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

दिनांक: 29th अगस्त, 2025

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 दिनांक 03.09.2025 (ऑनलाइन माध्यम) की कार्यसूची।
Subject: Agenda of Special Meeting of NRPC on 03.09.2025 through online mode -reg.

महोदय / महोदया,

एनआरपीसी की **विशेष बैठक** दिनांक **03.09.2025 (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 on **03.09.2025 (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

DHARMENDER KUMAR MEENA
Digitally signed by DHARMENDER KUMAR MEENA
Date: 2025.08.29 15:43:14 +05'30'

(डी. के. मीना)
अधीक्षण अभियंता (प्रचालन)

Copy to:

1. Sh. H Rajesh Prasad, IAS, Chairperson, NRPC and Principal Secretary to Government Power Development Department, J&K (jkpdd9@gmail.com)
2. Er. Raheela Wani, Chairperson, TCC and Managing Director, JKPTCL (mdjkptcl1@gmail.com)

सत्यमेव जयते

उत्तर क्षेत्रीय विद्युत समिति

NORTHERN REGIONAL POWER COMMITTEE

Agenda of

Special Meeting of

Northern Regional Power Committee

Date: 03rd September 2025

Time: 12:30 PM

Via: Video Conferencing

Agenda for Special NRPC Meeting

Introduction

A Special Meeting of NRPC is scheduled on 03.09.2025 through VC (online mode) to discuss the ISTS proposals furnished by the CTUIL.

A.1 Transmission system for evacuation of 5GE RE power from Renewable Energy Parks in Leh (agenda by CTUIL)

A.1.1 Based on the recommendations of the 7th NCT meeting, MOP vide letter dated 13.01.22 approved transmission system for evacuation of RE power from Renewable Energy Parks in Leh (Pang) [5 GW Leh-Kaithal Transmission corridor] for implementation under RTM by POWERGRID with implementation time frame of 5 years from approval i.e. approval of the Central Government for providing Central Grant for part funding of the project.

A.1.2 The scheme comprised of ±350kV HVDC system (VSC) between Pang & Kaithal PS, AC system strengthening in Ladakh to provide RE power to Ladakh and J&K through 220kV Pang – Leh (Phyang) S/c line and EHVAC system for dispersal of power to load centres towards Modipuram at 765kV level and Bahadurgarh at 400kV level.

A.1.3 Further, Delinking of EHVAC system beyond Kaithal from Transmission system for evacuation of RE power was approved in 17th NCT meeting held on 29.04.24 with Implementation Timeframe of Mar'30 for HVDC System and 24 months from SPV transfer for EHVAC System (AC system would be required in the matching timeframe of the HVDC system i.e. 31.03.2030).

A.1.4 Earlier, VSC based HVDC scheme was considered over EHVAC system due to limited transmission corridor availability, low SCR at pang bus, point to point controlled power transfer from Pang to Kaithal, independent reactive power control, etc.

A.1.5 Subsequently, due to various design, contractual and technical issues (as informed by OEM to POWERGRID), bidding of the VSC HVDC scheme (Pang-Kaithal) scheme could not yet be concluded.

A.1.6 To deliberate on above issues with POWERGRID and OEMs and to explore feasibility of EHVAC scheme, various meetings were held on 08.08.25, 14.08.25 & 27.08.25 under the Chairmanship of Chairperson (CEA) amongst CEA, CTU, Grid-India and POWERGRID /OEMs.

A.1.7 Pang-Kaithal VSC HVDC scheme was one of its kind in the entire world due to the involvement of extreme high altitude. Accordingly, the scheme was taken up in two stages viz FEED1 - FEED2. The FEED-1 studies (Front end engineering and design study) were carried out by OEMs comprised network studies i.e reactive power support requirement, filter requirement, dynamic & transient studies etc. The FEED-2 (equipment design studies) was included as part of pre bid studies. Based on FEED-1 study recommendations and inputs received, cost of VSC HVDC option was worked out to about Rs 43,456 Cr.

A.1.8 As per deliberation in above meetings, it was concluded that implementation of VSC based HVDC has the following challenges:

- Complex Geography of Pang PS (at 4700m altitude and low temperature [-35 degree]) - No VSC HVDC solutions were available at such high altitude
- Design and performance challenges of equipment to be adopted for such altitude – exemption from performance requirements
- High level of UV and cosmic radiation- higher failure rate of power electronic devices
- Weak network strength, presence of multiple inverter based resources (Solar, BESS, HVDC, SynCon/STATCOM),
- Transportation and logistics concerns
- Additional time requirement as well as scope exclusion requirements
- Other technical challenges i.e. working at derated voltage (leads to requirement of more no. of semiconductor devices to maintain voltage)

A.1.9 Considering above facts, Joint Studies were carried out amongst CEA, CTU, Grid-India & POWERGRID on 07.08.25 and 13.08.25 to explore feasibility of EHVAC options for evacuation of power from Pang to various load centres of Northern region. The studies were carried out in solar maximized scenario in 2030 timeframe. The outcome of studies were further discussed in meetings convened by CEA held on 07.08.25, 13.08.25 & 26.08.25 wherein the EHVAC scheme was finalized.

A.1.10 As part of EHVAC proposal, a 400/220kV pooling station at Pang is proposed with its 400kV interconnections to RE developer pooling stations i.e. 400kV PS1, PS2 & PS3 for integration of RE power. For evacuation of power from Pang PS, 400kV Sundernagar PS in Himachal Pradesh along with its 400kV interconnection to Pang PS through 2xD/c line with 45% FSC at Sundernagar end is being proposed.

A.1.11 For further dispersal of power from Sundernagar to NR load centres various options were explored. As part of the scheme, 400kV Sundernagar is proposed to be interconnected to 400kV Kaithal S/s through 2x D/c line with 45% FSC at Kaithal end. Further, 765/400kV Kaithal PS is proposed to be interconnected to Bahadurgarh & Modipuram S/s through 400kV D/c lines.

A.1.12 Further to provide RE power to Ladakh and J&K, 220kV Pang – Leh (Phyang) S/c line is also proposed as part of the EHVAC system.

A.1.13 To mitigate high loading at 220kV Leh (Phyang) - Khalsti-Kargil- Drass- Alusteng section, following measures were suggested as a separate strengthening scheme in matching timeframe of the EHVAC scheme :

A.1.14 Reconductoring of 220kV Leh (Phyang)- Khalsti-Kargil-Drass-Alusteng section with HTLS line or additional 220kV corridor from Leh to Alusteng

A.1.15 Suitable sectionlization arrangement at Pang generation end or Alusteng/Drass end to control loading on 220kV section (from Pang to Alusteng)

A.1.16 To maintain angular and voltage stability in base case as well as in various contingency scenarios, 8 nos. Syncon units (125MVAr) are proposed at Pang PS.

A.1.17 Establishment of 400/220kV PS-1, PS-2 & PS-3 along with 18 Nos. SynCons of 125 MVAr per unit (viz. 6 units at each PS) at 220 kV level (i.e. total of ± 125 x 18 = 2250 MVAr with suitable inertia) is considered in RE Developers scope.

A.1.18 For ease of implementation and to gain operational experience, transmission scheme is phased out in two phases. The Ph-I (1.67GW evacuation capacity) and Ph-II (2.33GW evacuation capacity) covers all the transmission elements of scheme, whereas for Ph-III generation of 1 GW, requirement of additional SynCons/400kV interconnection will be identified based on Operational Feedback from Grid-India.

A.1.19 Considering FEED-1 study results and inputs received, cost of EHVAC scheme was derived to about Rs 32,239 Cr.(tentative). (Scheme is attached as **Enclosure-1**)

Decision required from Forum:

NRPC to finalize the views on the above CTUIL proposals

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Enclosure-I

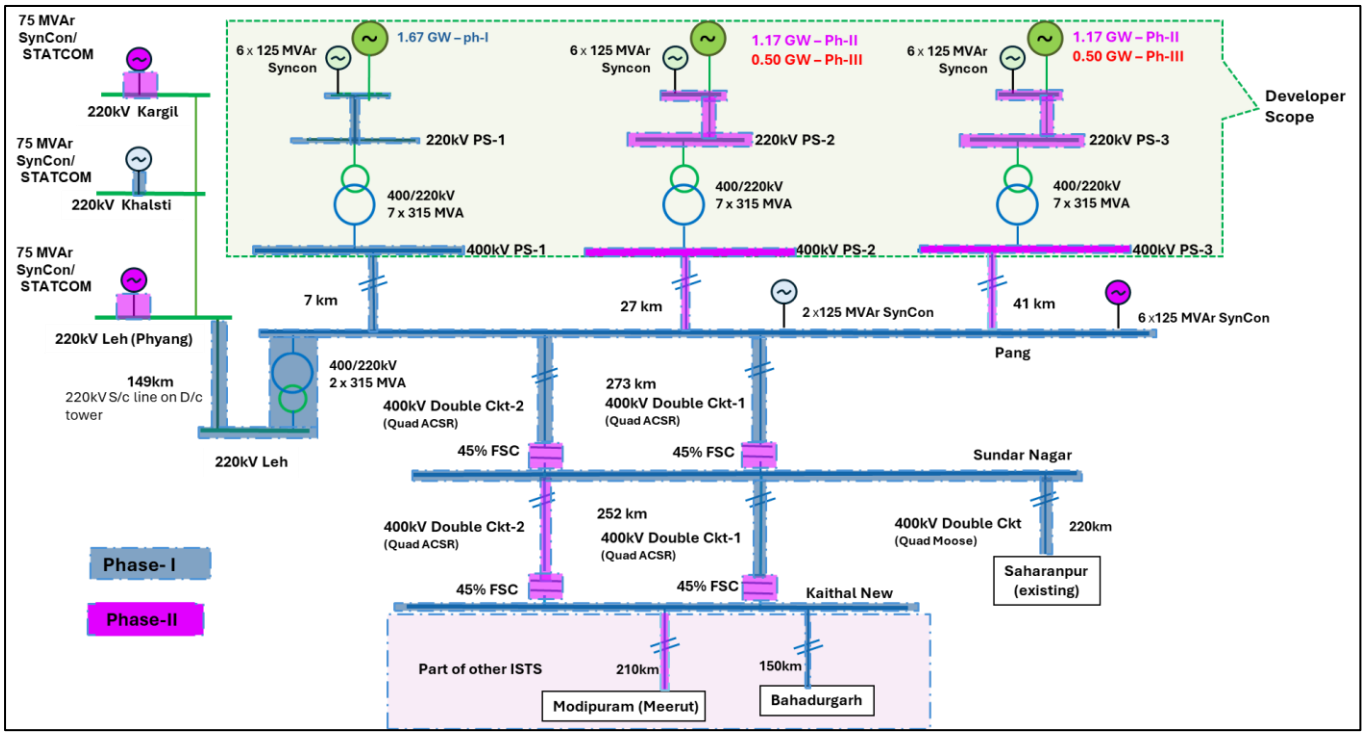
Transmission system for evacuation of 5GE RE power from Renewable Energy Parks in Leh

S. No.	Items	Details
1.	**Name of Scheme**	**Transmission system for evacuation of 5GW RE power from Renewable Energy Parks in Leh**
2.	**Scope of the scheme**	Details of Transmission scheme is enclosed in ***Annexure-I***
3.	**Depiction of the scheme on Transmission Grid Map**	Attached at **Exhibit-I**
4.	**Upstream/downstream system associated with the scheme**	220/66kV Leh(Phyang) S/s is existing substation which is interconnected to Khalsti S/s at 220kV level and to various load centres of Leh at 66kV level. 400/220kV Saharanpur S/s is an existing substation which is interconnected to Roorkee and Bagpat S/s at 400kV level.
5.	**Objective / Justification**	1. The present scheme comprises of Transmission system for evacuation of 5GW RE power from Renewable Energy Parks in Leh. 2. Based on the recommendations of the 7th NCT meeting, MOP vide letter dated 13.01.22 approved transmission system for evacuation of RE power from Renewable Energy Parks in Leh (Pang) [5 GW Leh-Kaithal Transmission corridor] for implementation under RTM by POWERGRID with implementation time frame of 5 years from approval i.e. approval of the Central Government for providing Central Grant for part funding of the project. 3. The scheme comprised of ±350kV HVDC system (VSC) between Pang & Kaithal PS, AC system strengthening in Ladakh to provide RE power to Ladakh and J&K through 220kV Pang – Leh (Phyang) S/c line and EHVAC system for dispersal of power to load centres towards Modipuram at 765kV level and Bahadurgarh at 400kV level. 4. Further, Delinking of EHVAC system beyond Kaithal from Transmission system for evacuation of RE power was approved in 17th NCT meeting held on 29.04.24 with Implementation Timeframe of Mar'30 for HVDC System and 24 months from SPV transfer for EHVAC System (AC system would be required in the matching timeframe of the HVDC system i.e. 31.03.2030). 5. Earlier, VSC based HVDC scheme was considered over EHVAC system due to limited transmission corridor availability, low SCR at pang bus, point to point controlled power transfer from Pang to Kaithal, independent reactive power control, etc. 6. Subsequently, due to various design, contractual and technical issues (as informed by OEM to POWERGRID),

S. No.	Items	Details
		bidding of the VSC HVDC scheme (Pang-Kaithal) scheme could not yet be concluded. 7. To deliberate on above issues with POWERGRID and OEMs and to explore feasibility of EHVAC scheme, various meetings were held on 08.08.25, 14.08.25 & 27.08.25 under the Chairmanship of Chairperson (CEA) amongst CEA, CTU, Grid-India and POWERGRID /OEMs. 8. Pang-Kaithal VSC HVDC scheme was one of its kind in the entire world due to the involvement of extreme high altitude. Accordingly the scheme was taken up in two stages viz FEED1 - FEED2. The FEED-1 studies (Front end engineering and design study) were carried out by OEMs comprised network studies i.e reactive power support requirement, filter requirement, dynamic & transient studies etc. The FEED-2 (equipment design studies) was included as part of pre bid studies. Based on FEED-1 study recommendations and inputs received, cost of VSC HVDC option was worked out to about Rs 43,456 Cr. 9. As per deliberation in above meetings, it was concluded that implementation of VSC based HVDC has the following challenges: • Complex Geography of Pang PS (at 4700m altitude and low temperature [-35 degree]) - No VSC HVDC solutions were available at such high altitude • Design and performance challenges of equipment to be adopted for such altitude – exemption from performance requirements • High level of UV and cosmic radiation- higher failure rate of power electronic devices • Weak network strength, presence of multiple inverter based resources (Solar, BESS, HVDC, SynCon/STATCOM), • Transportation and logistics concerns • Additional time requirement as well as scope exclusion requirements • Other technical challenges i.e. working at derated voltage (leads to requirement of more no. of semiconductor devices to maintain voltage) 10. Considering above facts, Joint Studies were carried out amongst CEA, CTU, Grid-India & POWERGRID on 07.08.25 and 13.08.25 to explore feasibility of EHVAC options for evacuation of power from Pang to various load centres of Northern region. The studies were carried out in solar maximized scenario in 2030 timeframe. The outcome of studies were further discussed in meetings convened by CEA held on 07.08.25, 13.08.25 & 26.08.25 wherein the EHVAC scheme was finalized. 11. As part of EHVAC proposal, a 400/220kV pooling station at Pang is proposed with its 400kV interconnections to RE developer pooling stations i.e. 400kV PS1, PS2 & PS3 for integration of RE power. For evacuation of power from Pang PS, 400kV Sundernagar PS in Himachal Pradesh along with

S. No.	Items	Details
		its 400kV interconnection to Pang PS through 2xD/c line with 45% FSC at Sundernagar end is being proposed. 12. For further dispersal of power from Sundernagar to NR load centres various options were explored. As part of the scheme, 400kV Sundernagar is proposed to be interconnected to 400kV Kaithal S/s through 2x D/c line with 45% FSC at Kaithal end. Further, 765/400kV Kaithal PS is proposed to be interconnected to Bahadurgarh & Modipuram S/s through 400kV D/c lines. 13. Further to provide RE power to Ladakh and J&K, 220kV Pang – Leh (Phyang) S/c line is also proposed as part of the EHVAC system. 14. To mitigate high loading at 220kV Leh (Phyang) - Khalsti-Kargil- Drass- Alusteng section, following measures were suggested as a separate strengthening scheme in matching timeframe of the EHVAC scheme : ➢ Reconductoring of 220kV Leh (Phyang)- Khalsti-Kargil-Drass-Alusteng section with HTLS line or additional 220kV corridor from Leh to Alusteng ➢ Suitable sectionlization arrangement at Pang generation end or Alusteng/Drass end to control loading on 220kV section (from Pang to Alusteng) 15. To maintain angular and voltage stability in base case as well as in various contingency scenarios, 8 nos. Syncon units (125MVAr) are proposed at Pang PS. 16. Establishment of 400/220kV PS-1,PS-2 & PS-3 along with 18 Nos. SynCons of 125 MVAr per unit (viz. 6 units at each PS) at 220 kV level (i.e. total of ± 125 x 18 = 2250 MVAr with suitable inertia) is considered in RE Developers scope. 17. For ease of implementation and to gain operational experience, transmission scheme is phased out in two phases. The Ph-I (1.67GW evacuation capacity) and Ph-II (2.33GW evacuation capacity) covers all the transmission elements of scheme, whereas for Ph-III generation of 1 GW, requirement of additional SynCons/400kV interconnection will be identified based on Operational Feedback from Grid-India. 18. Considering FEED-1 study results and inputs received, cost of EHVAC scheme was derived to about Rs 32,239 Cr.(tentative).
6.	**Estimated Cost**	**Rs 32,239 Cr (Tentative)** **Ph-I : Rs 23274 Cr** **Ph-II : Rs 8965 Cr**
7.	**Need of transmission phasing, if any**	**Ph-I : 1.67GW evacuation capacity** **Ph-II : 2.33GW evacuation capacity**
8.	**Implementation timeframe**	**Ph-I : Jul'29 (1.67GW)** **Ph-II : Dec'30 (2.33GW)**
9.	**System Study for evolution of the proposal**	Load flow results is attached at **Exhibit-II**

Exhibit-I


75 MVAr SynCon/ STATCOM
220kV Kargil
75 MVAr SynCon/ STATCOM
220kV Khalsti
75 MVAr SynCon/ STATCOM
220kV Leh (Phyang)
149km
220kV S/c line on D/c tower
220kV Leh
6 x 125 MVAr Syncon
1.67 GW – ph-I
220kV PS-1
400/220kV 7 x 315 MVA
400kV PS-1
6 x 125 MVAr Syncon
1.17 GW – Ph-II
0.50 GW – Ph-III
220kV PS-2
400/220kV 7 x 315 MVA
400kV PS-2
6 x 125 MVAr Syncon
1.17 GW – Ph-II
0.50 GW – Ph-III
220kV PS-3
400/220kV 7 x 315 MVA
400kV PS-3
Developer Scope
7 km
27 km
2 x125 MVAr SynCon
41 km
6 x125 MVAr SynCon
Pang
400/220kV 2 x 315 MVA
400kV Double Ckt-2 (Quad ACSR)
273 km
400kV Double Ckt-1 (Quad ACSR)
45% FSC
45% FSC
Sundar Nagar
400kV Double Ckt-2 (Quad ACSR)
252 km
400kV Double Ckt-1 (Quad ACSR)
400kV Double Ckt (Quad Moose)
220km
Saharanpur (existing)
45% FSC
45% FSC
Kaithal New
Part of other ISTS
210km
150km
Modipuram (Meerut)
Bahadurgarh
Phase- I
Phase-II

Transmission system for evacuation of 5GW RE power from Renewable Energy Parks in Leh

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)
	Phase-I : 1.67GW evacuation capacity	
1	400kV PS-1 - Pang Pooling Station D/c (Quad) line along with line bays at Pang Pooling Station Note: 400kV GIS line bays (2 nos) at PS-1 is under RE developer scope	Line Length ~7 km (Quad Moose)
2	Establishment of 400/220kV, 2x315MVA Pooling Station at Pang along with 1x125MVAr, 420kV bus reactor. **Future provisions :** ➢ 400 kV line bays –10 Nos. (4 nos. utilized for PS2 & PS3 interconnection in Ph-II scheme) ➢ 400/220 kV 315 MVA ICTs along with bays- 2 Nos. ➢ 400 kV Sectionalization bays: 2 set ➢ 220kV Sectionalization bay: 1 sets ➢ 220 kV BC (2 Nos.) & TBC (2 Nos.) ➢ 10 No. of Syncon units* at 400kV level along with 10 nos. of 400kV bays (6 nos. utilized in Ph-II scheme) ➢ 220kv line bays – 4 nos. *1 No. of SynCon unit comprises dynamic support of +125MVAr/-95MVAr (Minimum), Short circuit contribution at PCC of 750MVA (Minimum) (Value of inertia constant (sec) shall be considered 5)	Pang PS - GIS • 400/220 kV 315 MVA ICTs- 2 Nos. (7x105 MVA unit including one spare unit) • 400kV line bays – 6 nos. (for 400kV D/c interconnection PS1 and 2xD/c interconnection with Sundernagar S/s) • 400 kV ICT bays- 2 Nos. • 220 kV ICT bays - 2 Nos. • 125 MVAr Bus Reactor-1 Nos. • 400 kV Bus reactor bay- 1 Nos. • 220kV line bays – 1 nos. (for Leh (Phyang) interconnection • 400 kV bays for Syncons –2 Nos.
3	Establishment of 400kV Switching station near Sundar Nagar along with 2x125MVAr, 420kV bus reactor. **Future provisions (excl. scope of present scheme):** ➢ 400 kV line bays along with switchable line reactors –6 Nos. (2 nos. utilized for Kaithal interconnection in Ph-II scheme) ➢ 400 kV Sectionalization bays: 1 set ➢ 400/220 kV 315 MVA ICTs along with bays- 2 Nos ➢ 220kv line bays – 4 nos.	Sundar Nagar S/s - GIS • 400kV line bays – 6 nos. (for 400kV 2xD/c interconnection with Pang S/s & 400kV D/c interconnection with Kaithal S/s) • 125 MVAr Bus Reactor-2 Nos. • 400 kV Bus reactor bay- 2 Nos.

	➢ 220 kV BC (1 No.) & TBC (1 No.)	
4	Establishment of 400kV Kaithal substation along with 1x125MVAr, 420kV bus reactor **<u>Future provisions :</u>** ➢ 765/400 kV 1500 MVA ICTs- 4 Nos. ➢ 765 kV line bays along with switchable line reactor –6 nos. ➢ 400 kV line bays along with switchable line reactor –10 nos. (2 nos. utilized for Sundernagar interconnection in Ph-II scheme) ➢ 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-2 Nos. ➢ 220 kV line bays -4 Nos. ➢ STATCOM (2x±300MVAr) along with MSC (4x125 MVAr) & MSR (2x125 MVAr) along with 400kv bays (2nos.)	Kaithal S/s - AIS • 400kV line bays – 2 nos. (for 400kV D/c interconnection with Sundernagar S/s) • 125 MVAr Bus Reactor-1 Nos. • 400 kV Bus reactor bay- 1 Nos.
5	2 No. of Syncon units* at 400kV level *1 No. of SynCon unit comprises dynamic support of +125MVAr/-95MVAr (Minimum), Short circuit contribution at PCC of 750MVA (Minimum) (Value of inertia constant (sec) shall be considered 5)	Syncon units – 2 nos.
6	220kV Pang – Leh (Phyang) (PG) S/c line (Deer conductor) on D/c towers along with line bays at both ends	Line Length ~149 km • 220 kV line bays at Leh (Phyang) S/s- 1 No.
7	400kV Pang - Sundar Nagar 2xD/c Quad ACSR line along with 63MVAr switchable line reactor on each ckt. at both ends.	Line Length-273km (Quad) • 420 kV, 63 MVAr switchable line reactors at Pang PS end– 4 Nos. • Switching equipment for 420kV, 63MVAr switchable line reactors at Pang PS end – 4 Nos. • 420 kV, 63 MVAr switchable line reactors at Sundar Nagar PS end– 4 Nos. • Switching equipment for 420kV, 63MVAr switchable line reactors at Sundar Nagar PS end – 4 Nos.

8	400kV Sundar Nagar – Kaithal D/c Quad ACSR line along with 50MVAr switchable line reactor on each ckt at both ends.	Line Length-252km (Quad) • 420 kV, 50 MVAr switchable line reactors at Sundar Nagar PS end– 2 Nos. • Switching equipment for 420kV, 50MVAr switchable line reactors at Sundar Nagar PS end – 2 Nos. • 420 kV, 50 MVAr switchable line reactors at Kaithal S/s end– 2 Nos. • Switching equipment for 420kV, 50MVAr switchable line reactors at Kaithal S/s end – 2 Nos.
9	400kV Sundar Nagar - Saharanpur D/c line (Quad) along with 50MVAr switchable line reactor on each ckt. at both ends.	Line Length-220km (Quad Moose) • 400kv line bays at Saharanpur S/s – 2 nos. • 420 kV, 50 MVAr switchable line reactors at Sundar Nagar PS end– 2 Nos. • Switching equipment for 420kV, 50MVAr switchable line reactors at Sundar Nagar PS end – 2 Nos. • 420 kV, 50 MVAr switchable line reactors at Saharanpur S/s end– 2 Nos. • Switching equipment for 420kV, 50MVAr switchable line reactors at Saharanpur S/s end – 2 Nos.
10	1 No. of Syncon units* at 220kV level of Khalsti S/s *1 No. of SynCon unit comprises dynamic support of ±75MVAr (Minimum), Short circuit contribution at PCC of 450MVA (Minimum) (Value of inertia constant (sec) shall be considered 5)	Syncon unit – 1 nos. • 220kv line bay at Khalsti – 1 no.
11	Kaithal - Bahadurgarh (PG) 400 kV D/C Line (Quad)	Line Length ~170 km (Quad) • 400kV line bays at Kaithal end • 400kV line bays at B'garh end – 2 nos.
	Phase-II: 2.33 GW evacuation capacity	
1	400kV PS-2- Pang Pooling Station D/c (Quad) line along with line bays at Pang Pooling Station Note: 400kV GIS line bays (2 nos) at PS-2 is under RE developer scope	Line Length ~27 km (Quad Moose) • 400kV line bays at Pang PS – 2 nos. (for 400kV D/c interconnection with PS2)

2	400kV PS-3 - Pang Pooling Station D/c (Quad) line along with line bays at Pang Pooling Station Note: 400kV GIS line bays (2 nos) at PS-3 is under RE developer scope	Line Length ~41 km (Quad Moose) • 400kV line bays at Pang PS – 2 nos. (for 400kV D/c interconnection with PS3)
3	400kV Sundar Nagar – Kaithal 2nd D/c Quad ACSR line along with 50MVAr switchable line reactor on each ckt at both ends and line bays at both ends.	Line Length-252km (Quad) • 420 kV, 50 MVAr switchable line reactors at Sundar Nagar PS end– 2 Nos. • Switching equipment for 420kV, 50MVAr switchable line reactors at Sundar Nagar PS end – 2 Nos. • 420 kV, 50 MVAr switchable line reactors at Kaithal S/s end– 2 Nos. • Switching equipment for 420kV, 50MVAr switchable line reactors at Kaithal S/s end – 2 Nos.
4	FSC (45%) on all four ckts. of 400kV Pang PS – Sundar Nagar 2xD/c line at Sunder Nagar end.	FSC (45%) – 4 Nos. (at Sunder Nagar end)
5	FSC (45%) on all four ckts. of 400kV Sundar Nagar – Kaithal 2xD/c line at Kaithal end.	FSC (45%) – 4 Nos. (at Kaithal end)
6	6 No. of Syncon units* at 400kV level of Pang PS *1 No. of SynCon unit comprises dynamic support of +125MVAr/-95MVAr (Minimum), Short circuit contribution at PCC of 750MVA (Minimum) (Value of inertia constant (sec) shall be considered 5)	Syncon units – 6 nos. • 400kV line bay at Pang PS– 6 no.
7	1 No. of Syncon units* each at 220kV level of Leh (Phyang) and Kargil S/s *1 No. of SynCon unit comprises dynamic support of ±75MVAr (Minimum), Short circuit contribution at PCC of 450MVA (Minimum) (Value of inertia constant (sec) shall be considered 5)	Syncon unit – 2 nos. • 220kV line bay at Leh (Phyang) S/s– 1 no. • 220kV line bay at Kargil S/s– 1 no.
8	Kaithal - Modipuram (Meerut) (UPPTCL) 400kV D/C Line along with 1x80MVAr switchable line reactor on each ckt at Kaithal end	Line Length ~210 km (Quad) • 400kV line bays at Kaithal end • 400kV line bays at Modipuram end – 2 nos. (GIS) • 420 kV, 80 MVAr switchable line reactors at Kaithal S/s end– 2 Nos.

		• Switching equipment for 420kV, 80MVAr switchable line reactors at Kaithal S/s end – 2 Nos.

For Phase-III (1 GW evacuation capacity), Space is to be kept assessing transmission requirement of additional system based on Operational Feedback of Grid-India. Following space requirements is to be kept during Phase-I:

- Space for 4x125MVAr SynCon at 400kV Pang along with associated bays.
- Space for 4 Nos. of 400 kV line bays along with line reactor at Sundarnagar S/s for any future 400kV interconnection

EXHIBIT-II

PHASE - I

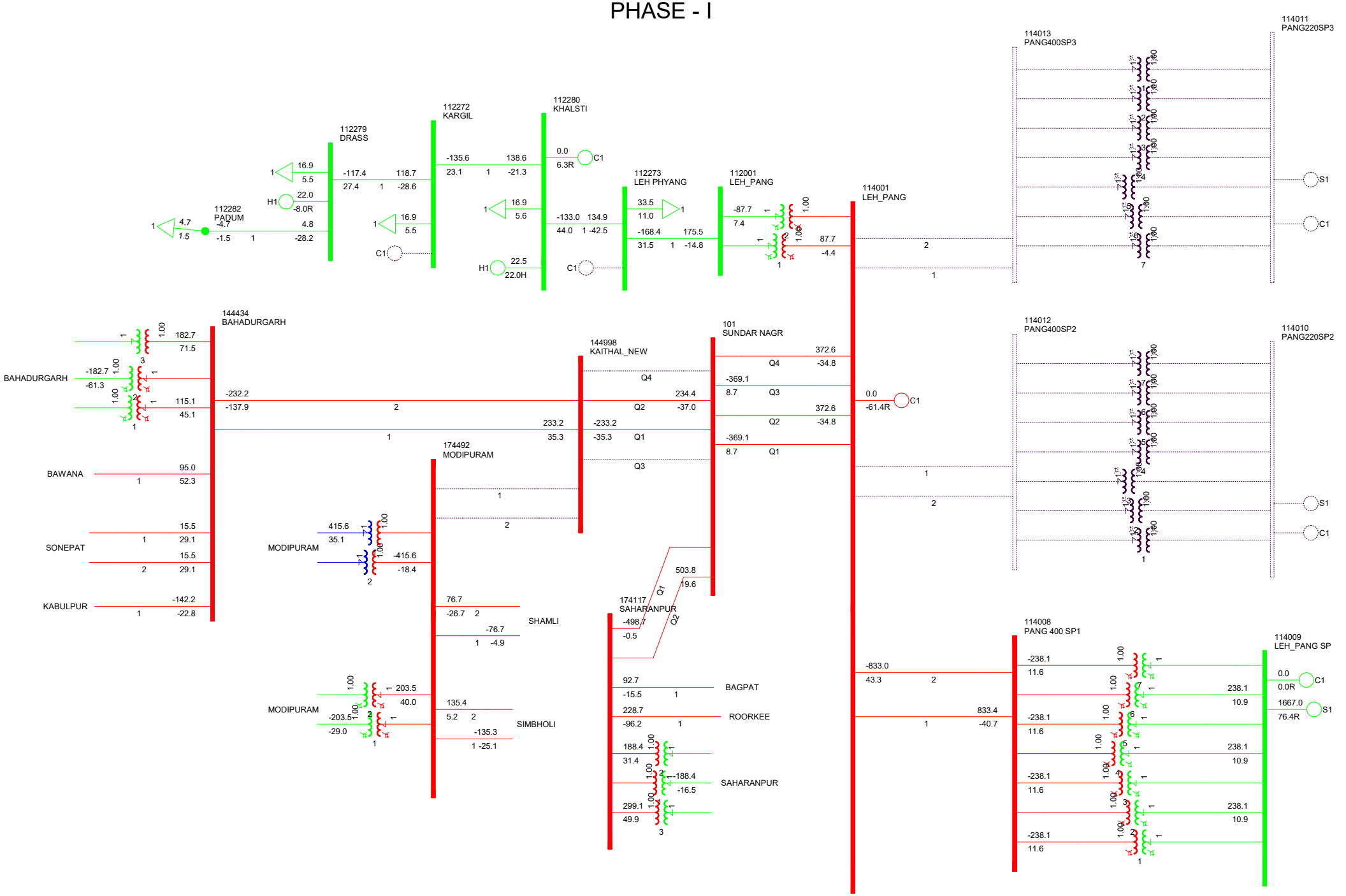


EXHIBIT - II

PHASE - I + II