of 765kV Bikaner – Moga D/c line at Pallu S/s along with 240MVar switchable line reactor for each circuit at Pallu S/s end of 765kV Pallu-Moga D/c line	Length-50km (LILO length) <ul style="list-style-type: none"> <li>• 765 kV, 240 MVar switchable line reactors at Pallu S/s end– 2 Nos.</li> <li>• Switching equipment for 765kV, 240MVar switchable line reactors at Pallu S/s end – 2 Nos.</li> </ul>
7	400 kV Pallu – Hanumangarh (RVPN) D/c (Quad) line	Line Length -80 km <ul style="list-style-type: none"> <li>• 400kV line bays – 2 nos. (at Hanumangarh (RVPN) S/s)</li> </ul>
8	Establishment of 765/400 kV, 3x1500 MVA S/s at suitable location near Panipat (Distt. Panipat) along with 2x240 MVar (765kV) & 2x125 MVar (420kV) Bus Reactors <u><b>Future provisions (excl. scope of present scheme):</b></u> <ul style="list-style-type: none"> <li>➤ 765 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 765/400 kV 1500 MVA ICTs- 3 Nos.</li> <li>➤ 400 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 400 kV line bays –4 Nos.</li> <li>➤ 765 kV Bus Reactor along with bays: 1 No</li> <li>➤ 400 kV Bus Reactor along with bays: 1 No.</li> <li>➤ 400 kV Sectionalization bays: 1 set</li> </ul>	Panipat S/s - AIS <ul style="list-style-type: none"> <li>• 765/400 kV 1500 MVA ICTs- 3 Nos. (10x500 MVA including one spare unit)</li> <li>• 765kV line bays –8 nos. (for 765kV 2xD/c interconnection each with Pallu S/s and Bulandshahr S/s)</li> <li>• 400kV line bays – 4 nos. (for 400kV interconnection with Mohali and Mandola S/s)</li> <li>• 765kV ICT bays – 3 nos.</li> <li>• 400 kV ICT bays- 3 Nos.</li> <li>• 240 MVar Bus Reactor-2 Nos. (7x80 MVar, including one</li> </ul>

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
	<ul style="list-style-type: none"> <li>➤ 400/220 kV ICT along with bays-5 Nos.</li> <li>➤ 220 kV line bays -8 Nos.</li> <li>➤ 220kV Sectionalization bay: 1 set</li> <li>➤ 220 kV BC (2 Nos.) &amp; TBC (2 nos.)</li> <li>➤ STATCOM (2x±300MVar) along with MSC (4x125 MVar) &amp; MSR (2x125 MVar) along with 400kv bays (2nos.)</li> <li>➤ 2 No. of Syncon units* at 400kV level along with 2 nos. of 400kV bays</li> </ul> <p>*1 No. of SynCon unit comprises dynamic support of +300MVar/-200MVar (Minimum) &amp; Short circuit contribution at PCC of 1200MVA (Minimum) (Value of inertia (MW-secs) shall be provided in RfP document)</p>	<p>spare unit)</p> <ul style="list-style-type: none"> <li>• 765 kV Bus reactor bays-2 Nos.</li> <li>• 125 MVar Bus Reactor-2 Nos.</li> <li>• 400 kV Bus reactor bays- 2 Nos.</li> </ul>
9	765 kV Pallu-Panipat 2xD/c line along with 240 MVar switchable line reactor for each circuit at each end	<p>Length-280km</p> <ul style="list-style-type: none"> <li>• 765 kV, 240 MVar switchable line reactors at Pallu S/s end– 4 Nos.</li> <li>• 765 kV, 240 MVar switchable line reactors at Panipat S/s end– 4Nos.</li> <li>• Switching equipment for 765kV, 240MVar switchable line reactors at Pallu S/s end – 4 Nos.</li> <li>• Switching equipment for 765kV, 240MVar switchable line reactors at Panipat S/s end – 4 Nos.</li> </ul>
10	<p>Establishment of 400/220kV, 3x500 MVA S/s at suitable location near Mohali (Distt. Mohali district) along with 2x125 MVar (420kV) Bus Reactors</p> <p><b><u>Future provisions (excl. scope of present scheme):</u></b></p> <ul style="list-style-type: none"> <li>➤ 400 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 400 kV line bays –2 Nos.</li> <li>➤ 400 kV Bus Reactor along with bays: 1 No.</li> </ul>	<ul style="list-style-type: none"> <li>• 400kV line bays – 4 nos. (for 400kV interconnection with Panipat S/s &amp; LILO of one circuit of 400kV Patiala-Panchkula D/c line)</li> <li>• 400kV ICT bays – 3 nos.</li> <li>• 220 kV ICT bays- 3 Nos.</li> <li>• 125 MVar Bus Reactor-2 Nos.</li> <li>• 400 kV Bus reactor bays- 2 Nos.</li> <li>• 220 kV line bays -6 Nos. (as</li> </ul>

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
	<ul style="list-style-type: none"> <li>➤ 400/220 kV ICT along with bays-3 Nos.</li> <li>➤ 400 kV Sectionalization bays: 1 set</li> <li>➤ 220 kV line bays -4 Nos.</li> <li>➤ 220kV Sectionalization bay: 1 set</li> <li>➤ 220 kV BC (2 Nos.) &amp; TBC (2 Nos.)</li> <li>➤ 2 No. of Syncon units* at 400kV level along with 2 nos. of 400kV bays</li> </ul> <p>*1 No. of SynCon unit comprises dynamic support of +300MVar/-200MVar (Minimum) &amp; Short circuit contribution at PCC of 1200MVA (Minimum)) (Value of inertia (MW-secs) shall be provided in RfP document)</p>	informed by PSTCL in meeting)
11	LILO of one circuit of 400kV Patiala-Panchkula D/c line at Mohali	Length-30km (LILO length)
12	400 kV Panipat S/s – Mohali D/c (Quad Moose) line along with 80 MVar (420kV) switchable line reactor for each circuit at Mohali end (155km)	Line Length-155km (Quad) <ul style="list-style-type: none"> <li>• 420 kV, 80 MVar switchable line reactors at Mohali S/s end – 2 Nos.</li> <li>• Switching equipment for 420kV, 80MVar switchable line reactors at Mohali S/s end – 2Nos.</li> </ul>
13	400 kV Panipat S/s – Mandola D/c (Quad) line	Line Length-75km (Quad) <ul style="list-style-type: none"> <li>• 400kV line bays at Mandola S/s – 2 nos.</li> </ul>
14	Establishment of 765 kV S/s at suitable location near Bulandshahr (Distt. Bulandshahr) along with 2x330 MVar (765kV) Bus Reactors <u><b>Future provisions (excl. scope of present scheme):</b></u> <ul style="list-style-type: none"> <li>➤ 765 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 765/400 kV 1500 MVA ICTs- 4 Nos.</li> <li>➤ 400 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 400 kV line bays –4 Nos.</li> <li>➤ 765 kV Bus Reactor along with bays: 1 No</li> <li>➤ 400 kV Bus Reactor along with bays: 1 No.</li> </ul>	Bulandshahr S/s – AIS <ul style="list-style-type: none"> <li>• 765kV line bays –10 nos. (for 765kV 2xD/c interconnection with Panipat S/s, 765kV D/c interconnection with Lucknow-II S/s &amp; Noida sec-148 (UPPTCL) S/s and LILO of 765kV Aligarh – Gr. Noida line)</li> <li>• 330 MVar Bus Reactor-2 Nos. (7x110 MVar, including one spare unit)</li> <li>• 765 kV Bus reactor bays-2 Nos.</li> </ul>

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
	<ul style="list-style-type: none"> <li>➤ 400 kV Sectionalization bays: 1 set</li> <li>➤ 400/220 kV ICT along with bays-5 Nos.</li> <li>➤ 220 kV line bays -8 Nos.</li> <li>➤ 220kV Sectionalization bay: 1 set</li> <li>➤ 220 kV BC (2 Nos.) &amp; TBC (2 nos.)</li> <li>➤ 2 No. of Syncon units* at 400kV level along with 2 nos. of 400kV bays</li> </ul> <p>*1 No. of SynCon unit comprises dynamic support of +300MVA/-200MVA (Minimum) &amp; Short circuit contribution at PCC of 1200MVA (Minimum) (Value of inertia (MW-secs) shall be provided in RfP document)</p>	
15	765 kV Panipat- Bulandshahr 2xD/c line along with 240 MVA switchable line reactor for each circuit at Bulandshahr end	Line Length-150km <ul style="list-style-type: none"> <li>• 765 kV, 240 MVA switchable line reactors at Bulandshahr S/s end– 4 Nos.</li> <li>• Switching equipment for 765kV, 240MVA switchable line reactors at Bulandshahr S/s end – 4 Nos.</li> <li>• 1x80 MVA, 765kV reactor spare unit</li> </ul>
16	LILO of 765kV Aligarh – Gr. Noida line at Bulandshahr S/s (Lilo length-30km)	Length-30km (LILO length)
17	765kV Bulandshahr - Noida sec-148 (UPPTCL) D/c line	Line Length- 50km <ul style="list-style-type: none"> <li>• 765kV line bays at Noida sec-148 S/s(UPPTCL) – 2 nos.</li> </ul>
18	Establishment of 765/400 kV, 2x1500 MVA Lucknow-II S/s at suitable location near Lucknow along with 2x330 MVA (765kV) & 2x125 MVA (420kV) Bus Reactors <b><u>Future provisions (excl. scope of present scheme):</u></b> <ul style="list-style-type: none"> <li>➤ 765 kV line bays along with switchable line reactor –8 nos.</li> <li>➤ 765/400 kV 1500 MVA ICTs- 4 Nos.</li> <li>➤ 400 kV line bays along with switchable line reactor –4 nos.</li> </ul>	Lucknow-II S/s – AIS <ul style="list-style-type: none"> <li>• 765/400 kV 1500 MVA ICTs- 2 Nos. (7x500 MVA including one spare unit)</li> <li>• 765kV line bays –4 nos. (for 765kV D/c interconnection each with Asana &amp; Bulandshahr S/s)</li> <li>• 400kV line bays – 2 nos. (for 400kV interconnection with Gonda (UPPTCL) S/s)</li> <li>• 765kV ICT bays – 2 nos.</li> </ul>

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
	<ul style="list-style-type: none"> <li>➤ 400 kV line bays –4 Nos.</li> <li>➤ 765 kV Bus Reactor along with bays: 1 No</li> <li>➤ 400 kV Bus Reactor along with bays: 1 No.</li> <li>➤ 400 kV Sectionalization bays: 1 set</li> <li>➤ 400/220 kV ICT along with bays-5 Nos.</li> <li>➤ 220 kV line bays -8 Nos.</li> <li>➤ 220kV Sectionalization bay: 1 set</li> <li>➤ 220 kV BC (2 Nos.) &amp; TBC (2 nos.)</li> <li>➤ 2 No. of Syncon units* at 400kV level along with 2 nos. of 400kV bays</li> </ul> <p>*1 No. of SynCon unit comprises dynamic support of +300MVar/-200MVar (Minimum) &amp; Short circuit contribution at PCC of 1200MVA (Minimum)) (Value of inertia (MW-secs) shall be provided in RfP document)</p>	<ul style="list-style-type: none"> <li>• 400 kV ICT bays- 2 Nos.</li> <li>• 330 MVar Bus Reactor-2 Nos. (7x110 MVar, including one spare unit)</li> <li>• 765 kV Bus reactor bays-2 Nos.</li> <li>• 125 MVar Bus Reactor-2 Nos.</li> <li>• 400 kV Bus reactor bays- 2 Nos.</li> </ul>
19	765 kV Bulandshahr – Lucknow-II D/c line along with 330 MVar switchable line reactor for each circuit at each end	<p>Line Length- 350km</p> <ul style="list-style-type: none"> <li>• 765 kV, 330 MVar switchable line reactors at Bulandshahr S/s end– 2 Nos.</li> <li>• Switching equipment for 765kV, 330MVar switchable line reactors at Bulandshahr S/s end – 2 Nos.</li> <li>• 765 kV, 330 MVar switchable line reactors at Lucknow-II S/s end– 2 Nos.</li> <li>• Switching equipment for 765kV, 330MVar switchable line reactors at Lucknow-II S/s end – 2 Nos.</li> </ul>
20	400 kV Lucknow-II – Gonda D/c (Quad Moose) line	<p>Line Length- 160km</p> <ul style="list-style-type: none"> <li>• 400kV line bays at Gonda S/s(UPPTCL) – 2 nos.</li> </ul>
21	Establishment of 765/400 kV, 2x1500 MVA S/s at suitable location near Asana Village (Chandauli District) along with 2x330 MVar (765kV) & 2x125 MVar (420kV) Bus Reactors	<p>Asna (Chandauli) S/s – AIS</p> <ul style="list-style-type: none"> <li>• 765/400 kV 1500 MVA ICTs- 2 Nos. (7x500 MVA including one spare unit)</li> <li>• 765kV line bays –4 nos. (for</li> </ul>

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
	<p><b><u>Future provisions (excl. scope of present scheme):</u></b></p> <ul style="list-style-type: none"> <li>➤ 765 kV line bays along with switchable line reactor –6 nos.</li> <li>➤ 765/400 kV 1500 MVA ICTs- 4 Nos.</li> <li>➤ 400 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 400 kV line bays –4 Nos.</li> <li>➤ 765 kV Bus Reactor along with bays: 1 No</li> <li>➤ 400 kV Bus Reactor along with bays: 1 No.</li> <li>➤ 400 kV Sectionalization bays: 1 set</li> <li>➤ 400/220 kV ICT along with bays-5 Nos.</li> <li>➤ 220 kV line bays -8 Nos.</li> <li>➤ 220kV Sectionalization bay: 1 set</li> <li>➤ 220 kV BC (2 Nos.) &amp; TBC (2 nos.)</li> <li>➤ 2 No. of Syncon units* at 400kV level along with 2 nos. of 400kV bays</li> <li>➤ STATCOM (2x±300MVar) along with MSC (4x125 MVar) &amp; MSR (2x125 MVar) along with 400kv bays (2nos.)</li> </ul> <p>*1 No. of SynCon unit comprises dynamic support of +300MVar/-200MVar (Minimum) &amp; Short circuit contribution at PCC of 1200MVA (Minimum)) (Value of inertia (MW-secs) shall be provided in RfP document)</p>	<p>765kV D/c interconnection each with Lucknow-II S/s &amp; Nawada)</p> <ul style="list-style-type: none"> <li>• 400kV line bays – 4 nos. (for LILO of both ckts of 400kV Varanasi – Biharsharif D/c line)</li> <li>• 765kV ICT bays – 2 nos.</li> <li>• 400 kV ICT bays- 2 Nos.</li> <li>• 330 MVar Bus Reactor-2 Nos. (7x110 MVar, including one spare unit)</li> <li>• 765 kV Bus reactor bays-2 Nos.</li> <li>• 125 MVar Bus Reactor-2 Nos.</li> <li>• 400 kV Bus reactor bays- 2 Nos.</li> </ul>
22	765 kV Lucknow-II-Asana D/c line along with 330 MVar switchable line reactor for each circuit at each end	<p>Line Length- 350km</p> <ul style="list-style-type: none"> <li>• 765 kV, 330 MVar switchable line reactors at Asana S/s end– 2 Nos.</li> <li>• Switching equipment for 765kV, 330MVar switchable line reactors at Asana S/s end – 2 Nos.</li> <li>• 765 kV, 330 MVar switchable line reactors at Lucknow-II S/s end– 2 Nos.</li> <li>• Switching equipment for 765kV, 330MVar switchable line reactors at Lucknow-II S/s end –</li> </ul>

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
		2 Nos.
23	LILO of both ckts of 400kV Varanasi – Biharsharif D/c line at Asana S/s along with 80 MVAR switchable line reactor for each circuit at Asana end of 400kV Asana-Biharsharif section	Length-25km (LILO length) <ul style="list-style-type: none"> <li>• 420 kV, 80 MVAR switchable line reactors at Asana S/s end– 2 Nos.</li> <li>• Switching equipment for 420kV, 80MVAR switchable line reactors at Asana S/s end – 2 Nos.</li> </ul>
24	Asana – Nawada 765kV D/c line along with 240MVAR switchable line reactors in each circuits at both ends	Line Length - 250km <ul style="list-style-type: none"> <li>• 765 kV, 240 MVAR switchable line reactors at Asana S/s end– 2 Nos.</li> <li>• Switching equipment for 765kV, 240MVAR switchable line reactors at Asana S/s end – 2 Nos.</li> <li>• 765 kV, 240 MVAR switchable line reactors at Nawada S/s end– 2 Nos.</li> <li>• Switching equipment for 765kV, 240MVAR switchable line reactors at Nawada S/s end – 2 Nos.</li> <li>• Single phase spare unit (80MVAR) – 1 no.</li> </ul>

### Meeting under Member (Power System), CEA

As agreed in the RPC meeting and on the request of CTUIL, a meeting was convened on 27.11.25 under Chairmanship of Member (PS) for deliberations on the scheme. In the meeting MS (ERPC) stated that proposed connection towards Nawada *would help ER states in import of RE power from Rajasthan complex*. The proposal is in order and shall be discussed in ensuing ERPC meeting for approval for ER portion.

Further in meeting Grid-India highlighted the following issues particularly for NR:

- Higher load considered in Scenario 7 as per LGB
- Severe low voltage issue in NR Grid in Solar maximized scenarios
- High voltage issues in winter night off peak scenario
- High fault level on Various substation in Rajasthan & Punjab

- Higher angular separation in 400kV Kishenpur - Moga D/c line in N-1 contingency
- N-1 violation issues pertaining to Intra State lines/ICTs (STU network) in NR
- Overloading of some of the 400/220kV ICTs and 220kV lines
- N-1 non-compliance of inter-state ICTs and higher angular separation of various lines in N-1 and N-1-1 contingency

Grid-India emphasized that above issues may be discussed and resolved as part of Grid strengthening scheme and may be taken up in matching timeframe of proposed Transmission scheme from Bikaner complex.

Member (PS) opined that CEA, CTU and Grid-India to carry out joint studies separately and mitigate issues highlighted by Grid-India.

### **Joint Study Meeting**

Accordingly, joint study meetings were held on 23.12.2025 & 24.12.2025 to discuss issues highlighted by Grid-India during the earlier discussions of Transmission scheme for evacuation of power as part of Rajasthan REZ Ph-IV (Part-6: 6GW) (Bikaner Complex) (Bikaner V: 6GW), along with Intra-state transmission schemes proposed by RVPN and Transmission Resource Adequacy report of Rajasthan was also discussed.

The various issues discussed in the meeting along with their solution/rectification measures are given below:

#### **1. Load Generation Balance Scenario-7 (Feb Solar Peak):**

In the meeting Grid-India highlighted that as per the CEA 20<sup>th</sup> EPS, the projected peak load for 2029-30 is ~335 GW. However, a load of 380 GW has been considered in Scenario-7 (Feb Solar) study case. The same may be reviewed and the regional load may be appropriately scaled to reflect realistic real-time operating conditions. GRID-INDIA also highlighted that the demand has been considered on the higher side and RE curtailment may be required in the future in the event of lower actual demand. This should be explicitly reflected in the proposed transmission schemes.

In the meeting, CTU mentioned that additional demand from Green Hydrogen, Bulk consumer in ER/SR/WR region is also considered in the studies files. Green hydrogen / Bulk loads considered in various regions are considered to about 54 GW (ER:13.2 GW SR:23 GW, WR: 18GW) for which transmission scheme is under various stages of finalization and linked with envisaged RE of SR and WR.

Further Grid-India emphasized that in Northern region also load is on higher side (116 GW). Considering sensitivity of Summer and winter season load of NR in winter season should be about 93GW. CTU mentioned that in Northern region load of about 6.2 GW is considered for KBNAIR complex which is linked with intra state RE of Rajasthan as part of GEC-III scheme. Additionally, 1GW of new load is considered at Mohali S/s. Further CTUIL vide mail dated 26.12.2025 to NR STUs requested to review Load demand considered in planning

files for 2029-2030 timeframes for winter season. Details of NR states load considered in PSSE planning files for 2029-2030 timeframe are as under:

Sl. no.	States	EPS load (in MW) (2029-2030 timeframe)	Load considered in Planning PSSE files (in MW)		STU reply on projected load demand for 2029-30	Load considered in Revised PSSE file (SC-7)
			Summer Solar Max	Winter Solar max		
1	<b>Jammu &amp; Kashmir</b>	4211	2800	4270	In joint study meeting, J&K indicated that load of 6-7GW needs to be considered in winter season (by 2029-30), However on conservative side load is considered to the tune of 5 GW.	5000
3	<b>Punjab</b>	19466	20310	15670	Load is in order. Considering diversity, load is considered 13.5GW in revised cases	13500
4	<b>Haryana</b>	19744	16420	13100	Load to be considered to about 11GW in revised cases	11000
5	<b>Delhi</b>	11046	9370	6150	Load is in order	6150
6	<b>Uttar Pradesh</b>	39781	38000	32600	UP increase their load trajectory of 44GW in summer season (evening) from 39GW. Considering above winter load is in order.	32600
7	<b>Himachal Pradesh</b>	2983	1780	2440	Load is in order	2440
8	<b>Uttarakhand</b>	3847	2960	2630	winter load to be considered is 2742MW	2742
9	<b>Rajasthan</b>	25048	31400	32300	Winter load is considered 25GW (incl. 6GW of KBNAIR load)	31000
10	<b>BBMB &amp; Chandigarh</b>			1000		1000

	<b>Total</b>			<b>11016 0</b>		<b>105432</b> (incl. 7.5 GW additional load not envisaged in EPS)
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As per the revised load, files for Scenario-7 have been modified and circulated.

## 2. For Over voltage/Under voltage issues in the Northern Region Grid

In the meeting, it was highlighted that during winter, issues of over voltage persist in Punjab, Haryana, Delhi and UP; and several 765kV and 400kV lines get opened on regular basis to control the high voltages. Further due to inadequate capacitor banks in J&K intra state network, severe low voltages have been seen in J&K grid.

To resolve above issues CTU sought voltage duration curve from Grid-India and analyzed the nodes suitable for installation of static and dynamic compensation. From the studies, nodes that were identified to be over-voltage nodes are Agra(PG), Orai(PG), Aligarh(PG), Sonapat(PG), Patran(IndiGrid), Jind(PG), Jhatikara(PG), Bamnauli(DTL), Mandola(PG) & Narela(PG) and nodes identified to mitigate low voltage are Wagoora(PG) & Amargarh(PG).

The issue of high and low voltage was already highlighted at various forum/reports (i.e. OCC forum, Quarterly Operational Feedback report). Further, POWERGRID vide letter dated 05.12.2025 also highlighted over voltage issue at Agra(PG), Orai(PG) Aligarh(PG) S/s. In the letter POWERGRID stated that as per 236<sup>th</sup> OCC meeting CTUIL has been advised to carry out a comprehensive study to examine the requirement of reactive power compensation devices for voltage control in particular area.

Following pockets/Substation were identified wherein reactive compensation measure is required to control Over voltage/Under voltage in the Northern Region. Details are as under:

Sl No.	Substation Name	Details of Proposed TCR/ STATCOM/ SYNCON/ REACTOR	Space Availability confirmation by respective TSP
1	Bhadla-III PS (Low voltage & Low SCR)	2 nos. of Synchronous Condensers (SynCon) units [2x(+300 MVar/-200 MVar)] at 220kV level of 765/400/220kV Bhadla-III PS along with 2 nos. of 220kV bays	Space Available-Taken up in CMETS-NR meeting for stakeholder consultation
2	Fatehgarh-IV(Sec-2) (Apraava) (Low voltage & Low SCR)	2 nos. of Synchronous Condensers (SynCon) units [2x(+300 MVar/-200 MVar)] at 220kV level of 765/400/220kV Fatehgarh-IV(Sec-2) PS along	space is available for two (02) line bays and one (01) synchronous condenser. However, placing the second synchronous condenser

		with 2 nos. of 220kV bays	obstructs the corridor for four (04) future 400 kV line bays. As the requirement for these future bays is currently unconfirmed, an alternative arrangement such as a 400kV UG cable connection from the dead-end tower to the gantry or any other could be explored later. Taken up in CMETS-NR meeting for stakeholder consultation
3	Agra (PG) (High voltage)	TCR (2x250MVA) <b>or</b> STATCOM (2x+300MVA) along with MSC (2x125 MVA) & MSR (4x125 MVA) <b>and</b> 1x330 MVA additional bus reactor at 765kV Bus & 1x125 MVA additional bus reactor at 400kV Bus	Space for 1x125MVA Additional BUS reactor is available. Space for STATCOM/TCR & 1X330MVA reactor is not available. Due to Grid Operation requirement, CTU again requested to review the space availability/feasibility for TCR(2X250 MVA) or STATCOM (2x+300MVA) along with MSC (2x125 MVA) & MSR (4x125 MVA) at Agra(PG) S/s
4	Orai (PG) (high voltage)	1x330 MVA bus reactor at 765kV Bus	Space Available Taken up in CMETS-NR meeting for stakeholder consultation
5	Aligarh (PG) (high voltage)	STATCOM (2x+300MVA) along with MSC (2x125 MVA) & MSR (4x125 MVA)	Space can be made available only for one STATCOM (1x+300MVA) along with MSC (1x125 MVA) & MSR (2x125 MVA) after compromising with the future scope of work. Taken up in CMETS-NR meeting for stakeholder consultation
6	Patran (IndiGrid)	1x125 MVA additional bus	Space Available

	(low/high voltage)	reactor at 400kV Bus	Taken up in CMETS-NR meeting for stakeholder consultation
7	Sonepat(PG) or Jind(PG) (low/high voltage)	STATCOM (2x+300MVA) along with MSC (2x125 MVA) & MSR (4x125 MVA)	<b>Sonepat(PG)</b> - Space not available <b>Jind(PG)</b> - Space not available Alternatives shall be discussed in CMETS-NR meeting
8	Wagoora(PG) (low voltage)	STATCOM (2x+300MVA) along with MSC (4x125 MVA)	Space is not available in existing switchyard. New land needs to be acquired adjacent to existing sub-station for STATCOM. Taken up in CMETS-NR meeting for stakeholder consultation (modalities of land procurement will be decided with CEA)
9	Amargarh(Indigri d) (low voltage)	STATCOM (2x+300MVA) along with MSC (4x125 MVA)	space is available with procurement of additional land in adjacent to S/s for ICT and STATCOM  Taken up in CMETS-NR meeting for stakeholder consultation
10	Jhatikara(PG) or Bamnauli(DTL) (low/high voltage)	STATCOM (2x+300MVA) along with MSC (4x125 MVA) & MSR (2x125 MVA)	<b>Jhatikara(PG)</b> -Space can be made available with minor adjustment at site. <b>Bamnauli(DTL)</b> - Space not available Taken up in CMETS-NR meeting for stakeholder consultation

11	Mandola(PG) or Narela(PG) (low/high voltage)	STATCOM (2x+300MVA) along with MSC (4x125 MVA) & MSR (2x125 MVA)	<b>Mandola(PG)</b> - Space can be made available only for one STATCOM (1x+300MVA) along with MSC (1x125 MVA) & MSR (2x125 MVA) after compromising with the future scope of work <b>Narela(PG)</b> - Space not available Taken up in CMETS-NR meeting for stakeholder consultation
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### 3. High Short Circuit level issues in the Northern Region Grid

During the discussion of various RE power evacuation scheme in NR, Grid-India highlighted the issue of high fault levels at various substations in Rajasthan/NR and suggest Necessary network/bus arrangements need to be planned to limit the fault current in coming future. Details of those substations in Rajasthan are as under:

Stations	Base kV	SC Current (in kA)
Bikaner-IV	400	72
Rampura Tonk	400	71
Bassi	400	69
Neemrana (PG)	400	69
Jaipur (Phagi)-RVPN	400	71
Bikaner (PG)	400	72
Bhadla (PG)	400	66
Fatehgarh-3	400	66
Bikaner-II	400	71
Bhadla-2	400	66
Bikaner-3	400	91
Barmer (RVPN)	400	64
Khuskhera	400	70
Bhiwadi (PG)	400	70
Bikaner (PG)	765	51
Sikar New	765	58
Bhadla-2	765	52
Beawar	765	58
Jaipur	765	62
Dausa	765	57

In the meeting, it was decided that remedial measures for high fault levels to be taken in phase-wise manner. Subsequently, drawee substations & few RE PS are to be considered in Phase-I & RE Injection substations are considered in Phase-II. Details of these substations are as under:

**Phase-I:**

Stations	Base kV	SC Current (As per IEC) (in kA)	SC Current (as per ASCC) (in kA)	Remarks
Bassi(PG)	400	69	60	Substations are designed for 40kA. Information regarding Space provision of series reactor & its placement on all substations is under finalization. Scheme shall be taken up in CMETS-NR meeting.
Neemrana(PG)	400	69	60	
Jaipur Phagi (RVPN)	400	71	63	
Jaipur Phagi (RVPN)	765	62	55	
Khuskhera/ Bhojrajka (RVPN)	400	70	56	
Bhiwadi(PG)	400	70	55	
Ludhiana	400	34	34 (220kV-52kA)	Based on OCC recommendation, series reactor & its placement will be finalized. Scheme shall be taken up in CMETS-NR meeting.
Moga	400	26 32	26 32 (220kV-44kA)	
Bhadla-III	220KV	-	54	Issue resolved with additional ICT augmentation in Sec-1.
Bikaner-V	400	63	58	Issue resolved with augmentation of ICT in Sec-1 with sectionlizer arrangement

CTUIL vide mail dated 31.12.2025 to respective TSPs, requested for Space for 1 no. of 400kV Bus sectionalizer bay with 12ohms per phase, Series Bus Reactor unit at Bassi(PG), Neemrana(PG), Bhiwadi(PG) & Jaipur South(PG) S/s.

**Phase-II (RE Injection/Intermediate S/s):**

Stations	Base kV	SC Current (as per IEC) (in kA)	SC Current (as per ASCC) (in kA)
Bikaner-IV	400	72	66
Rampura Tonk (RVPN)	400	71	63

Bikaner (PG)	765	51	47
Bikaner-NW	400	72	66
Bhadla PG	400	66	59
Fatehgarh-3	400	66	60
Bikaner-II	400	71	68
Bhadla-II	400	66	60
Bikaner-III	400	91	84
Barmer (RVPN)	400	64	58
Sikar-II	765	58	51
Bhadla-2	765	52	47
Beawar	765	58	51
Dausa	765	57	50

It was stated that after resolution of Ph-I substations, scheme will be evolved for Ph-II substations. SLD and space provision for sectionalizer is being sought from respective TSP.

GRID-INDIA stated that a number of series bus reactors may be required and planned in the RE complex for limiting high fault current. Accordingly, an interaction study may be carried out by the TSP, and a clear provision in this regard should be explicitly incorporated.

#### 4. N-1 Compliance and angular separation issues in Various ISTS lines

GRID-INDIA stated that the Manual on Transmission planning criteria 2023 clause no. 3.14.12 states that

*“ .... the lines for which the angular difference between its terminal buses is more than 20 degrees after contingency of one circuit may be selected for performing stability studies”*

Therefore, transient stability analysis may be carried out to ascertain the stability of the system.

#### **For the following high angular separation issues under N-1**

- 1) 400 kV Kishenpur – Moga line (275 km & 287 km): scheme for Upgradation of Moga - Kishenpur 400kV D/c line at 765kV level is already evolved and taken up in Joint study meeting to schedules shortly.
- 2) 400 kV Bhiwani - Moga line (273 km) & 400 kV Moga - Fatehabad D/c line (179 km) - CTU will examine the proposal and resolve the issue in next 2 months time.
- 3) 400 kV Bikaner-II - Khetri line (275 km) - CTU will take up the LILO of above line with subsequent scheme planned in Bikaner complex.
- 4) 400 kV Singraulli – Lucknow line (409 km) - Being a longest 400 kV line in NR, CTU will examine the proposal and discuss it with CEA/Grid-India.

#### 5. SCR at Bikaner-V Pooling station.

Pooling Station	Total RE Injection	Direct RE	Voltage	POI Fault	SCR	After proposed sectionalizer
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	<b>in the Region (MW)</b>	<b>Injection at POI (MW)</b>	<b>Level of POI (kV)</b>	<b>MVA</b>		<b>arrangement at 220kV level at Bikaner V PS</b>
Bikaner-V	6000	3500	220	16600	<b>4.74</b>	<b>220 kV Sec-1 : 8.4</b> <b>220 kV Sec-2 : 6.8</b>
		2500	400	34700	5.78	<b>5.7</b>

Grid-India highlighted in meeting that the SCR of 220 kV Bikaner-V stations is observed to be less than 5 under base case. It further reduced under N-1 contingencies. It is also understood that the above schemes will be commissioned in phases, the SCR in the initial phases will be very low. In the study case, 3,500 MW has been considered at the 220 kV level. However, it is possible that the entire 6,000 MW may eventually get connected at 220 kV, which could lead to operational challenges. Further, 2 Nos. of STATCOMs have been considered at Bikaner-V and a synchronous condenser (SynCON) has been kept under future scope. Grid India proposed that one STATCOM along with one SynCON be considered to strengthen the system.

CTU stated that connectivity of about 6 GW (3500MW at 220 kV & 2500MW at 400 kV) is already been granted at Bikaner-V PS. In the modified studies, Sectionalizer arrangement (normally open) is being kept at 220 kV level of Bikaner-V PS, which will also improve the SCR (>6) of both 220 kV sections as well as limit the short circuit current. Requirement of SynCon could be evaluated in case of any change in generation configuration (at 220kV and 400 kV level) at Bikaner-V PS.

## 6. Other major comments and measures

- Generation from Vedanta project in ER is kept to zero dispatch due to captive nature
- Dispatches of PSP were modified in consultation with other regional planning groups and incorporated in revised file.
- 0.95 pf Load power factor has been incorporated in all NR states wherever required. However, at certain places pf has been considered optimistically (0.99 pf).
- Grid-India highlighted that a total of ~11 GW of generation is being pooled at the 765 kV Pallu station, making it critical from system resiliency view point. In the event of complete outage of this station, evacuation of power from the RE complex would be severely impacted and may lead to a large disturbance also. Multiple stations may be planned in place of pooling such high RE generation at a single station.

Regarding resiliency of the system, CTU mentioned that in case of RE, various polling stations i.e. Sikar-II, Beawar, Siwani, Mandasaur, Neemrana-II are carrying power of more than 8 GW. In the event of complete outage of this station, evacuation of power from the RE complex would be impacted, however considering techno economics for RE evacuation (with low TUF) as well as RoW/Land issues it is not recommended that additional transmission to be planned from such complexes. CEA endorsed the same. Further, Pallu S/s could be utilized in future planning studies to increase resiliency.

- Regarding 765/400kV ICT augmentation at Panipat S/s (1375MW in N-1 contingency), CTU stated that an additional ICT may be planned based on real time loadings for which additional ICT is also kept as part of future scope.
- Regarding 765/400kV ICT augmentation at Noida-sec 148 S/s, CTU stated that substation belongs to UPPTCL and they will send communication to UPPTCL to augment additional ICT (3<sup>rd</sup>) in matching timeframe of Bikaner-V transmission scheme.
- Regarding N-1 Compliance issues at Mohali S/s, an additional 1x500MVA ICT (4<sup>th</sup>) included as part of scheme.
- Regarding high loading of Bikaner (RVPN) – Sikar (PG) D/c line in planning files, CTU stated that loading will be reviewed on real time basis and suitable measures i.e. reconductoring of line with high ampacity conductor will be carried out by RVPNL in matching timeframe of the above scheme. RVPNL agreed for the same
- Regarding high loading of 400kV Bhadla(RVPN) – Bhadla Sultanagar(RVPN) D/c line in planning files, it was agreed that RVPN will upgrade the conductor to quad moose / HTLS equivalent in matching timeframe of the intra state scheme.
- Regarding high loading of Patiala-Mohali section (formed after LILO of one circuit of 400kV Patiala-Panchkula D/c line at Mohali), it was agreed that reconductoring of 400kV Patiala-Mohali section is to be carried out as part of scheme.
- Sc-9 was also corrected with lower load of Rajasthan and ER region. The off- peak base case will be shared for assessing any voltage issues during night off peak hours. GRID-INDIA also highlighted that significant RE penetration is anticipated in the near future. The generation is also getting evacuated through large EHV lines. Therefore, dynamic simulation studies may be carried out to assess the stability of the planned system. CTU highlighted that considering the severe convergence issues in dynamics file, CTUIL is carrying out dynamic studies to converged files on truncated network specific to RE pockets in Rajasthan and Gujarat rather than to converge the file on All India level. In this regard, CTU is also pursuing for consultation with IIT Bombay for preparation of dynamics file. CEA opined that CTUIL, Grid India and other stakeholders may work together for formulation of required simulation files for dynamic studies.
- GRID-INDIA also requested to assign unique name for envisaged RE pooling stations. As several pooling substations with identical names but different numerical suffixes have been planned in the same district along with multiple interconnections, there is a chance of miscommunication during real-time operation among multiple constituents. For clarity of operation and ensuring that names of different substations are easily distinguished from each other, it is suggested that after finalization of the exact location, the ISTS substations are uniquely named as per the geographical name of the nearest location like village or taluk. CEA/CTU noted the same as issues is already highlighted with the NCT.

## Conclusion

As per the discussion in joint study meeting, revised files after incorporating study related comments of CEA and Grid-India were circulated on 16.01.26. The scheme to be put up to RPC for its concurrence. Further, for various other issues related to grid highlighted in the meeting; corresponding mitigation measures as deliberated in the meeting to be taken up separately and appropriately for stakeholder consultation.

After detailed deliberation following scheme was agreed in the Joint study meeting:

**Transmission scheme for evacuation of power as part of Rajasthan REZ Ph-IV (Part-6: 6GW) (Bikaner Complex) (Bikaner V: 6GW)**

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
1	<p>Establishment of 765/400 kV, 6x1500 MVA &amp; 400/220 kV, 10x500 MVA Bikaner-V Pooling Station along with 2x240 MVar (765kV) &amp; 2x125 MVar (420kV) Bus Reactors at a suitable location near Bikaner</p> <p><b><u>Future provisions (excl. scope of present scheme):</u></b></p> <ul style="list-style-type: none"> <li>➤ 765 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 400 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 400 kV line bays –4 Nos.</li> <li>➤ 765 kV Bus Reactor along with bays: 1 No</li> <li>➤ 400 kV Bus Reactor along with bays: 1 No.</li> <li>➤ 400/220 kV ICT along with bays-2 Nos.</li> <li>➤ 400 kV Sectionalization bays: 1 set</li> <li>➤ 220 kV line bays for connectivity RE Applications -4 Nos.</li> <li>➤ 220kV Sectionalization bay: 2 sets</li> <li>➤ 220 kV BC (2 Nos.) &amp; TBC (2 Nos.)</li> <li>➤ 1 No. of Syncon units* at 400kV level along with 1 nos. of 400kV bay</li> <li>➤ 1 No. of Syncon units* at 220kV level along with 1 nos. of 220kV bay</li> </ul> <p>*1 No. of SynCon unit comprises dynamic support of +300MVar/-200MVar (Minimum) &amp; Short circuit contribution at PCC of 1200MVA (Minimum)) (Value of inertia (MW-</p>	<p>Bikaner-V PS - AIS</p> <ul style="list-style-type: none"> <li>• 765/400 kV 1500 MVA ICTs - 6 Nos. (19x500 MVA including one spare unit)</li> <li>• 400/220 kV 500 MVA ICTs - 8 Nos.</li> <li>• 765kV line bays - 4 nos. (for 765kV interconnection with Pallu S/s)</li> <li>• 400kV line bays - 4 nos. (for 400kV interconnection with LILO of one D/c of 400kV Bikaner II PS- Khetri 2xD/c line)</li> <li>• 765kV ICT bays - 6 nos.</li> <li>• 400 kV ICT bays - 16 Nos.</li> <li>• 220 kV ICT bays - 10 Nos.</li> <li>• 240 MVar Bus Reactor-2 Nos. (7x80 MVar, including one spare unit)</li> <li>• 765 kV Bus reactor bays-2 Nos.</li> <li>• 125 MVar Bus Reactor-2 Nos.</li> <li>• 400 kV Bus reactor bays- 2 Nos.</li> <li>• 400kv line bays - 3 Nos. (for RE interconnection)</li> <li>• 220KV line bays - 10 Nos. (for RE interconnection)</li> <li>• 220kV Sectionalization bay: 1 set</li> <li>• 220 kV BC (2 Nos.) &amp; TBC (2</li> </ul>

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
	secs) shall be provided in RfP document)	Nos.) • 400kV Sectionalizer bay- 1 Set
2	STATCOM (2x±300MVA) along with MSC (4x125 MVA) & MSR (2x125 MVA) at Bikaner-V PS	• STATCOM (2x±300MVA) along with MSC (4x125 MVA) & MSR (2x125 MVA) • 400 kV bays: 2 Nos. (for STATCOM)
3	LILO of one double ckt of 400 kV Bikaner II PS - Khetri (Twin HTLS) 2xD/c line at Bikaner-V PS along with 50 MVA switchable line reactor for each circuit at Bikaner-V PS end of 400kV Bikaner-V - Khetri section	Length-45km (Quad) (LILO length)  • 420 kV, 50 MVA switchable line reactors at Bikaner-V PS end - 4 Nos. • Switching equipment for 420kV, 50MVA switchable line reactors at Bikaner-V PS end - 4 Nos.
4	Establishment of 765/400 kV, 2x1500 MVA S/s at suitable location near Pallu (Distt. Hanumangarh) along with 2x240 MVA (765kV) & 2x125 MVA (420kV) Bus Reactors  <b><u>Future provisions (excl. scope of present scheme):</u></b>  ➤ 765 kV line bays along with switchable line reactor –2 nos. ➤ 765/400 kV 1500 MVA ICTs- 2 Nos. ➤ 400 kV line bays along with switchable line reactor –4 nos. ➤ 400 kV line bays –4 Nos. ➤ 765 kV Bus Reactor along with bays: 1 No ➤ 400 kV Bus Reactor along with bays: 1 No. ➤ 400 kV Sectionalization bays: 1 set ➤ 400/220 kV ICT along with bays-5 Nos. ➤ 220 kV line bays -8 Nos. ➤ 220kV Sectionalization bay: 1 set ➤ 220 kV BC (2 Nos.) & TBC (2 Nos.) ➤ STATCOM (2x±300MVA) along with MSC (4x125 MVA) & MSR (2x125	Pallu S/s - AIS  • 765/400 kV, 1500 MVA ICTs- 2 Nos. (7x500 MVA including one spare unit) • 765kV line bays – 12 nos. (for 765kV 2xD/c interconnection each with Bikaner-IV PS, Panipat S/s and LILO of both ckt of 765kV Bikaner – Moga D/c line) • 400kV line bays – 2 nos. (for 400kV interconnection with Hanumangarh S/s) • 765kV ICT bays – 2 nos. • 400 kV ICT bays- 2 Nos. • 240 MVA Bus Reactor-2 Nos. (7x80 MVA, including one spare unit) • 765 kV Bus reactor bays-2 Nos. • 125 MVA Bus Reactor-2 Nos. • 400 kV Bus reactor bays- 2 Nos.

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
	<p>MVAr) along with 400kv bays (2nos.)</p> <ul style="list-style-type: none"> <li>➤ 2 No. of Syncon units* at 220kV level along with 2 nos. of 220kV bay</li> </ul> <p>*1 No. of SynCon unit comprises dynamic support of +300MVAr/-200MVAr (Minimum) &amp; Short circuit contribution at PCC of 1200MVA (Minimum)) (Value of inertia (MW-secs) shall be provided in RfP document)</p>	
5	765 kV Bikaner-V PS – Pallu 2xD/c line	Line Length -120 km
6	LILO of both ckts of 765kV Bikaner – Moga D/c line at Pallu S/s along with 240MVAr switchable line reactor for each circuit at Pallu S/s end of 765kV Pallu-Moga D/c line	<p>Length-50km (LILO length)</p> <ul style="list-style-type: none"> <li>• 765 kV, 240 MVAr switchable line reactors at Pallu S/s end– 2 Nos.</li> <li>• Switching equipment for 765kV, 240MVAr switchable line reactors at Pallu S/s end – 2 Nos.</li> </ul>
7	400 kV Pallu – Hanumangarh (RVPN) D/c (Quad) line	<p>Line Length -80 km</p> <ul style="list-style-type: none"> <li>• 400kV line bays – 2 nos. (at Hanumangarh (RVPN) S/s)</li> </ul>
8	<p>Establishment of 765/400 kV, 3x1500 MVA S/s at suitable location near Panipat (Distt. Panipat) along with 2x240 MVAr (765kV) &amp; 2x125 MVAr (420kV) Bus Reactors</p> <p><b><u>Future provisions (excl. scope of present scheme):</u></b></p> <ul style="list-style-type: none"> <li>➤ 765 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 765/400 kV 1500 MVA ICTs- 3 Nos.</li> <li>➤ 400 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 400 kV line bays –4 Nos.</li> <li>➤ 765 kV Bus Reactor along with bays: 1 No</li> <li>➤ 400 kV Bus Reactor along with bays: 1 No.</li> <li>➤ 400 kV Sectionalization bays: 1 set</li> </ul>	<p>Panipat S/s - AIS</p> <ul style="list-style-type: none"> <li>• 765/400 kV 1500 MVA ICTs- 3 Nos. (10x500 MVA including one spare unit)</li> <li>• 765kV line bays –8 nos. (for 765kV 2xD/c interconnection each with Pallu S/s and Bulandshahr S/s)</li> <li>• 400kV line bays – 4 nos. (for 400kV interconnection with Mohali and Mandola S/s)</li> <li>• 765kV ICT bays – 3 nos.</li> <li>• 400 kV ICT bays- 3 Nos.</li> <li>• 240 MVAr Bus Reactor-2 Nos. (7x80 MVAr, including one spare unit)</li> </ul>

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
	<ul style="list-style-type: none"> <li>➤ 400/220 kV ICT along with bays-5 Nos.</li> <li>➤ 220 kV line bays -8 Nos.</li> <li>➤ 220kV Sectionalization bay: 1 set</li> <li>➤ 220 kV BC (2 Nos.) &amp; TBC (2 nos.)</li> <li>➤ STATCOM (2x±300MVA) along with MSC (4x125 MVA) &amp; MSR (2x125 MVA) along with 400kv bays (2nos.)</li> <li>➤ 2 No. of Syncon units* at 400kV level along with 2 nos. of 400kV bays</li> </ul> <p>*1 No. of SynCon unit comprises dynamic support of +300MVA/-200MVA (Minimum) &amp; Short circuit contribution at PCC of 1200MVA (Minimum) (Value of inertia (MW-secs) shall be provided in RfP document)</p>	<ul style="list-style-type: none"> <li>• 765 kV Bus reactor bays-2 Nos.</li> <li>• 125 MVA Bus Reactor-2 Nos.</li> <li>• 400 kV Bus reactor bays- 2 Nos.</li> </ul>
9	765 kV Pallu-Panipat 2xD/c line along with 240 MVA switchable line reactor for each circuit at each end	Length-280km <ul style="list-style-type: none"> <li>• 765 kV, 240 MVA switchable line reactors at Pallu S/s end– 4 Nos.</li> <li>• 765 kV, 240 MVA switchable line reactors at Panipat S/s end– 4 Nos.</li> <li>• Switching equipment for 765kV, 240MVA switchable line reactors at Pallu S/s end – 4 Nos.</li> <li>• Switching equipment for 765kV, 240MVA switchable line reactors at Panipat S/s end – 4 Nos.</li> </ul>
10	Establishment of 400/220kV, 4x500 MVA S/s at suitable location near Mohali (Distt. Mohali district) along with 2x125 MVA (420kV) Bus Reactors  <u><b>Future provisions (excl. scope of present scheme):</b></u> <ul style="list-style-type: none"> <li>➤ 400 kV line bays along with switchable line</li> </ul>	<ul style="list-style-type: none"> <li>• 400kV line bays – 4 nos. (for 400kV interconnection with Panipat S/s &amp; LILO of one circuit of 400kV Patiala-Panchkula D/c line)</li> <li>• 400kV ICT bays – 4 nos.</li> <li>• 220 kV ICT bays- 4 Nos.</li> <li>• 125 MVA Bus Reactor-2 Nos.</li> </ul>

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
	reactor –4 nos. ➤ 400 kV line bays –2 Nos. ➤ 400 kV Bus Reactor along with bays: 1 No. ➤ 400/220 kV ICT along with bays-3 Nos. ➤ 400 kV Sectionalization bays: 1 set ➤ 220 kV line bays -4 Nos. ➤ 220kV Sectionalization bay: 1 set ➤ 220 kV BC (2 Nos.) & TBC (2 Nos.) ➤ 2 No. of Syncon units* at 400kV level along with 2 nos. of 400kV bays  *1 No. of SynCon unit comprises dynamic support of +300MVar/-200MVar (Minimum) & Short circuit contribution at PCC of 1200MVA (Minimum) (Value of inertia (MW-secs) shall be provided in RfP document)	<ul style="list-style-type: none"> <li>• 400 kV Bus reactor bays- 2 Nos.</li> <li>• 220 kV line bays -6 Nos. (as informed by PSTCL in meeting)</li> </ul>
11	LILO of one circuit of 400kV Patiala-Panchkula D/c line at Mohali along with reconductoring of 400kV Patiala – Mohali section with twin HTLS line (2100MVA)	Length-30km (LILO length)
12	400 kV Panipat S/s – Mohali D/c (Quad Moose) line along with 80 MVar (420kV) switchable line reactor for each circuit at Mohali end (155km)	Line Length-155km (Quad) <ul style="list-style-type: none"> <li>• 420 kV, 80 MVar switchable line reactors at Mohali S/s end– 2 Nos.</li> <li>• Switching equipment for 420kV, 80MVar switchable line reactors at Mohali S/s end – 2 Nos.</li> </ul>
13	400 kV Panipat S/s – Mandola D/c (Quad) line	Line Length-75km (Quad) <ul style="list-style-type: none"> <li>• 400kV line bays at Mandola S/s – 2 nos.</li> </ul>
14	Establishment of 765 kV S/s at suitable location near Bulandshahr (Distt. Bulandshahr) along with 2x330 MVar (765kV) Bus Reactors  <u>Future provisions (excl. scope of present</u>	Bulandshahr S/s – AIS <ul style="list-style-type: none"> <li>• 765kV line bays –10 nos. (for 765kV 2xD/c interconnection with Panipat S/s, 765kV D/c interconnection with Lucknow-II</li> </ul>

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
	<p><b><u>scheme):</u></b></p> <ul style="list-style-type: none"> <li>➤ 765 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 765/400 kV 1500 MVA ICTs- 4 Nos.</li> <li>➤ 400 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 400 kV line bays –4 Nos.</li> <li>➤ 765 kV Bus Reactor along with bays: 1 No</li> <li>➤ 400 kV Bus Reactor along with bays: 1 No.</li> <li>➤ 400 kV Sectionalization bays: 1 set</li> <li>➤ 400/220 kV ICT along with bays-5 Nos.</li> <li>➤ 220 kV line bays -8 Nos.</li> <li>➤ 220kV Sectionalization bay: 1 set</li> <li>➤ 220 kV BC (2 Nos.) &amp; TBC (2 nos.)</li> <li>➤ 2 No. of Syncon units* at 400kV level along with 2 nos. of 400kV bays</li> </ul> <p>*1 No. of SynCon unit comprises dynamic support of +300MVar/-200MVar (Minimum) &amp; Short circuit contribution at PCC of 1200MVA (Minimum) (Value of inertia (MW-secs) shall be provided in RfP document)</p>	<p>S/s &amp; Noida sec-148 (UPPTCL) S/s and LILO of 765kV Aligarh – Gr. Noida line)</p> <ul style="list-style-type: none"> <li>• 330 MVar Bus Reactor-2 Nos. (7x110 MVar, including one spare unit)</li> <li>• 765 kV Bus reactor bays-2 Nos.</li> </ul>
15	765 kV Panipat- Bulandshahr 2xD/c line along with 240 MVar switchable line reactor for each circuit at Bulandshahr end	<p>Line Length-150km</p> <ul style="list-style-type: none"> <li>• 765 kV, 240 MVar switchable line reactors at Bulandshahr S/s end– 4 Nos.</li> <li>• Switching equipment for 765kV, 240MVar switchable line reactors at Bulandshahr S/s end – 4 Nos.</li> <li>• 1x80 MVar, 765kv reactor spare unit</li> </ul>
16	LILO of 765kV Aligarh – Gr. Noida line at Bulandshahr S/s (Lilo length-30km)	Length-30km (LILO length)
17	765kV Bulandshahr - Noida sec-148	Line Length- 50km

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
	(UPPTCL) D/c line	<ul style="list-style-type: none"> <li>• 765kV line bays at Noida sec-148 S/s(UPPTCL) – 2 nos.</li> </ul>
18	<p>Establishment of 765/400 kV, 2x1500 MVA Lucknow-II S/s at suitable location near Lucknow along with 2x330 MVA<sub>r</sub> (765kV) &amp; 2x125 MVA<sub>r</sub> (420kV) Bus Reactors</p> <p><b><u>Future provisions (excl. scope of present scheme):</u></b></p> <ul style="list-style-type: none"> <li>➤ 765 kV line bays along with switchable line reactor –8 nos.</li> <li>➤ 765/400 kV 1500 MVA ICTs- 4 Nos.</li> <li>➤ 400 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 400 kV line bays –4 Nos.</li> <li>➤ 765 kV Bus Reactor along with bays: 1 No</li> <li>➤ 400 kV Bus Reactor along with bays: 1 No.</li> <li>➤ 400 kV Sectionalization bays: 1 set</li> <li>➤ 400/220 kV ICT along with bays-5 Nos.</li> <li>➤ 220 kV line bays -8 Nos.</li> <li>➤ 220kV Sectionalization bay: 1 set</li> <li>➤ 220 kV BC (2 Nos.) &amp; TBC (2 nos.)</li> <li>➤ 2 No. of Syncon units* at 400kV level along with 2 nos. of 400kV bays</li> </ul> <p>*1 No. of SynCon unit comprises dynamic support of +300MVA<sub>r</sub>/-200MVA<sub>r</sub> (Minimum) &amp; Short circuit contribution at PCC of 1200MVA (Minimum)) (Value of inertia (MW-secs) shall be provided in RfP document)</p>	<p>Lucknow-II S/s – AIS</p> <ul style="list-style-type: none"> <li>• 765/400 kV 1500 MVA ICTs- 2 Nos. (7x500 MVA including one spare unit)</li> <li>• 765kV line bays –4 nos. (for 765kV D/c interconnection each with Asana &amp; Bulandshahr S/s)</li> <li>• 400kV line bays – 2 nos. (for 400kV interconnection with Gonda (UPPTCL) S/s)</li> <li>• 765kV ICT bays – 2 nos.</li> <li>• 400 kV ICT bays- 2 Nos.</li> <li>• 330 MVA<sub>r</sub> Bus Reactor-2 Nos. (7x110 MVA<sub>r</sub>, including one spare unit)</li> <li>• 765 kV Bus reactor bays-2 Nos.</li> <li>• 125 MVA<sub>r</sub> Bus Reactor-2 Nos.</li> <li>• 400 kV Bus reactor bays- 2 Nos.</li> </ul>
19	765 kV Bulandshahr – Lucknow-II D/c line along with 330 MVA <sub>r</sub> switchable line reactor for each circuit at each end	<p>Line Length- 350km</p> <ul style="list-style-type: none"> <li>• 765 kV, 330 MVA<sub>r</sub> switchable line reactors at Bulandshahr S/s end– 2 Nos.</li> <li>• Switching equipment for 765kV, 330MVA<sub>r</sub> switchable line reactors at Bulandshahr S/s end</li> </ul>

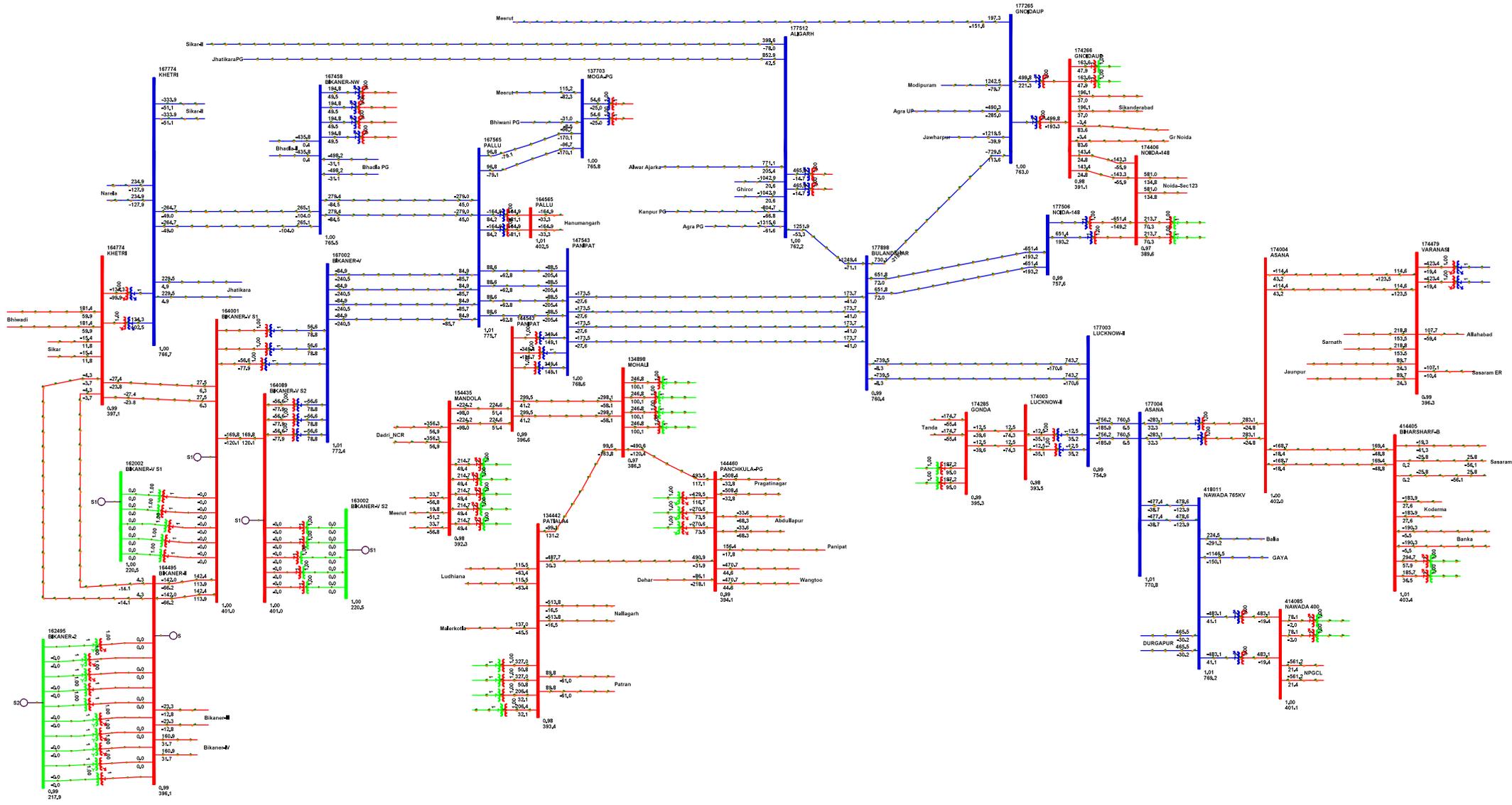
Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
		– 2 Nos. <ul style="list-style-type: none"> <li>• 765 kV, 330 MVA switchable line reactors at Lucknow-II S/s end – 2 Nos.</li> <li>• Switching equipment for 765kV, 330MVA switchable line reactors at Lucknow-II S/s end – 2 Nos.</li> </ul>
20	400 kV Lucknow-II – Gonda D/c (Quad Moose) line	Line Length- 160km <ul style="list-style-type: none"> <li>• 400kV line bays at Gonda S/s(UPPTCL) – 2 nos.</li> </ul>
21	Establishment of 765/400 kV, 2x1500 MVA S/s at suitable location near Asana Village (Chandauli District) along with 2x330 MVA (765kV) & 2x125 MVA (420kV) Bus Reactors  <u><b>Future provisions (excl. scope of present scheme):</b></u>  <ul style="list-style-type: none"> <li>➤ 765 kV line bays along with switchable line reactor –6 nos.</li> <li>➤ 765/400 kV 1500 MVA ICTs- 4 Nos.</li> <li>➤ 400 kV line bays along with switchable line reactor –4 nos.</li> <li>➤ 400 kV line bays –4 Nos.</li> <li>➤ 765 kV Bus Reactor along with bays: 1 No</li> <li>➤ 400 kV Bus Reactor along with bays: 1 No.</li> <li>➤ 400 kV Sectionalization bays: 1 set</li> <li>➤ 400/220 kV ICT along with bays-5 Nos.</li> <li>➤ 220 kV line bays -8 Nos.</li> <li>➤ 220kV Sectionalization bay: 1 set</li> <li>➤ 220 kV BC (2 Nos.) &amp; TBC (2 nos.)</li> <li>➤ 2 No. of Syncon units* at 400kV level along with 2 nos. of 400kV bays</li> <li>➤ STATCOM (2x±300MVA) along with MSC (4x125 MVA) &amp; MSR (2x125 MVA) along with 400kv bays (2nos.)</li> </ul>	Asna (Chandauli) S/s – AIS  <ul style="list-style-type: none"> <li>• 765/400 kV 1500 MVA ICTs- 2 Nos. (7x500 MVA including one spare unit)</li> <li>• 765kV line bays –4 nos. (for 765kV D/c interconnection each with Lucknow-II S/s &amp; Nawada)</li> <li>• 400kV line bays – 4 nos. (for LILO of both ckts of 400kV Varanasi – Biharsharif D/c line)</li> <li>• 765kV ICT bays – 2 nos.</li> <li>• 400 kV ICT bays- 2 Nos.</li> <li>• 330 MVA Bus Reactor-2 Nos. (7x110 MVA, including one spare unit)</li> <li>• 765 kV Bus reactor bays-2 Nos.</li> <li>• 125 MVA Bus Reactor-2 Nos.</li> <li>• 400 kV Bus reactor bays- 2 Nos.</li> </ul>

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
	*1 No. of SynCon unit comprises dynamic support of +300MVA/-200MVA (Minimum) & Short circuit contribution at PCC of 1200MVA (Minimum) (Value of inertia (MW-secs) shall be provided in RfP document)	
22	765 kV Lucknow-II-Asana D/c line along with 330 MVA switchable line reactor for each circuit at each end	Line Length- 350km <ul style="list-style-type: none"> <li>• 765 kV, 330 MVA switchable line reactors at Asana S/s end– 2 Nos.</li> <li>• Switching equipment for 765kV, 330MVA switchable line reactors at Asana S/s end – 2 Nos.</li> <li>• 765 kV, 330 MVA switchable line reactors at Lucknow-II S/s end– 2 Nos.</li> <li>• Switching equipment for 765kV, 330MVA switchable line reactors at Lucknow-II S/s end – 2 Nos.</li> </ul>
23	LILO of both ckts of 400kV Varanasi – Biharsharif D/c line at Asana S/s along with 80 MVA switchable line reactor for each circuit at Asana end of 400kV Asana-Biharsharif section	Length-25km (LILO length) <ul style="list-style-type: none"> <li>• 420 kV, 80 MVA switchable line reactors at Asana S/s end– 2 Nos.</li> <li>• Switching equipment for 420kV, 80MVA switchable line reactors at Asana S/s end – 2 Nos.</li> </ul>
24	Asana – Nawada 765kV D/c line along with 240MVA switchable line reactors in each circuits at both ends	Line Length - 250km <ul style="list-style-type: none"> <li>• 765 kV, 240 MVA switchable line reactors at Asana S/s end– 2 Nos.</li> <li>• Switching equipment for 765kV, 240MVA switchable line reactors at Asana S/s end – 2 Nos.</li> <li>• 765 kV, 240 MVA switchable</li> </ul>

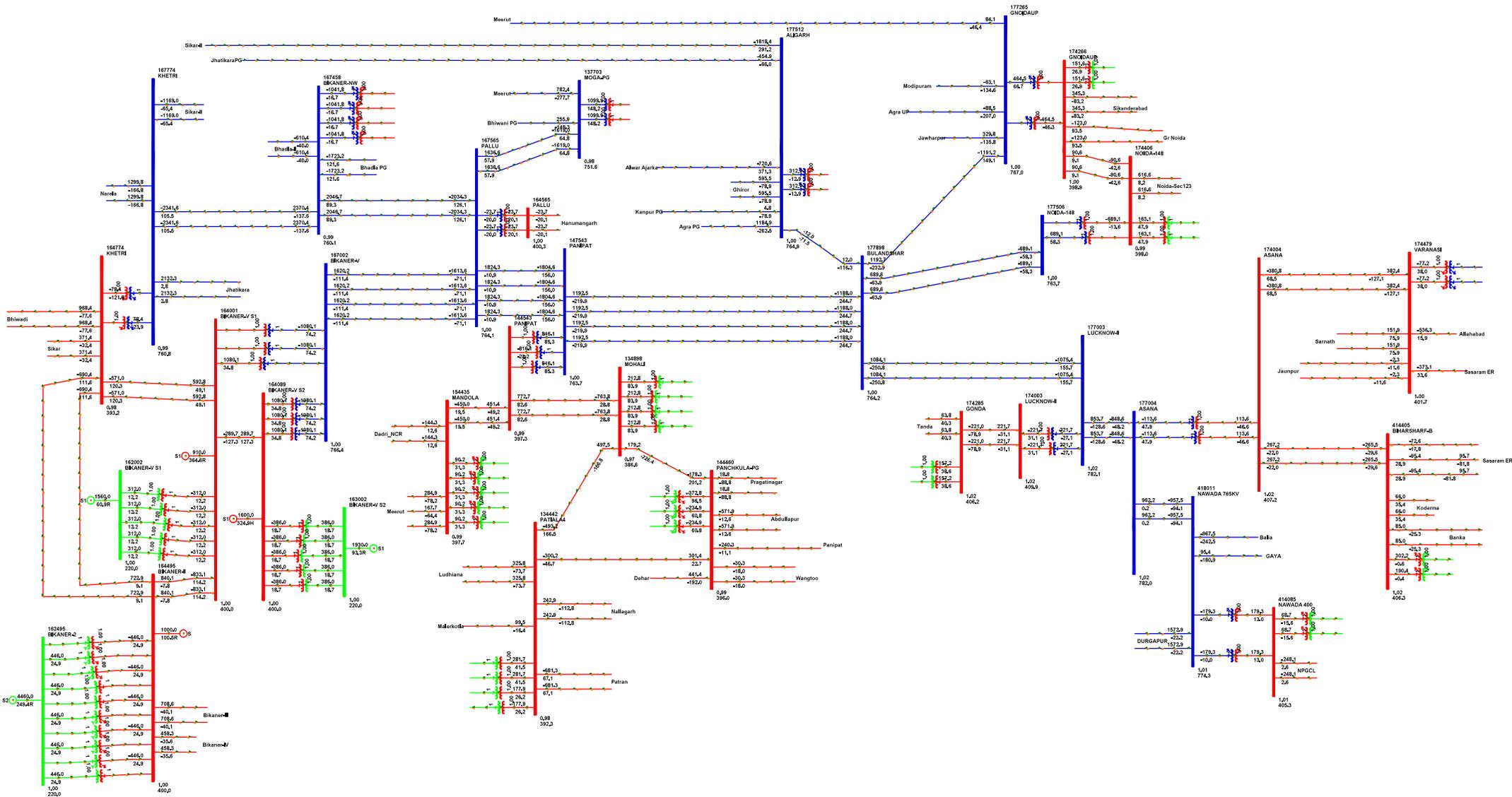
Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
		line reactors at Nawada S/s end– 2 Nos. • Switching equipment for 765kV, 240MVAr switchable line reactors at Nawada S/s end – 2 Nos. • Single phase spare unit (80MVAr) – 1 no.



# Summer Evening Peak Base case



# Winter Solar Max Base case





# Winter Night Off Peak Base Case

