BEFORE THE HON'BLE CENTRAL ELECTRICITY REGULATORY COMMISSION, NEW DELHI

PETITION NO. /TL/2023

IN THE MATTER OF:

Petition under Section 14, 15 and 79(1)(e) of the Electricity Act, 2003 read with the Central Electricity Regulatory Commission (Procedure, Terms and Conditions for Grant of Transmission License and other related matters) Regulations, 2009 for grant of transmission license to Beawar Transmission Limited.

AND

IN THE MATTER OF:

Beawar Transmission Limited

.... Petitioner

1

VERSUS

Central Transmission Utility of India Limited & Ors.

... Respondents

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PETITIONER

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Gaurav Dudeja, Partner PHOENIX LEGAL Advocates for the Petitioner Phoenix House, 254, Okhla Industrial Estate, Phase III, New Delhi – 110020 Email: gaurav.dudeja@phoenixlegal.in Mob: +91 9818833778

Place: New Delhi Date: 25.09.2023

BEFORE THE HON'BLE CENTRAL ELECTRICITY REGULATORY COMMISSION, NEW DELHI PETITION NO. /TL/2023

IN THE MATTER OF:

Fatehgarh III Beawar Transmission Limited

... Petitioner

VERSUS

Central Transmission Utility of India Limited & Ors.

... Respondents

MEMO OF PARTIES

Beawar Transmission Limited

Having its office at: DLF Cyber Park, Tower-B, 9th Floor, Udyog Vihar, Phase-III, Sector 20, Gurugram, Haryana – 1220008

VERSUS

... Petitioner

Central Transmission Utility of India Limited Saudamini, Plot No.2, Sector 29, Near IFFCO Chowk, Gurugram, Haryana – 122001

- REC Power Development and Consultancy Ltd. D Block, REC Headquarter, Plot No. 1-4, Sector- 29, Gurugram, Haryana- 122001
- Central Electricity Authority Seva Bhawan, R.K. Puram, New Delhi – 110016

Union Territory of Jammu & Kashmir Power Development Department SLDC Building, 1st Floor, Gladani Power House, Narwal, Jammu – 180006

- Union Territory of Ladakh Superintending Engineer, Distribution Circle, Power Development Department, Choglamsar, Leh – 194101
- Powergrid Corporation of India Limited B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi – 110016
- HVDC Dadri, Powergrid Corporation of India Limited B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi – 110016
- HVDC Rihand, Powergrid Corporation of India Limited B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi – 110016

Union Territory of Chandigarh Electricity Wing of Engineering Department, Room No. 511, 5th Floor, UT Secretariat (Deluxe) Building, Sector 9D, Chandigarh – 160009

 BSES Rajdhani Power Limited BSES Bhawan, Nehru Place, New Delhi – 110019

BSES Yamuna Power Limited B-Block, Shakti Kiran Building, Near Karkadooma Court, Karkadooma, New Delhi – 110092

- New Delhi Municipal Council Palika Kendra, Sansad Marg, New Delhi – 110002
- 13. Tata Power Delhi Distribution Limited NDPL house, Hudson Lines Kingsway Camp, New Delhi – 110009
- Himachal Pradesh State Electricity Board Vidyut Bhawan, Kumar House Complex Building II, Shimla, Himachal Pradesh – 171004

- Haryana Power Purchase Centre Shakti Bhawan, Sector-6, Panchkula, Haryana –134109
- 16. Punjab State Power Corporation Limited PP&R, Shed T-1, Thermal Design Patiala, Punjab – 147001
- Ajmer Vidyut Vitran Nigam Limited
 132 kV, GSS RVPNL Sub-station Building,
 Caligiri Road, Malviya Nagar,
 Jaipur, Rajasthan 302017
- Jaipur Vidyut Vitran Nigam Limited 132 kV, GSS RVPNL Sub-station Building Caligiri Road, Malviya Nagar, Jaipur, Rajasthan – 302017
- **19.** Jodhpur Vidyut Vitran Nigam Limited New Power House, Industrial Area, Jodhpur, Rajasthan – 342003
- 20. North Central Railway DRM Office, Nawab Yusuf Road, Prayagraj, Uttar Pradesh – 211011
- 21. Uttaranchal Power Corporation Limited Urja Bhawan, Kanwali Road, Dehradun, Uttarakhand – 248001
- 22. Uttar Pradesh Power Corporation Limited (Formerly Uttar Pradesh State Electricity Board) Shakti Bhawan, 14, Ashok Marg, Lucknow, Uttar Pradesh – 226001
- 23. A.D. Hydro Power Limited Bhilwara Towers, A-12, Sector 1, Noida, Uttar Pradesh – 201301

... Respondents

PETITIONER

5

THROUGH

Bludeje Gaurav Dudeja, Partner `

PHOENIX LEGAL Advocates for the Petitioner Phoenix House, 254, Okhla Industrial Estate, Phase III, New Delhi – 110020 Email: gaurav.dudeja@phoenixlegal.in Mob: +91 9818833778

Place: New Delhi Date: 25.09.2023

BEFORE THE HON'BLE CENTRAL ELECTRICITY REGULATORY COMMISSION, NEW DELHI

PETITION NO. /TL/2023

IN THE MATTER OF:

Petition under Section 14, 15 and 79(1)(e) of the Electricity Act, 2003 read with the Central Electricity Regulatory Commission (Procedure, Terms and Conditions for Grant of Transmission License and other related matters) Regulations, 2009 for grant of transmission license to Beawar Transmission Limited.

AND

IN THE MATTER OF: Beawar Transmission Limited

... Petitioner

VERSUS

Central Transmission Utility of India Limited & Ors.

... Respondents

PETITION UNDER SECTION 14, 15 and 79(1)(e) OF THE ELECTRICITY ACT, 2003 FOR GRANT OF TRANSMISSION LINCENCE TO THE PETITIONER

MOST RESPECTFULLY SHEWETH:

 The present Petition is being filed by the Petitioner, Beawar Transmission Limited, under Section 14, 15 and 79(1)(e) of the Electricity Act, 2003 ("the Act") read with the Central Electricity Regulatory Commission (Procedure, Terms and Conditions for Grant of Transmission License and other related matters) Regulations, 2009 ("Transmission License Regulations") for grant of transmission license for the establishment of "Transmission System for Evacuation of Power from REZ in Rajasthan (20 GW) under Phase III-Part F" ("the Project") on build, own, operate and transfer basis and to provide transmission services as per the terms of the Transmission Service Agreement ("TSA") dated 20 September 2023. The details of the Project are as follows:

S. No.	Name of Transmission Element	Scheduled COD in months from Effective Date
1.	Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus Reactor. • 765/400kV 1500 MVA ICTs: 2 nos. • (7x500 MVA, including one spare unit) • 330 MVAr, 765 kV bus reactor- 2 nos. • (7x110 MVAr, including one spare unit) • 765kV ICT bays – 2 nos. • 400 kV ICT bays – 2 nos. • 400 kV ICT bays – 2 nos. • 765 kV line bays – 6 nos. • 400kV line bay – 2 nos. • 765kV reactor bay – 2 nos. • 125 MVAr, 420kV bus reactor – 2 nos. • 420 kV reactor bay – 2 nos. • 420 kV reactor bay – 2 nos. • 765/400kV ICTs along with bays: 2 nos. • 765kV line bay along with switchable line reactor: 8 nos. • 765kV Bus Reactor along with bays: 2 nos. • 400/220 kV ICTs along with bays: 2 nos. • 400/220 kV ICTs along with bays: 2 nos. • 400 kV line bays along with switchable line reactor: 4 nos. • 400kV Bus Reactor along with bays: 1 no. • 220 kV line bays: 4 nos.	18 months
2.	LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar LILO of 400kV Kota –Merta line at Beawar	-
<u>3.</u> 4.	 Fatehgarh-3- Beawar 765 kV D/c along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3- Beawar 765 kV D/c line Switching equipment for 765 kV 330 MVAR switchable line reactor -4 nos. 765 kV, 330 MVAr Switchable line reactor-4 nos. 	
5.	\pm 2x300MVAr STATCOM, 4x125 MVAr MSC, 2x125 MVAr MSR at Fatehgarh- 3 PS along with 2 nos. of 400 kV bays at Fatehgarh-3 PS	

Note:

(i) POWERGRID to provide space for 765kV switchable line reactors at Fatehgarh-3 S/s (for 765kV Fatehgarh-3 PS – Beawar D/c line) for which no cost is envisaged. Two (02) nos. 765 KV line bays at Fatehgarh-III PS for interconnection of Fatehgarh-3– Beawar 765 kV D/c line is under the scope of M/s POWERGRID.

- (ii) ±300 MVAr STATCOM should be placed in each 400 kV bus section of Fatehgarh-3 PS (Phase-III Part E1).
- (iii) POWERGRID shall provide space at Fatehgarh-3 S/s for STATCOM along with MSC & MSR and associated 400kV bays.
- 2. The need for implementation of the Project was discussed in the 3rd meeting of Northern Regional Power Committee (Transmission Planning) ("NRPC-TP") held on 19 February 2021 and the Project was approved by the National Committee on Transmission ("NCT") during its 5th meeting held on 25 August 2021 & 02 September 2021. The Project was further recommended by the Technical Coordination Committee during the 49th meeting of NRPC that was held on 27 September 2021. The copies of the minutes of the 3rd NRPC-TP meeting held on 19 February 2021, 5th NCT meeting held on 25 August 2021 & 02 September 2021 and the 49th NRPC meeting held on 27 September 2021 are attached herewith and marked as ANNEXURE - 1 (Colly).
- 3. It is submitted that subsequently, the Ministry of Power ("MOP") issued the "*Tariff Based Competitive Bidding Guidelines for Transmission Service*" and "*Guidelines for Encouraging Competition in Development of Transmission Projects*" dated 10 August 2021 under Section 63 of the Act ("TBCB Guidelines"). Further, *vide* its Gazette Notification No. CG-DL-E-08122021-231686 (No. 4661) dated 06 December 2021 ("MOP Notification"), in exercise of the powers conferred by Para 3.2 of the said TBCB Guidelines, the MOP appointed REC as the BPC for conducting the bid process for selection of the successful bidder for establishment of the Project. The copy of the MOP Notification dated 06 December 2021 is attached herewith and marked as ANNEXURE 2.
- 4. The scope of the Project was modified as per the 11th NCT meeting held on 28 December 2022 and 17 January 2023, wherein, *inter alia*, the provision for STATCOM at Fatehgarh-3 PS was added under the scope of the Project. Pursuant to the same, the Petitioner company on 10 May 2023 and REC on 28 June 2023

issued letters to the Central Electricity Authority ("CEA") requesting for approval for laying of overhead transmission line. The MOP *vide* its letter dated 12 July 2023 approved the same. The copies of the letters dated 10 May 2023 by the Petitioner, 28 June 2023 by REC and 12 July 2023 by MOP is attached herewith and marked as ANNEXURE – 3 (Colly).

- 5. On 27 April 2022, the BPC incorporated the Petitioner company under the Companies Act, 2013, as its wholly owned subsidiary, to initiate various activities for execution of the Project, and to subsequently act as the Transmission Service Provider ("TSP"). A copy of the Certificate of Incorporation of the Petitioner company is annexed herewith and marked as ANNEXURE 4, and a copy of the Memorandum of Association & Articles of Association of the Petitioner Company is annexed herewith and marked as ANNEXURE 5 (Colly).
- 6. REC initiated the TBCB Process in terms of the TBCB Guidelines through a single stage two envelope process of Request for Proposal ("RFP"). The RFP was issued on 10 February 2022. The successful bidder was required to acquire one hundred percent (100%) of the equity shares of the Petitioner company/TSP along with all its related assets and liabilities. A copy of the RFP dated 10 February 2022 along with all the clarifications and amendments issued thereto are annexed herewith and marked as ANNEXURE 6 (Colly).
- 7. In compliance with the TBCB Guidelines, the entire bidding process was conducted on electronic platform created by MSTC Limited, wherein all the bidders had submitted their bids online through the electronic bidding platform.
- 8. It is submitted that Sterlite Grid 27 Limited ("SGL27") was one of the bidders who had submitted their bid for the Project. SGL27 submitted its Technical and Financial Bid-Initial Offer on 25 July 2023, and after the conclusion of e-reverse auction process, on 11 August 2023, SGL27 emerged as the successful bidder having quoted the lowest levelized transmission charges of INR 2,749.39 Million.

- 9. It is also highlighted that the Bid Evaluation Committee ("BEC") issued a certificate on 17 August 2023 ("BEC Certificate"), *inter alia*, declaring that the entire bidding process had been carried out in accordance with the TBCB Guidelines, and SGL27 emerged as the successful Bidder after the conclusion of the electronic reverse auction. A copy of the BEC Certificate dated 17 August 2023 are annexed herewith and marked as ANNEXURE 7.
- 10. Thereafter, BPC issued a Letter of Intent ("LOI") dated 25 August 2023 in favour of SGL27 and the same was unconditionally accepted by SGL27. A copy of the LOI dated 25 August 2023, duly accepted by SGL27, is annexed herewith and marked as ANNEXURE 8.
- 11. Further, SGL27 furnished a Contract Performance Guarantee ("CPG") dated 15 September 2023 for an amount of INR 57.06 Crores, with the expiry date of the CPG being 31 December 2025, in favour of the Nodal Agency, i.e., CTUIL/the Respondent No.1. A copy of the CPG dated 15 September 2023 is attached hereto and marked as ANNEXURE - 9.
- 12. It is most respectfully submitted that the bidding was done on the basis of the existing Standard Bidding Documents ("SBD"). However, the transmission charges would be shared and recovered as per the mechanism devised by this Hon'ble Commission which is the Point of Connection ("PoC") mechanism. The transmission scheme would be included in National Transmission Pool for recovering transmission charges through PoC mechanism. The charges will be recovered from the Designated Inter-State Transmission System customers and disbursed to the Petitioner as per the Revenue Sharing Agreement.
- 13. Further, vide letter dated 11 September 2023, the BPC informed SGL27 that the acquisition price for the acquisition of the Special Purpose Vehicle ("SPV") is INR 18,94,91,543. Subsequently, an amount of INR 17,32,46,933.40 (after deduction of TDS amounting to INR 1,62,44,609.60 from the acquisition price of INR 18,94,91,543/-) was paid by SGL27 to the BPC on 20 September 2023 vide transaction ID no. ICICR52023092000803948. A copy of the letter dated 11

September 2023 regarding SPV acquisition price is attached hereto and marked as ANNEXURE – 10.

- 14. It is pertinent to note that Clause 2.15.2 of the RFP provides for a timeline after issuance of the LOI, which requires execution of the Share Purchase Agreement ("SPA") and the Transmission Service Agreement ("TSA"), and acquisition of the SPV to be done within 10 days of issuance of the LOI. However, the same was extended by the BPC vide its letter dated 20 September 2023, whereby the BPC extended the timeline envisaged under the RFP, *inter alia*, for acquisition of the SPV and other activities from 4 September 2023 (10 dates from issuance of LOI dated 25 August 2023) to 27 September 2023. A copy of the letter dated 20 September 2023 issued by the BPC is annexed herewith and marked as ANNEXURE 11.
- 15. After completing all procedural requirements as specified in the bid documents, the acquisition of the SPV was done and SGL27 acquired 100% equity shareholding in the Petitioner Company on 20 September 2023 upon execution of the SPA. On the same day, the Petitioner also executed a TSA with CTUIL. Copies of the SPA dated 20 September 2023 executed between the BPC, the Petitioner and SGL27, and the TSA dated 20 September 2023 are annexed herewith and marked as ANNEXURE 12 and ANNEXURE 13 respectively.
- 16. It is humbly submitted that Section 14 of the Act provides that the Appropriate Commission may, on an application made under Section 15 of the Act, grant licence to any person to transmit electricity as a transmission licensee, in any area as may be specified in the licence. The word 'person' has been defined in Section 2(49) of the Act to include any company or body corporate or association or body of individuals, whether incorporated or not, or an artificial juridical person. Therefore, the Petitioner in accordance with the TSA and under Section 14 of the Act, is filing the present Petition, *inter-alia* seeking grant of a transmission licence for the Project explained above.

- 17. Further, it is most respectfully submitted that Section 15(1) of the Act provides that every application under Section 14 shall be made in such manner and in such form as may be specified by the Commission and shall be accompanied with such fees as may be prescribed under Transmission Licence Regulations. As per Regulation 6 of the Transmission Licence Regulations, a person selected through the process under the guidelines for competitive bidding is eligible for grant of licence. It is submitted that the Petitioner company, incorporated under the Companies Act, 2013 is a wholly owned subsidiary of SGL27 who has been selected through the TBCB process, in accordance with the TBCB Guidelines and is thus, eligible for the issuance of a transmission licence.
- 18. It is submitted that the grant of transmission license is a condition subsequent under the TSA and is also a requirement in law, without which, the Petitioner cannot proceed with the establishment of the Project.
- 19. It is submitted that this Hon'ble Commission, in the Transmission Licence Regulations, has prescribed Form-I and the fee for filing application seeking grant of a transmission licence. It is submitted the requisite fee for filing the present Petition has been paid by the Petitioner. A copy of the prescribed Form-I and the resolution passed by the Board of Directors of the Petitioner company are annexed herewith and marked as ANNEXURE - 14 (Colly).
- 20. It is submitted that Regulation 7 of the Transmission Licence Regulations provides the procedure for grant of a licence. This Hon'ble Commission, in exercise of its 'Powers to Relax' under Regulation 24 of the said regulations, has modified/amended the procedure laid down under Regulation 7 of the said Regulations, vide its suo-moto order dated 22 January 2022, in Petition No. 1/SM/2022 ("Suo-moto order"). It is, therefore, submitted that the Petitioner is making the present application in accordance with the procedure established under Regulation 7 of the Transmission Licence Regulations read with the said Suo-moto order passed by this Hon'ble Commission and the relevant provisions of the Act.

- 21. Pursuant to the above, the Petitioner, in accordance with Regulation 7(4) of the Transmission Licence Regulation, as modified by the Suo-moto order, has uploaded the complete application along with all the annexures and enclosures on the e-filing portal of this Hon'ble Commission, so that the same is served electronically to all the beneficiaries of the Project, registered on the e-filing portal.
- 22. Further, the Petitioner has served the copy of the present Petition through e-mail to all the beneficiaries not registered on the e-filing portal of this Hon'ble Commission. It is submitted that as per Regulation 7(4) read with the said Suomoto order, the copy of the complete Petition has been posted on the website of the Petitioner (<u>www.sterlitepower.com</u>), in English and in vernacular language.
- 23. It is submitted that as per Regulation 7(5) of the Transmission Licence Regulations, the Petition shall remain on the Petitioner's website till the time the licence is issued to the Petitioner or this Petition is rejected by this Hon'ble Commission.
- 24. It is further submitted that the Petitioner is submitting/furnishing a copy of the instant Petition to CTUIL, as required under Section 15(3) of the Act and Regulation 7(6) of Transmission Licence Regulations for its recommendations, simultaneously with the submission of the present Petition before this Hon'ble Commission.
- 25. It is submitted that the Petitioner shall, in future, comply with all the other requirements from time to time, as stipulated under the Act and the Transmission Licence Regulations read with the Suo-moto order passed by this Hon'ble Commission, and place a report of compliance of the same before this Hon'ble Commission.
- 26. Simultaneously, with the present Petition, the Petitioner is also filing a petition for adoption of the transmission charges with respect to the Project under Section

63 of the Act before this Hon'ble Commission separately, *inter alia*, in accordance with the provisions of Article 2.15.4 of the RFP.

- 27. In view thereof, it is humbly submitted that the Petitioner satisfies all the conditions for the grant of an inter-state transmission licence under the Act and the Transmission Licence Regulations for the establishment of the Project. Therefore, the Petitioner humbly prays that the aforementioned be take on record and its following prayers be allowed.
- 28. The Petitioner reserves its right to make any supplemental or additional filings/ submissions in furtherance to this Petition grant of transmission licence, if any and when required in view of any legal, policy or regulatory exigency. The Petitioner also undertakes to supply such further particulars/information as this Hon'ble Commission may require and direct.

PRAYER

In light of the abovementioned facts and circumstances, the Petitioner hereby humbly prays this Hon'ble Commission to:

- a) Grant transmission licence to the Petitioner;
- b) Allow sharing and recovery of the Transmission Charges for Inter-State Transmission System for establishment of "Transmission System for Evacuation of Power from REZ in Rajasthan (20 GW) under Phase III-Part F" as per the CERC (Sharing of Inter-state Transmission Charges and Losses) Regulations, 2020 and any other amendments issued thereon from time to time by the Hon'ble Commission;
- c) Condone any inadvertent errors omissions/errors/shortcomings and permit the Petitioner to add/change/modify/alter these filings and make further submissions as may be required going forward; and

- 16
- d) Pass such other order(s) as this Hon'ble Commission may deem fit and proper in the facts and circumstances of this case.



THROUGH

Gaurav Dudeja, Partner PHOENIX LEGAL Advocates for the Petitioner Phoenix House, 254, Okhla Industrial Estate, Phase III, New Delhi – 110020 Email: gaurav.dudeja@phoenixlegal.in Mob: +91 9818833778

Date: 25.09.2023 Place: New Delhi

IN THE MATTER OF:

Beawar Transmission Limited

... Petitioner

Versus

Central Transmission Utility of India Limited & Ors.

...Respondents

AFFIDAVIT VERIFYING THE PETITION

I, Balaji Sivan, S/o Shri Venkatraman Sivan, aged about 45 years, the Authorized Signatory of the Petitioner herein, having its office at DLF Cyber Park, Tower-B, 9th Floor, Udyog Vihar, Phase-III, Sector 20, Gurugram – 122008, presently in New Delhi, do solemnly affirm and state as follows:

- 1. I state that I am the Authorized Signatory of the Petitioner in the present matter and I am duly authorized and competent to swear and depose the present Affidavit on behalf of the Petitioner.
- 2. I state that I have perused the accompanying Petition and state that the facts stated therein are true and correct to the best of my knowledge and belief and based on the records of the Petitioner company and that the legal submissions made therein are based upon information received by me and believed to be true.
- 3. I state that the documents filed along with the accompanying Petition are true copies of their respective originals.

SM/S

VERIFICATION:

Solemnly affirm at New Delhi on this 25th day of September, 2023 that the contents of the above affidavit are true to my knowledge and belief and no part of it is false and nothing material has been concealed therein from.



SMIS. * 84

Annexure-1 (Colly)



भारत सरकार

Government of India विद्युत मंत्रालय

Ministry of Power केन्द्रीय विद्युत प्राधिकरण

Central Electricity Authority विद्युत प्रणाली योजना एवं मूल्यांकन–I प्रभाग

Power System Planning & Appraisal-I Division

सेवा में/To

-As per list enclosed-

विषय/Subject: Minutes of 3rd Meeting of Northern Regional Power Committee (Transmission Planning) [NRPC(TP)].

Sir/ Madam,

Please find enclosed the minutes of the 3rd meeting of Northern Regional Power Committee (Transmission Planning) [NRPC(TP)] held on 19.02.2021 through VC. The minutes are also available on CEA's website: <u>www.cea.nic.in</u> (path to access: Home Page -Wing - Power System-PSPA-I- Standing Committee on Power System Planning- Northern Region).

Yours faithfully,

Signature Not Verified Digitally signed by SHAN SHARAN Date: 2021.05.0922:26:37 IST

(ईशान शरण/ Ishan Sharan)

मुख्य अभियन्ता/ Chief Engineer



I/15489/2021

File No.CEA-PS-11-21(19)/3/2019-PSPA-I Division

1.	Chairperson, CEA,	2.	Member (Power	3.	Member Secretary,
1.	Sewa Bhawan, New	<u>∠</u> .	System), CEA, Sewa	5.	NRPC,
	Delhi-110066		Bhawan, New Delhi-		18-A Shajeed Jeet Singh
	DCIIII-110000		110066		Sansanwal Marg,
			110000		Katwaria Sarai,
					New Delhi - 110016
					(Fax-011-26865206)
4.	MD, SECI,	5.	COO (CTU)	6.	Chief GM(C&SO),
4.	Prius Platinum, D-3,	5.	POWERGRID,	0.	
	District Centre,		Saudamini, Plot no.		SJVNL, Corporate Office Complex, Shanan,
			,		Complex, Shanan, Shimla- 171006
	Saket, New Delhi -		2, Sector 20		Sillina- 171000
	17		Sector -29,		
			Gurgaon-122 001		
7.	Director (PP&D)	8.	(Fax-0124-2571809)	9.	Director (Technical)
1.		8.	Director (Technical) HVPNL	9.	Director (Technical) HPSEB Ltd.
	RVPN, 3 rd Floor, Room no 330,		Shakti Bhawan,		VidutBhawan,
	,		Shaku Bhawan, Sector-6		Shimla -171004
	Vidhyut Bhawan,		Panchkula-134109		Fax-0177-2813554
	Janpath, Jaipur-302005.		Paliciikula-154109		Fax-01/7-2813334
10.	Managing Director,	11	Chief Engineer	12	Director (W &P)
10.	HPPTCL,		(Operation)	12	UPPTCL, Shakti
	Barowalias, Khalini	•	Ministry of Power,	•	Bhawan Extn,3rd floor,
	Shimla-171002		UT Secretariat,		14, Ashok Marg,
	Fax-0177-2623415		Sector-9 D		Lucknow - 226 001
	1°ax-01//-2023413		Chandigarh -161009		(Fax:0522-2287822)
			Fax-0172-2637880		(rax.0322-2287822)
13.	Director (Projects),	14	Director (System	15	Chief Engineer (System &
15.	PTCUL, Vidhyut	14	Operation),	15	Operation Wing),
	Bhawan, Near ISBT	•	POSOCO		JKPDD, Grid Substation
	Crossing,		B-9, Qutab		Complex, Janipur,
	Saharanpur Road,		Institutional Area,		Jammu-180006
	Majra, Dehradaun-		Katwaria Sarai		Jamma-100000
	248002		New Delhi – 110010		
16.	Director (Technical),	17	Development		
10.	Punjab State		Commissioner		
	Transmission	•	(Power), JKPDD,		
	Corporation Ltd.		Jehangir Complex,		
	(PSTCL)Head		Exhibition		
	Office		Grounds, Srinagar		
	The Mall Patiala -		Grounus, Srinagai		
	147001				
L	17/001				

Minutes of the 3rd Meeting of Northern Regional Power Committee (Transmission Planning) [NRPC(TP)] held on 19.02.2021:

List of participants is enclosed at Annexure-A.

- 1.0 Confirmation of the Minutes of the 2nd meeting of Northern Regional Power Committee (Transmission Planning) [NRPC(TP)] held on 01.09.2020
- 1.1 CEA stated that the 2nd meeting of Northern Regional Power Committee (Transmission Planning) [NRPC(TP)] was held on 01.09.2020 and the minutes of the meeting had been issued vide CEA letter no. CEA-PS-11-21(19)/3/2019-PSPA-I Division dated 12.11.2020.
- 1.2 As no comments/observations were received from the constituents, the minutes of 2nd meeting of NRPC(TP) issued vide CEA letter no. CEA-PS-11-21(19)/3/2019-PSPA-I Division dated 12.11.2020 were confirmed.
- 2.0 Transmission System requirement for additional 20GW REZ in Northern Region (Phase-III)
- **2.1** CEA stated that the transmission system for additional 20 GW REZ was envisaged in Rajasthan and was discussed in the 2nd meeting of NRPC(TP) held on 01.09.2020, wherein 2 alternatives were discussed, one with HVAC system and other with Hybrid system (HVAC+HVDC). After deliberations, it was decided that all the constituents would send their comments/suggestions and accordingly the same would be incorporated in the studies and would be deliberated in the next NRPC(TP) meeting.
- **2.2** Based on the load flow studies related observations received from POSOCO, Punjab, Haryana, Rajasthan and UP, revised system studies for 20 GW RE potential were carried out and two alternatives were proposed for evacuation of power from 20GW generations in Phase-III:

Alternative1 –HVAC

Proposed transmission system includes following transmission elements:

- i) Establishment of 8x500 MVA 400/220 kV pooling station at Fatehgarh-4 along with 2x125 MVAr Bus Reactor
- ii) Establishment of 7x1500 MVA 765/400kV & 10x500 MVA 400/220 kV pooling station at Bhadla-3 along with 2x330 MVAr Bus Reactor & 2x125 MVAr Reactor
- iii) Establishment of 2x500 MVA, 400/220 kV pooling station at Ramgarh (ISTS) along with 2x125 MVAr Bus Reactor (provision to upgrade at 765kV level)
- iv) Fatehgarh-3- Fatehgarh-4 400 kV 2xD/c(Quad) line (50 km)
- v) Fatehgarh 4 Bhadla-3 400 kV D/c line(Quad) (200 km) along with 80 MVAr Switchable line reactor for each circuit at both ends of Fatehgarh 4 - Bhadla-3 400kV D/c line
- vi) Establishment of 2x1500MVA station at suitable location near Phulera along with 2x330 MVAr Bus Reactor & 2x125 MVAr bus Reactor
- vii) Ramgarh (ISTS) Bhadla-3 765kV D/c line (180 km) (Charged at 400 kV) along with 80 MVAr line reactor on both ends at each circuit
- viii) Bhadla-3 Phulera 765 kV 2xD/c line (340 km) along with 330 MVAr Switchable line reactor for each circuit at each end of Bhadla-3 Phulera 765 kV 2xD/c line
- ix) Phulera- Sikar-II 765 kV D/c(90 Km)
- x) Phulera Ajmer (PG) 400kV D/c line (Quad) (110km)
- xi) Sikar-II Khetri 765 kV D/c line (90 Km)
- xii) Sikar-II Narela 765 kV D/c line (260 Km) along with 240 MVAr Switchable line reactor for each circuit at each end of Sikar-II Narela 765 kV D/c line

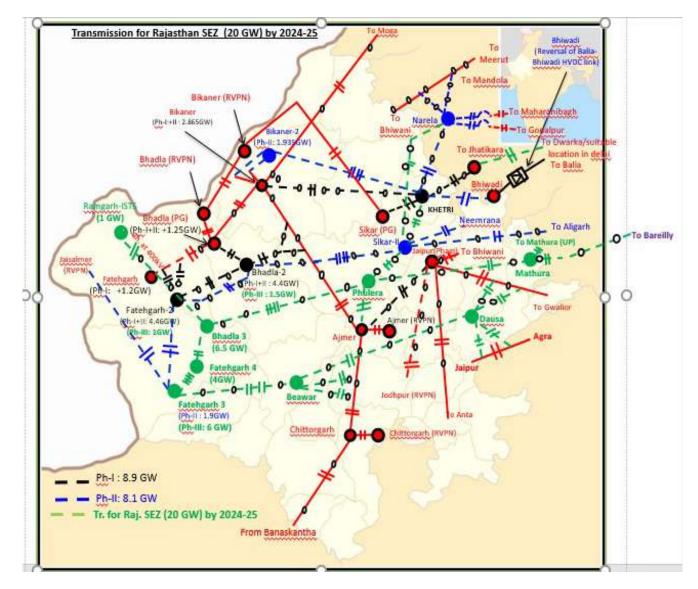
- xiii) Augmentation of 1x1500 MVA ICT (3rd), 765/400kV ICT at Jhatikara Substation (Bamnoli/Dwarka section)
- xiv) Augmentation with 400/220kV, 1x500MVA Transformer (10th) at Fatehgarh-2 PS
- xv) Augmentation with 765/400kV, 1x1500MVA Transformer (5th) at Bhadla-2 PS
- xvi) Augmentation with 765/400kV, 1x1500MVA Transformer (3rd) at Bikaner (PG)
- xvii) Jhatikara Dwarka 400kV D/c line (Quad) (20km)
- xviii) Establishment of 7x1500 MVA 765/400kV & 5x500 MVA 400/220 kV pooling station at Fatehgarh-3 (section-2-new section) (In addition to 4x500 MVA ICT proposed under Rajasthan SEZ Ph-II-of Section-1) along with 2x330 MVAr,765kV & 2x125 MVAr, 400kV Bus Reactors
- xix) Augmentation of 1x500 MVA ICT (5th), 400/220kV ICT at Fatehgarh-3 Substation (section-1)
- Establishment of 2x1500 MVA 765/400kV substation at suitable location near Mathura along with 2x330 MVAr Bus Reactor & 2x125 MVAr Reactor
- xxi) Phulera Mathura 765 kV D/c line (280 km) along with 1x240 MVAr Switchable line reactor for each circuit at each end of Phulera – Mathura 765 kV D/c line
- xxii) Mathura Mathura (UPPTCL) 400 kV D/c (quad) interconnection(10 km)
- xxiii) Mathura Bareilly 765 kV D/c line (220 km) along with 1x240 MVAr Switchable line reactor for each circuit at each end of Mathura Bareilly 765 kV D/c line
- xxiv) Establishment of 765kV switching station at suitable location near Beawar along with 2x330 MVAr 765 Bus Reactor
- xxv) Fatehgarh-3– Beawar 765 kV 2xD/c (350 km) along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line
- xxvi) LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar (45 km)
- xxvii) Establishment of 2x1500 MVA 765/400kV substation at suitable location near Dausa along with 2x330 MVAr Bus Reactor & 2x125 MVAr Reactor
- xxviii) Beawar Dausa 765 kV D/c line (240 km) along with 240 MVAr Switchable line reactor for each circuit at each end
- xxix) LILO of both circuits of Jaipur-Gwalior 765 kV D/c at Dausa along with 240 MVAr Switchable line reactor for each circuit at Dausa end of Dausa – Gwalior 765 kV D/c line
- xxx) LILO of both circuits of Agra Jaipur(south) 400kV D/c at Dausa along with 80 MVAr Switchable line reactor for each circuit at Dausa end of Dausa – Agra 400kV D/c line
- xxxi) STATCOM:
 - Fatehgarh III S/s : STATCOM : ± 600 MVAr, 4x125 MVAr MSC , 2x125 MVAr MSR
 - Bhadla–3 S/s : STATCOM : \pm 600 MVAr, 4x125 MVAr MSC , 2x125 MVAr MSR

Note:

- 1. Provision of suitable sectionalization shall be kept at Fatehgarh-3, Fatehgarh-4, Bhadla-3, Ramgarh (ISTS) pooling stations at 400kV & 220kV level to limit short circuit level
- 2. 400kV/220kV bays for termination of developer feeders are not considered under the present scope. It is assumed that bays to be implemented by applicant.
- 3. Reactive power support (both leading & lagging) from Solar Generation has been considered for 0.98 pf

- 4. Line loading limit of 765kV lines under N-1 contingency is considered as 3500MW.
- 5. UPPTCL to confirm space provision for 2 nos. of 400kV bays and 400/220kV ICT (3rd) at Mathura or Replacement of one 315MVA ICT with 500MVA

Estimated Cost: Rs 19,900 Cr



Alternative 2: -HVAC+HVDC

Proposed transmission system includes following elements:

- i) Establishment of 8x500 MVA 400/220 kV pooling station at Fatehgarh-4 along with 2x125 MVAr Bus Reactor
- ii) Establishment of 4x1500 MVA 765/400kV & 10x500 MVA 400/220 kV pooling station at Bhadla-3 along with 2x330 MVAr Bus Reactor & 2x125 MVAr Reactor
- iii) Establishment of 2x500 MVA, 400/220 kV pooling station at Ramgarh (ISTS) along with 2x125 MVAr Bus Reactor (provision to upgrade at 765kV level)
- iv) Fatehgarh-3- Fatehgarh-4 400 kV 2xD/c(Quad) line (50 km)
- v) Fatehgarh 4- Bhadla-3 400 kV D/c line(Quad) along with 80 MVAr Switchable line reactor for each circuit at both ends of Fatehgarh 4- Bhadla-3 400kV D/c line (200 km)

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- vi) Ramgarh (ISTS) Bhadla-3 765kV D/c line(180 km) (Charged at 400kV) along with 80 MVAr line reactor on both ends at each circuit
- vii) Bhadla-3 Sikar-II 765 kV D/c line (350 km) along with 330 MVAr Switchable line reactor for each circuit at each end of Bhadla-3 Sikar-II 765 kV D/c line
- viii) Sikar-II Khetri 765 kV D/c line (90 Km)
- ix) Sikar-II Narela 765 kV D/c line (260 Km) along with 240 MVAr Switchable line reactor for each circuit at each end of Sikar-II Narela 765 kV D/c line
- x) Augmentation of 1x1500 MVA ICT (3rd), 765/400kV ICT at Jhatikara Substation (Bamnoli/Dwarka section)
- xi) Augmentation with 400/220kV, 1x500MVA Transformer (10th) at Fatehgarh-2 PS
- xii) Augmentation with 765/400kV, 1x1500MVA Transformer (5th) at Bhadla-2 PS
- xiii) Augmentation with 765/400kV, 1x1500MVA Transformer (3rd) at Bikaner (PG)
- xiv) Jhatikara Dwarka 400kV D/c line (Quad) (20km)
- Establishment of 7x1500 MVA 765/400kV & 5x500 MVA 400/220 kV pooling station at Fatehgarh-3 (section-2-new section) (In addition to 4x500 MVA ICT proposed under Rajasthan SEZ Ph-II-of Section-1) along with 2x330 MVAr,765kV & 2x125 MVAr, 400kV Bus Reactors
- xvi) Augmentation of 1x500 MVA ICT (5th), 400/220kV ICT at Fatehgarh-3 Substation (section-1)
- xvii) Establishment of 765kV switching station at suitable location near Beawar along with 2x330 MVAr 765 Bus Reactor
- xviii) Fatehgarh-3– Beawar 765 kV 2xD/c (350 km) along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line
- xix) LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar (45 km)
- Establishment of 2x1500 MVA 765/400kV substation at suitable location near Dausa along with 2x330 MVAr Bus Reactor & 2x125 MVAr Reactor
- xxi) Beawar Dausa 765 kV D/c line (240 km) along with 240 MVAr Switchable line reactor for each circuit at each end
- xxii) LILO of both circuits of Jaipur-Gwalior 765 kV D/c at Dausa (40km) along with 240 MVAr Switchable line reactor for each circuit at Dausa end of Dausa – Gwalior 765 kV D/c line
- xxiii) LILO of both circuits of Agra Jaipur(south) 400kV D/c at Dausa (30km) along with 80 MVAr Switchable line reactor for each circuit at Dausa end of Dausa – Agra 400kV D/c line
- xxiv) 5000MW, ±500KV VSC HVDC terminal at Bhadla-3 substation
- xxv) 5000MW, ±500KV, Fatehpur VSC HVDC terminal station at suitable location near Fatehpur
- xxvi) Establishment of 5x1500MVA, 765/400KV ICT at pooling station at suitable location near Fatehpur along with 2x330MVAr (765kV) bus reactor
- xxvii) ±500KV HVDC line (Quad lapwing-2 loops) between Bhadla-3 & Fatehpur (950km)
- xxviii) LILO of both ckts of 765kV Varanasi Kanpur D/c at Fatehpur(30km)
- xxix) Augmentation of 1x1500MVA ICT 765/400kV at Kanpur 765kV substation

Note:

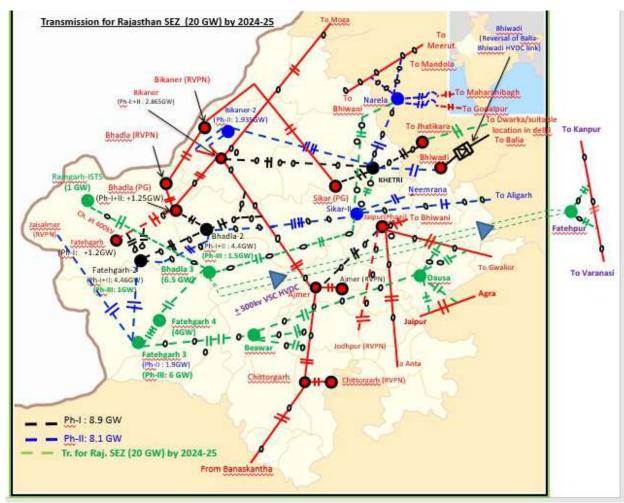
1. Provision of suitable sectionalization shall be kept at Fatehgarh-3, Fatehgarh-4, Bhadla-3, Ramgarh (ISTS) pooling stations at 400kV & 220kV level to limit short circuit level

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- 2. 400kV/220kV bays for termination of developer feeders are not considered under the present scope. It is assumed that bays to be implemented by applicant.
- 3. Reactive power support (both leading & lagging) from Solar Generation has been considered for 0.98 pf
- 4. Line loading limit of 765kV lines under N-1 contingency is considered as 3500MW.

Estimated Cost: Rs 25,900 Cr



- **2.3** The above proposed transmission system along with the load flow studies was shared with the constituents of Northern Region. Subsequently, to discuss the proposed system, a meeting was held on 22.01.2021 with the constituents in which following observations were shared by the constituents:
 - (i) RVPN indicated that out of REZ Ph-III (20 GW) Solar Potential, 3 GW solar capacity shall be planned under Intra state transmission, therefore ISTS may be planned for balance 17 GW under REZ Ph-III. RVPN also submitted anticipated locations of additional 3 GW Solar capacity vide letter dated 25.01.21. In addition, merit order dispatches for intra state (Rajasthan) conventional generators, were also shared. In the meeting, SECI indicated that Inter-state transmission system should be planned for REZ Ph-III (20 GW) only and RVPN may plan additional system for 3 GW intra-state solar.
 - (ii) SECI also indicated that evacuation for capacity of at least 2.9 GW at Ramgarh be planned under Phase III so as to match the total planned requirement of Phase-I, II &

III at Ramgarh. SECI indicated that 1.9 GW of planned capacity under Phase -II was shifted to Fatehgarh area due to technical constraints of GIB area earlier. Accordingly, evacuation for additional capacity only for 9.1 GW at Fatehgarh area be planned under Phase -III so as to match the total planned requirement of Phase-I, II & III at Fatehgarh and Ramgarh capacity may be considered as 2.9 GW. This will equalize the distribution of capacity at different areas as intimated by SECI in Feb 2020 and nullify the impact due to shifting of Ramgarh to Fatehgarh area. Further, Stage-II connectivity for a capacity of 2 GW at Ramgarh is already granted by CTU and this area is also of high RE potential for solar, wind and hybrid.

- (iii) UPPTCL commented that though all their comments have been addressed but their anticipated peak demand of 31,500 MW for 2024-25 has not been considered to which CTU clarified that since UPPTCL encounters maximum demand in evening, above may be considered commensurate to evening peak scenario, however ratio of their afternoon & evening demand may be considered based on present trends. Accordingly, NRLDC/POSOCO was requested to share demand trends of all NR states for above scenario.
- (iv) POSOCO gave the following observations:
 - (a) Demand pattern of WR may be reconsidered as load in afternoon is relatively higher than in evening. Further, Solar generation in NR is considered as 100% whereas in other region as 60% and needs to be reviewed.
 - (b) In HVAC scenario, all 04 no. 765 kV lines from Bhadla-3 and Fatehgarh-3 are terminating at one station (Phulera in case of Bhadla-3 and Beawar in case of Fatehgarh-3). These lines are evacuating more than 8000 MW from respective stations and in case of complete outage of any of the stations, 400 kV system will not be sufficient and this may cause large disturbance. Same case will be the case for Fatehgarh-3 in HVDC alternative also.
 - (c) Dynamic studies especially in cases where angular separation is crossing 20 degrees under 'N-1' contingency may be carried out to ascertain system stability in the proposed schemes.
 - (d) In peak solar dispatch case, loading of 765 kV Phulera Bhadla 2xD/C, 765 kV Fatehgarh 3 Beawar 2xD/C and 765 kV Phulera Mathura D/C is very high and angular separation between stations is crossing 20 degrees for all these lines under 'N-1' scenario.
 - (e) In the study cases, instead of individual ICTs at a particular station, the whole transformation capacity has been modelled as a single transformer thereby, making it difficult to identify 'N-1' noncompliance at some stations like 765/400 kV Jodhpur Kankani ICTs (2316 MW total), Bikaner (2051 MVA total), Narela (3400 MVA total) etc.
 - (f) High fault level (>40 kA) has been observed at several 400 kV buses of northern region. Same needs to be addressed.
 - (g)0.98 lagging power factor has been considered for various solar generators in the complex which are providing reactive power support in study cases. However, in real-time, it has been observed that there is net MVAR drawl by solar generators.
 - (h)High loadings in base case:
 - •400 kV Bhinmal Zerda is overloaded in both HVAC and HVDC solar peak cases. 400 kV Barmer- Bhinmal is also 'N-1'non-compliant.

- •400 kV Singrauli Anpara is overloaded in both HVAC and HVDC evening cases.
- •400/220 kV ICTs at several other locations such as Nakodar, Ludhiana, Sohna Road, Hindaun, Kota, Chittorgarh, Kashipur are 'N-1' non-compliant.
- (v) On the above observations of POSOCO, CTU gave following clarifications:
 - (a) Regarding POSOCO's observation that solar generation in NR has been considered as 100% whereas other region as 60%, CTU had clarified that dispatch level of solar generations considered in other regions are based on the decision taken while carrying out all-India Studies for integration of power from identified Renewable Energy Zones in 2021-22 with CEA & POSOCO in September/October, 2019. However, it was agreed that sensitivity studies would be carried out for higher solar dispatches (90-100%) in contiguous regions like WR/Gujarat for Solar peak scenario to assess the transmission system requirement. However, it is observed that this would require further ramp down of dispatched central sector thermal units upto 40-45% instead of earlier assumed value of 55% (technical minimum) as well as state sector (Intra) thermal generation to lower limits of 55-70% instead of earlier assumed value of 55-85%.
 - (b) Regarding POSOCO's observation of the modelling of whole transformation capacity as a single transformer, CTU informed that it won't make any difference in load flow studies whether the transformers are modelled as 10 transformers of 500 MVA or one transformer of 5000 MVA. If all the transformers are individually modelled, then representing them in a PSS/E SLD drawing will be cumbersome and lot of overlapping will make it difficult to draw and understand. Therefore, for ease of representation and drawing clarity, transformers have been combined and represented as a single transformer with equivalent impedance. For identifying N-1 compliance, these transformers may be replaced by individual transformers and checked, if required.
 - (c) Regarding mitigation measures for high fault level (>40 kA) at several 400 kV buses of northern region, CTU stated that in the 32nd SCPSPNR meeting, a number of series line reactors, series bus reactors and bus split arrangement at Bawana and Dadri were proposed in order to contain the short circuit level of the substations associated with NCR ring. After detailed deliberation, it was agreed that only Series line reactor (single phase unit of 75 MVAr, 12 ohms) of 400 kV Dadri-Mandola-I & II at Mandola end along with Series Bus reactor at Mandola & Ballabgarh end were agreed to be implemented under Phase-I and it was decided that rest of the proposed elements may be taken up after gaining operational experience. The above agreed series reactors have been commissioned. Further, in 44th NRPC meeting held on 19.03.2019, NRLDC indicated that commissioning of above reactors has brought down the three phase short circuit level at Dadri, Mandola & Ballabgarh by ~ 10, 20 & 14 kA respectively.

CTU further stated that subsequently, in 39th SCPSPNR meeting held on 29-30 May, 2017, issue of high short circuit level in various substations in NR was discussed. Accordingly, measures to control high short circuit level i.e. bus split arrangement, installation of series reactors and reconfiguration of feeders in seven pockets namely Delhi NCR, Meerut Area, Kanpur Area, Bhiwani Area, Singrauli Area, Lucknow Area and Agra were proposed. It was also suggested that reduction of short circuit level by reconfiguration of feeders, wherever suggested, is a least

cost and least time taking solution and may be taken up for implementation immediately. The other measures suggested such as bus sectionalisation and series reactors may be taken for implementation subsequently in a phased manner. On this, CTU stated that corrective measure taken at one substation will have a dispersed effect in reducing short circuit current in neighbouring substation. It was further informed that if reactors are being implemented in a phased manner, the short circuit level may be higher than the study results and it will reduce further only when other proposed measures are taken up for implementation subsequently. After detailed deliberations, it was agreed to implement measures to control short circuit level in two pockets namely Kanpur and Bhiwani. However, if all the proposed measures in remaining areas shall be implemented, the issue of high short circuit level may be addressed.

(d) Regarding high loading in Bhinmal-Zerda line, CTU informed that from studies, it emerged that loading of 400 kV Bhinmal-Zerda line is critically high due to injection from intra-state RE complex in western Rajasthan. It is observed that loading of Barmer-Bhinmal is mainly due to incremental intra-state RE generation in Jaisalmer, Barmer and Ramgarh area. According to information provided by RVPN, cumulative capacity of 5,600 MW of Wind and 4,700 MW of Solar generation will be connected to intra-state system mainly in Jaisalmer and Barmer district by 2024-25. The same is incorporated in study files as per RVPN data. The main evacuation path available for above intra- state RE generation is through Kankani/Jodhpur & Barmer. From the studies, it was observed that more power is rushing towards Bhinmal and causing overloading beyond Barmer/Bhinmal.

An additional case has been carried out in alterntiave-2 to observe impact of injection of power from Fatehgarh-3 to Jaisalmer-2, results of which are as under:

Fathergarh3-Jaisalmer2 400	Barmer Bhinmal 400 kV				
kV Line Loading (MW)	Line Loading (MW)				
2	2x773;				
2x850	N-1 (1123)				
NA	2x677;				
NA	N-1 (987)				
	2x830				

It was observed that even without injection from Fatehgarh-3 to Jaisalmer-2, 400 kV Barmer-Bhinmal (twin moose) line (144 km) & corridors beyond Bhinmal are critically loaded due to intra-state RE generation. For this, RVPN may need to evolve suitable strengthening in intra-state system. Additionally, 400/220 kV transformer augmentation at Chittorgarh (RVPN) is also required.

- (vi) PSTCL indicated that another scenario for minimum demand hours in Northern Region may also be carried out for above study period. Based on NRLDC/POSOCO inputs on demand patterns of NR, it was decided that morning lean hours having minimum demand with no solar generation shall be simulated to see the impact on thermal dispatches as well as voltage management issues.
- **2.4** Accordingly, based on above discussions, following redistribution of potential were carried out for further studies.

S.No	Complex	Potential (Ph-III) - 20GW (2nd NRPC-TP) (As per SECI)	Modified potential based in VC study meeting on 22.01.21 & CEA meeting on 29.01.21 (GW)	RE Pooling point	Modified Ph-III (20GW) Generation considered in studies (GW)
				Bhadla	0
1	Bhadla	8	8	Bhadla-2	1.5
				Bhadla-3	6.5
					8
	Fatehgarh	11	9.1	Fatehgarh	0
				Fatehgarh-2	1
2				Fatehgarh-3 (Section-2+ part sec-1)	6
				Fatehgarh-4	2.1
				Sub total	9.1
				Bikaner	0
3	Bikaner	0	0	Bikaner-2	0
4	Ramgarh	1	2.9	Ramgarh ISTS	2.9
		20	20		20

The studies were carried out for Rajasthan ISTS SEZ (37 GW) [Ph-1: 8.9 GW; Ph-II-8.1 GW; Ph-III: 20 GW] in Western Rajasthan. Additionally, Rajasthan Intra-State Solar addition of about 7.3 GW (total Solar capacity of about 10.4 GW) as well as 3.3 GW Inter - state Solar parks capacity was also considered in the studies.

Further redistribution of Ph-I&II (17 GW) generation considered based on St-II/LTA granted at Bhadla (PG), Bhadla-2, Fatehgarh-2, Bikaner & Bikaner-II pooling stations and any spill over generation granted on above pooling stations was adjusted from Ph-III potential.

2.5 In the meeting held on 22.01.2021, constituents had requested to carry out the load flow studies for lean period also along with afternoon and evening scenarios. Based on the above, studies were carried out again incorporating the observations of the constituents with the two alternatives in 3 scenarios i.e. afternoon, evening and morning lean hours having minimum demand. Also, as suggested by POSOCO, one more case was simulated with alternative-2 (Hybrid system EHVAC+HVDC) in the afternoon scenario with 100% solar dispatches from WR/Gujarat. Load flow studies for these seven cases were circulated by CEA vide email dated 16.02.2021 along with a note which contained proposed

transmission system along with all the assumptions that were considered while carrying out the load flow studies.

2.6 Further, in view of higher SCR ratio at various buses, VSC v/s LCC HVDC technology was reviewed for further optimisation of techno-economics (VSC Converter is 30% costlier than LCC converter). It is seen that in view of the SCR of Bhadla-3 & Fatehgarh bus of 2.8 & 3.8 respectively, LCC HVDC technology may be considered. Further, to take care of voltage stability requirements, STATCOM at various buses may be planned along with LCC HVDC.

Based on the above, revised scheme proposed under both the alternatives are as under:

Alternative-1: EHVAC Proposal

- i) Establishment of 5x500 MVA 400/220 kV pooling station at Fatehgarh-4 along with 2x125 MVAr Bus Reactor
- ii) Establishment of 5x1500 MVA 765/400kV & 10x500 MVA 400/220 kV pooling station at Bhadla-3 along with 2x330 MVAr (765kV) Bus Reactor & 2x125 MVAr (420kV) Reactor
- iii) Establishment of 3x1500 MVA 765/400kV & 2x500 MVA 400/220 kV pooling station at Ramgarh-1 along with 2x240 MVAr (765kV) Bus Reactor & 2x125 MVAr (420kV) Bus reactor
- iv) Fatehgarh-2 Bhadla-3 400kV D/c line (Quad) along with 50 MVAr Switchable line reactor for each circuit at both ends of Fatehgarh 2- Bhadla-3 400kV D/c line (200 km)
- v) Fatehgarh-4 Fatehgarh-3 400 kV 2xD/c(Quad) line (50 km)
- vi) Fatehgarh 3 Bhadla-3 400 kV D/c line(Quad) (200 km) along with 50 MVAr Switchable line reactor for each circuit at both ends of Fatehgarh 3 - Bhadla-3 400kV D/c line
- vii)Ramgarh Bhadla-3 765kV D/c line(180 km) along with 240 MVAr line reactor at each circuit at Ramgarh end of Ramgarh Bhadla-3 765kV D/c line
- viii) Establishment of 2x1500MVA station at suitable location near Phulera along with 2x330 MVAr Bus Reactor & 2x125 MVAr bus Reactor
- ix) Bhadla-3 Phulera 765 kV 2xD/c line (340 km) along with 330 MVAr Switchable line reactor for each circuit at each end of Bhadla-3 Phulera 765 kV 2xD/c line
- x) Phulera- Sikar-II 765 kV D/c (90 Km)
- xi) Phulera Ajmer (PG) 400kV D/c line (Quad) (110km)
- xii) Sikar-II Khetri 765 kV D/c line (90 Km)
- xiii) Sikar-II Narela 765 kV D/c line (260 Km) along with 240 MVAr Switchable line reactor for each circuit at each end of Sikar-II Narela 765 kV D/c line
- xiv) Augmentation of 1x1500 MVA ICT (3rd), 765/400kV ICT at Jhatikara Substation (Bamnoli/Dwarka section)
- xv) Augmentation with 400/220kV, 1x500MVA Transformer (10th) at Fatehgarh-2 PS
- xvi) Augmentation with 765/400kV, 1x1500MVA Transformer (5th) at Bhadla-2 PS
- xvii) Augmentation with 765/400kV, 1x1500MVA Transformer (3rd) at Bikaner (PG)
- xviii)Jhatikara Dwarka 400kV D/c line (Quad) (20km)
- xix) Establishment of 7x1500 MVA 765/400kV & 5x500 MVA 400/220 kV pooling station at Fatehgarh-3 (new section*) (In addition to 4x500 MVA ICT proposed under Rajasthan SEZ Ph-II-of Section-1) along with 2x330 MVAr,765kV & 2x125 MVAr, 400kV Bus Reactors

- xx) Augmentation of 1x500 MVA ICT (5th), 400/220kV ICT at Fatehgarh-3 Substation (section-1)
- xxi) Establishment of 2x1500 MVA 765/400kV substation at suitable location near Mathura along with 2x330 MVAr Bus Reactor & 2x125 MVAr Reactor
- xxii) Phulera Mathura 765 kV D/c line (280 km) along with 1x240 MVAr Switchable line reactor for each circuit at each end of Phulera Mathura 765 kV D/c line
- xxiii) Mathura Mathura (UPPTCL) 400 kV D/c (quad) interconnection (10 km)
- xxiv) Mathura Bareilly 765 kV D/c line (220 km) along with 1x240 MVAr Switchable line reactor for each circuit at each end of Mathura Bareilly 765 kV D/c line
- xxv) Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr Bus Reactor & 2x125 MVAr Reactor
- xxvi) Fatehgarh-3– Beawar 765 kV 2xD/c (350 km) along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line
- xxvii) LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar (45 km)
- xxviii) LILO of 400kV Kota –Merta line at Beawar (20 km)
- xxix) Establishment of 2x1500 MVA 765/400kV substation at suitable location near Dausa along with 2x330 MVAr Bus Reactor & 2x125 MVAr Reactor
- xxx) Beawar Dausa 765 kV D/c line (240 km) along with 240 MVAr Switchable line reactor for each circuit at each end
- xxxi) LILO of both circuits of Jaipur(Phagi)-Gwalior 765 kV D/c at Dausa along with 240 MVAr Switchable line reactor for each circuit at Dausa end of Dausa – Gwalior 765 kV D/c line
- xxxii) LILO of both circuits of Agra Jaipur(south) 400kV D/c at Dausa along with 50 MVAr Switchable line reactor for each circuit at Dausa end of Dausa Agra 400kV D/ c line

xxxiii) Augmentation with 1x1500 MVA ICT (7th) at Fatehgarh-2 PS xxxiv)STATCOM:

- Fatehgarh 3 S/s : STATCOM : ± 600 MVAr, 4x125 MVAr MSC , 2x125 MVAr MSR
- Bhadla–3 S/s : STATCOM : ± 600 MVAr, 4x125 MVAr MSC , 2x125 MVAr MSR

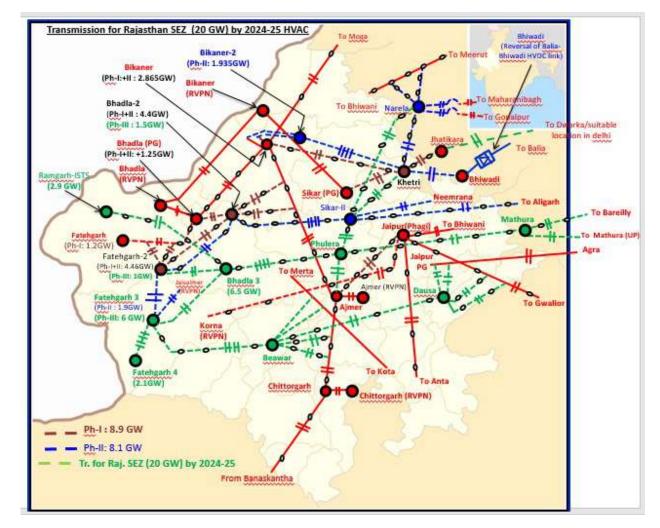
Note :

- 1. Provision of suitable sectionalization shall be kept at Fatehgarh-3, Fatehgarh-4, Bhadla-3, Ramgarh pooling stations at 400kV & 220kV level to limit short circuit level
- 2. Reactive power support (both leading & lagging) from Solar Generation has been considered for 0.98 pf
- 3. Line loading limit of 765kV lines under N-1 contingency is considered as 3500MW.
- 4. UPPTCL to confirm space provision for 2 nos. of 400kV bays and 400/220kV ICT (3rd) at Mathura or Replacement of one 315MVA ICT with 500MVA
- 5. *RVPN to confirm space provision for 2 nos. of 400kV bays and 400/220kV ICT (3rd) at Chittorgarh (RVPN)*
- 6. Fatehgarh-3 PS to be sectionalised

Estimated Cost: Rs 20,850 Cr

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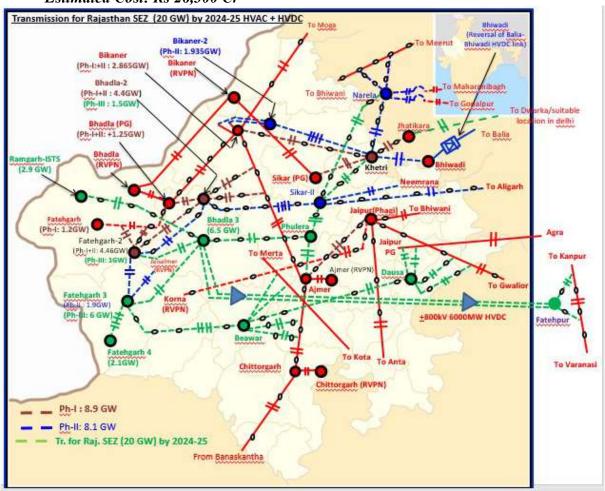
Alternative-2 : EHVAC + HVDC (LCC)

- i) Establishment of 5x500 MVA 400/220 kV pooling station at Fatehgarh-4 along with 2x125 MVAr Bus Reactor
- ii) Establishment of 2x1500 MVA 765/400kV & 10x500 MVA 400/220 kV pooling station at Bhadla-3 along with 2x330 MVAr (765kV) Bus Reactor & 2x125 MVAr (420kV) Bus Reactor
- iii) Establishment of 3x1500 MVA 765/400kV & 2x500 MVA 400/220 kV pooling station at Ramgarh along with 2x240 MVAr (765kV) Bus Reactor & 2x125 MVAr (420kV) Bus reactor
- iv) Fatehgarh-2 Bhadla-3 400kV D/c line (Quad) along with 50 MVAr Switchable line reactor for each circuit at both ends of Fatehgarh 2- Bhadla-3 400kV D/c line (200 km)
- v) Fatehgarh-4- Fatehgarh-3 400 kV 2xD/c(Quad) line (50 km)
- vi) Fatehgarh 3- Bhadla-3 400kV D/c line(Quad) along with 50 MVAr Switchable line reactor for each circuit at both ends of Fatehgarh 3- Bhadla-3 400kV D/c line (200 km)
- vii)Ramgarh Bhadla-3 765kV D/c line(180 km) along with 240 MVAr line reactor at each circuit at Ramgarh end of Ramgarh Bhadla-3 765kV D/c line
- viii) Establishment of 2x1500MVA station at suitable location near Phulera along with 2x330 MVAr (765kV) Bus Reactor & 2x125 MVAr (420 kV) bus Reactor

- ix) Bhadla-3 Phulera 765 kV D/c line (340 km) along with 330 MVAr Switchable line reactor for each circuit at each end of Bhadla-3 Phulera 765 kV D/c line
- x) Phulera- Sikar-II 765 kV D/c(90 Km)
- xi) Phulera Ajmer (PG) 400kV D/c line (Quad) (110km)
- xii) Sikar-II Khetri 765 kV D/c line (90 Km)
- xiii) Sikar-II Narela 765 kV D/c line (260 Km) along with 240 MVAr Switchable line reactor for each circuit at each end of Sikar-II Narela 765 kV D/c line
- xiv) Augmentation of 1x1500 MVA ICT (3rd), 765/400kV ICT at Jhatikara Substation (Bamnoli/Dwarka section)
- xv) Augmentation with 400/220kV, 1x500MVA Transformer (10th) at Fatehgarh-2 PS
- xvi) Augmentation with 765/400kV, 1x1500MVA Transformer (5th) at Bhadla-2 PS
- xvii) Augmentation with 765/400kV, 1x1500MVA Transformer (3rd) at Bikaner (PG)
- xviii)Jhatikara Dwarka 400kV D/c line (Quad) (20km)
- xix) Establishment of 6x1500 MVA 765/400kV & 5x500 MVA 400/220 kV pooling station at Fatehgarh-3 (new section*) (In addition to 4x500 MVA ICT proposed under Rajasthan SEZ Ph-II-of Section-1) along with 2x330 MVAr,765 kV & 2x125 MVAr, 420kV Bus Reactors
- xx) Augmentation of 1x500 MVA ICT (5th), 400/220kV ICT at Fatehgarh-3 Substation (section-1*)
- xxi) Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr Bus Reactor & 2x125 MVAr Reactor
- xxii) Fatehgarh-3– Beawar 765 kV 2xD/c (350 km) along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line
- xxiii)LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar (45 km)
- xxiv)LILO of 400kV Kota -Merta line at Beawar (20 km)
- xxv)Establishment of 2x1500 MVA 765/400kV substation at suitable location near Dausa along with 2x330 MVAr Bus Reactor & 2x125 MVAr Reactor
- xxvi)Beawar Dausa 765 kV D/c line (240 km) along with 240 MVAr Switchable line reactor for each circuit at each end
- xxvii) LILO of both circuits of Jaipur(Phagi)-Gwalior 765 kV D/c at Dausa (40km) along with 240 MVAr Switchable line reactor for each circuit at Dausa end of Dausa – Gwalior 765 kV D/c line
 - xxviii) LILO of both circuits of Agra Jaipur(south) 400kV D/c at Dausa (30km) along with 50 MVAr Switchable line reactor for each circuit at Dausa end of Dausa – Agra 400kV D/c line
 - xxix) 6000MW, ±800KV HVDC terminal at Bhadla-3 substation
 - xxx) 6000MW, ±800KV HVDC terminal station at suitable location near Fatehpur (UP)
 - xxxi) Establishment of 5x1500MVA, 765/400KV ICT at pooling station at suitable location near Fatehpur along with 2x330MVAr (765kV) bus reactor
 - xxxii) ±800KV HVDC line (Hexa lapwing) between Bhadla-3 & Fatehpur (950km)
 - xxxiii) LILO of both ckts of 765kV Varanasi Kanpur (GIS) D/c at Fatehpur(30km) xxxiv)Augmentation of 1x1500MVA ICT at 765/400kV Kanpur(GIS) substation
 - xxxv) STATCOM :
 - Fatehgarh III S/s : STATCOM : ± 600 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR
 - Ramgarh/Bhadla–3 S/s : STATCOM : ± 600 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR

Note :

- 1. Provision of suitable sectionalization shall be kept at Fatehgarh-3, Fatehgarh-4, Bhadla-3, Ramgarh pooling stations at 400kV & 220kV level to limit short circuit level
- 2. Reactive power support (both leading & lagging) from Solar Generation has been considered for 0.98 pf
- 3. Line loading limit of 765kV lines under N-1 contingency is considered as 3500MW.
- 4. *RVPN to confirm space provision for 2 nos. of 400kV bays and 400/220kV ICT (3rd) at Chittorgarh (RVPN)*
- 5. Fatehgarh-3 PS to be sectionalised



Estimated Cost: Rs 26,300 Cr

- **2.7** PSTCL stated that in the meeting held on 22.01.2021, they had requested for the load flow study of lean period of all India and lean period of Northern region considering the lean period of Punjab. Loading in Punjab in lean period is around 3,000 MW, which occurs in the night time. In the day time also, load in Punjab is around 6,000 MW which increases to approx. 8000 MW in the evening. However, in the load flow studies of lean period, load in Punjab has been considered around 14,000 GW.
- **2.8** CTU stated that load of Punjab during lean period was not intimated in the joint study meeting held on 22.01.2021as well as in the earlier comments given by PSTCL. However, as it has been intimated by PSTCL now, one more study could be carried out with the demand figures furnished by PSTCL.

2.9 Rajasthan highlighted the issue of increase in fault level in intra-state network of RVPN with the proposed system for evacuation of 20 GW RE power.

CTU stated that with the implementation of the transmission network for injection of such a big quantum of RE power in Rajasthan, fault level in RVPN will surely increase. However, fault level in RVPN network is in limit at present which is expected to go beyond limit in 2024-25 scenario for which suitable measures will have to be taken.

- **2.10** POSOCO gave the following observations:
 - (i) In order to assess the adequacy and reliability of the proposed transmission system, it is necessary that at least sixteen (16) scenarios (4 points on load curve for each season) on all- India case be simulated and studied. This point was also highlighted during planning of Ph-I & II REZ schemes in Rajasthan but same is yet to be studied while planning the regional transmission schemes. Along with this, the suggestion for carrying out stability studies and exploring the possibility of installing synchronous condensers was also given previously. These points may now be considered in Ph-III REZ transmission planning.
 - (ii) The option of installing Battery Energy Storage System (BESS) as an alternative to transmission system may also be explored. A detailed communication in this regard has already been sent to CEA/CTU on 18th Feb 2021. Considering the numerous advantages of BESS over transmission system as highlighted in the communication, Battery Energy Storage System (BESS) may act as a better alternative to the conventional transmission system in the face of uncertainties, lower gestation period and falling prices.
 - (iii) Regarding the hybrid HVDC-AC option for Ph-III, POSOCO stated that when the Phase-II proposals were being deliberated in May 2019, the HVDC terminal was considered at Modipuram in Uttar Pradesh. With the HVDC terminal at Fatehpur (UP) in the current proposal, the HVDC location has been shifted further 400-500 kilometers eastwards which might have possibly increased the cost of HVDC option. In case the storage alternative is evaluated, the STATCOMs too could be dispensed with. It was suggested that Rajasthan too could explore the feasibility of a similar arrangement for their intra- state RE transmission system.
 - (iv) POSOCO also stated that planning of transmission schemes for Ph-I & II REZ across the country was carried out keeping in view the commissioning time-frame of 2021-22. However, at present, even regulatory approval for the Ph-I & II REZ schemes in Southern region has not been received. Further, stage-II connectivity for only 0.3 GW against potential of 18.5 GW in SR has been granted till date. Any delay in the commissioning of the envisaged generation may result in change in all-India LGB as well as inter-regional flows. Further, from the discussions, it is emerging that there could be high certainty of 40 GW generation coming up in Bhadla region of Rajasthan compared to other RE projects in rest of the country. This might require further system strengthening in parts of the network so that congestion and RE curtailment is minimized. Therefore, in view of high uncertainty in the spatial and temporal distribution of RE generation, it is of utmost importance that the transmission system for the same is reviewed periodically. The inputs of SECI from time to time regarding status of RE projects will also be required for this exercise so that a reliable transmission system can be planned which would ensure minimal congestion and minimal RE curtailment.
 - (v) POSOCO further stated that as per the transmission planning criteria, "A stuck breaker condition shall not cause disruption of more than four feeders for the 220kV system and two feeders for the 400kV system and 765kV system". As large quantum

of RE generation is getting pooled at a single station in the proposed transmission schemes, it is necessary that the need for bus sectionalising arrangement be studied thoroughly and indicated in the RPC(TP) minutes. This will help in minimizing loss of generation/elements in case of any stuck breaker condition at one end and will also avoid any gap in implementation of schemes when bids are floated for TBCB.

- **2.11** Regarding POSOCO's observation to carry out load flow studies for at least sixteen (16) scenarios (4 points on load curve for each season), CTU clarified that during the previous all- India studies carried out by CEA, CTU and POSOCO, it was agreed that instead of sixteen, nine scenarios may be carried as scenario of October and February is almost similar and the same was recorded in the minutes 1st SPRC(TP) meeting. Regarding synchronous condensers, CTU stated that synchronous condenser would be very useful in providing system inertia as well as reactive compensation/voltage stability in high solar penetration scenario, however, some western Rajasthan pooling stations already have high short circuit (near to designed capacity) level, which will further increase with placement of synchronous condenser. Therefore, it is suggested to place the synchronous condenser far from the western Rajasthan solar pockets.
- **2.12** Regarding POSOCO's observation of increase in the cost of the scheme due to consideration of HVDC terminal at Fatehpur rather than Modipuram which was deliberated in May 2019 for Phase-II scheme, CTU clarified that HVAC corridors are already planned/under implementation in Rajasthan SEZ (Ph-I/II/III) towards Narela, Jhatikara and Aligarh to feed the demand of Delhi/UP, however, in solar peak/low thermal scenario, feed towards southern Uttar Pradesh will optimally utilize the 765 kV transmission system as well as meet the demand of south UP/ eastern region. Regarding the bus sectionalisation, CEA mentioned that during the preparation of detailed scope of works for National Committee on Transmission, proper bus sectionalisation has been considered for Ph-I and Ph-II scheme. The same would also be considered in Phase-III scheme.
- **2.13** RVPN suggested that in the alternative 2 i.e. hybrid HVAC and HVDC system, only one HVDC line has been considered. One more alternative may be explored with two or more HVDC lines.
- **2.14** Chief Engineer (PSPA-I), CEA, opined that in the proposed alternative 2, one HVDC line has been planned for 6 GW, which has caused an increase of around Rs 6000 crore compared to HVAC system. If more number of HVDC lines would be planned, it would increase the cost even more and would not be commercially viable.
- **2.15** RVPN further suggested that power from Bhadla-3 to Phulera is going towards Sikar-II only. Also, distance from Bhadla-3 to Phulera and Sikar-II is almost similar, therefore Phulera substation can be avoided and Sikar-II can be directly connected to Bhadla-3 and in case need arises in future, Phulera substation can be created with LILO of Bhadla-3 Sikar-II line.
- **2.16** CTU stated line length of Bhadla-3 Sikar -II line is expected to be approx. 380 km. However, as the location of Bhadla-3 is not fixed yet, therefore, the line length may increase or decrease. Therefore, it would be better to defer the implementation of Phulera substation at present and we can proceed with the proposal of Bhadla-3- Sikar II line. With the firming up of location of Bhadla-3 substation, Phulera substation can be planned, if needed.
- **2.17** RVPN and PSTCL also suggested that the option of installing Battery Energy Storage System (BESS) should be explored.
- **2.18** SECI stated that the presently the cost of battery is high, therefore, the same has not been proposed in the present 20GW generation projects, however, the same may be considered in future projects when the cost of battery would come down.

- **2.19** CEA suggested that a number of studies have been carried out for the proposed transmission system. As discussed earlier, the HVDC+HVAC transmission alternative proposed may be agreed broadly. The additional studies as requested by PSTCL, RVPN and POSOCO may be carried out and shared with the constituents. Based on the studies any augmentation required may be incorporated and accordingly, incorporated in the minutes of the meeting.
- **2.20** Accordingly, the additional system studies were carried out considering Alternative-II i.e. HVDC+HVAC, no major constraints were observed in the studies. These additional system studies were circulated to the members of NRPC(TP) vide CEA email dated 09.04.2021 and members were requested to furnish their input within one week's time. No observations were received from the members in the stipulated time.
- **2.21** Regarding the suggestion by constituents on installation of Battery Energy Storage System (BESS) for deferment of transmission system, CTU carried out an analysis on capacity of Storage requirement (MW &MWh) and the cost of transmission system deferred due to installation of BESS for Rajasthan Phase-III system for both HVAC and HVDC alternatives. The same was shared with POSOCO and CEA vide e-mail dated 10.04.2021. Similar analysis was also carried out by CEA which was shared with constituents vide email dated 09.04.2021. From the analysis, it emerged that at the present cost level of BESS, its application for transmission deferral is not economical as establishment cost of BESS is much higher than the cost savings due to deferment of transmission system.
- **2.22** Based on the above, following transmission system was agreed for evacuation of power from additional 20 GW REZ in Rajasthan (Phase-III):
 - i) Establishment of 5x500 MVA 400/220 kV pooling station at Fatehgarh-4 along with 2x125 MVAr Bus Reactor
 - Establishment of 2x1500 MVA 765/400kV & 10x500 MVA 400/220 kV pooling station at Bhadla-3 along with 2x330 MVAr (765kV) Bus Reactor & 2x125 MVAr (420kV) Bus Reactor
 - Establishment of 3x1500 MVA 765/400 kV & 2x500 MVA 400/220 kV pooling station at Ramgarh along with 2x240 MVAr (765kV) Bus Reactor & 2x125 MVAr (420kV) Bus reactor
 - Fatehgarh-2 Bhadla-3 400 kV D/c line (Quad) along with 50 MVAr Switchable line reactor for each circuit at both ends of Fatehgarh 2- Bhadla-3 400 kV D/c line (200 km)
 - v) Fatehgarh-4- Fatehgarh-3 400 kV 2xD/c twin HLTS line (50 km)
 - vi) Fatehgarh 3- Bhadla-3 400kV D/c line (Quad) along with 50 MVAr Switchable line reactor for each circuit at both ends of Fatehgarh 3- Bhadla-3 400kV D/c line (200 km)
 - vii) Ramgarh Bhadla-3 765kV D/c line (180 km) along with 240 MVAr switchable line reactor at each circuit at Ramgarh end of Ramgarh Bhadla-3 765kV D/c line
 - viii) Bhadla-3 Sikar-II 765 kV D/c line (380 km) along with 330 MVAr Switchable line reactor for each circuit at each end of Bhadla-3 Sikar-II 765 kV D/c line
 - ix) Sikar-II Khetri 765 kV D/c line (90 Km)
 - x) Sikar-II Narela 765 kV D/c line (260 Km) along with 240 MVAr Switchable line reactor for each circuit at each end of Sikar-II Narela 765 kV D/c line
 - xi) Augmentation of 1x1500 MVA ICT (3rd), 765/400kV ICT at Jhatikara Substation (Bamnoli/Dwarka section)
 - xii) Augmentation with 400/220kV, 1x500MVA Transformer (10th) at Fatehgarh-2 PS
 - xiii) Augmentation with 765/400kV, 1x1500MVA Transformer (5th) at Bhadla-2 PS
 - xiv) Augmentation with 765/400kV, 1x1500MVA Transformer (3rd) at Bikaner (PG)

- xv) Jhatikara Dwarka 400kV D/c line (Quad) (20km)
- xvi) Establishment of 6x1500 MVA 765/400kV & 5x500 MVA 400/220 kV pooling station at Fatehgarh-3 (new section*) (In addition to 4x500 MVA ICT proposed under Rajasthan SEZ Ph-II-of Section-1) along with 2x330 MVAr,765kV & 2x125 MVAr, 420kV Bus Reactors
- xvii) Augmentation of 1x500 MVA ICT (5th), 400/220kV ICT at Fatehgarh-3 Substation (section-1*)
- xviii) Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr, 765 kV Bus Reactor & 2x125 MVAr, 420 kV Bus Reactor
- xix) Fatehgarh-3– Beawar 765 kV 2xD/c (350 km) along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line
- xx) LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar (45 km)
- xxi) LILO of 400kV Kota –Merta line at Beawar (20 km)
- xxii) Establishment of 2x1500 MVA 765/400kV substation at suitable location near Dausa along with 2x330 MVAr 765 kV Bus Reactor & 2x125 MVAr, 420 kV Bus Reactor
- xxiii)Beawar Dausa 765 kV D/c line (240 km) along with 240 MVAr Switchable line reactor for each circuit at each end
- xxiv) LILO of both circuits of Jaipur (Phagi)-Gwalior 765 kV D/c at Dausa (40km) along with 240 MVAr Switchable line reactor for each circuit at Dausa end of Dausa – Gwalior 765 kV D/c line
- xxv) LILO of both circuits of Agra Jaipur(south) 400kV D/c at Dausa (30km) along with 50 MVAr Switchable line reactor for each circuit at Dausa end of Dausa – Agra 400kV D/c line
- xxvi) 6000MW, ±800KV HVDC terminal at Bhadla-3 substation
- xxvii) 6000MW, ±800KV HVDC terminal station at suitable location near Fatehpur (UP)
- xxviii) Establishment of 5x1500MVA, 765/400KV ICT at pooling station at suitable location near Fatehpur along with 2x330MVAr (765kV) bus reactor
- xxix) ±800KV HVDC line (Hexa lapwing) between Bhadla-3 & Fatehpur (950km)
- xxx) LILO of both ckts of 765kV Varanasi Kanpur (GIS) D/c at Fatehpur(30km)
- xxxi) Augmentation of 1x1500MVA ICT at 765/400kV Kanpur(GIS) substation
- xxxii) STATCOM:
 - Fatehgarh 3 S/s : STATCOM : ± 600 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR
 - Ramgarh S/s : STATCOM : ± 600 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR
- xxxiii) Provision for suitable space for future scope at various substations
- xxxiv) Provision of spare single phase 765/400kV, 500 MVA transformers and spare 765 kV single phase 80 MVAR/110 MVAR reactor at Bhadla-3, Ramgarh, Dausa, Fatehgarh-3 (new section*), Fatehpur and Beawer substation.

The above transmission system would be implemented in phases based on grant of LTA by CTU.

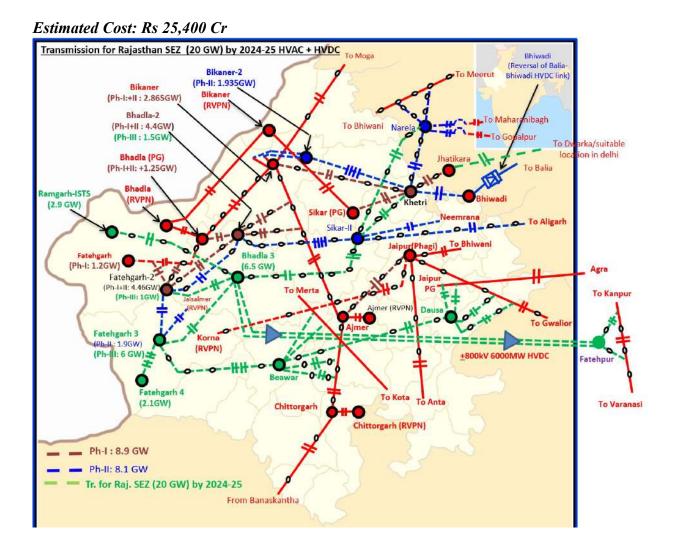
Note :

1. Provision of suitable sectionalization shall be kept at Fatehgarh-3, Fatehgarh-4, Bhadla-3, Ramgarh pooling stations at 400kV & 220kV level to limit short circuit level

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- 2. Reactive power support (both leading & lagging) from Solar Generation has been considered for 0.98 pf
- 3. Line loading limit of 765kV lines under N-1 contingency has been considered as 3500 MW.
- 4. *RVPN to confirm space provision for 2 nos. of 400 kV bays and 400/220 kV ICT (3rd) at Chittorgarh (RVPN)*
- 5. *Fatehgarh-3 PS to be sectionalised. STATCOM to be placed at new section of Fatehgarh-3 PS from where phase-III scheme emanating.



3.0 Creation of 400/220 kV, 2x315 MVA S/S at Siot (earlierAkhnoor/Rajouri) as ISTS:

3.1 Director (PSPA-I), CEA stated that proposal for creation of Akhnoor substation was deliberated in 36th meeting of Standing Committee on Power System Planning in Northern Region held on 13th July, 2015, wherein it had been decided that JKPDD/JKPTCL should plan downstream system so that 400 kV substation may be utilized properly. Subsequently, JKPDD/JKPTCL had submitted a comprehensive transmission plan for Jammu Region which inter-alia included establishment of 400/220 kV, 2x315 MVA S/s at Akhnoor/ Rajouri as ISTS works with the following downstream transmission system:

Works proposed under ISTS:

i) Establishment of 2x315MVA, 400/220kV Akhnoor/Rajouri S/s with 4nos. of 400kV line bays and 6nos. of 220kV line bays

ii) LILO of 400 kV D/c Amargarh (Kunzer)- Samba line at 400/220 kV Akhnoor/ Rajouri S/s

Works proposed under Intra-State Transmission works:

- iii) 220 kV D/c line from 400/220 kV Akhnoor/ Rajouri to 220/132 kV Akhnoor-II
- iv) 220 kV D/c line from 400/220 kV Akhnoor/ Rajouri to 220/132 kV Rajouri
- v) 220 kV D/c line from 400/220 kV Akhnoor/ Rajouri to 220/132 kV Katra-II

The above mentioned 3 substations i.e. Akhnoor-II, Rajouri and Katra-II had been agreed in 1st meeting of NRPC (TP) held on 24th January 2020.

Director (PSPA-I), CEA, further stated that proposal for creation of 400/220 kV, 2x315 MVA S/S at Akhnoor/Rajouri was further discussed in the 2nd NRPC(TP) meeting held on 01.09.2020, wherein it had been decided that revised studies would be carried out by CEA and CTU for J&K, along with the confirmation of 220 kV outlets from this substation and accordingly the proposal would be deliberated in the next NRPC(TP) meeting.

Accordingly, revised system studies were carried out by CEA in consultation with JKPDD for the time frame of 2025-26. Mainly two cases were studied considering peak load of Jammu in summer and peak load of Kashmir in winter and discussed at length with JKPDD and CTU in a meeting held on 12.01.2021, wherein, the proposal was agreed in-principle.

- 3.2 JKPTCL stated that they are in urgent requirement of this substation as they are facing shortfall of transmission capacity in the areas of Jammu, Rajouri and Punchh district. Presently, due to very long length of 220 kV transmission lines in these areas, there are issues of low voltage. This 400 kV substation will strengthen the transmission system. JKPDD further stated that 220kV interconnection to Rajouri S/s would feed the areas of Rajouri & Poonch districts presently having restricted load of around 300MVA. The Siot substation would feed the areas near Akhnoor and Jammu region and the interconnection with Katra-II would also improve reliability of supply, considering the importance of Katra being a holy town with lots of visiting pilgrims. The substation would also provide relief from the low voltage issues at Draba/Chandak. JKPDD also mentioned that the proposed substation would be located between Rajouri and Akhnoor at Siot, therefore, the substation may be named as Siot.
- 3.3 CTU opined that it would be better to have 500 MVA transformers instead of 315 MVA to which JKPTCL clarified that transportation is an issue in the hilly areas, therefore, provision of 2x315 MVA transformers has been kept. CTU suggested that provision of bus reactor of 125 MVAR may be kept.
- 3.4 Regarding timelines, JKPDD stated that timeline of the downstream system is March 2024 and implementation of 400 kV Siot substation and 6 nos of 220 kV bays for downstream system of JKPDD should be considered in the same time frame.
- 3.5 CTU enquired whether the 400 kV Siot substation would be AIS or GIS to which JKPDD suggested that adequate land is available, therefore AIS substation can be planned.
- 3.6 POSOCO stated that JKPDD needs to plan for reactive power resources in J&K area along with the transmission system. J&K grid faces low voltage issues in most of the areas and also has large payables in the reactive power account charges.
- 3.7 POSOCO further stated that in the study results, voltages in J&K have been observed to be on the lower side. Therefore, adequate reactive power compensation may also be planned along with proposed transmission system. Also, loading of 220 kV Kishenpur - Baran D/C line (410 MW) and 220 kV Salal - Jammu D/C line (350 MW) is observed to be on the

higher side and may be rechecked.

- 3.8 After deliberations, following was agreed:
 - (a) Creation of 400/220 kV, 2x315 MVA S/S at Siot (AIS) under ISTS as a system strengthening scheme with following scope of works:
 - Establishment of 2x315 MVA (or 2x500 MVA if possible), 400/220kV Siot S/ s with 1x125 MVAR, 420 kV bus reactor, 4 nos. of 400kV line bays and 6 nos. of 220kV line bays
 - (ii) LILO of both circuits of 400 kV D/c Amargarh (Kunzer)- Samba line at 400/220 kV Siot S/s

Timeline for the implementation of the above transmission works to be considered as March 2024.

- (b) Steps to mitigate the issue of low voltages in J&K would be taken up by power department of J & K.
- (c) JKPDD to complete their downstream network for drawl as per the timeline of establishment of Siot S/s i.e. Mar'24

4.0 Handing over of 400 kV D/c Khandukhal-Rampura line and 220 kV D/c Mori-Dehradun line of PTCUL under UITP scheme (deemed ISTS) to Central Sector

- **4.1** Director (PSPA-I), CEA, stated that UITP (Uttarakhand Integrated Transmission Project) scheme is under implementation by PTCUL. CERC vide its order dated 31.01.2013 had declared the scheme as a deemed ISTS scheme. The scheme comprises of transmission system for evacuation of the power from proposed HEP's in various basins of Uttarakhand. There are certain deemed Inter-State Transmission System (deemed ISTS) elements of UITP, where PTCUL had not been able to achieve the targeted timeline (deadlines). Amongst these are the 400 kV D/C Srinagar (Khandukhal) Kashipur (Rampura)Transmission line which was required to evacuate power from upcoming projects the Alaknanda basin, and the 220 kV D/C Mori-Dehradun line which was proposed to evacuate power from proposed generators in Yamuna basin. Construction of these lines had not been taken up by M/s PTCUL so far and recently M/s PTCUL vide letter dated12.1.2021 has conveyed that Board of Directors of PTCUL had accorded approval for handing over of construction of 400 kV Khandukhal-Rampura Transmission Line to CentralSector.
- **4.2** CE (PSPA-I) stated that immediate requirement of 400 kV Khandukhal-Rampura D/C Transmission Line was for evacuation of power from NTPC Tapovan Vishnugad HEP in Alaknanda basin which was scheduled to be commissioned in December 2022. However, due to an unfortunate event, this project is delayed. However, the transmission line wouldbe required in the tine frame of Vishnugad Pipalkoti HEP generation of THDC.
- **4.3** THDC intimated that the commissioning schedule of Vishnugad Pipalkoti HEP is June 2023.
- **4.4** Regarding implementation of 220 kV D/c Mori-Dehradun line, CE (PSPA-I) stated that immediate requirement of this line was for evacuation of power from Naitwar Mori hydro project (60 MW) of SJVN in Yamuna basin, expected commissioning schedule of which is March 2022. However, as the length of the line is approx. 116 km, implementation of the line in a hilly terrain in such a short time would be difficult. Therefore, SJVN has proposed

an alternative arrangement. (Alternative arrangement was deliberated and agreed in Agenda no. 5). Except Natwar Mori, no other hydro project in Yamuna basin is expected within next 2-3 years, therefore implementation of 220 kV D/c Mori-Dehradun line may be considered in future under central sector with materialization of other projects in Yamuna basin.

- **4.5** POSOCO stated that PMU should be compulsorily implemented for all generating stations. It would help in understanding the dynamics of the system and further support in tuning the generating station with change in network conditions. Further, as telemetry from PTCUL substations is very poor, along with the transmission system, the communication system requirement may also be planned by the transmission utility to avoid any issues during first time charging and subsequent grid operation.
- **4.6** After deliberations, following was agreed:
 - (i) Implementation of 400 kV D/c Khandukhal(Srinagar)-Rampura (Kashipur) line to be taken up under central sector as an ISTS scheme with the matching time frame of commissioning of Vishnugad Pipalkoti HEP of THDC i.e June 2023 or Tapovan Vishnugad HEP of NTPC whichever is earlier.
 - (ii) Implementation of 220 kV D/c Mori-Dehradun line may be considered in future under central sector with materialisation of projects other than Naitwar Mori in Yamuna basin.

5.0 Transmission Scheme for evacuation of power from hydro projects in Yamuna Basin:

5.1 Director (PSPA-I), CEA, stated that for evacuation of power from hydro projects viz Naitwar Mori(60MW), ArokotTuni (72 MW), HanolTuni (45 MW), Mori Hanol (63 MW) and JakholSakari(44 MW) in Yamuna Basin of Uttarakhand, a 220kV D/C Twin Zebra Mori - Dehradun (Vyasi) Transmission Line (116 km approx) along with Mori substation was planned under UITP scheme and the line was to be implemented by PTCUL under UITP scheme approved by CERC as deemed ISTS scheme.

Out of the above mentioned hydro projects, Naitwar Mori hydro project is in advance stage of implementation by SJVN and a tripartite LTA agreement was signed on 31.01.2020 between PTCUL, CTU & SJVN Ltd. The expected commissioning schedule of Natwar Mori HEP is in March 2022. However, the work for the construction of associated transmission system has not been started by PTCUL and PTCUL has written to CEA to take up the implementation of the 220kV Mori –Dehradun D/c line under central sector.

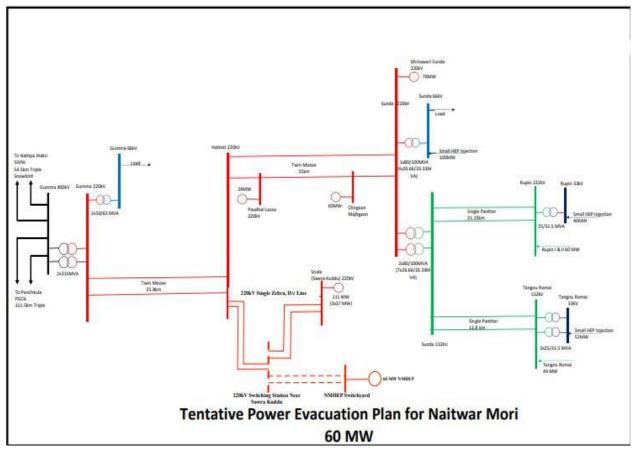
In order to discuss the evacuation system for Naitwar Mori HEP, a meeting was held on 14.01.2021 with representatives from CEA, CTU, PTCUL, SJVN and HPPTCL. In the meeting, SJVN indicated that the completion of Mori – Dehradun 220 kV D/c line would not be possible in matching time frame of Natwar Mori HEP, therefore, they came out with an alternative arrangement for evacuation of power from Natwar Mori in consultation with HPPTCL. The proposal involves construction of following transmission line under ISTS:

• LILO of one circuit of the existing 220 kV Snail – Hatkoti line of HPPTCL at Naitwar Mori switchyard (about 25 kms.).

In the meeting it was observed that with the above proposal, the switchyard of Naitwar Mori HEP must be capable of handling the additional power from Swara Kuddu HEP under n-1 condition. SJVN intimated that their switchyard has already been designed. Therefore, it was

proposed to explore the possibility to pool the power directly to Hatkoti S/s, which is connected to Gumma S/s through Twin Moose 220 kV D/c line.

5.2 Director (PSPA-I), CEA, further stated that a site visit was carried out by HPPTCL and SJVN on 18.01.2021 and 19.01.2021, in order to ascertain the availability of space at Hatkoti S/s and Snail S/s. As per the visit, it emerged that there is space constraint at Swara Kuddu HEP Switchyard/Snail and Hatkoti S/s. Therefore, it was proposed to create a new switching station near Snail by LILO of 220 kV Snail-Hatkoti line and terminate both circuits from Naitwar Mori at this Pooling (Switching) Station. A schematic of the proposal is given below:



- **5.3** Regarding length of 220kV D/c line from Naitwar Mori HEP Switchyard to pooling station near Snail, SJVN intimated that they have carried out survey for 2 routes, one is by crossing the hill which is approx. 28-30 km and other is by going along with the river which is approx. 35-40 km.
- **5.4** CTU stated that earlier proposed evacuation system with Mori Dehradun 220 kV D/C line was an ISTS system, however, new proposal involves intra- state transmission system of HPPTCL. Therefore, it was suggested that the implementation of the system may be carried out by HPPTCL.
- **5.5** HPPTCL stated that they can implement portion of the system which falls in HP. However, some portion of the system also lies in Uttarakhand.
- **5.6** CEA and CTU suggested SJVN to construct the 220kV transmission line from Naitwar Mori Switchyard to pooling station near Snail as a dedicated line which would help in reducing the implementation time rather than implementation of this line as ISTS through RTM/TBCB route, which may take more time.

- **5.7** POSOCO stated that presently, SPS is implemented in Rampur-Jhakri-Karcham-Gumma complex and same would need revision in case of any additional injection from Gumma HEP.
- **5.8** SJVNL stated that considering the short time frame left for construction of the 220kV D/c Twin Zebra Mori -Dehradun (Vyasi) transmission line (116 km approx), they requested the committee for considering the construction of the alternative system with 220 kV Naitwar Mori to Hatkoti/Snail PS line and the 220 kV Pooling Station near Snail S/S as a dedicated system of the generation project instead of considering the work through TBCB.
- **5.9** After deliberations, following was agreed for evacuation of power from Naitwar Mori hydro project (60 MW) of SJVN:
 - (i) Creation of 220kV Pooling station near Snail with LILO of both circuits of Snail –Hatkoti 220kV D/c line, 6 nos. of 220kV line bays, 50 MVAR bus reactor along with reactor bay.
 - (ii) SJVN to construct 220 kV Naitwar Mori to Hatkoti/Snail PS D/c line and the 220 kV Pooling Station near Snail S/S as a dedicated system.
 - (iii) CTU to revoke connectivity granted for Naitwar Mori hydro project (60 MW) and SJVN to apply for connectivity to HPPTCL.
 - (iv) CTU to revise the LTA granted for Naitwar Mori hydro project (60 MW)

6.0 Transmission system for evacuation of power from Neemuch Solar Park (1000MW)

6.1 Director (PSPA-I), CEA, stated that RUMS Ltd (Rewa Ultra Mega Solar Ltd.) is developing 1000 MW Neemuch Solar Park in Madhya Pradesh and the transmission system for evacuation of power from this solar park was deliberated in the 2nd meeting of WRPC(TP) held on 4.09.2020 wherein following alternatives were proposed:

Alternative-I

- 1) Establishment of 2x500MVA, 400/220kV Pooling Station at Neemuch
- 2) Neemuch PS Kota 400kV D/c line~ 70 km
- 3) 1x125 MVAR, 420 kV bus reactor at Neemuch PS

Alternative-II

- 1) Establishment of 2x500MVA, 400/220kV Pooling Station at Neemuch
- 2) Neemuch PS Chittorgarh (PG) 400kV D/c line ~130 km
- 3) Augmentation of Chittorgarh (Rajasthan) by 1x500MVA, 400/220kV ICTs
- 4) 1x125 MVAR, 420 kV bus reactor at Neemuch PS

Alternative-III

- 1) Establishment of 2x500MVA, 400/220kV Pooling Station at Neemuch
- 2) Neemuch PS Mandsaur (MP) 400kV D/c line~ 120 km
- 3) 1x125 MVAR, 420 kV bus reactor at Neemuch PS

Based on the discussions, following was agreed:

- I. Transmission system for evacuation of power from Neemuch Solar Park (1000 MW):
 - a. Establishment of 2x500MVA, 400/220kV Pooling Station at Neemuch

- b. Neemuch PS Kota 400kV D/c line~ 70 km
- c. 1x125 MVAR, 420 kV bus reactor at Neemuch PS
- d. 4 nos. 220 kV line bays for solar park interconnection
- II. With the agreed scheme, the issue of 400/220 kV ICTs at Kota becoming N-1 noncompliant in scenario of low generation at KTPS would be studied further in coordination with NR group. The scheme would also be discussed in the meeting of NRPC(TP). Any additional requirement arising out of Kota 400/220 ICT overloading, would be included in the scheme. The same would be intimated to the WRPC(TP) in the next meeting.
- III. RUMS Ltd (Rewa Ultra Mega Solar Ltd.) would apply for LTA application for its 500 MW Neemuch Solar Park (to be commissioned in July, 2022 timeframe) for which Stage-II Connectivity has already been applied. Further, RUMS would also apply for Stage-II Connectivity application for additional 250 MW (out of remaining 500 MW) for which land has already been identified nearby Singoli village.

For further deliberation on the matter, a meeting was held on 11.02.2021 with CEA, CTU, MPPTCL and RUMS wherein load flow studies were done and it was observed that Alternative –I is not feasible as with strengthening of ICT at Kota, more power will flow towards 220 kV level which will require further strengthening. Therefore, it was decided to explore possibility of connecting Neemuch PS with LILO of RAPS- Kankroli 400 kV S/c line at Neemuch PS. With this option, line loadings have been found to be under limit.

- **6.2** Regarding evacuation of 1000 MW power at Neemuch with LILO of RAPS- Kankroli 400 kV S/c line at Neemuch PS, CTU highlighted that with this option, power flows towards Shujalpur through RAPS-Shujalpur 400 kV D/c line. In case of outage of one circuit of RAPS-Shujalpur 400 kV D/c line, the other circuit becomes critically loaded.
- **6.3** On enquiry by RVPN regarding the beneficiaries of Neemuch solar park, CEA clarified that Madhya Pradesh is having the major share. RVPN suggested that since MP is major beneficiary of Neemuch solar park, the power should be taken towards Western Region instead of pushing it to Rajasthan system. They suggested alternative -III i.e evacuation through Mandasaur (MP) could be explored. CTU clarified that Mandasaur is a substation under Intra- state transmission system of MPPTCL whereas Neemuch solar park is an Inter-State Generation.
- **6.4** After deliberation, it was decided that the possibility of integration of the Neemuch Solar generation with the Western Region transmission system may be explored.

7.0 LILO of Auriya (UP) – Mehgaon 220kV line at Bhind (TBCB) 220kV substation

- 7.1 Director (PSPA-I), CEA, stated that MPPTCL is implementing 2x160 MVA,220/132kV Bhind (TBCB) substation with LILO of Auriya(UP) – Mehgaon 220kV line as an Intra state scheme. These works are being implemented by Transmission Service Provider (TSP) i.e. M/s Powergrid-Bhind Guna Transmission Ltd. (PG-BGTL) which has been selected by MPPTCL through TBCB process.
- 7.2 Director (PSPA-I), CEA, further stated that the agenda was discussed and agreed in the 2nd meeting of WRPC(TP) held on 04.09.2020 wherein following had been agreed:
 - i. LILO of Auriya (UP) Mehgaon 220kV line at Bhind (TBCB) 220kV substation to be implemented by MPPTCL.

- ii. MPPTCL agenda would also be put up for the concurrence of NRPC (TP) as Auriya (UP) Mehgaon 220kV line is between WR and NR.
- 7.3 POSOCO stated that with LILO of Auraiya (UP) Mehgaon 220 kV line at Bhind (TBCB) 220kV substation, there is possibility that 400/220 kV ICTs at Auraiya may get overloaded (400 kV to 220 kV side power flow) during high load at Bhind and low generation at Auraiya. Similarly, ICTs may get overloaded in opposite direction (220 kV to 400 kV side) in case of high generation at Auraiya and high solar injection expected in near future at Morena. This aspect may be studied and any augmentation in transformation capacity at Auraiya, if required, may be planned suitably.
- 7.4 As Auriya (UP) Mehgaon 220 kV line is an ISTS line between UP and MP, UPPTCL enquired regarding the change of metering point after the LILO. CTU clarified that even after LILO of Auriya (UP) Mehgaon 220kV line at Bhind (TBCB) 220kV substation, line will still remain as ISTS line. Therefore, normal protocol regarding metering of ISTS line will be followed.
- 7.5 After deliberations, members agreed to the proposal of LILO of Auriya (UP) Mehgaon 220kV line at Bhind (TBCB) 220kV substation.

8.0 Reconductoring of portion of Dulhasti-Kishtwar- Kishenpur 400 kV (Quad) S/c:

- 8.1 Director (PSPA-I), CEA, stated that CTU vide email dated 08.01.2021 has proposed reconductoring of portion of Dulhasti-Kishtwar- Kishenpur 400 kV (Quad) S/c line. CTU has mentioned that in the 1st NRPC (TP) meeting held on 24.01.2020, comprehensive system for connectivity was agreed for evacuation of power from Pakaldul (1000MW), Kiru (624 MW) and Kwar (540 MW) HEPs of CVPPL. It was also agreed that the above projects would be connected to a common pooling station through 400kV dedicated transmission line to be implemented by developer of these projects. Further, establishment of common pooling station at Kishtwar by LILO of one circuit of Kishenpur Dulhasti 400kV D/c (Quad) line (Single Circuit Strung) was also agreed to be implemented under ISTS to provide connectivity to above projects.
- 8.2 Director (PSPA-I), CEA, further stated that presently, power from Dulhasti HEP (390 MW) is being evacuated through 400 kV Dulhasti-Kishenpur S/c line & D/c (quad) line (one circuit strung). Ratle HEP (690 MW) was planned to be developed in the downstream of Dulhasti HEP and it was agreed that Dulhasti-Kishenpur D/c Quad (S/c strung) would be LILOed at Ratle HEP and 2ndquad circuit shall be strung from Kishenpur and terminated at Ratle matching with the commissioning of Ratle HEP. Further, it was also agreed during 35th NR Standing Committee Meeting held on 03.11.2014 that as outlet beyond Dulhasti is Dulhasti-Kishenpur 400kV line is a single circuit line, the amount of power that can be exported/imported is limited. Hence, Dulhasti is 2000 A which is further reduced to 700/800A due to reduced capacity of XLPE/OIL cable for connection of line to GIS bus at Dulhasti end.

Based on above considerations, POWERGRID implemented Dulhasti-Kishenpur 400kV S/c line (Quad) with Twin Moose conductor till Ratle LILO point. Beyond Ratle LILO point, line was implemented with Quad Moose conductor. However, LTA & Connectivity application for Ratle HEP was revoked at later stage due to non-signing of requisite agreements.

8.3 For connectivity of Pakaldul HEP (1000 MW), LILO of one circuit of Dulhasti - Kishenpur 400 kV line (quad) has been agreed at Kishtwar Pooling station. However, as location of

proposed Kishtwar S/s is above Ratle location and towards Dulhasti, portion of Dulhasti-Ratle LILO tap Point of Dulhasti (TW loc 10 indicated at Fig-1) - Kishenpur 400 kV line (TW loc 49-indicated at Fig-1) (approx. 13 kms) implemented through twin moose conductor, needs to be reconductored with Quad moose conductor. This reconductoring of approx. 13 km section (LILO tap Point of Dulhasti - Kishenpur 400 kV line) would be needed to cater to power transfer requirement from hydro projects (Pakaldul, Kiru & Kwar) including LTA of Pakaldul (1000 MW) HEP. An exhibit depicting above arrangement is at Fig-1.

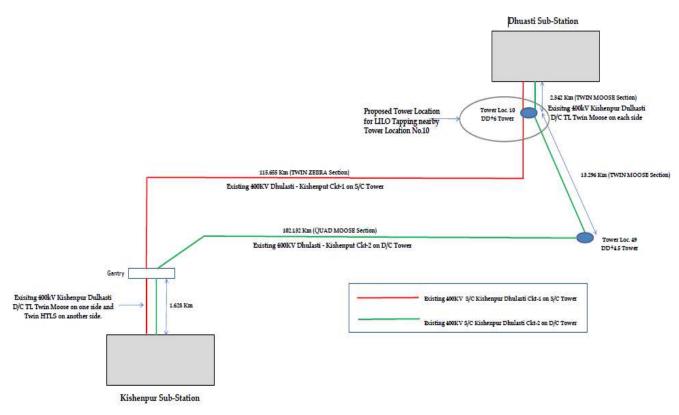


Fig-1

- 8.4 Director (PSPA-I), CEA, further stated that during 2nd meeting of NRPC (TP) held on 01.09.2020, transmission System was agreed for transfer of 1000 MW power from Pakaldul HEP to NR on target region on Long-term Access (LTA) basis. However, due to unavailability of spare bay as well as space for new diameter in 400 kV switchyard for Kishenpur substation, POWERGRID has proposed to terminate 400kV Kishtwar-Kishenpur 400kV S/c (Quad) line (second ckt) [LTA system of Pakaldul HEP] in bus reactor bay (125 MAVAR), for which bus reactor will be converted to switchable line reactor, at Kishenpur S/s.
- 8.5 After deliberations, following was agreed as system strengthening scheme:
 - Reconductoring of Dulhasti-Ratle LILO tap Point of Dulhasti Kishenpur 400 kV line (approx. 13 kms) implemented through twin moose conductor with Quad moose conductor in matching time frame of Pakaldul HEP generation.
 - (ii) Termination of 400kV Kishtwar- Kishenpur 400kV S/c (Quad) line (second ckt) [LTA system of Pakaldul HEP] in bus reactor bay (125 MAVAR) in view of unavailability of spare bay as well as space for new diameter in 400 kV switchyard for Kishenpur substation and conversion of bus reactor to switchable line reactor at Kishenpur S/s.

- 9.0 Transmission system strengthening scheme for evacuation of power from Solar Energy Zones (SEZs) in Rajasthan (8.1 GW) under Phase-II-Part G1-Modification
- 9.1 Director (PSPA-I), CEA, stated that transmission system strengthening scheme for evacuation of power from Solar Energy Zones (SEZs) in Rajasthan (8.1 GW) under Phase-II was agreed in 5th NRSCT meeting held on 13.09.19 at New Delhi. As part of above transmission scheme, 765/400kV Narela substation along with 400kV transmission system for onwards dispersal was agreed as below
 - Removal of LILO of Bawana Mandola 400kV D/c(Quad) line at Maharani Bagh/ Gopalpur S/s. Extension of above LILO section from Maharani Bagh/Gopalpur upto Narela S/s so as to form Maharani Bagh – Narela 400kV D/c(Quad) and Maharani Bagh -Gopalpur-Narela 400kV D/c(Quad) lines.

The above 400kV transmission scheme is under implementation by POWERGRID under RTM route.

- 9.2 Director (PSPA-I), CEA, further stated that POWERGRID has intimated that they carried out survey for the extension of LILO of Bawana- Mandola 400kV D/C line at Maharanibagh S/S to Narela S/S (so as to form 400kV M/c Maharanibagh Narela transmission line). Based on the survey, it was observed that due to severe space constraints especially near NH-1 crossing, even narrow base Multi circuit towers cannot be spotted. Further, due to large deviation angles at the NH-1 crossing, design and manufacturing Multi circuit monopoles for these locations is also not feasible, as emerged from the meeting held with the manufacturers. LILO of one circuit of 400kV D/C line on D/C monopole structures can be spotted through this area. For LILO of another circuit, severe space constraints exist at NH-1 crossings and the line has to be routed from far beyond of Ganaur in Haryana, thereby resulting in to line length of approx. 95-100 km. Therefore, following arrangement with rerouting shall be made with above:
 - Extension of LILO of one ckt of 400kV Bawana-Mandola at Maharanibagh to Narela (Route length: 25 kms approx.)
 - Extension of LILO of another ckt of 400kV Bawana-Mandola at Maharanibagh to Narela (Route length: 95-100 kms approx.)

It is also explored that in case of extension of LILO of only one ckt at Narela, short circuit level of Bawana increases to 54kA (base case: 46kA). The issue of high short circuit level in Delhi ring especially at Bawana & Narela was also discussed in 5thNRSCT meeting. In view of this LILO of Bawana – Mandola 400kV D/c (Quad) at Narela 765/400kV S/s, agreed earlier in 4th NRSCT meeting, was dropped. Therefore, in case LILO of one circuit of Bawana-Mandola line at Maharanibagh (via Gopalpur) is maintained, the issue of high short circuit level still remains. Therefore, non-removal of LILO is not a feasible solution.

- 9.3 POSOCO suggested that since LILO extension length is short, whether it is possible to carry out the implementation with GIL. However, possibility of this was negated by PGCIL as the area is very congested.
- 9.4 After deliberations, it was decided that a site visit may be carried out by representatives from CEA, CTU, Powergrid and DTL and accordingly the proposal may be deliberated in the next meeting of NRPC(TP).

10.0 Grant of 400kV & 220kV bays to RE generators at Fatehgarh-3 (erstwhile Ramgarh-

2) PS under ISTS

10.1 Director (PSPA-I), CEA, stated that establishment of 4x500MVA, 400/220kV Ramgarh-II Pooling Station was agreed in the 5thmeeting of NRSCT held on 13.09.2019 under "Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II –Part A". The Transmission scheme is currently under bidding through TBCB. Further, change in location of Ramgarh-II PS to Fatehgarh-3 PS was agreed in 2nd NRPC(TP) meeting held on 01.09.2020 in order to avoid GIB zone. It was also agreed that since the substation has now been now shifted to Fatehgarh area, there should be futuristic land provision for evacuation of around 8-9 GW RE power instead of 1.9 GW as planned in Ramgarh-II PS.

Subsequently, several Stage-II Connectivity applications have been received at Fatehgarh-3 (erstwhile Ramgarh-II) PS at various voltage levels i.e. 400kV & 220kV level. RE generators who have won bids under SECI Manufacturing linked tender, have also applied for RE generation capacities for up to 1000 MW at a single ISTS pooling station and sought connectivity at 400 kV level.

10.2 Applications were discussed in various NR LTA & Connectivity meetings in line with Detailed Procedure for grant of connectivity to RE Generators. Para 5.3.1 of Detailed Procedure for grant of connectivity to RE Generators stipulates:

Quote

"For the connectivity system, the dedicated transmission line including line bays at generation pooling station shall be under the scope of the applicant and the terminal bays at the ISTS sub-station shall be under the scope of transmission licensee owning the ISTS sub-station subject to compliance of relevant provision of tariff policy" Unquote

Accordingly, after deliberations in NR LTA & Connectivity meetings, it was agreed that these RE generators may be granted Stage-II Connectivity at 220kV & 400 kV level and bay at ISTS PS may be implemented under ISTS. The details are as below:

S. No.	Applicant	Applications No.	Stage-II Connectivity Sought (MW)/Date	Connectivit y Point	Agreed for grant*/Granted bays for providing Connectivity
1	Adani Green Energy Four Limited	1200002683	1500/ 30-06-2022	Fatehgarh-3	400kV-1 no. 220kV-2*nos. (*1 no. of 220kV bay is part of 7 nos. of 220kV bays, currently under bidding at Fatehgarh-3 PS)
2	IB VOGT SOLAR SEVEN PRIVATE LIMITED	1200002700	300/ 05-04-2022	Fatehgarh-3	220kV-1 no.
3	ABC Renewable Energy Private Limited	1200002699	400/ 31-01-2022	Fatehgarh-3	220kV-1 no.

S. No.	Applicant	Applications No.	Stage-II Connectivity Sought (MW)/Date	Connectivit y Point	Agreed for grant*/Granted bays for providing Connectivity
4	ReNew Surya Jyoti Private Limited	1200002746	210/ 31-03-2022	Fatehgarh-3	220kV-1 no. (This bay shall also be utilized for providing connectivity to ReNew Surya Pratap Private Limited Application No. 1200002778 - 210MW))
5	Azure Power India Pvt. Ltd.	1200002812	500/ 19-01-2024	Fatehgarh-3	400kV-1 no. (This bay shall also be utilized for providing connectivity to another Azure Power India Pvt. Ltd. (Application No 1200002813- 500MW))
6	Azure Power India Pvt. Ltd.	1200002814	500/ 19-01-2025	Fatehgarh-3	400kV-1 no. (This bay shall also be utilized for providing connectivity to another Azure Power India Pvt. Ltd. (Application No 1200002815- 500MW))
7	XL Xergi Power Pvt. Ltd.	1200002847	400/ 31-05-2022	Fatehgarh-3	220kV-1 no.
8	Energizent Power Pvt Ltd	1200002907	125/31-08-22	Fatehgarh-3	220kV-1 no*.

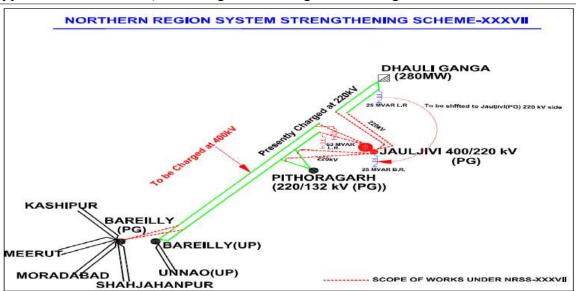
- 10.3 Director (PSPA-I) further stated that at Fatehgarh –III PS implementation 7 nos. of 220kV bays are currently under bidding (Phase-II-Part A scheme) and all the above bays have already been allocated to RE generators. Space provision for future 15 nos. of 220kV bays and 10 nos. of 400kV bays has also been kept at Fatehgarh-3 (erstwhile Ramgarh-II). Accordingly, in view of the above and also as given in detailed procedure for grant of connectivity to RE generators, it is proposed that above 6 nos. of 220kV bays and 3 nos. of 400kV bays at Fatehgarh-3 PS may be implemented under ISTS matching with RE generators.
- 10.4 CTU stated that based on the applications, Stage-II connectivity for 7705 MW has been granted at Fatehgarh-3 substation. As desired by the applicants (Sl no. 1 to 8) and as per regulations, the above proposed bays are needed to be constructed under ISTS. This section will be new section, therefore there would be requirement of bus extension of existing 220 kV bus as well as bus sectionaliser arrangement between both the levels i.e 400 kV new section and 220 kV new section.
- 10.5 After deliberations, above proposal of 6 nos. of 220kV bays and 3 nos. of 400kV bays along with bus extension of 220 kV & 400kV bus as well as bus sectionaliser arrangement between both the levels i.e 400 kV new section and 220 kV new section with under implementation section at Fatehgarh-3 PS to be implemented under ISTS was agreed by members.

11.0 Underground Cabling works (220kV) in 220 kV Pithoragarh-Jauljivi D/c line

11.1 Director (PSPA-1), CEA stated that in the 35th& 36th Standing Committee meeting of Northern region constituents held on 03/11/14 & 13/07/15, transmission system with scope for establishment of 400/220kV, 2x315MVA GIS Substation in Jauljiviby LILO of both circuit of 400 kV Dhauliganga - Bareilly (PGCIL) line charged at 220 kV at Jauljivi (ISTS) was agreed under Ph-II scheme.

The broad scope of work (Ph-II) included following elements:

- 1. Establishment of 400/220kV,2x315 MVA GIS Substation at Jauljivi
- 2. 765/400kV Bareilly (PGCIL) Substation Extension
- 3. Diversion of 400kV D/c Dhauliganga-Bareilly line (operated at 220kV) at Bareilly end from Bareilly (UP) to Bareilly (PGCIL)
- 4. Disconnection of 220kV LILO arrangement of Dhauliganga-Bareilly at Pithoragarh and connecting Pithoragarh to Jauljivi 400/220kV Substation at 220kV level
- 5. LILO of both ckt. of 400kV Dhauliganga-Bareilly (PG) at Jauljivi S/s
- 6. Charging of Jauljivi–Bareilly D/c line at 400kV level
- 11.2 Director (PSPA-I), CEA, further stated that project is being implemented by POWERGRID which is likely to be completed by March, 2021. However, reg. element (4) above (Disconnection of 220kV LILO arrangement of Dhauliganga-Bareilly at Pithoragarh and connecting it to Jauljivi 400/220kV Substation at 220kV level i.e. 220 kV D/C Pithoragarh-Jauljivi line), major portion of the line is complete except at 5 locations which are held up due to non-availability of civil aviation clearance wherein a section of line (between AP05 & AP06) is to be connected by 220kV UG Cable. AAI agreed to issue NOC for restricted locations (5) only with the condition that the conductor in span between AP 5/0 and AP6/0 is to be replaced with underground cable (MOM of meeting dated 17/12/2020/ NOC is awaited). Accordingly, as per revised detailed survey, the route having span length of 1200 mtr. approx. between Loc. No. AP-5 (Tower Type: 220kV D/C DD+9) & AP-6 (Tower Type: 400kV D/C DD+9) is envisaged for underground cabling.



In view of above, laying of underground cable is proposed between Loc. No. AP 5/0 to AP 6/0. The estimated cost for supply and installation work of 220kV cable would be about Rs. 20 Cr. including GST.

- 11.3 CE (PSPA-I), CEA, enquired whether there may be any protection issue due to laying of cable to which PGCIL clarified that since the cable length is very short i.e. 1.2 km, any protection issue arising due to cable would be taken care at substation end.
- 11.4 PGCIL submitted that Jauljivi substation and LILO portion of 400 kV D/c Dhauliganga-Bareilly line (operated at 220kV) are ready for commissioning whereas above proposed cable laying work of 220 kV D/c Pithoragarh-Jauljivi line may take approx. 6 months. Therefore, to keep the equipment at Jauljivi substation in healthy condition, PGCIL requested for charging of Jauljivi substation with LILO of one circuit of 400 kV D/c Dhauliganga-Bareilly line (operated at 220kV) at Jauljivi substation and charging of Jauljivi- Bareilly S/c line formed after LILO at 400 kV.
- 11.5 CEA stated that the system may be charged as suggested by PGCIL, however, the utilization of Jauljivi S/s will be there only after the proposed cabling works get completed. Therefore, the CoD of the Jauljivi S/s along with associated works may be considered after completion of the complete scope of works.
- 11.6 After deliberations, following was agreed:
 - (i) Approx. 1.2 km span length of 220 kV Pithoragarh-Jauljivi D/c line between Loc. No. AP-5 (Tower Type: 220kV D/C DD+9) & AP-6 (Tower Type: 400kV D/C DD+9) to be implemented with laying of underground cable.
 - (ii) LILO of one circuit of 400 kV D/c Dhauliganga-Bareilly line (operated at 220kV) at Jauljivi substation and charging of Jauljivi- Bareilly S/c line formed after LILO at 400 kV would be an interim measure till establishment of direct connection between Pithoragarh and Jauljivi Substation at 220kV level.

12.0 Proposal for line reactive compensation on 400kV transmission lines (ISTS)-Agenda Point by CTU:

- 12.1 Director (PSPA-I), CEA, stated that CTU vide mail dated 02.02.2021 has informed that due to prevailing high voltage in NR grid, it is observed that some of the 400kV ISTS lines having more than 200km line length are without any line compensation and therefore experiencing difficulty in line charging. 400kV D/c (Twin moose) line of 200-240km line length typically have a line rise (Ferranti rise) of 10-14 kV (without reactors) at open end during line charging. In addition, source rise will be additional in total rise. In above scenario, during line charging of transmission lines of 200-240 km length, voltage may breach permissible steady stage voltage limit of 420kV due to consistently higher voltage (>410kV). Further, due to such high voltage during charging event, issues are also observed on line equipment.
- 12.2 Director (PSPA-I) further stated that POWERGRID has analysed ISTS lines of more than 200 km line length and without any line reactive compensation in Northern region. As informed by POWERGRID, space was not available for placement of line reactive compensation in substations for some of the lines. Based on information on availability of space in substation for placement of line reactive compensation, analysis has been carried out for following lines:
 - 400kV Mainpuri- Ballabgarh D/c line (236 km)
 - 400kV Kanpur- Allahabad S/c line (225 km)
 - 400kV Agra- Bhiwadi ckt -2 (209 km)

Powergrid had analysed the past one year data of voltage profiles of terminal substations of above ISTS lines and based on their detailed analysis and keeping in the view the availability of space at the substation, Powergrid proposed the following:

- (i) Installation of 50 MVAR switchable line reactor at Mainpuri end and fixed 50 MVAR line reactor at Ballabgarh end on 400kV Mainpuri- Ballabgarh D/c line.
- (ii) Installation of 50 MVAR switchable line reactor at Allahabad end on400kV Kanpur- Allahabad line.
- (iii) Installation of 50 MVAR line reactor at Bhiwadi end for uncompensated circuit of 400kV Agra- Bhiwadi D/c line.
- 12.3 POSOCO stated that although providing line reactive compensation is grid requirement, it is also necessary that adequate reactive compensation is also provided at the sub-station level. This would help to manage the voltages within IEGC limits and will minimize high voltages at the open end during switching of lines.
- 12.4 POSOCO further stated that it is being seen that transmission utilities are ready to charge the lines without line reactor, if the reactor is under planned or forced outage. Such operation leads to the impression that the requirement of line reactor has not been studied properly. Therefore, it is essential that whenever line reactor is planned, it may also be clearly specified by CTU whether the line can be safely charged without line reactor or not.
- 12.5 After deliberations, it was agreed that POSOCO would conduct a comprehensive study on the issue of high voltage at the various sub-stations and assess requirement of reactive compensation to address the same. POSOCO agreed for the same.

13.0 Downstream system of ISTS s/S reg. Planning, Implementation and Charges thereof:

- 13.1 Director (Planning & Commercial), UPPTCL, stated that as agreed in 23rdmeeting of SCPSPNR, held on 16-02-2008, numbers of 220 kV line bays associated with 400/220 kV transformers were being finalised on normative basis (3 nos. line bays for each 315 MVA T/F and 4 no. line bays for each 500 MVA T/F) and the same would be considered as a part of Regional Pooled system, for transmission tariff purposes. Accordingly, a number of substations under NRSS schemes have been planned in U.P., Punjab, Himanchal Pradesh, Haryana and Rajasthan in which 220 kV line bays were planned on normative basis and were to be considered as part of regional pooled system.
- 13.2 Director (Planning & Commercial), UPPTCL, cited example of NRSS XIX scheme wherein Bagpat 400 kV PGCIL substation was planned with anticipated commissioning by Feb, 2012. UPPTCL had planned its downstream system considering above anticipated commissioning date, which were required to relieve its system loading/ constraints in Intra-State Transmission system around Bagpat, Muradnagar, Shamli areas, etc. However, subsequently POWERGRID Bagpat system got delayed due to various RoW issues and could not be completed till 2015. In view, UPPTCL had to plan alternative transmission scheme to relieve its Intra-State system loading by way of establishment of a new substation, Muradnagar-II in 2014.
- 13.3 He further stated that from 35th standing committee meeting (held in Nov, 2014) onwards, the matter regarding identification of specific downstream lines for various ISTS substation were discussed (36thSCM held on 13.07.15, 37thSCM held on 20.01.2016 & 38thSCM held on 30.05.2016).

In view of the above, UPPTCL had to plan additional transmission system to be connected with bays at PGCIL substation & intimated the same in 38thSCM on dated 30.05.2016. Further, keeping in view 2 years execution time for 220 kV downstream system, as agreed by members in 30thSCM on dated 19.12.2011, UPPTCL transmission system was supposed to be commissioned by May, 2018.

However, based on POWERGRID's tariff application, CERC approved deemed commissioning of the unconnected Bays under Regulation 4(3)(ii) of Tariff Regulations, 2014 and directed that charges, for unutilized bays shall be paid by UPPTCL on bilateral basis till actual commissioning of associated downstream line.

Similar tariff orders were released by CERC in respect of other Powergrid substations, namely Saharanpur, Sohawal and Shahjahanpur, wherein 220 kV line bays were initially planned, on normative basis.

- 13.4 UPPTCL submitted that while CERC had taken note of the delays which happened due to RoW issues in the area at the time of finalizing tariff of POWERGRID transmission scheme, no consideration was given to the fact that UPPTCL's planned additional transmission system is also being laid in the same area & had to face similar RoW issues and hence could not be completed as indicated at the time of planning, in 2016.
- 13.5 Under the above circumstances and as the similar issues are being faced by the others Northern Region constituents, UPPTCL proposed that NRPC(TP) may recommend to CTU as well as CERC that charges for the line bays which were originally planned "under normative system" should be considered as part of POC mechanism, along with charges of ICTs and should not be loaded separately to the state transmission utility on bilateral basis.
- 13.6 Director (Planning & Commercial), UPPTCL further stated that this is also in line with the MoP, GoI's recent order No. 23/12/2016-R&R dated 15.01.2021 wherein it is stated that ISTS charges should be included for determination of transmission charges of DIC in accordance with Regulation 5 to 8 of Sharing Regulations, independent of readiness of associated generation or upstream or downstream transmission elements.
- 13.7 The members of NRPC(TP) took note of deliberations and advised UPPTCL to approach CERC.
- 14.0 Transmission works to be implemented in Jammu and Kashmir Region under Intra State transmission system:
- **14.1** CEA stated that JKPDD had submitted DPR for Jammu transmission works in Jammu region, which were agreed in the 1st meeting of NRPC(TP) held on 24.01.2020. Subsequently, some additional transmission works were also submitted by JKPDD. Also, JKPDD has submitted DPR for transmission works in Kashmir region in January, 2020, for the transmission works with 2639 MVA of new substations and 739 ckms of new transmission lines.System studies were carried out for both regions for the time frame of 2025-26. Two cases were studied considering peak load of Jammu in summer and peak load of Kashmir in winter. Based on the system studies and discussions carried out with JKPDD, the transmission system requirement for both Jammu and Kashmir region were worked out and the same are listed at **Annexure-B**.
- **14.2** Further, following intra-state works proposed by JKPDD requires interconnection with the ISTS elements:

1	LILO of	220kV	Wagoora -	Kishanganga - Wagoora 220kV D/C line is an
	Kishenganga (Beerwah)	line	at Khansahib	ISTS line

2	LILO of one ckt of Alusteng- Leh 220kV S/c line on D/c towers at Gangangeer (Sonamarg) (5km)	Alusteng- Leh 220kV S/c line is an ISTS line
3	220kV D/C line from 400/220kV Kunzar - 220/33kV Sheeri (40km)	Amargarh (Kunzer) is an ISTS S/s. Out of 6 nos. of 220kV bays, 4 bays have been utilized for LILO of Delina –Zainkote line at Amargarh (Kunzer), 2 nos. of bays are proposed to be utilized through Kunzar –Sheeri 220kV D/c line.
4	220kV New Wanpoh - Mattan D/C line (15km)	Out of 6 nos. of existing bays,4 nos. of 220kV bays are utilized at New Wanpoh with New Wanpoh –Alusteng220kV D/c line and New Wanpoh- Mirbazar 220kV D/c line, which are presently under construction. 2 nos. of 220kV bays can be utilized for proposed connectivity
5	LILO of 220kV D/C Delina - Kishanganga Line (PGCIL) at Wahipora (35km)	220kV D/C Delina - Kishanganga Line (PGCIL) is

- 14.3 The above proposal was discussed with CTU and JKPDD in a meeting held on 12.01.2021 with CTU and JKPDD. In the meeting it was highlighted that the system studies were carried out by CEA for the Winter Peak (2025-26) scenario considering anticipated load for UT of J&K as 4802 MW (Jammu Region 2008 MW & Kashmir Region 2794 MW). Some major observations from the system studies results are:
 - 2x315MVA, 400/220kV ICTs at New Wanpoh gets critically loaded
 - 2x315MVA, 400/220kV ICTs at Amargarh (Kunzar)n-1 non complaint
- **14.4** For New Wanpoh S/s, CTU informed that there is space constraint for 3rd ICT and the augmentation of existing ICTs may be possible; however, there may be issues of utilization and capitalization of existing ICTs.
- 14.5 CEA stated that at present, the transformation capacities are not properly utilized at both New Wanpoh and Amargarh S/s, therefore, the decisions regarding replacement of 400/200kV ICTs at New Wanpoh and addition of new 400/220kV ICT at Amargarh may be taken up in future with increased loading of existing transformers.
- **14.6** POSOCO stated that as per the studies, the additional 3rd transformer at Amargarh may be considered with the increased load in J &K. JKPTCL however indicated they won't need any additional 220kV line bays for drawl along with above transformer.
- 14.7 The issue of creation of 220kV S/s at Gagangeer/Nilgrar for about 40-50 MW of load was also raised in the meeting and JKPTCL informed that there is load requirement of around 35MVA at Gagangeer by NHAI as operational requirements of two numbers of tunnels in that area and around 10-15 MVA requirement for some sparsely populated area in the region. JKPDD added that there is no 132kV S/s for around 30kms from Gagangeer and the 220kV Leh Srinagar line is the nearest. On suggestion of CTU to explore possibility of inter-connection through 66kV from Drass substation, JKPDD informed that implementation of 66kV line from Drass is not feasible considering that the line has to pass through Zojila pass and also it would not be possible to get forest clearance for the transmission line in that area. JKPDD emphasized that this substation is also important considering the Amarnath yatra route through this area.
- **14.8** After further deliberations, the following was agreed:

- (a) Transmission elements to be implemented by JKPDD as Intra-State transmission works attached as **Annexure-B** along with following transmission elements as Intra-State transmission works which require interconnection with the ISTS elements were agreed:
 - (i) LILO of 220kV Wagoora Kishenganga line at Khansahib (Beerwah)
 - (ii) LILO of one ckt of Alusteng- Leh 220kV S/c line on D/c towers at Gangangeer (Sonamarg)
 - (iii) 220kV D/C line from 400/220kV Kunzar 220/33kV Sheeri
 - (iv) 220kV New Wanpoh Mattan D/C line
 - (v) LILO of 220kV D/c Delina Kishanganga Line (PGCIL) at Wahipora
- (b) Addition of new 1x315 MVA(or 1x500 MVA if possible), 400/220kV ICT at Amargarh to be taken up under ISTS with the time frame of March 2026.
- (c) Replacement of 400/200kV ICTs at New Wanpoh would be considered in future with increased loading of existing transformers.
- (d) JKPTCL to study and suggest the requirement for creation of new 400kV S/s in Kashmir so as to reduce the loadings on New Wanpoh S/s.

15.0 Power evacuation scheme of 66 MW Dhaulasidh HEP of SJVN Limited in Himachal Pradesh

- 15.1 Director (PSPA-I), CEA, stated that CTU had granted Connectivity & LTA for evacuation of power from 66 MW Dhaulasidh HEP of SJVN through 220 kV D/c line from Dhaulasidh HEP to Hamirpur (PG). Two no. of 220 kV bays at Hamirpur S/s were also in the scope of SJVN. Earlier, SJVN vide their letter dated 09.07.2020has proposed to LILO 220kV Dehan-Hamirpur (under-construction) line of HPPTCL at Dhaulasidh instead of availing direct connectivity to Hamirpur. The same proposal was discussed in a meeting held on 28.07.2020 through VC, wherein, it was agreed that SJVN would analyze the overall cost of the line for both the arrangements considering the enhancement of the capacity of switchyard equipment, change in the line length with the conductor configuration and the transmission charges and would share the details with CEA and CTU for final deliberations.
- 15.2 Director (PSPA-I), CEA, stated that SJVN vide their mail dated 27.11.2020 and 02.12.2020 has proposed another alternative in consultation with HPPTCL, which involves construction of a 220 kV switching station at Sujanpur with the LILO of Dehan-Hamirpur line by HPPTCL and SJVN would construct 220 kV D/c line with single zebra conductor from Dhaulasidh HEP to planned switching station at Sujanpur for evacuation of power from Dhaulasidh HEP. The 2 no. of bays at Sujanpur S/s for terminating this line would also be under the scope of SJVN. The same was discussed in the meeting held on 09.12.2020, wherein, SJVN stated that constructing a direct 30 km line from Dhaulasidh to Hamirpur (PG) with single zebra conductor would involve more RoW constraints in the area. Therefore, SJVN approached HPPTCL, wherein it was emerged that a Pooling station could be constructed which would be helpful in power evacuation of Dhaulasidh HEP as well as for upcoming HEPs like Thana Plaun and Triveni Mahadev. SJVN further stated that with the construction of Sujanpur S/s, the transmission charges per unit would be more or less same or even lesser in the new proposal and further, looking into RoW constraints, the proposal of Sujanpur S/s would be more economical.

SJVN intimated that the commissioning schedule of Dhaulasidh HEP is March 2025 and requested HPPTCL to keep the time schedule of Sujanpur S/s matching with Dhaulasidh HEP.

After deliberations, following was agreed:

- (i) HPPTCL to construct a 220 kV switching station at Sujanpur with LILO of Dehan-Hamirpur 220 kV D/c line of HPPTCL.
- (ii) For evacuation of power from Dhaulasidh HEP, SJVN to construct a 220 kV D/c line from Dhaulasidh to Sujanpur with single zebra configuration along with two number of 220kV bays at Sujanpur.
- (iii) SJVN to approach HPPTCL for grant of connectivity and accordingly CTU to revoke the connectivity granted to Dhaulasidh HEP at Hamirpur.
- (iv) CTU to revise the LTA granted to SJVN for Dhaulasidh HEP.
- 16.0 220/400 kV, 2x315 MVA PS at Gumma (HPPTCL) along with 400 kV D/C LILO of Nathpa Jhakri-Abdullapur at Gumma (HPPTCL):
- 16.1 HPPTCL stated that in the Connectivity/Long Term Access Meeting held on 29.12.2010 along with 29th meeting of SCPSPNR, connectivity and LTA for 111 MW generation from Sawara Kuddu HEP was agreed through establishment of 220/400kV, 2x315 MVA pooling station along with LILO of one circuit of Nathpa Jhakri- Abdullapur 400 kV D/c line to be implemented by HPPTCL. Since the Standing Committee on Transmission System Planning of Northern Region meeting and meeting for the Connectivity/Long Term Access were held together on 29.12.2010, therefore the above arrangement was not included in the minutes of the 29thSCPSPNR meeting. However, the same was covered in the MoM of the Connectivity/Long Term Access meeting. Further, PGCIL vide their letter dated 03.05.2011 intimated to HPPTCL for LILO of both circuits of Nathpa Jhakri-Abdullapur (Now Nathpa-Jhakri-Panchkula) D/c line at Gumma (Pragatinagar) to ensure balanced loading and accordingly HPPTCL had amended scope.
- 16.2 HPPTCL further stated that they have constructed the 220/400kV, 2x315 MVA Gumma (Pragatinagar) pooling station along with 400 kV D/C LILO of Nathpa Jhakri-Abdullapur (Now Nathpa-Jhakri-Panchkula) and has submitted initial charging documents for approval to NRLDC, for which NRLDC has asked for approval of Standing Committee. In this context, a meeting was held through VC on 05.10.2020, wherein POSOCO had raised certain queries regarding action plan of HPPTCL, total generation to be evacuated through Gumma S/s, SPS, metering arrangement and agreement for sale of power of Sawra Kuddu HEP. Subsequently, HPPTCL vide letter dated 06.10.2020 submitted compliances on the queries raised by POSOCO. The same was discussed in a meeting held on 09.10.2020, wherein, following was agreed:
 - (i) CTU to perform the system study for evacuation of power as per LTA. Further, to study the power flow considering LILO of one ckt. of 400kV Jhakri – Panchkula transmission line and intimate restrictions, if any, in power evacuation without the LILO of 2nd ckt.
 - (ii) HPPTCL to intimate/submit details regarding the Protection settings at NJPS, Panchkula and Gumma substations and to update the same in the Protection Committee meeting in NRLDC.
 - (iii) HPPTCL to approach NRPC for review/modification in the SPS arrangement in Jhakri Complex.

- (iv) POSOCO to give charging permission for LILO of one circuit of 400kV Jhakri Panchkula transmission line at Gumma S/s after implementation of revised SPS by HPPTCL.
- 16.3 HPPTCL informed that after attending to the above points, NRLDC accorded the permission for charging the LILO of one circuit and the 400/220 kV Transformer ICT-I on 31.10.2020 & 01.11.2020 respectively and vide their email dated 05.11.2020 requested CEA to get the system ratified in the forthcoming Standing Committee.
- 16.4 Members agreed and noted the same.
- 16.5 CTU and POSOCO suggested HPPTCL to examine space for installation of a 125 MVAR bus reactor at Gumma substation as issue of high voltage has been observed at Gumma specially during winter night when generations at Nathpa-Jhakri and Rampur is down. HPPTCL agreed for the same and to revert with the details.
- 17.0 Construction of 220/400kV, 2x315 MVA PS at Lahal & 400 kV D/C (Twin Moose) line from 400/220 kV, 2 x 315 MVA, Lahal Sub-Station to 400/220 kV Chamera P.S. of PGCIL
- **17.1** HPPTCL stated that in the 27th meeting of SCPSPNR held on 30th May 2009, following was approved for evacuation of power from Hydro Electric Projects in Ravi Basin:

"HP would establish a 400/220 kV Sub-Station at Lahal in the time frame of Kutehar HEP which would be connected to Chamera Pooling Station by a 400 kV D/C line. Initially this line would be charged at 220 kV level and subsequently with the coming up of more generation, this line can be charged at 400 kV level ensuring that the ICTs (2x315MVA) at Chamera-II Pooling station are not overloaded"

It was further mentioned that instead of 2 no. of 220 kV D/C Lines, a 400 kV D/C Line considering the overall power flow requirement of about 1000-1100 MW shall be constructed in order to conserve R.O.W.

HPPTCL had accordingly taken up the execution of the following Transmission Elements:

- 1. 400/220 kV, 2 x315 MVA & 220/33 kV, 63 MVA Sub-Station at Lahal.
- 2. 400 kV D/C (Twin Moose) line from 400/220 kV, 2 x315 MVA, Lahal Sub-Station to 400/220 kV Chamera P.S. of PGCIL.

The work of construction of 400/220kV Sub-Station has been completed. The 220/33kV portion of the Sub-Station has already been commissioned to provide interim power evacuation path to SHEPs via construction of 220 kV S/C line on D/C towers from Lahal to Budhil HEP till completion of 400 kV D/C (Twin Moose) line from 400/220 kV, 2x315 MVA, Lahal Sub-Station to 400/220 kV Chamera P.S. of PGCIL.

17.2 HPPTCL further stated that in order to charge the 400/220 kV S/s, HPPTCL had approached NRLDC for no load charging of 400/220kV Sub-Station through 220/400kV ICT from 220 kV side. However, NRLDC had observed that the transformation capacity of 400/220 kV Substation has not been mentioned in the Standing Committee approval accorded in the 27th meeting which is required before according approval for charging.

- **17.3** The matter was accordingly taken up with CEA vide letter dated 05.11.2020 to clarify on the capacity of S/Stn. Accordingly, CEA convened a meeting of all concerned stakeholders through VC on 11.11.2020, wherein following was decided:
 - (i) POSOCO to provide permission to HPPTCL for charging of 400/220 kV, 2x315 MVA Lahal substation.
 - (ii) Transformation capacity of 2x315 MVA at 400/220 kV Lahal substation would be ratified in the next standing committee meeting.
 - (iii) HPPTCL to explore the possibility of installation of Bus Reactor at Lahal S/Stn.
- 17.4 In view of above, HPPTCL requested members to consider & approve the following -
 - (i) The capacity of Lahal S/S as 400/220 kV, 2x315MVA.
 - (ii) Construction of 400 kV D/C (Twin Moose) line from 400/220 kV, 2x315 MVA Lahal Sub-Station to 400/220 kV Chamera P.S. of PGCIL
- **17.5** Members agreed to the proposal of HPPTCL. HPPTCL was again requested to explore the possibility of installation of Bus Reactor at Lahal S/Stn. HPPTCL agreed for the same and to revert with the details.

18.0 Establishment of 400/220kV Nange Pooling Station for proposed SJVN Hydro Power Plant Luhri Stage-I, II & Sunni Dam:

18.1 Director (PSPA-I) stated that in the 2nd NRSCT meeting held on 13.11.18, transmission system for connectivity to Luhri-I (210 MW), Luhri-II (172 MW) & Sunni Dam (382 MW) HEP were agreed. It was decided during the meeting that power from all the three stages of Luhri HEP would be evacuated at 220 kV level and would be pooled at 400/220 kV proposed ISTS Nange pooling station located near Luhri-II HEP and further evacuated to Koldam through 400 kV D/c line (along with associated bays at both ends). In the 3rd NRSCT meeting also, information of connectivity granted for above projects was recorded.

However, transformation capacity of 400/220 kV Nange Pooling Station (315 MVA) has been missed inadvertently in the minutes of 2nd NRSCT meeting. Accordingly, it is proposed that transformation capacity at 400/220 kV Nange Pooling Station (2x315 MVA) may be included. Further, CTU is in receipt of Connectivity & LTA application from SJVN for Luhri-I and Connectivity applications for Luhri-II & Sunni Dam. Accordingly, 2nd 315 MVA ICT at Nange PS shall be considered with grant of LTA to Luhri Stage-I in order to meet n-1 contingency criteria.

- 18.2 Accordingly, connectivity system for Luhri-I, Luhri-II & Sunni Dam HEP is as under:
 - (i) Establishment of 2x315MVA, 400/220 kV Nange GIS Pooling Station (tentatively Identified near Luhri Stage-II HEP).
 - (ii) Nange GIS Pooling Station Koldam 400kV D/c line along with associated bays at both ends (GIS bays at Koldam).
 - (iii) 125 MVAR Bus Reactor at Nange GIS PS.

Identified transmission system each from Luhri-I/Luhri-II/Sunni Dam upto Nange Pooling station shall be under the scope of SJVN/generation developer. Further LTA system for Luhri-I shall include 2nd 315 MVA ICT at Nange GIS Pooling Station.

- 18.3 SJVN intimated that commissioning schedules for Luhri Unit-I (210 MW), Sunni Dam (382 MW) and Luhri Unit -II (172 MW) are April 2025, January 2027 and October 2027 respectively. Accordingly, 2x315 MVA ICT capacity at Nange Pooling station shall be required in the time frame of Luhri Unit-I (210 MW).
- 18.4 SJVN further stated that as the transmission system each from Luhri-I/Luhri-II/Sunni Dam upto Nange Pooling station shall be under the scope of SJVN, location of Nange Pooling Station should be finalized and communicated to SJVN at the earliest so that SJVN could undertake the survey work for laying transmission line from the HEPs to Nange PS.
- 18.5 It was also opined that considering the transportation constraints, single phase units for transformers may be considered.
- 18.6 After deliberations, it was agreed that following transmission system may be taken up for implementation with the time frame of Luhri-I HEP (April 2025):
 - (i) Establishment of 7x105MVA (single phase units, 400/220kV Nange GIS Pooling Station (tentatively Identified near Luhri Stage-II HEP).
 - (ii) Nange GIS Pooling Station Koldam 400kV D/c line along with associated bays at both ends (GIS bays at Koldam).
 - (iii) 125 MVAR Bus Reactor at Nange GIS PS.

The above transmission system would also be utilized for connectivity of Sunni Dam and Luhri-II HEPs of M/s SJVN.

19.0 Construction of 220/33 kV, 31.5 MVA Substation in AD Hydro Switchyard at Prini by HPPTCL

19.1 Director (PSPA-I), CEA, stated that HPPTCL vide letter dated 01.01.2021 has informed that AD Hydro Power Corporation Ltd. has developed 192 MW project at Prini in Himachal Pradesh. In order to evacuate power from the project, CTU had granted connectivity to ADHPL at 400/220 kV Nalagarh Substation through 220 kV D/C Prini to Nalagarh Line of ADHPL. During the grant of consent for forest clearance case of 220 kV D/C Prini-Nalagarh line to ADHPL, it was agreed that AD Hydro will provide space for one additional 220 kV Bay in its Switchyard at Prini for injection & drawl of power at Prini by HP.

AD Hydro had also agreed for LILO of line between Prini & Panarsa/Banala by HPPTCL which was done by HPPTCL by establishing 220/33 kV, 100 MVA Phojal Substation by S/ C LILO of 220 kV D/C AD Hydro - Nalagarh line. Subsequently, it was agreed that 220/33 kV, 31.5 MVA substation shall be constructed in the yard of AD Hydro Switchyard at Prini. The substation has been planned to facilitate injection of power from Small Hydro Electric Projects in summers and to provide drawl of power to Manali area in winter. Currently power from the small hydro projects is being evacuated through 220/33 kV,100 MVA Phojal Substation of HPPTCL.

Due to constraints in 33 kV system of HPSEBL, the SHEPs have to back down during peak generation period i.e. Summer. With the construction of 220/33 kV, 31.5 MVA Prini Substation, SHEPs will be able to inject power directly at Prini Substation. This will result in shifting of peak summer injection from Phojal S/Stn to Prini Substation & similarly winter drawl of Manali area will shift from Phojal S/Stn to Prini S/Stn.

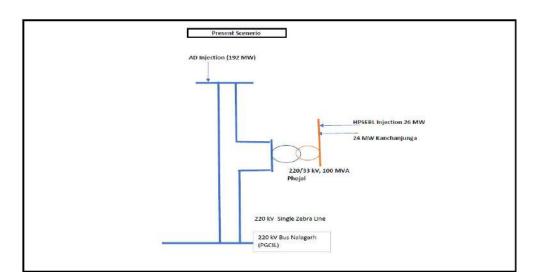
Sl. No.Name of Substation	Peak Injection (MW) (Summer)	Peak Drawl (MW)(Winter)
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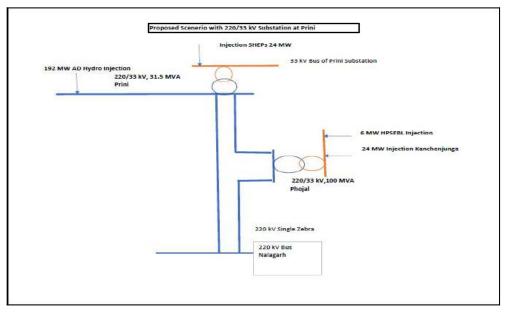
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1.	220/33 kV, 31.5 MVA Prini S/Stn.	24	24
2.	220/33 kV, 100 MVA Phojal S/Stn.	30	8
	Total	54	32





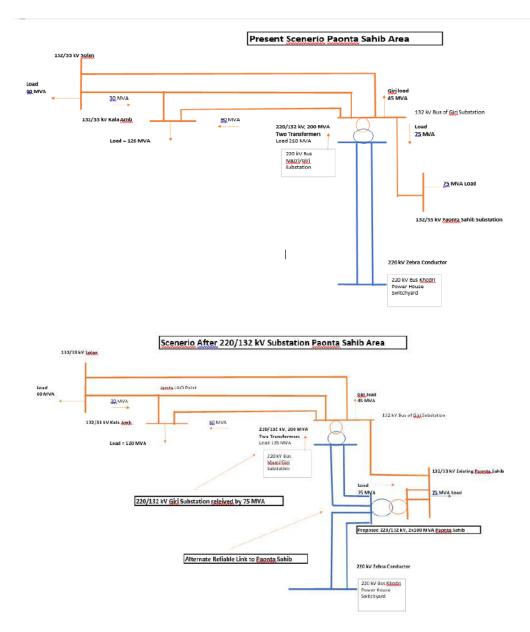
Accordingly, HPPTCL has proposed the construction of Prini 220/33 kV, 31.5 MVA substation by HPPTCL in AD Hydro Switchyard at Prini alongwith one number of 220kV bay at Prini.

- 19.2 POSOCO stated that under N-1 contingency of 220 kV Phojal-Nalagarh line, there would be only one 220 kV line from AD Hydro-Nallagarh to evacuate more than 250 MW power. Therefore, thermal rating of the line may be checked and need for any SPS may be explored by HPPTCL and AD Hydro. Moreover, since the line is a dedicated line constructed by AD hydro, the sharing of charges and other commercial agreement may be done between the parties beforehand to avoid any issue at a later stage.
- 19.3 HPPTCL stated that AD Hydro Power Corporation Ltd has also agreed to HPPTCL's proposal. There are some technical issues regarding control signal which would be mutually sorted out between HPPTCL and AD Hydro Power Corporation Ltd.
- 19.4 After deliberations, members agreed to the above proposal of HPPTCL. The commercial

arrangements for usage of the line may be settled mutually between HPPTCL and M/s AD Hydro Power Corporation Ltd.

20.0 Construction of 220/132 kV, 2x100 MVA Substation at Paonta Sahib by D/C LILO of 220 kV Khodri-Mazri Line:

20.1 HPPTCL stated that presently, 132kV Paonta Sahib substation is being fed from 132kV Giri substation. LILO of 132kV Giri-Kulhal transmission line at 132/33kV Paonta (Gondpur) Sub-Station was approved in 4th NRSCT meeting held on 25.07.2019. HPPTCL vide their letter dated 17.12.2020 had informed that after the preliminary survey of the area, it was observed that there is a ROW constraint for termination of LILO at Paonta Sahib. Therefore, alternate proposal to establish 220/132 kV, 100 MVA Substation at Paonta Sahib by D/C LILO of existing 220 kV Khodri (HPPTCL) – Mazri(PTCUL)line, which is passing from nearby 132/33 kV Paonta Substation was studied and found feasible by HPPTCL.



20.2 CEA stated that as 220 kV Khodri (HPPTCL)–Mazri (PTCUL) line is an ISTS line between Himachal Pradesh and Uttarakhand, consent of PTCUL is also required. CEA requested HPPTCL to bilaterally discuss the issue with PTCUL and accordingly the issue may be taken up in the next NRPC (TP).

21.0 Transmission works proposed by RVPN:

Director, (PSPA-I), CEA, stated that RVPN vide mail dated 11.01.2021 had submitted the following proposals for approval from NRPC(TP):

- Creation of 220 kV GSS at Karoli (Upgradation), District-Alwar and additional interconnections at PGCIL's 400/220 kV GSS Neemrana.
- Creation of a 220 kV GSS at Pathreda, District-Jaipur, alongwith 220 kV D/C line from PGCIL's 400 kV GSS Kotputli (Khelna).
- Creation of 220 kV GSS Reodar, District-Sirohi, by LILO of 220 kV S/C Sirohi-Bhinmal (PG) line The details are as under:

21.1 Creation of 220 kV GSS at Karoli (Upgradation), District-Alwar, and additional interconnections at PGCIL's 400/220 kV Neemrana sub-station

- 21.1.1 PGCIL has constructed 6 nos. of 220 kV feeder bays at their 400/220 kV Neemrana sub-station and RVPN has utilized 4 nos. of 220 kV bays with following interconnections: -
 - 220 kV D/C Neemrana-Behror line
 - 220 kV S/C Neemrana (400 kV GSS)-Neemrana (220 kV GSS) line
 - 220 kV S/C Neemrana (400 kV GSS)-Khushkhera line

The load is continuously increasing in the Kushkhera, Bhiwadi and Karoli areas due to industrial development. RVPN presented the details of transformation capacity and peak load at various GSS as well as transmission lines in the region. RVPN also presented the load flow studies for total system load of 15,169 MW corresponding to FY 2022-23.

RVPN stated that following were the outcomes of the studies:

- Total system losses have been reduced from 1383.366MW to 1379.910 MW in proposed case, thus saving of approximate 3.456MW (130.7861LUs/Annum) is achieved in the proposed case.
- The loading on the existing 220 kV line from PGCIL's 400 kV GSS Neemrana to RVPN's 220 kV GSS Neemrana has reduced from 212 MW is base case to 93MW in the proposed case.
- The loading on the existing 220 kV line from PGCIL's 400 kV GSS Bhiwadi to RVPN's 220 kV GSS Bhiwadi has reduced from 335 MW is base case to 298 MW in proposed case.
- Creation of 220 kV GSS at Karoli will help to meet the load growth in the Kushkhera and Bhiwadi region and simultaneously 2 nos. 220 kV Bays lying unutilized at PGCIL's 400/220 kV Neemrana sub-station would be utilized.
- 21.1.2 Accordingly, following transmission system was proposed for creation of 220 kV GSS at Karoli (Upgradation) and additional interconnections at PGCIL's 400/220 kV GSS Neemrana:
 - 1x160MVA, 220/132kV Power Transformer and 40/50 MVA, 132/33 kV Power Transformer at proposed 220kV GSS Karoli (Distt. Alwar).
 - •6 km LILO of 220 kV S/C Bhiwadi (400 kV GSS)-Neemrana (220 kV GSS) line at PGCIL's 400 kV GSS Neemrana.

- •6 km LILO of 220 kV S/C Bhiwadi (400 kV GSS)-Neemrana (220 kV GSS) line at proposed 220 kV GSS Karoli.
- 0.2 km LILO of 220 kV S/C Kushkhera-Alwar line at proposed 220 kV GSS Karoli

RVPN informed the timelines of the above proposal as one year.

POSOCO expressed concern on low voltages encountered in Hindaun and Alwar areas during real-time operation. It was suggested that connectivity of these stations may once again be relooked into and any additional system/ reactive power requirement may be planned suitably.

- 21.2 Creation of a 220 kV GSS at Pathreda, District-Jaipur, alongwith 220 kV D/C line from PGCIL's 400 kV GSS Kotputli (Khelna)
- **21.2.1** At PGCIL's 400/220 kV GSS Kotputli (Khelna), following 220 kV transmission lines are connected:
 - 220 kV D/C Kotputli (PGCIL)-Bansur line
 - 220 kV S/C Kotputli (PGCIL)- Kotputli (RVPN) line
 - 220 kV S/C Kotputli (PGCIL)- Manoharpur line

Presently PGCIL has constructed 6 nos. of 220 kV feeder bays at their 400/220 kV GSS Kotputli (Khelna) and RVPN has utilized 4 nos. of 220 kV bays. Furthermore, the agriculture load is continuously increasing in the Kotputli, Paota and Pathredi region. In this region industrial load is also increasing due to development of an industrial area. There is severe RoW problem around 220 kV GSS Kotputli and the DISCOM cannot construct additional 33 kV feeders from 220 kV GSS Kotputli, hence, a new 220 kV GSS is considered at Patheredi for meeting additional load growth in the area. RVPN presented the details of transformation capacity and peak loads at various GSS and transmission lines in the region. RVPN also presented the load flow studies for total system load of 15,169 MW corresponding to FY 2022-23.

RVPN stated that following were the outcomes of the studies:

- •—In the proposed case, utilization of 630 MVA, 400/220 kV transformers at 400 kV GSS Kotputli (Khelna) would increase.
- Creation of 220 kV GSS will help to meet the additional anticipated load in region.
- 21.2.2 Accordingly, RVPN proposed following transmission system for creation of 220 kV GSS at Pathredi (new location) and additional interconnections at PGCIL's 400/220 kV GSS Kotputli:
 - 1x160MVA, 220/132kV Power Transformer and 40/50 MVA, 132/33 kV Power Transformer at proposed 220kV GSS Pathredi (Distt. Jaipur).
 - 20 km LILO of 220 kV D/C PGCIL's 400 kV GSS Kotputli (Khelna)-Pathredi line.
 - 5 km LILO of 132 kV S/C Kotputli-Paota line at proposed 220 kV GSS Pathredi.
 - 34 km 132 kV S/C Pathredi-Tmhanagazi line.

RVPN informed the timeline of the above proposal as one year.

21.2.3 POSOCO stated that loading of 400/220 kV ICTs at Kotputli may be monitored and based on the expected load growth in this area, requirement of new ICT may be studied.

- 21.3 Creation of 220 kV GSS Reodar, District-Sirohi, by making LILO of 220 kV S/C Sirohi-Bhinmal (PG) line
- 21.3.1 Following 132 kV GSS connected in ring are fed from 220 kV GSS Sirohi and 220 kV GSS Pindwara:-
 - 132 kV GSS Reodar
 - 132 kV GSS Abu Road RIICCO
 - 132 kV GSS Abu Road
 - 132 kV GSS Swaropganj

Further, 132 kV GSS Sorda and 132 kV GSS Badgaon are also fed from 132 kV GSS Reodar through a 132 kV S/C line. Hence, total 6 nos. of 132 kV GSS are fed from above mentioned ring system. A peak load of 89 MW (approx.) has been recorded on 132 kV S/C Sirohi-Reodar line.

During outage of the 132 kV S/C Sirohi-Reodar line or 132 kV S/C Pindwara-Swaroopganj line, the load demand of above 6 nos. 132 kV GSS cannot be met from either 220 kV GSS due to overloading of existing 132 kV S/C line and is resorted to load shedding over large area. Hence, a new 220 kV GSS is essential in and around Reodar. RVPN presented the Load flow studies for total system load of 14,430 MW for condition corresponding to FY 2021-22.

RVPN stated that following were the outcomes of the studies:

- By creation of 220 kV GSS at Reodar, loading on 132 kV S/C Sirohi-Reodar line will be reduced in proposed case.
- Creation of 220 kV GSS at Reodar will also help to meet the load demand of proposed 132 kV GSS at Jaswantpura.
- 132 kV GSS Sorda and 132 kV GSS Badgaon will be connected in ring system and two supply sources will be available on these GSS in proposed case.
- Four supply sources will be available at 132 kV GSS Reodar which is the main load centre. Hence, reliability of power supply would be improved in the proposed case.
- 21.3.2 Based on the results of load flow study and technical feasibility received from the field, following transmission system was proposed for creation of 220 kV GSS at Reodar:
 - 1x160 MVA, 220/132 kV Power Transformer and 1x20/25 MVA, 132/33 kV Power Transformer at 220 kV GSS Rodar (Proposed).
 - 28 km LILO of existing 220 kV S/C Bhinmal (PG)-Sirohi line at 220 kV GSS Reodar (Proposed).
 - 32 km 132 kV S/C Reodar (220 kV GSS)-Badgaon line or LILO of Reodar-RIICO AbuRoad.
 - 15 km 132 kV S/C Reodar (220 kV GSS)-Reodar (132 kV GSS) line.
- 21.3.3 After deliberation the proposed Intra –State transmission schemes of RVPN mentioned at Para no. 21.1.2, 21.2.2 and 21.3.2 were agreed by the members.

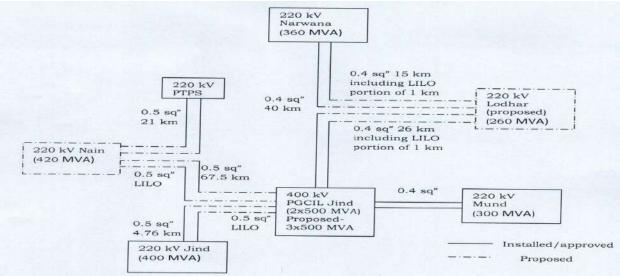
22.0 Intra-State transmission schemes proposed by HVPN

CEA stated that HVPNL vide letter no. Ch-108/HSS-391 dated 08.12.2020 has envisaged five transmission schemes at 220 kV level which involve inter-connection with 400 kV ISTS elements, the details of which are as under: -

22.1 Creation of 220 kV AIS substation Nain, District Panipat.

 (i) Creation of proposed 220 kV AIS substation Nain with capacity of 2x160 MVA, 220/132 kV + 2x100 MVA, 220/33 kV transformers with 1x100 MVA, 220/33 kV transformer as standby HOT transformer. (ii) Creation of LILO of both circuits of 220 kV Jind HVPNL to PTPS D/C line at 400 kV substation PGCIL Khatkar (Jind) with 0.5 sq inch ACSR conductor and thereby LILO of both circuits of 220 kV PGCIL Khatkar (Jind) to PTPS D/C line at proposed 220 kV substation Nain with 0.5 sq inch ACSR conductor.

The above proposed system would require four nos. 220 kV line bays or bay space at 400 kV PGCIL Khatkar (Jind) for interconnection of LILO of both circuits of 220 kV Jind HVPNL -PTPS D/C line at 400 kV substation PGCIL Khatkar (Jind).



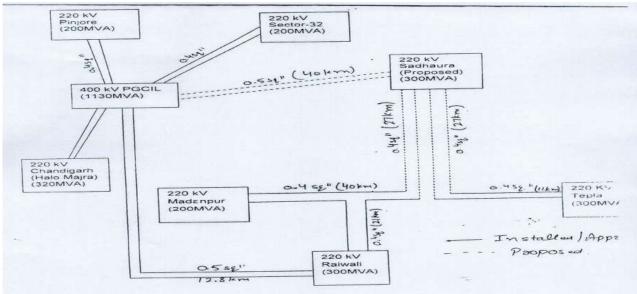
- 22.1.1 CTU confirmed the availability of space for 220 kV line bays at Jind (PG) substation.
- 22.1.2 HVPNL intimated the time frame of Nain substation as July, 2023, and also informed that 2 nos. of bays are already available at Jind PG. Therefore, only 2 nos. of 220 kV bays are required to be constructed by PGCIL.

22.2 Creation of 220 kV substation Lodhar

- (i) Creation of proposed 220 kV substation Lodhar with capacity of (1x160+ 1x100) MVA, 220/132 kV + 1x40/50 MVA, 132/33 kV transformers.
- LILO of both circuits of 220 kV PGCIL Khatkar (Jind) to Narwana D/C line at proposed 220 kV substation Lodhar (approx. 1 km) with 0.4 sq. inch ACSR zebra conductor.
- 22.2.1 HVPNL stated that time frame of Lodhar substation is March, 2024.
- 22.2.2 CEA stated that the Nain and Lodhar 220 kV substations are proposed to be connected at Jind (PG) 400/220 kV substation with the time frame of 2023 and 2024 respectively. System studies have been carried out by HVPN and CEA. From the load flow studies, it has been observed that the transformation capacity of 2x500 MVA at 400/220 kV Jind (PG) substation would be sufficient to cater the loads in the time frame of 2022-23 with creation of Nain substation. However, with the creation of Lodhar substation in time frame of 2023-24, transformation capacity at Jind (PG) may not be adequate for system to be N-1 compliant. Therefore, a future provision of augmentation of 400/220 kV transformation capacity at 400 kV Jind (PG) from 2x500 MVA to 3x500 MVA may be kept.
- 22.2.3 POSOCO stated that in the studies, 360 MW generation has been considered at Panipat TPS. However, ICTs may be N-1 non-compliant whenever there is less or no generation at

Panipat TPS (the plant has a high variable cost). Also, after eight 220 kV feeders from Jind, 3rd 500 MVA ICT at Jind may be required earlier and may be studied accordingly.

- 22.2.4 CTU stated that space for ICT augmentation is available at Jind (PG) substation and implementation can be taken up in future depending upon the ICT loading.
- 22.3 Creation of 220 kV substation Sadhaura by up-gradation of 66 kV substation Sadhaura to 220 kV level
 - (i) Creation of 220 kV substation Sadhaura by up-gradation of existing 66 kV substation Sadhaura with installed capacity of 2x25/31.5 MVA, 66/11 kV transformers to 2x100 MVA, 220/66 kV + 1x100 MVA, 220/33 kV + 2x25/31.5 MVA, 66/11 kV + 1x12.5/16 MVA, 66/11 kV transformers.
 - (ii) 220 kV D/C line with moose conductor from 400 kV PGCIL Naggal (Panchkula) to proposed 220 kV substation Sadhaura. (Line length- 40 km approx)
 - (iii) LILO of 220 kV S/C line from 220 kV Tepla to 220 kV substation Madanpur at proposed 220 kV substation Sadhaura with zebra conductor (Approx. 27km) and LILO of 220 kV S/C line from 220 kV Tepla to 220 kV substation Raiwali at proposed 220 kV substation Sadhaura with zebra conductor (Approx. 27km).



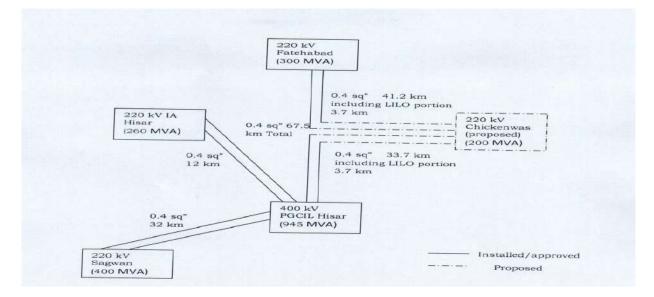
As per the study results, no constraints were observed with the proposed transmission elements.

- 22.3.1 HVPNL intimated the time frame of Sadhaura substation as September, 2023.
- 22.3.2 The above proposed system would require two nos. of 220 kV bays at 400 kV PGCIL substation Naggal (Panchkula) to accommodate 220 kV D/C line from 400 kV PGCIL Naggal (Panchkula) to proposed 220 kV substation Sadhaura. HVPNL subsequently intimated that the 2 nos. of 220 kV bays are required to be constructed by PGCIL.

22.4 Creation of 220 kV substation Chickenwas

 Creation of proposed 220 kV substation Chickenwas with capacity of 2x100 MVA,220/33 kV transformers.

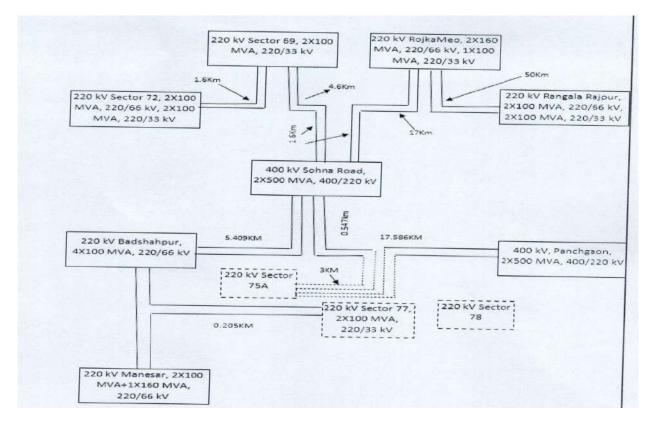
- (ii) Creation of LILO of both circuits of 220 kV PGCIL Hisar to Fatehabad HVPNLD/c line at proposed 220 kV substation Chickenwas (approx. 3.7 km) with 0.4 sq. inch ACSR zebra conductor.
- (iii) Time frame of Chickenwas substation is 2023-24.



- 22.4.1 HVPNL stated that time frame of Chickenwas substation is March, 2024. CEA stated that as per the system studies, no constraints were observed with the proposed transmission elements.
- 22.4.2 POSOCO expressed concern on the high loading of 220 kV Hisar (PG)- Hisar (IA) D/C line and asked HVPNL to explore measures to relieve loadings of these lines. HVPNL agreed for the same.
 - 22.5 Creation of 220 kV substation Sector 75-A, Gurugram in lieu of 220 kV substation Sector-77 Gurugram (already approved by NRPC(TP) as downstream network of 400 kV substation Sohna Road)
 - (i) Cancellation of creation of 220 kV substation in Sector 77, Gurugram, with capacity of 2x100 MVA, 220/33 kV transformers due to de-notification of land by Government of Haryana in Sikohpur village. The sub-station had been approved by NRPC(TP) as downstream network of 400 kV Sohna Road substation.
 - (ii) Creation of 220 kV substation Sector 75-A, Gurugram, with capacity of 2x100MVA, 220/33 kV transformers (in lieu of 220 kV substation in Sector 77 Gurugram)
 - (iii) Creation of LILO of both circuits of 220 kV Badshahpur to Panchgaon (PGCIL) D/c line (Now 220 kV Sohna Road to Panchgaon D/C line created after LILO of both circuits of 220 kV Badshahpur to Panchgaon (PGCIL) D/c line at Sohna Road) at 220 kV sub-station in Sector 75-A by extending already erected LILO of 220 kV Badshahpur to Panchgaon (PGCIL) D/C line at Sector 77 Gurugram to 220 kV substation Sector 75-A on M/C towers (extended line length approx. 2.5 km) along with dismantlement of part of already erected LILO towers. Earlier proposal was LILO of both circuits of 220 kV Badshahpur to Panchgaon and thereby LILO of both circuits of thus created 220 kV Sector 77 Gurugram substation and thereby LILO of both circuits of thus created 220 kV Badshahpur -220 kV Sector 77 Gurugram D/c line at Sohna Road.

POSOCO stated that only 2x500 MVA ICTs are planned at Sohna Road and Manesar (PG). The need for additional ICTs at these stations may be studied in view of the expected load growth in this area due to its proximity to Gurugram.

CTU stated that loading on transformers at Sohna Road is under limit in present scenarios. However, as per the studies carried out for 2023-24 scenarios, it may become N-1 noncompliant in future scenarios. Therefore, there is a need to observe the loading on the transformers and take adequate measures for ICT augmentation as and when need arises.



- **22.6** After deliberations, members agreed to the HVPN proposals mentioned at para 22.1, 22.2, 22.3, 22.4 and 22.5 as intra -state transmission scheme.
- 22.7 Further, following was agreed as ISTS works:
 - (i) construction of two nos. 220 kV bays at 400 kV PGCIL substation Naggal (Panchkula) in the matching timeframe of Sadhaura S/s (September, 2023)
 - (ii) construction of two nos. 220 kV bays at 400 kV PGCIL substation Jind in the matching timeframe of Nain S/s (July, 2023)

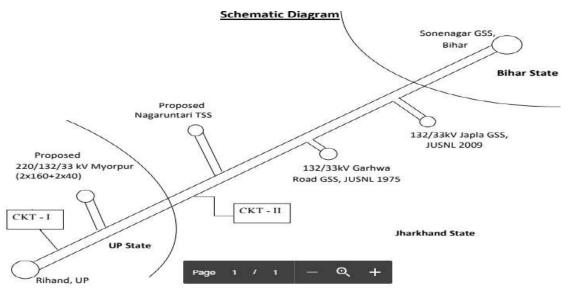
23.0 LILO of one ckt 132kV D/C line Rihand Hydro(Pipari-UP)-Sonenager (Bihar) at 220/132/33kV S/S Myorpur (UPPTCL)

23.1 Director (PSPA-I), ČEA, stated that UPPTCL vide their letter dated 01.10.2020 and 13.01.2021 has proposed for LILO of one ckt 132kV D/C Rihand Hydro (Pipari-UP)-Sonenager (Bihar) line at 220/132/33kV S/S Myorpur (UPPTCL) as intra-state works. UPPTCL informed that in the 2nd NRPC(TP) meeting held on 01.09.2020, UPPTCL had proposed to take up the agenda for LILO of 132 kV ckt of Rihand Hydro (Pipri-UP)-Sonenagar (Bihar) line at 220/132/33 kV S/s Myorpur (UPPTCL), wherein, UPPTCL had been advised to discuss the matter in ERPC(TP) meeting and to seek NOC from BSPTCL.

Accordingly, UPPTCL have received the NOC from BSPTCL, vide letter no. 716/BSPTCL/

CE(P&E)/65/2020 dated 29.09.2020 and subsequently deliberated the issue in 2nd ERPC(TP) meeting held on 30.09.2020 and the same was agreed by the ER constituents.

23.2 UPPTCL informed that the 1st ckt. of 132kV D/C Rihand Hydro (Pipari-UP) Sonenagar (Bihar) line is normally charged on no load and 2nd ckt (with normal loading of 25-35 MW) of the same has been LILOed at Gharwa Road S/s in Jharkhand. Hence, for charging of 220kV Myorpur S/S, UPPTCL has proposed for approval of LILO (22 km.length) of 1st ckt. of 132kV Rihand Hydro (Pipari-UP)-Sonenagar (Bihar) DC line which is normally running on no load. As discussed in ERPC(TP) meeting, post proposed LILO, this 132 kV Rihand(Pipri)- Sonenagar ISTS line shall become 132 kV Myorpur- Nagaruntari TSS-Sonenagar ISTS line & same shall be operated as per the instruction of JSLDC and UPSLDC.

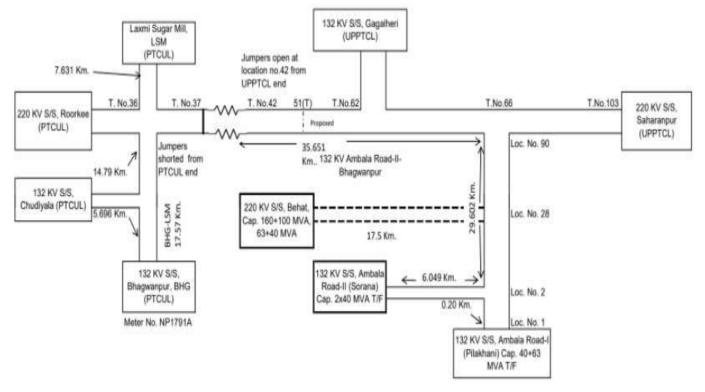


23.3 After deliberations, members agreed to the above proposal.

24.0 LILO of 220kV Phulpur- Jhusi line at 400kV S/S Machhalishahr (Jaunpur):

- 24.1 Director (PSPA-I), CEA, stated that UPPTCL vide its letter dated 13.01.2021 has proposed LILO of 220kV Phulpur- Jhusi line at 400kV S/S Machhalishahr (Jaunpur). UPPTCL has informed that 220 kV Allahabad (PG)- Phulpur (UPPTCL) line had been constructed by PGCIL. Later on, 220 kV Allahabad (PG)- Phulpur (UPPTCL) line was LILOed at 220kV S/S Jhusi(UPPTCL). 220 kV substation at Phulpur and Jhusi in Prayagraj district are fed mainly by 400 kV Allahabad (PG) S/S. In case of outage of any one of base line, the other line gets overloaded.
- 24.2 UPPTCL stated that to avoid the overloading of 220kV Allahabad PG(400 kV) Phulpur line or 220kV Allahabad PG(400 kV)- Jhusi line, a LILO of 220kV Phulpur Jhusi interconnection(PGCIL) lineat 400kV S/S Machhalishahr, Jaunpur (under construction) is proposed. This will ensure alternate source for 220kV Jhusi and Phulpur UPPTCL Substations.
- 24.3 After deliberations, members agreed to the above proposal.
- 25.0 Utilization of 132kV Ambala Road/Saharanpur-Bhagwanpur/Roorkee line by UPPTCL
- 25.1 UPPTCL stated that Saharanpur (UPPTCL)- Roorkee (PTCUL) 132kV D/c line (ISTS) has been LILOed at various substation of PTCUL & UPPTCL such as Ambala Road (UPPTCL), Bhagwanpur(PTCUL), Gagalheri(UPPTCL) Laxmi Sugar Mill(PTCUL) of UP & Uttarakhand.

25.2 UPPTCL further stated that tower no. 01 to 37 of Saharanpur (UPPTCL) – Roorkee(PTCUL)132kV D/c line are located in Uttrakhand region and presently jumpers are shorted at Tower no. 37 by PTCUL to utilize the same as Bhagwanpur(PTCUL)-Laxmi Sugar Mill(PTCUL) 132kV S/c line.



SINGLE LINE DIAGRAM OF THE LILO OF 132 KV SAHARANPUR-BHAGWANPUR/ROORKEE LINE

- **25.3** UPPTCL further stated that presently, at tower no. 42 of above line, jumpers are opened and there is no flow of power from PTCUL to UPPTCL. Hence, for better utilization of the line, UPPTCL has proposed that jumper may be shorted at tower no. 51 so that the same may be utilized as Gagelheri (UPPTCL)-Ambala Road (UPPTCL) 132kV S/c line. Subsequently, LILO of this circuit may be done to supply reliable source to 220kV Behat(UPPTCL) S/S.
- **25.4** CEA enquired the fate of the remaining line between Tower no. 37 and 51 to which UPPTCL clarified that the portion of the line between Tower no. 37 and 51 is presently being maintained by UPPTCL which would be dismantled after approval of this proposal of shorting the jumpers at tower no. 51. This in turn would change the status of the line from ISTS to two independent Intra- state lines.
- **25.5** After deliberations, the proposal was agreed by the members.

26.0 Evacuation of 2x660 MW Obra 'C' TPS & Startup Power

²⁶¹ UPPTCL stated that Obra "C" evacuation was deliberated in 38th SCM dated 30.05.2016 and modification for start-up power in 3rd NRSCT held on 24.05.2019. Now at 765/400kV Obra "C" due to availability of 2x1000 MVA transformers in place of 2x1500 MVA transformers and non-availability of planned reactors, following modification is proposed as given below:

S.No	Approved in 3 rd NRSCT meeting dated 24.05.2019	Now Proposed
01	GT 21/765kV at Obra "C"	-No Change-

02	2x1500 MVA 765/400kV ICT at Obra "C"	2x1000 MVA 765/400kV ICT at Obra
		"C"
03	LILO of Anpara "D"-Unnao 765kV SC line at Obra	-No Change-
05	1	ito change
	"C"- 15km and shifting of 330 MVAR line reactor	
	from Anpara "D" to Obra "C" TPS	
04	LILO of one ckt of 400kV DC line Obra "B"-Obra	LILO of one ckt of 400kV DC Obra
	"C" at Jaunpur(400)-190 km	"B"-Obra "C" line at Jaunpur(400
		kV)-190 km with Line Reactor of 63
		MVAR for each ckt at Obra "C" end.
05	400kV DC line Obra "B"-Obra "C" – 1.5km (for	-No Change-
	Startup Power)	
06	Bus Reactor 330 MVAR, 765kV at Obra "C"	Bus Reactor 189 MVAR, 765kV at
		Obra "C"
07		Bus Reactor 125 MVA, 400kV at Obra
		"C"
08		Station Transformer 400/11.5 kV,
		2x100 MVA

^{26.2} Members note the same.

27.0 Augmentation at 400kV S/S Muradnagar-I (1x500+2x315 MVA to 2x500+1x315 MVA)

- 27.1 UPPTCL stated that presently at Muradnagar-I substation,1x500+1x315 MVA transformers are in working condition against the installed capacity 1x500+2x315 MVA. Other 1x315 MVA transformer had got damaged on 13.03.2020 and is likely to take time in repair & restoration. Further, maximum loading observed in the sub-station in September, 2020 was 522 MVA. As such, to meet out the N-1 criteria and anticipated load growth in Ghaziabad area, augmentation at 400kV Muradnagar-I S/S from 1x500+2x315 MVA to 2x500+1x315 MVA has been proposed by UPPTCL.
- 27.2 Members agreed to the above proposal of augmentation of 400kV Muradnagar-I S/s from 1x500+2x315 MVA to 2x500+1x315 MVA as intra-State transmission works of UPPTCL.

28.0 Increasing capacity of 400kV Agra PG, Allahabad PG, Kanpur PG, Lucknow PG and Meerut PG Substations

28.1 Director (PSPA-I), CEA, stated that UPPTCL has informed that at following PGCIL substations, ICT's have been observed to be 'N-1' non-compliant under peak load conditions:

S. No	Name of S/s	Voltage level (in kV)	ICT's	Capacity of ICT's (in MVA)	*Peak Load of ICT's (in MVA)	% Loading of individual ICT's	Average Loading of S/s ICT's (%)	
01	Agra (PG)	765kV	ICT-I	315	250	79	84	
01	Agia (10)	705K V	ICT-II	315	277	88	04	
02	Sohawal (PG)	400kV	ICT-I	315	276	88	87	
02	Soliawai (FU)	400K V	ICT-II	315	274	87	07	
	Allahabad (PG)	400kV	ICT-I	315	213	68		
03			ICT-II	315	213	68	66	
			ICT-III	315	201	64		
04	4 Kanpur (PG)	Vonnur (DC)	400kV	ICT-I	315	213	68	67
04		400K V	ICT-II	315	211	67	07	
05	Luchmann (DC)	4001-37	ICT-I	500	329	66	67	
05	Lucknow (PG)	400kV	ICT-II	500	341	68	07	
		PG) 400kV	ICT-I	500	317	63		
06	Meerut (PG)		ICT-II	315	217	69	67	
00			ICT-III	315	218	69	0/	
			ICT-IV	315	218	69		

* As observed in September' 2020

Therefore, UPPTCL has proposed for increasing transformation capacity at 400 kV Agra (PG) & Sohawal (PG) immediately and for other substations, namely Allahabad (PG), Kanpur (PG), Lucknow (PG), Meerut (PG) substations, the same shall be proposed subsequently, commensurate with load growth under Intra-State system.

28.2 Director (PSPA-I), CEA, further stated that UPPTCL vide letter dated 04.01.21 has requested Powergrid to explore space availability for augmentation of 400/220kV transformation capacity at Agra, Allahabad, Kanpur, Lucknow and Meerut POWERGRID substations due to high loading on existing transformers. Powergrid vide email dated 15.01.2021 has informed following in regard of space availability at above substations:

S. No.	Substation	Space Availability
1	Agra PG	Not Available
2	Sohawal PG	Available
3	Allahabad PG	Space for 400 & 220kV Bays Available. However, for interconnection, 220kV Cables required.
4	Kanpur PG	Space for 400 & 220kV Bays Available. However, for interconnection, 220kV Cables required.
5	Lucknow PG	Not Available
6	Meerut PG	Available

- 28.3 UPPTCL stated that immediate requirement is at Agra (PG) and Sohawal (PG) substations where average loading of transformers is around 85%. For rest of the substations mentioned in the table, loading is around 70%. Therefore, requirement and timeline for augmentation of ICTs at these substations can be deliberated.
- 28.4 CTU informed that there is no space available in Agra (PG) substation, therefore some alternative arrangement has to be explored to relieve the loading of the ICTs at Agra (PG).
- 28.5 Regarding new ICT at Agra (PG), POSOCO informed that a new substation at Ferozabad near Agra (PG) has recently been commissioned and UPPTCL may explore option of feeding some loads from Ferozabad S/s. UPPTCL agreed for the same.
- 28.6 Regarding new ICT at Sohawal (PG), POSOCO stated that the loading of 2x315 MVA, 400/220 kV ICTs at Sohawal (PG) were observed to be 'N-1' non-compliant for most of the time during last year. In this regard, a new station in vicinity (at Gonda) is under construction and commissioning of the same may be expedited. To this, UPPTCL stated that due to certain issues, there is uncertainty in completion of the transmission lines of Gonda in next 2 years. Therefore, augmentation of ICTs at Sohawal (PG) is needed.
- 28.7 For new ICTs at other sub-stations, POSOCO representative stated that there is currently slight margin in ICTs at these sub-stations and need for new ICTs may be studied depending on projected load growth in respective areas.
- 28.8 After deliberations, members agreed for 1x500 MVA, 400/220 kV ICT augmentation (3rd) at Sohawal (PG) under system strengthening.

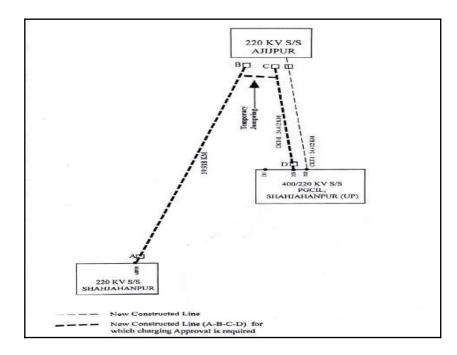
29.0 Upcoming 765kV, 400kV & 220 kV substations and lines of UPPTCL:

- 29.1 CEA stated that UPPTCL has forwarded the list of upcoming 765kV, 400kV and 220kV substations and their associated lines which are under construction/planned as Intra-state network and deliberated in different SCM meeting of CEA are enclosed as **Annexure-C**.
- 29.2 Members noted the same.

- 30.0 Interim arrangement for charging of 220 kV Shahjahanpur PG(400)- Shahjahanpur (UPPTCL) S/c line
- 30.1 Director (PSPA-I), CEA, stated that UPPTCL vide their letter dated 01.02.2021 has informed that the creation of 220 kV Azizpur (Shahjahanpur) S/s had been approved in the 40th meeting of SCPSPNR held on 22.06.2018, with the following connectivity:
 - i. Creation of 220/132/33 kV, 2x160 MVA+2x40 MVA S/s at Azizpur (Shahjahanpur)
 - ii. Shahjahanpur (PG) (400 kV)- Azizpur (Shahjahanpur) 220 kV D/c line- 20km
 - iii. Shahjahanpur(220) Azizpur (Shahjahanpur) 220 kV S/c line- 20km

Further, the connecting lines of Azizpur S/s at 220 kV level have been constructed, but the works of Azizpur Substation will take another 4-5 months for completion.

- 30.2 Director (PSPA-I), CEA, further stated that for utilization of the completed 220 kV lines and 220 kV bays at Shahjahanpur (PG) S/s, UPPTCL has proposed the following interim arrangement till the completion of 220 kV Azizpur S/s:
 - i. 220 kV S/c line Shahjahanpur (PG) (400)- Shahjahanpur (UPPTCL)- 64 km



- 30.3 UPPTCL intimated that 2nd circuit of Shahjahanpur (PG) (400 kV)- Azizpur (Shahjahanpur) 220 kV D/c line will also be kept in charged condition as anti-theft measure.
- 30.4 Members agreed to the above proposal.

31.0 Non-utilization of 2 Nos. 220 kV line bays at Jalandhar substation

31.1 PSTCL vide their letter dated 06.05.2020 has informed that as per the minutes of 30th SCPSPNR meeting, it had been agreed that concerned STU should inform POWERGRID regarding their requirement of 220 kV line bays at respective substations, at least 24 months in advance so that bays could be constructed in time. It was also agreed that 220 kV bays would be provided as per the requirement of STU. It is also pertinent to mention that there was no requirement of bays submitted by PSTCL for the 400 kV PGCIL Jalandhar substation with the augmentation work of 1x500 MVA transformer. The perusal of minutes of 30th meeting of SCPSPNR reveals that wherever PSTCL has demanded bays (e.g. for Amritsar, Moga, Ludhiana), the same has been categorically mentioned and PSTCL has intimated the requirement, whereas in case of Jalandhar, no requirement has been expressed

by PSTCL.

- 31.2 Moreover, in the 37thmeeting of the Empowered Committee on Transmission held on 20.9.2017, CEA stated that STUs raised the issue of bays in 39thmeeting that while planning a substation, upfront fixing of detailed scope of downstream works is not always possible as STU may require outgoing feeder bays at different point of time. To this, Empowered Committee suggested that 220 kV bays to be included in the scope of TBCB as per requirement indicated by the drawing entity.
- 31.3 CTU stated that 2 Nos. 220 kV line bays at Jalandhar substation were implemented as agreed in the 25thNRPC meeting. However, PSTCL opined that only the system was agreed in the NRPC meeting, not the timeline. Regarding timeline, in the 30th SCPSNR meeting, it was agreed that concerned STU should inform POWERGRID regarding their requirement of 220 kV line bays at respective substation, at least 24 months in advance so that bays could be constructed in time. However, PSTCL never requested for the 2 Nos. 220 kV line bays at Jalandhar, even then the same have been implemented by PGCIL.
- 31.4 UPPTCL suggested that the same matter has been raised by them (discussed under agenda item no. 13), cost of these bays may be considered under PoC and the matter needs to be taken up with CERC.
- 31.5 As PSTCL and CTU had their own view regarding implementation of 2 Nos. 220 kV line bays at Jalandhar substation, it was decided that as the matter pertains to charges for the implementation of bays, therefore the issue may be taken to CERC.
- 32.0 Augmentation of transformation capacity at 400kV Nakodar sub-station of PSTCL
- 32.1 Director (PSPA-I), CEA, stated that the present transformation capacity at 400kV Nakodar S/s is 2x315 MVA, 400/220 kV ICT. Due to increase in the loading on these ICTs, PSTCL vide its letter no. 818/P-I/315 dated 19.01.2021 has proposed to replace both the 315 MVA ICTs with 500 MVA ICTs. The work of augmentation of 1 no. 315MVA, 400/220kV ICT to500MVA, 400/220kV ICT, along with 1 No.400kV ICT bay and 1 No. 220 kV ICT bay at 400kV Nakodar was planned by PSTCL during 2018-19 and the work was also approved in the Capital Investment Plan for the year 2020-23 by PSERC. Augmentation of 2nd 315 MVA ICT at 400kV Nakodar sub-station to 500MVA ICT shall be executed during FY2022-23. Both the 315 MVA ICT from 400kV Nakodar sub-station would be dismantled and commissioned at 400kV Dhanansu sub-station, as in Dhanansu sub-station, there is proposal of installation of 2nd 315 MVA ICT to be kept as a spare ICT.
- 32.2 PSTCL intimated that based on latest loading conditions and load flow studies, petitionno.37 of 2020 was filed by PSTCL and PSERC has approved augmentation of both the 400kV,315MVA ICT's to 500MVA with the revised scope & procedure of replacement of transformers. Therefore, augmentation of 2x315 MVA transformers with 2x500 MVA transformers at 400kV Nakodar S/s has been proposed for concurrence of NRPC (TP).
- 32.3 Members agreed to the above proposal.
- 33.0 Grant of Connectivity to Kutehr HEP (240 MW) by S/C LILO of 400 kV D/C (Twin Moose) line from 400/220 kV, 2 x 315 MVA, Lahal Sub-Station to 400/220 kV Chamera P.S. of PGCIL at Rajera.
- 33.1 HPPTCL stated that they are implementing following system for evacuation of power from Hydro Projects in Ravi Basin-
 - (i) 400/220 kV, 2 x315 MVA Sub-Station at Lahal.

- (ii) 400 kV D/C (Twin Moose) line from 400/220 kV, 2 x315 MVA, LahalSub-Station to 400/220 kV Chamera P.S. of PGCIL at Rajera.
- (iii) 220 kV D/C (Twin Moose) line from Bajoli Holi to Lahal.
- 33.2 HPPTCL further stated that Kutehr HEP (240 MW) of M/s JSW was originally granted connectivity at220 kV level at400/220 kV, 2x315 MVA Lahal Substation in the year 2012by HPPTCL. In the meantime, HPPTCL had received Long Term Access Applications from Bajoli Holi HEP (180 MW) and four Small HEPs with aggregate capacity of 51 MW, thus about 230 MW of capacity out of 315 MVA available at Lahal Substation has been committed. Further additional 25 to30 MW of Small Hydro Potential is also planned to be evacuated through Lahal Substation. Thus, total injection on 220 kV Bus at Lahal Substation would be around 260 MW.

In view of the capacity constraints envisaged at Lahal substation, HPPTCL had conveyed to M/s JSW regarding requirement for review of evacuation arrangement for Kutehr HEP (240 MW) by changing connectivity from 220 kVlevel to 400 kV level. Subsequently, it was conveyed to M/s JSW that Kutehr HEP (240 MW) would be provided connectivity through LILO of one circuit of400 kV D/C (Twin Moose) line from 400/220 kV, 2 x315 MVA, Lahal Sub-Station to 400/220 kV Chamera P.S. of PGCIL at Rajera.

In compliance to above, M/s JSW had applied for revised connectivity for Kutehr HEP 240MW by S/C LILO of 400 kV D/C (Twin Moose) Lahal to Chamera line of HPPTCL.

- 33.3 HPPTCL requested to approve the evacuation system of Kutehr HEP (240 MW) by S/C LILO of 400 kV D/C (Twin Moose) line from 400/220 kV, 2 x315 MVA, Lahal Sub-Station to 400/220 kV Chamera P.S. of PGCIL at Rajera.
- 33.4 On query by CEA regarding the status of Kutehr HEP, HPPTCL intimated that JSW has started the work of Kutehr HEP. CEA suggested that the issue needs deliberations, therefore a separate meeting may be carried out.
- 33.5 POSOCO stated that a detailed study is needed before finalization of the evacuation system.
- 33.6 After deliberations, it was decided that system studies may be done considering the time frame of Kutehr HEP and the matter may be deliberated in the next meeting of NRPC(TP).

34.0 2ndCircuit stringing of 220 kV Karian - Rajera line & construction of 220/132 kV, 100 MVA Substation at Mazra by S/C LILO of 220 kV Karian to 400/220 kV Chamera Pooling station at Rajera.

- 34.1 HPPTCL stated that construction of 220/33 kV substation at Karian in Ravi Basin had been approved in 29th meeting of SCPSPNR held on 29.12.2010. Accordingly, 2 No. of 220 kV Bays were approved for termination of 220 kV D/C line from Karian at 400/220 kV, 2x315 MVA Chamera Pooling station of PGCIL at Rajera. Subsequently, in the 30thSCPSPNR meeting held on 19.12.2011, HPPTCL had informed that one bay would be required in first instance. Accordingly following elements have been commissioned and charged:
 - 220/33 kV, 50/63 MVA Karian Substation.
 - 220 kV S/C line on D/C towers from Karian to Chamera.
- 34.2 HPPTCL further stated that in order to strengthen the intra-state transmission system specially to meet the requirement during winter season when the generation is low and demand peaks in the Chamba district, HPPTCL has planned following system:
 - (i) 2ndcircuit stringing of 220 kV Karian to Chamera transmission line.

HPPTCL vide letter dated 01.01.2019 had intimated to PGCIL that additional circuit stringing will be done by 31.12.2021, along with a request to intimate the schedule of commissioning of 2nd bay at 400/220 kV Chamera Pooling Station at Rajera.

- (ii) 220/132 kV, 100 MVA Substation at Mazra by S/C LILO of 220 kV D/C Karian to Chamera transmission line.
- (iii) D/C LILO of 132 kV Kurthla Bathri line at proposed 220/132 kV Mazra Substation

The 220/132 kV, 100 MVA Mazra substation has been planned to provide drawl of power to Chamba area in Winters.

- 34.3 POSOCO stated that transformation capacity at Chamera PS is only 2x315 MVA. Power from Budhil HEP, Chamera III and Karian HEP are getting pooled at 220 kV Chamera PS and being evacuated through 400 kV lines. Injection of more power at Chamera PS may overload the 400/220 kV ICTs at Chamera. Also, many small hydro projects may come in this area in future which will be evacuated through Chamera PS.
- 34.4 HPPTCL clarified that the proposed system will result in drawl of power from Chamera PS which in turn would also help in relieving the loadings on the ICTs at Chamera.
- 34.5 HPPTCL clarified that the proposed system would result in drawl of power in winter from Chamera PS. Further, with commissioning of Mazra 220/132kV substation, the drawl of power would increase which in turn would also help in relieving the loadings on the ICTs at Chamera. However, considering the inputs from POSOCO, it was decided that HPPCL/HPPTCL would restrict the injection from the small hydros at Karian, in case of overloading of transformation capacity at Chamera Pool.
- 34.6 Powergrid stated that the agenda item was not the part of the agenda circulated by CEA, therefore, they have no updates regarding the implementation the 220kV bay at Chamera Pool.
- 34.7 After deliberations, following was agreed:

A. Transmission elements to be implemented by HPPTCL

(i) 2nd circuit stringing of 220 kV Karian to Chamera Pooling point transmission line.
(ii) 220/132 kV, 100 MVA Substation at Mazra by S/C LILO of 220 kV D/c Karian to Chamera transmission line.

(iii) LILO of 132 kV Kurthla -Bathri D/c line at 220/132 kV Mazra Substation

B. Transmission element under ISTS

(i) One no. of 220kV bay at Chamera Pool for 2nd circuit stringing of 220 kV Karian to Chamera transmission line

35.0 Intra state strengthening system by UPPTCL:

- 35.1 UPPTCL proposed following intra-state works to strengthen the network for addl. loads and reliability
 - (i) Augmentation of 400/220kV Panki S/s (UPPTCL), from 2x315 MVA to 2x500MVA to meet anticipated demand and 'n-1' criteria.
 - (ii) Replacement of old and damaged 50MVAR line reactor for 400kV Unnao Bareilly D/C line at Bareilly end for both ckts by 2x63 MVAR line reactor.
 - (iii) LILO of 132kV Sahupuri(220kV) Karmnasha (Bihar) ckt-II at 132kV Chandauli S/ s for reliable supply of power.
- 35.2 Members agreed to the above proposal of UPPTCL. Regarding proposal at (iii), UPPTCL was requested to get the proposal ratified in the ERPC(TP) meeting as 132kV Sahupuri(220kV) Karmnasha (Bihar) line is an inter-regional line.

D.

36.0 Down Stream network by State utilities from ISTS Station: Status of down stream network by State utilities from ISTS Station is enclosed as **Annexure**

27.0. Connectivity/ITA granted from Sontamber 2020 to January 2021 by CTU.

37.0 Connectivity/LTA grantedfrom September 2020 to January 2021 by CTU:

The list of connectivity/LTA granted by CTU from September 2020 to January 2021 is enclosed at Annexure-E.

	Annexure	A
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S. No.	Name (Smt/Shri/Ms)	Designation
CEA		
1	Goutam Roy	Chief Engineer (PSPA-I)
2	Ishan Sharan	Chief Engineer
3	Manjari Chaturvedi	Director
4	Nitin Deswal	Asst. Director
5	Kanhaiya Singh Kushwaha	Asst. Director
NRPC		
6	Naresh Bhandari	MS
СТИ		
7	Subir Sen	COO (CTU)
8	Ashok Pal	CGM (CTU)
9	Kashish Bhambhani	SR DGM (CTU)
SECI		
10	R.K.Aggarwal	Consultant
POSOCO		1
11	S.R. Narsimhan	Director System Operation
12	NallarasanNagarathinam	Chief General Manger
13	Rajeev Porwal	GM
UPPTCL	5	
14	Anil Jain	Director (Planning &
		Commercial)
JKPTCL, Ja	mmu	
15	Sudhir Gupta	CE(Trans)
PSTCL		
16	Sanjeev Gupta	CE/TS
RVPN		
17	Sudhir Jain	SE(P&P)
18	Sona Shishodia	Xen (P& P)
HPPTCL		
19	Arun Goyal	Director (Projects)
20	Sandeep Kumar	GM
PDD Ladakł	1	I
21	Ghulam Ahmed Meer	Chief Engineer (Distribution)
DTL	I	
22	Pramod Kumar	Asstt. Manager (Tech)
THDC		
23	L P Joshi	DGM
HVPNL	1	1
24	Pushpendra Singh	SE/Planning
25	B.K. Bhargava	XEN
26	K. K. Sarkar	XEN
27	Deepak Sarit	XEN
28	Sachin Goyal	AE

File No.CEA-PS-11-21(19)/3/2019-PSPA-I Division

S. No.	Name (Smt/Shri/Ms)	Designation
NTPC		
29	Subhash Thakur	AGM
HPSLDC		· ·
30	Ravinder Kumar	SEE
31	Sunandan Kumar	SEE
SJVN		· ·
32	Sushil Sharma	Director (Electrical)
33	S. P. Pathak	Chief General Manager
34	Romesh Kumar Kapoor	Chief General Manager
35	AmanKatoch	Deputy General Manager
CVPPPL		· ·
36	Amrik Singh	GM
37	Sandhya Gupta	Manager
PTCUL		
38	Anil Kumar	Director (Projects)
POWERGRI	D	
39	Anoop Singh	Sr GM

Annexure- B

Transmission works to be implemented in Jammu Region under Intra-State transmission system

Sl. No.	Name of the Schemes					
Ι	Laying of new D/C 220KV Transmission Line with ACSR Zebra					
а	Erection of new 220 KV Chowadi-Nagrota-Katra Line (55 Kms)					
II	Thickening of D/C 220KV Transmission Line with HTLS Conductor					
а	S/C LILO of 220KV Gladni -Udhampur line 5km at 220/33KV Grid station Nagrota					
III	Infrastructure at 132 KV Level in Tribal areas					
а	Creation of New 50 MVA 220/33 KV Grid Station Ramanagar including 24km LILO line from 220 KV Sarna- Udhampur Transmision line					
b	Creation of new 1x50 MVA , 132/33KV Grid Station Basohli including132 KV S/c LILO of 132KV D/C Sewa Mahanpur line					
С	Creation of new 20 MVA 132/33 KV Grid Station Paddar including 28km, 132 KV line from 132/33KV Grid Station Khellani Doda					
IV	Creation of new 220 KV Line Bays					
а	220 KV Line Bay 4 no (at Nagrota for 220 KV Chowadhi Nagrota katra line)					
V	Creation of new 132KV Line Bays					
a	Creation of new 132 KV line bays Creation of new 132 KV line bay at Grid station Draba for 132 KV Draba-Mendhar line					
b	Creation of 2 no new 132 KV line bays at Grid station Gladni for evacuation of power to Nagrota link from Gladni.					
с	Creation of new 1 No 132 KV line bay Jhajjar-Kotli					
d	Creation of new 10 66 KV line bay (4 No at 220/66KV Samba and 4 no at 220/66KV Ghatti)					
e	Creation of new 21 no 33 KV line bay (04 no for Nagrota Sub station, 4 no at Chowadhi 4 no at Gladni and Barn each)					
VI	Creation of new 66KV or 33KV line bays for evacuation of power					
a	Creation of new 66 KV line bay at recently augmented 150 MVA Grid station Kathua for evacuation of power					
b	Creation of new 33 KV line bay at recently augmented 150 MVA Grid station Miransahib for evacuation of power					
VII	Departive Companyation at 22KV on 66 KV Lavel					
a	Reactive Compensation at 33KV or 66 KV LevelInstallation of capacitor Banks at various Grid Stations of System and Operation Wing Jammu					
VIII	Completion of Balance work of 132 KV lines under arbitration					
a	LILO bays of 132 KV D/C RRKTL from the proposed evacuation 440/132 KV Sub Station of CVPPL along with associated 25 km 132 KV D/c transmission line					
IX	Other Miscellaneous Works					

а	Replacement of old/deteriorated control cables of 33KV & 132 KV bays at Orid station Miransahib and BB-I
b	Replacement of old/deteriorated control cables of 33KV & 132 KV bays at Grid station BB-
	11
с	Renovation of control Room building at Grid station at Miran sahib & BB-I
d	Provision for civil works at Grid station Batote as the area is sinking/slide prone and has caused damaged to protection walls and other civil works.

A

Transmission works to be implemented in Kashmir Region under Intra-State transmission system

Sl. No.	Name of the Schemes			
[A]	Infrastructure at 220kV level			
(I)	Construction of 220/132kV Grid Sub-Stations			
а	Wahipora (1x160)MVA, 220/132kV & (2x50) MVA, 220/33kV with 4 nos. 220kV line bays, 4 nos. 132kV line bays & 4 nos. 33kV line bays			
b	Badampora GIS (1x160) MVA, 220/132kV with 2 nos. 220kV line bays, 4 nos. 132kV line bays			
с	Mattan 160MVA, 220/33kV with 4 nos. 220kV line bays & 6 nos. 33kV line bays along with 160MVA 220/132kV with 2 nos. of 132kV bays			
d	Nillow (Kapren)Kulgam,160 MVA (4x53.33)MVA, 220/33kV S/s with 2 no. of 220kV line bays and 6 nos. 33kV line bays along with 160MVA (4x53.33)MVA, 220/132kV with 4 nos. of 132kV line bays			
(II)	Augmentation of 220/132kV Grid Sub-Stations			
1	Budgam 320 to 470 MVA			
2	Mirbazar 320 to 475 MVA			
3	Zainkote 450 to 615 MVA			
(III)	Construction of 220/33kV Grid Sub-Stations			
1	Sheeri GIS (1x160)MVA, 220/33kV with 2 nos. 220kV line bays & 4 nos. 33kV line bays			
2	Batkote (Pahalgam) (1x50)MVA, 220/33kV with 2 nos. 220kV line bays & 4 nos. 33kV line bays			
3	Gulmarg (1x50)MVA, 220/33kV (GIS) with 2 nos. 220kV line bays & 4 nos. 33kV line bays			
4	Tral (2x50)MVA with 2 nos. 220kV line bays & 4 nos. 33kV line bays			
5	Piglena (Pulwama), 160 MVA (4x53.33)MVA, 220/33kV S/s with 2 no. of 220kV line bays and 4 nos. 33kV line bays			
6	Bijbehara (2x50)MVA, 220/33kV with 4 nos. 220kV line bays & 6 nos. 33kV line bays			
7	Qazigund (1x50)MVA, 220/33kV S/s with 2 nos. 220kV line bays & 4 nos. 33kV line bays			
8	Gagangeer (Sonmarg) (1x50)MVA, 220/33kV S/s with 2 nos. 220kV line bays & 4 nos. 33kV line bays			
9	Khan Sahib (Beerwah) (1x50)MVA, 220/33kV with 4 nos. 220kV line bays & 4 nos. 33kV line bays			
10	Lollipora (Budgam) (2x50)MVA, 220/33kV with 4 nos. of 220kV bays & 4 nos. of 33kV line bays			
(IV)	Construction of new 220kV transmisssion lines			
(IV)	LILO of both ckts of 220kV D/C Delina - Kishanganga Line (PGCIL) at Wahipora (35km)			
2	220kV D/C line from 400/220kV Kunzar - 220/33kV Sheeri (40km)			
3	LILO of one circuit of 220kV Mirbazar –Wagoora D/C line at (Pinglena) Pulwama (12km)			
5	of one encant of 220k + frinouzur - fragoora D/C fine at (fingiona) f anwand (12km)			

4 220kV New Wanpoh - Mattan D/C line (15km) 5 LILC of one circuit of New Wanpoh - Alusteng Tr. Line at Tral (20km) 6 LILC of Alusteng - Leh 220kV S/c line on D/c towers at Gangangere (Sonamarg) (5km) 7 LILC of both ckis of 220 kV Wagoora - Kishengaga D/C line at Khansahib (Beerwah) (12km) 8 LILC of 1st ckt. of 220 kV Kishenpur - Pampore D/C line at Nillow (New Kulgam) (15km) 9 LILC of 1st ckt. of 220kV Kishenpur - Pampore D/C line at Qazigund (3km) 10 LILC of 1 ^{ard} ckt. of proposed 220kV Kunzer - Sheeri D/C line at Loulipora (4km) 12 220kV Mattan - Bijbehara (Sallar) D/C line (15km) 13 220kV Mattan - Bijbehara (Sallar) D/C line (15km) 14 LILO of one ckt. of 220kV Zainkote - Alusteng line at Badampora GIS (2.4km) •••••••••••••••••••••••••••••••••••		83
6 LILO of Alusteng - Leh 220kV S/c line on D/c towers at Gangangeer (Sonamarg) (5km) 7 LILO of both ckts of 220 kV Wagoora - Kishengaga D/C line at Nillow (New Kulgam) (12km) 8 LILO of 1 ^{su} ckt, of 220kV Kishenpur - Pampore D/C line at Nillow (New Kulgam) (15km) 9 LILO of 1 ^{su} ckt, of 220kV Kishenpur - Pampore D/C line at Qazigund (3km) 10 LILO of 1 ^{su} ckt, of proposed 220kV Kunzer - Sheeri D/C line at Gulmarg (8km) 11 LILO of 2 ^{sul} ckt, of proposed 220kV Kunzer - Sheeri D/C line at Loolipora (4km) 12 220kV Matan Bijbehara (Sallar) D/C line (15km) 13 220kV Sallar (Bijbehara) - Pahalgam (Batkote) D/C line (5km) 14 LILO of one ckt. of 220kV Zainkote - Alusteng line at Badampora GIS (2.4km) Construction of 132/33kV evel Construction of 132/34V evel (V) Construction of 132/34V evel (V) Construction of 132/34V with 2 nos. 132kV line bays & 4 nos. 33kV line bays Lolab (Kupwara) (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays Construction of 132/33kV Grid Sub-Stations (VI) Augentation of 132/33kV Grid Sub-Stations (VII)	4	220kV New Wanpoh - Mattan D/C line (15km)
7 LILO of both ekts of 220 kV Wagoora - Kishengaga D/C line at Khansahib (Beerwah) (12km) 8 LILO of 1st ekt. of 220 kV Kishenpur - Pampore D/C line at Nillow (New Kulgam) (15km) 9 LILO of 2 nd ekt. of 220 kV Kishenpur - Pampore D/C line at Qazigund (3km) 10 LILO of 2 nd ekt. of proposed 220 kV Kunzer - Sheeri D/C line at Gulmarg (8km) 11 LILO of 2 nd ekt. of proposed 220 kV Kunzer - Sheeri D/C line at Loolipora (4km) 12 220 kV Mattan Bijbehara (Sallar) D/C line (15 km) 13 220 kV Sallar (Bijbehara) - Pahalgam (Batkote) D/C line (5 km) 14 LILO of one ekt. of 220 kV Zainkote - Alusteng line at Badampora GIS (2.4 km) 14 LILO of one ekt. of 220 kV Zainkote - Alusteng line at Badampora GIS (2.4 km) 14 LILO of one ekt. of 220 kV Zainkote - Alusteng line at Badampora GIS (2.4 km) 14 LILO of 132/33 kV Grid Sub-Stations 1 Rafiabad (1x50)MVA, 132/33 kV with 2 nos. 132 kV line bays & 4 nos. 33 kV line bays 2 Hajan (1x50)MVA, 132/33 kV with 2 nos. 132 kV line bays & 4 nos. 33 kV line bays 3 Lolab (Kupwara) (1x50)MVA, 132/33 kV with 2 nos. 132 kV line bays & 4 nos. 33 kV line bays 4 Karah (Distt. Kupwara) (2x20)MVA, 132/33 kV with 1 nos. 132 kV line bays & 4 nos. 33 kV line bays 6 Magam (132.5 to 170 MVA), 2x50+20+12.5 to 3x50+20	5	LILO of one circuit of New Wanpoh - Alusteng Tr. Line at Tral (20km)
8 LILO of 1st ckt. of 220kV Kishenpur - Pampore D/C line at Nillow (New Kulgam) (15km) 9 LILO of 2 nd ckt. of 220kV Kishenpur - Pampore D/C line at Qazigund (3km) 10 LILO of 2 nd ckt. of proposed 220kV Kunzer - Sheeri D/C line at Gulmarg (8km) 11 LILO of 2 nd ckt. of proposed 220kV Kunzer - Sheeri D/C line at Loolipora (4km) 12 220kV Sallar (Bijbehara) - Pahalgam (Batkote) D/C line (15km) 13 220kV Sallar (Bijbehara) - Pahalgam (Batkote) D/C line (5km) 14 LILO of one ckt. of 220kV Zainkote - Alusteng line at Badampora GIS (2.4km) 17 Construction of 132/33kV Grid Sub-Stations 18 Infrastructure at 132kV level (V) Construction of 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 2 Hajan (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 3 Lolab (Kupwara) (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 4 Karnah (Distt. Kupwara) (2x20)MVA, 132/33kV with 1 nos. 132kV line bay & 3 nos. 33kV line bays 7 Augmentation of 132/33kV Grid Sub-Stations 1 Amargarh (132.5 to 170 MVA), 2x50+20+12.5 to 3x50+20 2 Badampora (66 to 100 MVA), 50 to 50+50 4 Kangan (40 to 70 MVA), 50 to 50+50 5 Lissar (50 to 100 MVA)	6	LILO of Alusteng - Leh 220kV S/c line on D/c towers at Gangangeer (Sonamarg) (5km)
9 LILO of 2 nd ckt. of 220kV Kishenpur - Pampore D/C line at Qazigund (3km) 10 LILO of 1 st ckt. of proposed 220kV Kunzer - Sheeri D/C line at Gulmarg (8km) 11 LILO of 2 nd ckt. of proposed 220kV Kunzer - Sheeri D/C line at Loolipora (4km) 12 220kV Mattan - Bijbehara (Sallar) D/C line (15km) 13 220kV Sallar (Bijbehara) - Pahalgam (Batkote) D/C line (5km) 14 LILO of one ckt. of 220kV Zainkote - Alusteng line at Badampora GIS (2.4km) 17 Pafiabad (1x50)MVA, 132/33kV grid Sub-Stations 18 Infrastructure at 132kV level (V) Construction of 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 2 Hajan (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 3 Lolab (Kupwara) (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 4 Karnah (Distt. Kupwara) (2x20)MVA, 132/33kV with 1 nos. 132kV line bays & 4 nos. 33kV line bays 5 Lolab (Kupwara) (2x20)MVA, 132/33kV with 1 nos. 132kV line bay & 3 nos. 33kV line bays 6 Magmentation of 132/33kV Grid Sub-Stations 1 Amargarh (132.5 to 170 MVA), 2x50+20+12.5 to 3x50+20 2 Badampora (66 to 100 MVA), 50 to 50+50 3 Khunmoh (50 to 100 MVA), 50 to 50+50 4 Kargan (40 to 70 MVA), 50	7	LILO of both ckts of 220 kV Wagoora - Kishengaga D/C line at Khansahib (Beerwah) (12km)
 10 LILO of 1st ckt. of proposed 220kV Kunzer - Sheeri D/C line at Gulmarg (8km) 11 LILO of 2nd ckt. of proposed 220kV Kunzer - Sheeri D/C line at Loolipora (4km) 12 220kV Mattan – Bijbehara (Sallar) D/C line (15km) 13 220kV Sallar (Bijbehara) - Pahalgam (Batkote) D/C line (5km) 14 LILO of one ckt. of 220kV Zainkote - Alusteng line at Badampora GIS (2.4km) 17 Infrastructure at 132kV level (V) Construction of 132/33kV Grid Sub-Stations 18 Rafiabad (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 2 Hajan (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 3 Lolab (Kupwara) (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 4 Karnah (Distt. Kupwara) (2x20)MVA, 132/33kV with 1 nos. 132kV line bays & 4 nos. 33kV line bays 4 Karnah (Distt. Kupwara) (2x20)MVA, 132/33kV with 1 nos. 132kV line bay & 3 nos. 33kV line bays 1 Amargarh (132.5 to 170 MVA), 2x50+20+12.5 to 3x50+20 2 Badampora (66 to 100 MVA), 50 to 50+50 3 Khunmoh (50 to 100 MVA), 50 to 50+50 4 Kangan (40 to 70 MVA), 2x20 to 20+50 5 Lissar (50 to 100 MVA), 50 to 50+50 6 Magam (50 to 100 MVA), 50 to 50+50 8 Arampora (90 to 120 MVA), 50 to 50+50 8 Arampora (90 to 120 MVA), 50 to 50+50 9 Habak (120 to 150 MVA), 2x50+20 to 3x50 10 Bandipora (50 to 100 MVA), 50 to 50+50 11 Shopian (50 to 100 MVA), 50 to 50+50 12 Sheeri (50 to 100 MVA), 50 to 50+50 13 LJHP (20 to 50 MVA), 20 to 50 	8	LILO of 1st ckt. of 220kV Kishenpur – Pampore D/C line at Nillow (New Kulgam) (15km)
11LILO of 2nd ckt. of proposed 220kV Kunzer - Sheeri D/C line at Loolipora (4km)12220kV Mattan - Bijbehara (Sallar) D/C line (15km)13220kV Sallar (Bijbehara) - Pahalgam (Batkote) D/C line (5km)14LILO of one ckt. of 220kV Zainkote - Alusteng line at Badampora GIS (2.4km)18Infrastructure at 132kV level(V)Construction of 132/33kV Grid Sub-Stations1Rafiabad (1x50)MVA, 132/33kV Grid Sub-Stations2Hajan (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays3Lolab (Kupwara) (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays4Karnah (Distt. Kupwara) (2x20)MVA, 132/33kV with 1 nos. 132kV line bays & 4 nos. 33kV line bays1Amargarh (132.5 to 170 MVA), 2x50+20+12.5 to 3x50+202Badampora (66 to 100 MVA), 50 to 50+503Khunmoh (50 to 100 MVA), 50 to 50+504Kangan (40 to 70 MVA), 2x20 to 20+505Lissar (50 to 100 MVA), 50 TO 50+506Magam (50 to 100 MVA), 50 TO 50+507Vilgam (50 to 100 MVA), 50 to 50+508Arampora (90 to 120 MVA), 50 to 50+509Habak (120 to 150 MVA), 50 to 50+5010Bandipora (50 to 100 MVA), 50 to 50+5011Shopian (50 to 100 MVA), 50 to 50+5012Sheeri (50 to 100 MVA), 50 to 50+5013LJHP (20 to 50 MVA), 50 to 50+5014Stopian (50 to 100 MVA), 50 to 50+5015Shopian (50 to 100 MVA), 50 to 50+5016Bandipora (50 to 100 MVA), 50 to 50+5017Shopian (50 to 100 MVA), 50 to 50+50	9	LILO of 2 nd ckt. of 220kV Kishenpur - Pampore D/C line at Qazigund (3km)
12 220kV Mattan – Bijbehara (Sallar) D/C line (15km) 13 220kV Sallar (Bijbehara) - Pahalgam (Batkote) D/C line (5km) 14 LILO of one ckt. of 220kV Zainkote - Alusteng line at Badampora GIS (2.4km) (W) Construction of 132/33kV Grid Sub-Stations 1 Rafiabad (1x50)MVA, 132/33kV Grid Sub-Stations 1 Rafiabad (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 2 Hajan (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 3 Lolab (Kupwara) (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 4 Karnah (Distt. Kupwara) (2x20)MVA, 132/33kV with 1 nos. 132kV line bays & 4 nos. 33kV line bays 6 Magnentation of 132/33kV Grid Sub-Stations 1 Amargarh (132.5 to 170 MVA), 2x50+20+12.5 to 3x50+20 2 Badampora (66 to 100 MVA), 50 to 50+50 3 Khunmoh (50 to 100 MVA), 50 to 50+50 4 Kargan (40 to 70 MVA), 2x20 to 20+50 5 Lissar (50 to 100 MVA), 50 to 50+50 6 Magam (50 to 100 MVA), 50 to 50+50 7 Vigam (50 to 100 MVA), 50 to 50+50 8 Arampora (90 to 120 MVA), 50 to 50+50 9 Habak (120 to 150 MVA), 50 to 50+50 10 Bandipora (50	10	LILO of 1 st ckt. of proposed 220kV Kunzer - Sheeri D/C line at Gulmarg (8km)
13 220kV Sallar (Bijbehara) - Pahalgam (Batkote) D/C line (5km) 14 LILO of one ckt. of 220kV Zainkote - Alusteng line at Badampora GIS (2.4km) 14 LILO of one ckt. of 220kV Zainkote - Alusteng line at Badampora GIS (2.4km) 15 Infrastructure at 132kV level (V) Construction of 132/33kV Grid Sub-Stations 1 Rafiabad (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 2 Hajan (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 3 Lolab (Kupwara) (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 4 Karnah (Distt. Kupwara) (2x20)MVA, 132/33kV with 1 nos. 132kV line bay & 3 nos. 33kV line bays 6 Karnah (132.5 to 170 MVA), 2x50+20+12.5 to 3x50+20 2 Badampora (66 to 100 MVA), 50 to 50+50 3 Khunmoh (50 to 100 MVA), 50 to 50+50 4 Karagar (40 to 70 MVA), 2x20 to 2x50+20 5 Lissar (50 to 100 MVA), 50 to 50+50 6 Magam (50 to 100 MVA), 50 to 50+50 7 Vilgam (50 to 100 MVA), 2x50+20 to 2x50+20 9 Habak (120 to 150 MVA), 2x0+20 to 2x50+20 9 Habak (120 to 150 MVA), 50 to 50+50 10 Bandipora (50 to 100 MVA), 50 to 50+50 11	11	LILO of 2 nd ckt. of proposed 220kV Kunzer - Sheeri D/C line at Loolipora (4km)
14 LILO of one ckt. of 220kV Zainkote - Alusteng line at Badampora GIS (2.4km) 18 Infrastructure at 132kV level (V) Construction of 132/33kV Grid Sub-Stations 1 Rafiabad (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 2 Hajan (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 3 Lolab (Kupwara) (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 4 Karnah (Distt. Kupwara) (2x20)MVA, 132/33kV with 1 nos. 132kV line bay & 3 nos. 33kV line bays 6 Karnah (Distt. Kupwara) (2x20)MVA, 132/33kV with 1 nos. 132kV line bay & 3 nos. 33kV line bays 6 Magarh (132.5 to 170 MVA), 2x50+20+12.5 to 3x50+20 2 Badampora (66 to 100 MVA), 50 to 50+50 3 Khunmoh (50 to 100 MVA), 50 to 50+50 4 Karagarh (132.5 to 170 MVA), 2x20 to 2x50 5 Lissar (50 to 100 MVA), 50 to 50+50 6 Magam (40 to 70 MVA), 50 to 50+50 7 Vilgam (50 to 100 MVA), 50 to 50+50 8 Arampora (90 to 120 MVA), 50+2x20 to 2x50+20 9 Habak (120 to 150 MVA), 2x50+20 to 3x50 10 Bandipora (50 to 100 MVA), 50 to 50+50 11 Shopian (50 to 100 MVA), 50 to 50+50 12	12	220kV Mattan – Bijbehara (Sallar) D/C line (15km)
Image: Construction of 132/33kV Grid Sub-Stations 1 Rafiabad (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 2 Hajan (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 3 Lolab (Kupwara) (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 4 Karnah (Distt. Kupwara) (2x20)MVA, 132/33kV with 1 nos. 132kV line bays & 4 nos. 33kV line bays 4 Karnah (Distt. Kupwara) (2x20)MVA, 132/33kV with 1 nos. 132kV line bay & 3 nos. 33kV line bays 6 Nagmentation of 132/33kV Grid Sub-Stations 1 Amargarh (132.5 to 170 MVA), 2x50+20+12.5 to 3x50+20 2 Badampora (66 to 100 MVA), 50 to 50+50 3 Khunmoh (50 to 100 MVA), 50 to 50+50 4 Kangan (40 to 70 MVA), 2x20 to 20+50 5 Lissar (50 to 100 MVA), 50 to 50+50 6 Magam (50 to 100 MVA), 50 to 50+50 7 Vilgam (50 to 100 MVA), 50 to 50+50 8 Arampora (90 to 120 MVA), 50 to 50+50 9 Habak (120 to 150 MVA), 2x50+20 to 3x50 10 Bandipora (50 to 100 MVA), 50 to 50+50 11 Shopian (50 to 100 MVA), 50 to 50+50 12 Sheeri (50 to 100 MVA), 50 to 50+50	13	220kV Sallar (Bijbehara) - Pahalgam (Batkote) D/C line (5km)
(V) Construction of 132/33kV Grid Sub-Stations 1 Rafiabad (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 2 Hajan (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 3 Lolab (Kupwara) (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 4 Karnah (Distt. Kupwara) (2x20)MVA, 132/33kV with 1 nos. 132kV line bays & 4 nos. 33kV line bays 6 Karnah (Distt. Kupwara) (2x20)MVA, 132/33kV with 1 nos. 132kV line bay & 3 nos. 33kV line bays 7 Vigamentation of 132/33kV Grid Sub-Stations 1 Amargarh (132.5 to 170 MVA), 2x50+20+12.5 to 3x50+20 2 Badampora (66 to 100 MVA), 50+16 to 50+50 3 Khunmoh (50 to 100 MVA), 50 to 50+50 4 Kangan (40 to 70 MVA), 2x20 to 20+50 5 Lissar (50 to 100 MVA), 50 to 50+50 6 Magam (50 to 100 MVA), 50 to 50+50 7 Vilgam (50 to 100 MVA), 50 to 50+50 8 Arampora (90 to 120 MVA), 2x50+20 to 3x50 9 Habak (120 to 150 MVA), 50 to 50+50 11 Shopian (50 to 100 MVA), 50 to 50+50 12 Sheeri (50 to 100 MVA), 50 to 50+50 13 LJHP (20 to 50 MVA), 20 to 50	14	LILO of one ckt. of 220kV Zainkote - Alusteng line at Badampora GIS (2.4km)
(V) Construction of 132/33kV Grid Sub-Stations 1 Rafiabad (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 2 Hajan (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 3 Lolab (Kupwara) (1x50)MVA, 132/33kV with 2 nos. 132kV line bays & 4 nos. 33kV line bays 4 Karnah (Distt. Kupwara) (2x20)MVA, 132/33kV with 1 nos. 132kV line bays & 4 nos. 33kV line bays 6 Karnah (Distt. Kupwara) (2x20)MVA, 132/33kV with 1 nos. 132kV line bay & 3 nos. 33kV line bays 7 Vigamentation of 132/33kV Grid Sub-Stations 1 Amargarh (132.5 to 170 MVA), 2x50+20+12.5 to 3x50+20 2 Badampora (66 to 100 MVA), 50+16 to 50+50 3 Khunmoh (50 to 100 MVA), 50 to 50+50 4 Kangan (40 to 70 MVA), 2x20 to 20+50 5 Lissar (50 to 100 MVA), 50 to 50+50 6 Magam (50 to 100 MVA), 50 to 50+50 7 Vilgam (50 to 100 MVA), 50 to 50+50 8 Arampora (90 to 120 MVA), 2x50+20 to 3x50 9 Habak (120 to 150 MVA), 50 to 50+50 11 Shopian (50 to 100 MVA), 50 to 50+50 12 Sheeri (50 to 100 MVA), 50 to 50+50 13 LJHP (20 to 50 MVA), 20 to 50		
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7 Vilgam (50 to 100 MVA), 50 TO 50+50 8 Arampora (90 to 120 MVA), 50+2x20 to 2x50+20 9 Habak (120 to 150 MVA), 2x50+20 to 3x50 10 Bandipora (50 to 100 MVA), 50 to 50+50 11 Shopian (50 to 100 MVA), 50 to 50+50 12 Sheeri (50 to 100 MVA), 50 to 50+50 13 LJHP (20 to 50 MVA), 20 to 50 VIII) Construction of additional 132kV line bays at existing Grid Sub-station	5	Lissar (50 to 100 MVA), 50 to 50+50
8 Arampora (90 to 120 MVA), 50+2x20 to 2x50+20 9 Habak (120 to 150 MVA), 2x50+20 to 3x50 10 Bandipora (50 to 100 MVA), 50 to 50+50 11 Shopian (50 to 100 MVA), 50 to 50+50 12 Sheeri (50 to 100 MVA), 50 to 50+50 13 LJHP (20 to 50 MVA), 20 to 50 (VII) Construction of additional 132kV line bays at existing Grid Sub-station	6	Magam (50 to 100 MVA), 50 to 50+50
9 Habak (120 to 150 MVA), 2x50+20 to 3x50 10 Bandipora (50 to 100 MVA), 50 to 50+50 11 Shopian (50 to 100 MVA), 50 to 50+50 12 Sheeri (50 to 100 MVA), 50 to 50+50 13 LJHP (20 to 50 MVA), 20 to 50 (VII) Construction of additional 132kV line bays at existing Grid Sub-station	7	Vilgam (50 to 100 MVA), 50 TO 50+50
10 Bandipora (50 to 100 MVA), 50 to 50+50 11 Shopian (50 to 100 MVA), 50 to 50+50 12 Sheeri (50 to 100 MVA), 50 to 50+50 13 LJHP (20 to 50 MVA), 20 to 50 (VII) Construction of additional 132kV line bays at existing Grid Sub-station	8	Arampora (90 to 120 MVA), 50+2x20 to 2x50+20
11 Shopian (50 to 100 MVA), 50 to 50+50 12 Sheeri (50 to 100 MVA), 50 to 50+50 13 LJHP (20 to 50 MVA), 20 to 50 (VII) Construction of additional 132kV line bays at existing Grid Sub-station	9	Habak (120 to 150 MVA), 2x50+20 to 3x50
12 Sheeri (50 to 100 MVA), 50 to 50+50 13 LJHP (20 to 50 MVA), 20 to 50 (VII) Construction of additional 132kV line bays at existing Grid Sub-station	10	Bandipora (50 to 100 MVA), 50 to 50+50
12 Sheeri (50 to 100 MVA), 50 to 50+50 13 LJHP (20 to 50 MVA), 20 to 50 (VII) Construction of additional 132kV line bays at existing Grid Sub-station	11	Shopian (50 to 100 MVA), 50 to 50+50
13 LJHP (20 to 50 MVA), 20 to 50 (VII) Construction of additional 132kV line bays at existing Grid Sub-station	12	Sheeri (50 to 100 MVA), 50 to 50+50
(VII) Construction of additional 132kV line bays at existing Grid Sub-station		
1 Additional 132kV line bays at different Switchyard (11 nos.)	(VII)	Construction of additional 132kV line bays at existing Grid Sub-station
	1	Additional 132kV line bays at different Switchyard (11 nos.)

	3 nos. at Vilgam for Vilgam – Sheeri S/c, Vilgam – Karnah S/c and 2 nd ckt. of Vilgam – Arampora D/c transmission lines
	3 nos. at Arampora for Arampora - Wahipora D/c line, and 2nd circuit of Arampora - Vilgam line
	1 no. at Sheeri for LILO of Viligam – Sheeri S/c line
	2 nos. at Shopian for Shopian – Kulgam D/c line
	2 nos. at Kulgam for Shopian – Kulgam D/c line
(VIII)	Construction of new 132kV transmisssion lines
1	Wahipora - Arampora 132kV D/C line (25km)
2	Wahipora - Lolab 132kV D/C line (50km)
3	LILO of Shopian - Kulgam 132kV D/C line (22km)
4	LILO of one circuit of Badampora - Bandipora 132kV D/c line at Hajan (6km)
5	Sheeri - Vilgam 132kV S/C on D/C line along with LILO at Rafiabad (36km)
6	Vilgam - Karnah S/C on D/C line (50km)
7	Laying of second circuit on Arampora – Vilgam 132kV S/C on D/C line (18.4km)
8	Laying of HTLS conductor on 132kV Delina - Amargarh D/C line (14ckm)
9	Laying of HTLS conductor on 132kV Mirbazar - Wanpoh D/C line (8ckm)
10	Laying of HTLS conductor on 132kV Pampore - Rawalpora D/C line (31ckm)
11	Laying of HTLS conductor on 132kV Zainkote - Waganpora D/C line (22ckm)
12	Laying of HTLS conductor on 132kV Zainkote- Bemina Tr. Line (13ckm)

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Annexure C

List of upcoming UPPTCL 765 kV, 400 kV & 220 kV substations and lines for FY 2020-21 to 2023-24

SI.	Name of Substation/Line	Voltage Ratio	Capacity (in MVA)/Ckt.	Approval	of SCM/NRSC
No.	Name of Substation/Line	Voltage Ratio	Legth (in Km.)	No.	Date
	FY : 2020-21				
	400/220/132 KV S/S Firozabad with 125 MVAR Bus Reactor	400/220 220/132	2x500 2x160		
	LILO of one Ckt of 400kv line Fatehabad, Agra (765) - Agra South (400) at Firozabad	-	20		
1	400kV DC (Quad) line Jwaharpur (TPS) - Firozabad (400)	-	80	40^{th}	22.06.2018
	LILO of 220kV SC line Firozabad 220- Agra (PG) at Firozabad (400)	-	20		
	LILO of 220kV Section of Agra PG (765) - Firozabad(400) at 220kV S/s Tundla				
	LILO of 132kV SC line Etmadpur-Barhan at Firozabad (400) 132kV DC line Firozabad- Narkhi	-	35 30		
	400/220/132KV S/S Badaun(GIS) with 125 MVAR Bus Reactor	400/220 220/132	2x315 2x160		
	400kV DC line Rosa(TPS)-Badaun(400)		100	38^{th}	30.05.2016
	400kV DC line Sambhal(400)-Badaun(400)		67		
2	400kV DC line Badaun-Farrukhabad (GREEN COR.)		95		
	LILO of 220kV SC line CB Ganj(220)-Badaun(220) at Badaun(400)		5		
	LILO of 220kV SC line Chandausi(220)-Badaun(220) at Badaun(400)		35		
	220kV DC line Badaun(400)-Dataganj(220) on single moose conductor		28		
	132kV SC line Ujhani(132)-Badaun(400), 132kV SC line Bilsi(132)-Badaun(400)(for connecting Ujhani & Bilari 132kV S/S from Badaun(400) 30km DC line on tower and further addition of 132kV 2xSC line of 10 km)		40		
	400/220/132 KV S/S Jehta(Hardoi Road), Lucknow GIS with 63 MVAR bus Reactor	400/220 220/132	2x500 2x200	37 th	20.01.2016
	LILO of both ckt. of 400kV DC line Kursi Road Lucknow (PG) - Unnao at Jehta Hardoi Road Lucknow	-	15	37	20.01.2010
•	220kV DC line Jehta Hardoi Road Lucknow(400) - Hardoi Road Lucknow (220)	-	10	-	-
3	220kV DC line Jehta Hardoi Road - Mallawan Hardoi		90		
	132kV DC line Rahimabad - Jehta Hardoi Road Lucknow(400)	-	35	-	-
	132kV SC line Jehta Hardoi Road Lucknow(400) - Mehtab bagh (Neebu Park) by U/G cable 1000sqmm. Alluminaum (3+1)	-	12	-	-
	132kV DC U/G cable interconnection between Jehta, Hardoi road(400) - Jehta New (132) S/s		0.5		
	400/220/132KV S/S Rasra (GIS), Ballia with 125 MVAR Bus Reactor	400/220 220/132	2x500 2x160	38^{th}	30.05.2016
	LILO of one ckt of 400kV DC line Ballia PG(765)-Kasara(Mau) at Rasra(400)		38		
4	LILO of 220kV SC line Rasra(220)-Ghazipur(220) at Rasra(400) 220kV DC line Rasra(400)-Bhadaura(220)		10 47		
4	132kV DC line Rasra(400)-Ballia(132)		35		
	132kV SC line Rasra(400)-Chitbaragaon(Ballia)		18		
	132kV DC line Rasra(400)-Kasimabad(132)		26		
	132kV DC line Rasra(400)-Badagaon(Mau)		50		
	400/220/132kV S/S Bhaukhari (GIS), Basti with 125 MVAR Bus Reactor	400/220 220/132	2x500 2x200	40^{th}	22.06.2018
	400 kV DC Tanda Extn. (NTPC) - Bhaukhari (Basti) Quad line LILO of two ckt. (ckt. 3&4) of 400 kV lines (Twin Moose) Gorakhpur (PG) - Lucknow (PG) at Bhaukhari (Basti) with 50 MVAR line reactors in both circuits. of Lucknow(PG)-	-	48 28, 30	1 st	11.09.2018
5	Bhaukhari (Basti) 400kV DC line at Basti end.				
	LILO of 220 kV SC line Gonda (220) - Basti (220) at Bhaukhari (400) 220 kV DC line Bhaukhari(400) - Dulhipar (Khalilabad)	-	15 60	40^{th}	22.06.201
	132 kV DC line Bhaukhari(400) - Dulhipar (Khailiabau)	-	45		
	LILO of 132 kV SC line Harraiya (Basti) - Darshannagar (Ayoddhya) at Bhaukhari (400)	-	15		
	132 kV DC line Bhaukhari (400) - Rudauli (Basti)	-	35		
	132 kV SC line Bhaukhari (400) - Gharighat		20		
	400/132/33KV S/S Sector-123, Noida, GB Nagar with 63 MVAR Bus Reactor	400/132 132/33	4x200(2x200 MVA Energized) 4x100		
	400kV DC line on Monopole Sec-148(400)-Sector-123		20		
6	LILO of one ckt of Quad Moose DC line Ataur(400)-Indirapuram(400) at Sector-123		10	3rd :	24.05.201
	132kV SC line Noida Sec-123(400)-Sec(66)		10		
	132kV DC line Noida Sec-123(400)-Sec(63)		4		
	132kV DC line Noida Sec-123(400)-Sec(67) LILO of 132kV SC line Surajpur-Noida(66) at Sec(123)		4 7		
	132kV DC line Noida Sec-123(400) - Noida Sec-115 Extn.		13		
	400/220/132KV S/S Shamli with 125 MVAR Bus Reactor	400/220 220/132	2x500 2x200		
	400kV DC line Shamli(400)-Aligarh(400) with 50MVAR line reactor on each ckt at Shamli end.		235	35 th	03.11.201
	400kV DC line Shamli(400)-Modirpuram(765)		75		
7	LILO of 220kV SC line Shamli(220)-Nanauta(220) at Shamli(400)		8		
	220kV DC line Shamli(400)-Badaikalan(220)		40		
	220kV DC line Shamli(400)-Modipuram-II(220)		60	├───	
	LILO of 132kV SC line Jalalpur(Bannat)-Thanabhawan(132) at Shamli (400) LILO of 132kV SC line Budhana-Kharad at Shamli(400)		5 16		
			10		1

				20	
SI.	Name of Substation/Line	Voltage Ratio	Capacity (in MVA)/Ckt.	Apr Ch	of SCM/NRSCT
No.		g	Legth (in Km.)	No.	Date
	220/132/33KV S/S Babina, Jhansi	220/132 132/33	2x160 2X40		
8	LILO of one ckt of 220kV DC line Lalitpur(TPS)-Dunara, Jhansi(220) at Babina(220)		10		
	LILO of 132kV 2nd ckt Lalitpur(TPS)-Hasari at Babina(220)		10		
	220/132/33KV S/S Faridpur, Bareilly	220/132 132/33	2x100 2X40	35^{th}	03.11.2014
9	LILO of 220 kV SC line Shahjahanpur - Bareilly at Faridpur (220)	-	20		
	LILO of 132 kV SC line Faridpur(132) - Bareilly Town at Faridpur (220)	-	20		
	132 kV SC line Faridpur (220) - Bisalpur on DC tower	- 220/132	30 2x160		
10	220/132/33kV S/S Vrindavan, Mathura	132/33	2X100 2X40		
10	LILO of one ckt of 220kV DC line Chhata(220)-Math(400) at Vrindavan(220) LILO of 132kV Sonkh Road - Mathura II at Vrindavan(220)		27 20		
	220/132/33kV Ayodhya (GIS)	220/132	2x160		
11		132/33	2x63	40^{th}	22.06.2018
11	LILO of one ckt of 220kV DC line Sohawal (PG)-New Tanda(220) at Ayodhya (220)		20		
	LILO of 132kV SC line Darshan nagar-Nawabganj(Gonda) at Ayodhya(220) 132kV DC line Ayodhya(220)-Rudauli(132)		20 45		
	220/132, 220/33kV S/S Nirpura(Hybrid)	220/132	2x160		
12		220/33	1x60		
	LILO of 220kV SC line Baraut(220)-Shamli(220) at Nirpura(220) LILO of 132kV SC line Chhaprauli(132)-Kirthal(132) at Nirpura(220)		15 20		
	220/33KV S/S Integrated Industrial Township Gr. Noida Ltd.(IITGNL), GIS, Gr. Noida	220/33	4x60	40^{th}	22.06.2018
13	220kV DC line Gr.Noida(765)-IITGNL(220)		45		
	220kV DC line Sikandrabad(400)-IITGNL(220)		42		
	220/33kV S/S Kidwainagar (GIS), Kanpur Nagar	220/33	3x60	3 rd	24.05.2019
14	LILO of 220 kV SC line Panki (220) - Bhauti PG (400) at Kidwai Nagar (220) Kankpur (with U/G 1000 sqmm DC copper cable)		6		
	220/132/33KV S/S Azizpur, Shahjahanpur	220/132 132/33	2x160 2x40	40^{th}	22.06.2018
	220kV DC line Shahjahanpur PG(400)-Azizpur(220)		20		
15	220kV SC line Shahjahanpur(220)-Azizpur(220)		20		
	132kV SC line Azizpur(220)-Jalalabad upto tower no. 12 of Shahjanapur-Kribhko line		7		
	132kV DC line Azizpur(220)-Srimau(132)		45 2x160		
	220/132/33KV S/S Badaikalan, Muzaffarnagar	220/132 132/33	2x100 2x40 (160+40 MVA enersiged)	35 th	03.11.2014
16	220 kV DC line Badaikalan (220) - Shamli (400)	-	40		
	LILO of 220 kV SC line Muzaffarnagar (400) - Nanauta at Badaikalan (220)	-	10 40		
	132 kV SC line Badaikalan (220) - Purkaji (132) on DC Tower LILO of 132 kV SC line Lalukheri-Baghara at Badaikalan (220)	-	40 20		
	220/132/33KV S/S Balrampur	220/132	2x160		
	LILO of 220kV SC line Gonda(400)-Behraich(220) at Balrampur(220)	132/33	2x40		
17	132kV DC line Balrampur(220)-Tulsipur(132)	-	46 48		
	132kV SC line Balrampur(220)-Bhinga(Sravasti) (2.5 km new line & 32 km stringing)	-	34.5		
	LILO of 132kV SC line Balrampur(132)-Bhinga(132) at Balrampur(220)		4		
	220/132/33KV S/S Dulhipar(Khalilabad), Sant Kabirnagar	220/132 132/33	2x160 2x40	40^{th} 1^{st}	22.06.2018 11.09.2018
	220 kV DC line Bhaukhari (Basti) - Dulhipar	-	60	-	
	220 KV DC line Braukhan (Basti) - Duinipar		1		22.06.2018
18	LILO of 220 kV SC line Gorakhpur (PG)-Bansi (Sant Kabir nagar) at Dulhipar (220)	-	15	40^{th}	22.00.2018
18		-	15 10	40 th	22.06.2018
18	LILO of 220 kV SC line Gorakhpur (PG)-Bansi (Sant Kabir nagar) at Dulhipar (220)			40 th	22.06.2018
18	LILO of 220 kV SC line Gorakhpur (PG)-Bansi (Sant Kabir nagar) at Dulhipar (220) LILO of 132 kV SC line Mehdawal - Basti (220) at Dulhipar	220/132	10 38 2x160	40 th	22.06.2018
18	LILO of 220 kV SC line Gorakhpur (PG)-Bansi (Sant Kabir nagar) at Dulhipar (220) LILO of 132 kV SC line Mehdawal - Basti (220) at Dulhipar 132 kV DC line Dulhipar(220) - GIDA (gorakhpur) 220/132/33KV S/S Maharajganj	-	10 38 2x160 2x40	40 th	01.09.2020
_	LILO of 220 kV SC line Gorakhpur (PG)-Bansi (Sant Kabir nagar) at Dulhipar (220) LILO of 132 kV SC line Mehdawal - Basti (220) at Dulhipar 132 kV DC line Dulhipar(220) - GIDA (gorakhpur) 220/132/33KV S/S Maharajganj 220 kV DC line Maharajganj (220) - Gorakhpur (PG) LILO of one ckt of 220 kV DC line Gorakhpur (PG) - Maharajganj (220) at Anandnagar	- - 220/132 132/33	10 38 2x160 2x40 70		
18	LILO of 220 kV SC line Gorakhpur (PG)-Bansi (Sant Kabir nagar) at Dulhipar (220) LILO of 132 kV SC line Mehdawal - Basti (220) at Dulhipar 132 kV DC line Dulhipar(220) - GIDA (gorakhpur) 220/132/33KV S/S Maharajganj 220 kV DC line Maharajganj (220) - Gorakhpur (PG) LILO of one ckt of 220 kV DC line Gorakhpur (PG) - Maharajganj (220) at Anandnagar (220)	- - 220/132 132/33 -	10 38 2x160 2x40 70 30		
-	LILO of 220 kV SC line Gorakhpur (PG)-Bansi (Sant Kabir nagar) at Dulhipar (220) LILO of 132 kV SC line Mehdawal - Basti (220) at Dulhipar 132 kV DC line Dulhipar(220) - GIDA (gorakhpur) 220/132/33KV S/S Maharajganj 220 kV DC line Maharajganj (220) - Gorakhpur (PG) LILO of one ckt of 220 kV DC line Gorakhpur (PG) - Maharajganj (220) at Anandnagar	- - 220/132 132/33	10 38 2x160 2x40 70		

		1	1	-87	
SI. No.	Name of Substation/Line	Voltage Ratio	Capacity (in MVA)/Ckt. Legth (in Km.)	Approval No.	of SCM/NRSCT Date
	220/132KV S/S Chandpur, Bijnore	220/132	2x160		
20	LILO of one ckt of 220kV DC line (Moose conductor) Meerut(765) UPPTCL S/s - Amroha(220) at Chandpur(220)	-	27		
	132kV DC line Chandpur-Tajpur	-	30		
	220/132 KV S/S Malwan, Fatehpur	220/132 132/33	2x160 2x40	, oth	22.07.2010
	LILO of one ckt of 220kV DC lineFatehpur(220)-Unchahar(220) at Malwan(220)	-	30	40 th	22.06.2018
21	132kV SC line Malwan(220)-Jahanabad	-	45		
	LILO of 132kV SC line Malwan(132)-Naubasta(220) at Malwan(220)	-	1		
	LILO of 132kV SC line Malwan(132)-Bindaki(132) at Malwan(220)	-	1		
	220/132/33KV S/S Kasganj	220/132 132/33	2x160 2x40		
22	LILO of 220kV SC line Sikandrarao(220)-Jawaharpur TPS(220) at Kasganj(220)	-	30	40 th	
	LILO of 132kV SC line Kasganj(132)-Ganj Dundwara(132) at Kasganj(220)	-	12		
	220/132/33KV S/S Sangipur, Pratapgarh	220/132 132/33	2x160 2x40	37 th	20.01.2016
	220KV DC line Sultanpur(400)-Sangipur 220kV DC line Raebareli(400)-Sangipur(220)	-	40 15.5		
	132kV DC line Sangipur(220)-Kunda(132)	-	40		
	132kV SC line Sangipur(220)-Lalganj(132)	-	30		
	FY : 2021-22				
	765/400/220KV S/S Modipuram (GIS), Meerut with 240 MVAR Bus Reactor on 765kV Bus & 80 MVAR Bus Reactor on 400kV Bus	765/400 400/220	2x1500 2x500	38 th	
	LILO of 765kV SC line(WUPPTCL) Greater Noida (765) - Hapur (765) at 765kV S/s Modipuram (Meerut) UPPTCL S/s.	-	45		30.05.2016
	400 kV DC line Modipuram (765) - Shamli	-	75		
1	400 kV DC line Modipuram (765) - Simbhaoli	-	40		
	220 kV DC line Modipuram(765) - Jansath on Moose Conductor	-	45		
	220 kV DC line Modipuram (765) - Amroha on Moose Conductor	-	45		
	LILO of one ckt 220kV DC line Modipuram(765) - Amroha at 220kV S/s Chandpur on Moose Conductor		27		
	220 kV DC line Modipuram (765) - Greater Noida (II) on Moose Conductor	- 765/400	50 2x1500		
	765/400/220KV S/S Rampur (GIS) with 330 MVAR Bus Reactor on 765kV Bus LILO of 765kV SC line Ghatampur TPS-Hapur at Rampur(765)- 116 km (Quad Bersimis	400/220	2x1500 2x500		
2	2xSC line on single ckt tower) with 240 MVAR line Reactor at Rampur end for Rampur- Ghatampur Section	-	116	2 nd	13.11.2018
	LILO of one ckt of 400kV DC line Bareilly (PG)-Moradabad(400) line at Rampur(765)	-	3	2	
	400kV DC line Rampur(765)-Sambhal(400)	-	70		
	LILO of 220kV SC line Moradabad(400)-Rampur(220) at Rampur (765) 220kV DC line Rampur(765)-Moradabad-II(220) on Moose Conductor	-	10 70		
	400/220/132KV S/S Simbhaoli (GIS) , Hapur with 80 MVAR Bus Reactor	400/220	2x500		
	400 kV DC line Simbhaoli (400)- Muradnagar-II(Ghaziabad) onTwin moose	220/132	2x200 95	38^{th}	30.05.2016
3	400 kV DC line Modipuram(765) - Simbhaoli	_	40		
	LILO of 220 kV SC line Hapur(Hybrid) - Simbhaoli (220) at Simbhaoli (400)	-	30		
	LILO of 132 kV SC line Garhmukteshwar- Gajraula (132) at Simbhaoli (400)	-	8		
	400/220/132KV S/S Sambhal (GIS) with 125 MVAR Bus Reactor	400/220 220/132	2x500 2x160		
	400kV DC line Rampur(765)-Sambhal(400)	-	80		
	400kV DC line Sambhal(400)-Badaun(400)	-	67	2 nd	13.11.2018
4	LILO of 220kV SC line Chandausi(220)-Sambhal(220) at Sambhal(400) LILO of 220kV SC line Sambhal(220)-Gajraula(Amroha) at Sambhal(400)	-	20 50		
	LILO of 132kV SC line Babrala(132)-Bisauli(132) at Sambhal(400)	-	24		
	LILO of 132kV SC line Chandausi(132)-Bilari(132) at Sambhal(400) 132kV SC line Sambhal(400)-Kailadevi(132)	-	32 25		
	132kV DC line Sambhal(400)-Kalladevi(132) 132kV DC line Sambhal(400)-Hasanpur(132) on Zebra Conductor.		35		
	400/220/132KV S/S Raebareli (GIS) with 125 MVAR Bus Reactor	400/220 220/132	2x500 2x160	38 th	30.05.2016
5	LILO of one ckt.of 400 kV DC line Unchahar (NTPC) - Fatehpur (PG) at Raebareli(400) 220kV DC line Raebareli(400) - Bachhrawan on moose conductor	-	60 35	30	
	220kV DC line Raebareli(400) - Bachmawan on moose conductor 220kV DC line Raebareli(400) - Amethi	-	40	38 th	30.05.2016
	220kV DC line Raebareli(400) - Sangipur(220)		15.5		
	LILO of one circuit of 132kV DC line Amawan(132) - Salon at Raebareli(400)	-	15		

SI.	Name of Substation// inc	Voltoria Datia	Capacity (in MVA)/Ckt.	₽	of SCM/NRSCT
No.	Name of Substation/Line	Voltage Ratio	Legth (in Km.)	No.	Date
	400/220/132KV Macchlisahar, Jaunpur with 63 MVAR Bus Reactor	400/220 220/132	2x315 2x160		
	Machhlisahar (400) - Varanai (765) PG 400kV DC line	-	75	4th	25.07.2019
	LILO of one ckt. of 400kV DC line Obra 'C' (400) - Obra 'B' (400) at Machhlisahar (400)				
	and 50 MVAR line reactor on each ckt at Machhlisahar (400) end.	-	175		
6	LILO of 220kV SC line Jaunpur(220) - Gajhokhar at Machhlisahar (400)	-	45		
	LILO of one ckt. of 220kV DC line (U/C) Azamgarh (II) - Bhadohi (220) at Machhlisahar				
	(400)	-	50		
	LILO of 220kV SC line Jhusi - Phoolpur at Machhlisahar(400)		51.4		
	132kV DC line Machhalishahar (400) - Shahganj		40		
	132kV SC line Machhalishahar (400) - Badlapur		30		
	LILO of 132kV SC line U/C Mungrabadsahpur - Machhlisahar(132) at Machhlisahar(400)		20		
	400/220kV S/S Sahupuri, Chandauli with 125 MVAR Bus Reactor	400/220	2x500		
	LILO of 400kV ISTS (Quad) DC line Varanasi PG(765)-Bihar Shariff(Bihar) at Sahupuri(400) with 63 MVAR Line Reactor on each ckt at Sahupuri End	-	30	. Li	
7	Extension of 220kV bus of 400/220kV Sahupuri S/S for interconnection with Sahupuri 220/132kV S/S with 1200 sq mm copper cable	-	2x0.7	39 th	29 & 30.05.201
	Shifting of 220kV Sahupuri(220)-Bhelupur(220) DC line to 400/220kV Chandauli with U/G cable	-	2x0.7		
	400/220/132KV S/S Maheba (GREEN COR.), Jalaun with 125 MVAR Bus reactor	400/220/132	2x500 2x160		
	LILO of one ckt of DC line Banda (400) - Orai(400) at Maheba(400)	-	25		
	400kV DC line Maheba(400) - Farrukhabad(400)	-	140	40^{th}	22.06.2018
	220kV DC line sarila(220) - Maheba(400)	-	140		
	220kV SC line Dakaur(220) - Maheba(400) 220kV SC line Dakaur(220) - Maheba(400)	-	35		
		220/132	2x200		
	220/132/33kV S/S Bhadohi GIS	132/33	2x200 2x40		
	Stringing of 2nd ckt of U/C 220kV SC line on DC Tower from Azamgarh -II(220) - Aurai(400)	-	78		
	LILO of one ckt of 220kV DC line Azamgarh-II (220) - Aurai(400) section at Machhalishahar (400) After stringing of 2nd ckt of U/C 220kV SC line on DC Tower from Azamgarh -II(220) - Aurai(400)	-	50		
	Extension of 220kV DC line Azamgarh (220)- Aurai(400) upto Bhadohi after stringing of 2nd ckt of 220kV (U/C) SC line on DC Tower Azamgarh -II(220) - Aurai(400)	-	5		
	Extension of U/C 220kV SC line Mirzapur- Aurai (400) upto Bhadohi(220)	-	6		
9	Extension of U/C 220kV SC line Phoolpur(220) - Aurai (400) upto Bhadohi(220) Stringing of 2nd ckt of U/C 220kV SC line on DC Tower Sahupuri(220) - Raja Ka Talab upto Aurai(400)	-	8 63		
	Stringing of 2nd ckt of U/C 220kV SC line on DC Tower Raja ka Talab - Aurai(400)	-	17		
	Extension of 220kV DC line Raja ka Talab-Aurai(400) upto Bhadohi (220)	-	5		
	Extension of U/C 132kV DC line Aurai(400)-Aurai(132) upto Bhadohi (220)	-	6		
	Extension of U/C 132kV SC line Aurai(400)-Gopiganj(132) upto Bhadohi (220)	-	9		
	Extension of U/C 132kV SC line Aurai(400)-Raja ka talab (132) upto Bhadohi (220)	-	4		
	In place of LILO of 132kV SC line Jaunpur-Mariyahu-Bhadohi(132) at Aurai(400) using inter connector(using Existing line) Additional work *At LILO point of Jaunpur(220)-Mariyahu-Bhadohi construction of 132kV DC line LILO point to Bhadohi(132) *132kV DC line Aurai(400)-Bhadohi(220)(Extension of LILO of 132kV Jaunpur-Mariyahu-Bhadohi(132)	-	6 3		
	220/132/33KV S/S Farrukhabad(Bhojpur)	220/132	2x160	3 rd	24.05.2019
		132/33	2x40	5 -	24.05.2019
10	220 kV DC line Chibramau (Kannauj) - Farrukhabad on Moose conductor	-	30		
-	LILO of one ckt of 220 kV DC line Neebkarori (Farrukhabad) - Mainpuri (PG) at 220 kV Bhojpur (Farrukhabad)	-	20	3 rd	24.05.2019
	LILO of 132 kV SC line Fategarh - Kayamganj at 220 kV Bhojpur (Farrukhabad)	-	15		
	220/132/33KV S/S Myorepur(Sonebhadra)	220/132	2x160		
11	220kV DC line Obra(220)TPS-Myorepore(Sonebhadra) each on single Moose conductor	- 132/33	2x40 75		
	LILO of one ckt of 132kV DC line Pipari Rihand - Sone nagar(Bihar) at 220kV S/s Myorepur		22		
	220/33 KV Sec-18 YEIDA	220/33	2x100		
12					
	220kV DC line Gr.Noida(765)-Sec(18)	-	24.5		
13	220/33 KV Sec-24 YEIDA	220/33	2x100		
	220kV DC line Gr.Noida(765)-Sec(24)	-	30		
	220/132/33KV S/S Dataganj(Badaun)	220/132 132/33	2x160 2x40		
1.4	220kV DC line Badaun(400)GIS-Dataganj(220) ckt on Single Moose	-	28		
	LILO of one ckt of 220kV DC line Rosa(TPS)-Badaun(220) at Dataganj(220)		12		1
	LILO of 132kV SC line Usawan-Tilhar(132) at Dataganj(220)		21		

				Appresent of SCM/NRSCT		
SI. No.	Name of Substation/Line	Voltage Ratio	Capacity (in MVA)/Ckt. Legth (in Km.)	No.	Date	
	220/132/33KV S/S Kundani,Sitapur	220/132 132/33	2x200 2x63			
	220 kV DC line Kursi road (400) PG - Kundani (220) on Mosse conductor(220 kV Bays -2 no. already exist at Kursi Road PG substation)	-	60	1 st	24.01.2020	
	LILO of 220 kV SC line Sitapur - Shahjahanpur (220) at Shahjahanpur (400) PG S/s	-	10			
15	LILO of 220 kV SC line Sitapur - Nighasanat Kundani (220)	-	30			
	132 kV DC line Biswan (132) - Kundani (220) (Zebra Conductor)	-	20			
	Stringing of 2nd ckt of 132 kV existing SC line on DC tower Sidhauli (132) - Mahmoodabad (132) 32 Km. & 01 km. New SC line on DC Tower .	-	33			
	LILO of one ckt of 132 kV DC line (after stringing of 2nd ckt) Sidhauli (132) - Mahmoodabad (132) at Kundani (220)	-	20			
16	220/33KV S/S Morta(Ghaziabad) After LILO of 220kV SC line Muradnagarll(400)-Ataur(400) at Madhuban Bapudham then LILO of 220kV Section of Muradnagar II-Madhuban Bapudham at Morta(220) on	- 220/33	3x60 0.8			
	Monopole 220/132/33KV S/S Gola, Lakhimpur	220/132 132/33	2x160	1 st	11.09.2018	
	220 kV DC line Shahjahanpur (PG) - Gola (220) Kheeri on Moose conductor	-	2x40 65	1	11.09.2018	
	LILO of 220 kV SC line Shahjahanpur (220) - Nighasan (220) at S/s Gola (220)	-	10			
17	LILO of 132 kV SC line Gola (132) -Bandaa (Shahjahanpur) at S/s Gola (220) LILO of 132 kV Gola(132)-Mohammadi section of Shahjahanpur (220)-Mohammadi -Gola (132) line at S/s Gola (220)	-	15 20			
	132 kV DC line from Mohammdi to T/off point of Shahjahanpur (220) -Gola (132) 132 kV line	-	2			
	132 kV DC line Gola (220)-Oel(132) on Zebra conductor	-	45			
	220/132/33 KV S/S Modipuram II, Meerut	220/132 132/33	2x160 2x40	35^{th}	03.11.2014	
	220kV DC line Modipuram(220)-Shamli(400)u/c	-	64	e eth	00.06.2016	
	220kV DC line Modipuram(220)-Baghpat PG(400)u/c	-	35	38 th	08.06.2016	
	LILO of 220kV SC line Modipuram(220)-Faridnagar(220) at S/s Modipuram II(220) LILO of 132kV SC line Sardhana-Kankarkhera II at S/s Modipuram II(220)	-	5 22			
	LILO of 132kV SC line Kankarkhera-Vedbyaspuri at S/s Modipuram II(220)	-	11			
	LILO of 132kV SC line Partapur-Niwari Road at S/s Modipuram II(220)	-	7			
	220/33 KV S/S Jewar Hybrid	220/33	2x60			
19	LILO of one ckt of 220kV DC line Jahangirpur(765)-IITGNL at Jewar(220)(5.5 km line on Narrow Base DC Tower then after 1.5km on Multi ckt narrow base 400kV tower equipments to quad moose on twin HTLS on Zebra conductor	-	7			
20	220/132/33 ,220/33KV S/S Deoband, Saharanpur	220/132 220/33 132/33	2x160 2x60 2x40	3 rd	24.05.2019	
	220 kV DC line SaharanpurPG(400) - Deoband on Moose conductor	-	30			
	220 kV DC line Shamli (400) - Deoband on Moose conductor	-	55			
	LILO of 132 kV SC line Kota - Deoband (132) at Deoband (220)	- 220/132	5 2x100			
	220/132/33KV S/S Amariya, Pilibhit	132/33	2x40			
21	220kV DC line Bareilly(400)-Amariya(pilibhit) on Single Moose conductor	-	40			
	132kV DC line Amariya-Pooranpur on Zebra conductor	-	60			
	132kV DC line Amariya-Richha	-	30			
	220/132KV S/S Moth, Jhansi (Upgaradation of 132kV S/s Moth)	220/132	1x160			
22	Upgradation of 132kV S/S Moth to 220kV S/S Moth	-				
	LILO of 220kV 2nd ckt of Pariccha TPS-Orai at Moth(220)	-	20			
	LILO of 132kV SC line Moth-Orai(220) at Eraich(132)	- 220/132	20 2x160			
	220/132/33KV S/S Bijnore, Lucknow	132/33	2x100 2x40			
	LILO of 220kV SC line Sarojininagar(400)-Bachhrawan at Bijnore(220) on Moose	-	1			
	LILO of one ckt. of 132 kV DC line Sarojininagar (440) - SGPGI at Bijnore (220)	-	1.5 2x160			
	220/132/33KV S/S Mallawan, Hardoi	220/132 132/33	2x40(40 MVA enersiged)			
	220kV DC line Jehta,Hardoi Road(400)-Mallawan on Moose Conductor	220	90			
24	Mallawan-Hardoi (220) 220kV DC line (since space for 220 kV bays not available at 220 kV existing Substation Hardoi, Shahjahanpur (PG) - Hardoi 220 kV SC line from Hardoi end will be disconnected and will be terminated at Mallawan (Hardoi) 220 kV substation, thus system after reorientation will be Shahjahanpur (PG) - Mallawan 220 kV SC line -110 km. and Mallawan (Hardoi) - Hardoi (existing 220 kV) 220 kV SC line)	220	56	1 st	11.09.2018	
	132 kV DC line Baghauli (Hardoi) - Mallawan (Hardoi) on Zebra Conductor	-	15			
	LILO of 132 kV SC line Sandila (Hardoi) - Bangermau (Unnao) at Mallawan (220)	-	20			

CI.				Approved of SCM/NRSCT			
SI. No.	Name of Substation/Line	Voltage Ratio	Capacity (in MVA)/Ckt. Legth (in Km.)	No.	Date		
	220/33KV S/S Satrikh Road, (Jugaur) Lucknow	220/33	2x60				
25	220kV DC line Barabanki(220)-Satrikh Road(220)	-	25				
	LILO of 220kV Single Moose line Chinhat (220)-CG City at Satrikh Road(220)	- 220/132	0.3 2x160				
	220/132/33 KV S/S Tundla, Firozabad	132/33	2x100 2x40	3 rd	24.05.2019		
26	LILO of 220 kV SC line Agra (765) PG - Firozabad (400) at Tundla (220)	-	1	3	24.03.2019		
	LILO of 132 kV SC line Tundla (132) - Barhan at Tundla (220)	-	1.5				
	220/132/33 KV S/S Birdha (GREEN COR.), Lalitpur	220/132	1x160				
27	220kV SC line Birdha(Lalitpur)-Lalitpur(220)	132/33	1x40 35				
		220/132					
28	220/132/33KV S/S Mandwara, Lalitpur	1x160 1x40					
	220kV SC line Mandwara(Lalitpur)-Lalitpur(220)		50 1x160				
29	220/132/33 KV S/S Dakor(GREEN COR.), Jalaun	220/132 132/33	1x40				
30	220kV SC line Dakor(220)-Maheba(400) 220/132KV S/S Hamirpur(GREEN COR.)	220/132	35 2x160				
30	220kV DC line Hamirpur(220)-Maheba(Jalaun) with Twin Moose conductor		104	40^{th}	22.06.2018		
31	220/132KV S/S Panwari(GREEN COR.), Mahoba	220/132 132/33	1x160 1x40				
	220kV SC line on DC tower Panwari(Mahoba)-Hamirpur (220)		40				
	220KV S/S Rampura (GREEN COR.), Jalaun	220/132 132/33	1x160 1x40				
32	220kV SC line Rampura-Sikandra(220)		30				
	220/132 kV Downstream at 400 kV S/s Banda (GREEN COR.)	220/132					
33	132kV Voltage level at Banda by Installation of 220/132kV 2x160 MVA ICT at Banda		2x160				
	400kV S/s.						
	FY: 2022-23						
	765/400/220 kV, S/s Gurusarai (Green Corr.) with 330 MVAR at 765 & 125 MVAR at 400kV Bus reactor	765/400/220	2x1500+3x500				
1	765kV S/C line Gurusarai (Jhansi)-Mainpuri		185	40^{th}	22.06.201		
	400kV Gurusarai-Orai PG(765) Quad D/C line		100				
	400/220/132kV S/s Mohanlalganj(Lucknow) GIS with 125 MVAR Bus Reactor	400/220/132	2x500+2x200				
	LILO of 400kV SC line Sarojininagar-Unnao at Mohanlalganj(400) LILO of 400kV SC line Lucknow PG-Sultanpur at Mohanlalganj(400)		37 6				
2	LILO of 220kV SC line Chinhat-CG City at Mohanlalgani(400) on Moose Conductor		31.7	1 st	24.01.2020		
	LILO of one ckt of 220kV DC line Barabanki-Satrikh Road at Mohanlalgani(400)		20				
	Interconnecting by DC U/G 1000 Sq. mm Copper Cable with optical fiber approach cable						
	between U/C 132/33 kV S/s Mohanlalganj - Mohanlalganj(400) 400/220/132 kV, S/s Farrukhabad wih 125 MVAR Bus reactor	400/220/132	2x500+2x160				
	400kV D/C line Maheba (Jalaun)-Farrukhabad	400/220/102	140				
3	400kV D/C line Farrukhabad-Badaun		95	40^{th}	22.06.201		
	220kV D/C line Farrukhabad (400)-Neebkarori 220kV D/C line Farrukhabad (400)-Etah (220)		50 90				
	220/132 kV, S/s Charkhari(Green Corr.), Mahoba	220/132	1x160				
4	220kV D/C line Charkari (Mahoba)-Gurusarai (Jhansi) with High Ampacity conductor		80	40^{th}	22.06.2018		
5	220/132/33 kV, S/s Bamaur(Green Corr.), Jhansi	220/132/33	2x160+2x40	40^{th}	22.06.2018		
	220kV S/C line Bamaur (Jhansi)-Gurusarai (Jhansi) on D/C tower 220/132/33 kV, S/s Bangra(Green Corr.), Jhansi	220/132/33	12 2x160+2x40		22.04.2014		
6	220kV S/C line Bangra Jhansi)-Gurusarai (Jhansi) on D/C tower		15	40^{th}	22.06.2018		
7	220/132/33 kV, S/s Kabrai(Green Corr.), Mahoba 220kV SC Kabrai (Mahoba)-Charkhari (Mahoba) on DC tower	220/132/33	1x160+1x40 26	40^{th}	22.06.2018		
	220/132/33 kV S/s Mohan Road (Lucknow) 220kV DC line Jehta(400) - Mohan Road(22km overhead line on Zebra conductor & 6km	220/132/33	2x160+3x63				
	by underground cooper cable 1000 sqmm.)		28				
0	LILO of 220kV SC line Sarojni nagar(400) - Hardoi road at Mohan road(400) LILO of 132kV SC line Mohan road(132) - TRT at Moahan road(220) (By underground		3				
	cooper cable 1000 sqmm.)		6				
	220/33 kV S/s Awas Vikas Sultanpur Road (Lucknow) with addition of 132/33kV	220/33	5x60+2x40	at			
9	220kV DC line Mohanlalganj(400)-Awas Vikas Sultanpur Road		15	1 st	24.01.2020		
	LILO of 132kV SC line SGPGI-Martinpurwa at Awas Vikas Sultanpur Road 220/132, 220/33 kV S/S Noida-45 (GIS)	220/132,220/33	0.2 1x160+2x60	35 th	03.11.2014		
	Interconnetor between existing 132kV Noida-45 - 220kV Noida-45 GIS with 220kV bay by 400 meter GIB/Powerr Cable 1200 Sq mm copper 220 kV Multicircuit line from Noida 148(400)-Noida 45(GIS)		0.4	33	05.11.201		
10	220 kV Multicircuit line from Noida 148(400)-Noida 45(GIS) -21.5km a) 220 kV Multicircuit (4x220) line from Noida 148(400)-Noida 45(GIS) & Noida Sector 38(A) - 17.5 km b) Following works after Bifercation point- i) 220kV DC line on Narrow base/Monopole from 17.5 km Bifcierfication point to Noida		21.5				
	Sec-45 - 1.25km ii) 220kV DC line on Narrow base/Monopole from 17.5km Bifercation point to Noida Sec 38A - 3km and 0.5km underground with 1200 Sq mm Copper Cable		21.0				

				01	
SI.			Capacity (in MVA)/Ckt.	Approval	of SCM/NRSCT
No.	Name of Substation/Line	Voltage Ratio	Legth (in Km.)	No.	Date
	220/132/33kV S/S Kirawali(Agra)	220/132/33	2x100+2x40		
	LILO of 220kV SC line Agra PGCIL(765) - Sikandra(220) 220kV PGCIL section of 220kV SC line Sikandra(220) Bharatpur(Rajasthan) at 220kV S/s Kirawali Agra		13	3 rd	24.05.2019
	LILO of 132kV SC line Kirawali(132)-Fatehpur Sikari(U/C) at Kirawali		27		
	LILO of 132kV SC line Mathura(132)-Farah(U/C) at kirawali(220)		30		
	220/132/33kV S/S Anandnagar (Maharajganj)	220/132/33	2x160+2x40		
12	LILO of One ckt of 220kV DC line Gorakhpur PG(400)-Maharajganj at Anandnagar		30	2 nd	01.09.2020
12	LILO of one ckt of 132kV DC line Bansi (220) - Nautanwa at Anand nagar(220)		17		
	LILO of 132kC U/C SC line Anandnagar(132)-Naugarh at 220kV S/s Anand nagar		1.5		
	220/132/33kV S/s Khatauli Muzaffarnagar	220/132/33	2x160+2x63		
13	LILO of 220kV SC line Muzaffarnagar(400)-Modipuram(220) at Khatauli(220)		1		
15	LILO of 220kV SC line Muzaffarnagar(400)-Shamli(220) at Khatauli(220)		12		
	LILO of 132kV SC line U/C Khatauli(132)-Pura (132) at Khatauli(220)		8		
	FY : 2023-24				
	765/400/220/132kV S/s Jakhora(Green Corr.), Lalitpur	765/400/220/132	1x1500+2x500+2x160		
	Jakhora (Lalitpur)-Gurusarai (Jhansi) 765kV S/C line		115		
1	Interconnectin of Lalitpur TPS through 220kV Jakhora – Lalitpur TPS (HTLS)D/C line		50	40 th	22.06.2018
	LILO of one ckt of Lalitpur TPS–Agra 765kV 2xS/C line at Jakhora S/S – 50Km and shifting of 330 MVAR 765kV line reactor of Lalitpur TPS–Agra 765kV S/C line at Lalitpur TPS end to Jakora end of the Jakhora–Agra 765 kV S/C line.		50		
2	220/132/33 kV, S/s Baragaon(Green Corr.), Jhansi	220/132/33	2x160+2x40	40^{th}	22.06.2018
2	Baragaon (Jhansi)-Gurusarai (Jhansi) 220kV S/C on D/C line		50	40	22.00.2018
3	220/132/33 kV, S/s Jaitpur(Green Corr.), Mahoba	220/132/33	2x160+2x40	40^{th}	22.06.2018
v	Jaitpur (Mahoba)-Charkhari (Mahoba) 220kV S/C on D/C line		22	40	22.00.2010
	220/33kV S/s Khorabar(Gorakhpur) GIS	220/33	3x60		
4	LILO of one ckt of 220kV DC line Motiram Adda(400)-Bharahua(2 km on DC Monopole & 2 km UG Cable 1000 sq mm Corepare cable)		4		

Annexure D

S.	Substation	Downstream	Status of bays	Planned 220kV system and
No.	Substation	network bays	· ·	Implementation Status
1	400/220kV, 3x315 MVA Samba	2 nos. bays utilized	Commissioned: 6 Under	
2	400/220kV, 2x315 MVA New Wanpoh	2 nos. bays utilized 4 Nos. of 220 kV bays to be utilized	Commissioned: 6	
3	400/220kV, 2x315 MVA Amargarh	4 nos. bays utilized 2 Nos. of 220 kV bays to be utilized	Commissioned: 6	 220kV D/C line from 400/220kV Kunzar - 220/33kV Sheeri No update received from PDD, J&K
4	400/220kV, 2x500 MVA Kurukshetra (GIS)	6 nos. bays utilized 2 nos. of 220 kV bays to be utilized	Commissioned: 8	 220kV Bhadson (Kurukshetra) – Salempur D/c line Status: Commissioned on 15.08.2020 Network yet to be planned for 2 bays
5	400/220kV, 2x315 MVA Dehradun	4 nos. of 220 kV bays to be utilized	Commissioned: 6	 220 kV Dehradun-Jhajra D/c line Nov, 2021 Network to be planned for 2 bays No update received from PTCUL
6	Shahjahanpur, 2x315 MVA 400/220 kV	2 nos. bays utilized Balance 4 Nos. of 220 kV bays to be utilized.	Approved: 1	 220 kV D/C Shajahnapur (PG) - Azizpur D/C line. 220 kV D/C Shahajahanpur (PG) - Gola line. LILO of Sitapur – Shahjahanpur 220 kV SC line at Shahjahanpur (PG) No update received from UPPTCL
7	Hamirpur 400/220 kV Sub-station	2 nos. bays utilized under ISTS. Balance 6 nos. to be utilized.	Commissioned :8	•220 kV Hamirpur-Dehan D/c line under construction by HPPTCL. COD- June-21

Down Stream network by State utilities from ISTS Station

S. No.	Substation	Downstream network bays	Status of bays	Planned 220kV system and Implementation Status
8	Kaithal 400/220 kV S/s	2 nos. of 220kV bays to be utilized	Commissioned :2	•220 kV Kaithal(PG)- Neemwala D/c line. Status: Commissioned on 04.08.2020
9	Sikar 400/220kV, S/s	2 Nos. of 220 kV bays to be utilized	Commissioned :2	LILO of 220 kV Sikar (220 kV GSS)-Dhod S/C line at Sikar (PG) The work is under execution and is targeted to be completed in May/June 2021
10	Bhiwani 400/220kV S/s	6 nos. of 220kV bays to be utilized	Commissioned :6	 220 kV D/C line Bhiwani (PG) – Bhiwani (HVPNL) line – Mar'21 Status: Likely to be commissioned on 30.06.2021 220 kV Bhiwani (PG) - Isherwal (HVPNL) D/c line. Status: Likely to be commissioned on 30.06.2021 Lines for 2 nos. of line bays: Yet to be Planned
11	Jind 400/220kV S/s	4 nos. of 220kV bays utilized 2 nos. of 220kV bays to be utilized Additional 2 No. 220 kV bays required by HVPNL	Commissioned :6	 LILO of both circuits of 220kV Narwana – Mund D/c line at Jind (PG). Status: Charged from HVPNL end on 01.02.2021. LILO of 220 kV Jind HVPNL to PTPS D/C line at Jind PG and thereby LILO of Jind PG to PTPS D/C line at proposed 220 kV substation Nain. Status: Proposal placed for approval by NRPCTP at Agenda Item no. 22. Additional 2 No. bays need to be constructed for the same.
12	400/220kV Tughlakabad GIS	10 no of 220kV bays to be utilized	Commissioned:1 0	

S. No.	Substation	Downstream network bays	Status of bays	Planned 220kV system and Implementation Status
		network buys		 Masjid Mor – Tughlakabad 220kV D/c line – Under execution (Expected COD: July 2022)
13	400/220kV Kala Amb GIS (TBCB) (7x105)	6 nos. of 220kV bays to be utilized	Commissioned :6	HPSEBL has planned one no. of 220kV D/c line from Kala Amb 400/220kV S/s to 220/132kV Kala Amb S/s COD- May-2023
14	400/220kV Kadarpur Sub- station (TBCB) (2x500)	8 nos. of 220kV bays to be utilized	Commissioned : 8	 LILO of both circuits of 220 KV Pali - Sector 56 D/C line at Kadarpur along with augmentation of existing conductor from 220 KV Sector-56 to LILO point with 0.4 sq inch AL-59 conductor. Status: Likely to be awarded by 31.03.2021. LILO of both circuits of 220KV Sector 65 - Pali D/C line at Kadarpur along with augmentation of balance 0.4 sq. inch ACSR conductor of 220 kV Kadarpur - Sector 65 D/C line with 0.4sq inch AL-59 conductor Status: Likely to be awarded by
15	400/220kV Sohna Road Sub-station (TBCB)	4 nos. of 220kV bays utilized 4 nos. of 220kV bays to be utilized	Commissioned : 8	 31.03.2021. LILO of both circuits of 220kV D/c Sector-69 - Roj Ka Meo line at 400kV Sohna Road Status: Likely to be commissioned by 30.04.2021. LILO of both circuits of 220kV D/c Badshahpur-Sec77 line at 400kV Sohna Road Status: Commissioned on 20.07.2020 Augmentation of balance conductor of 220 kV D/C Badshahpur - Sohna Road line from ACSR zebra conductor to 0.4" AL-59 conductor Status: Likely to be commissioned by 31.03.2021.

S.	Substation	Downstream	Status of bays	Planned 220kV system and
No.		network bays		Implementation Status
No. 16	400/220kV Prithla Sub- station (TBCB)	4 nos. of 220kV bays utilized 4 nos. of 220kV bays to be utilized	Commissioned : 8	 LILO of both ckt of 220kV D/c Ranga Rajpur – Palwal line Status: Commissioned on 02.05.2020 220kV D/C from Sector78, Faridabad Status: Likely to be awarded by 31.03.2021. 220 kV D/C from 220 kV Harfali with LILO of one
				circuit ar 220 kV Meerpur Kurali with 0.5 sq inch Moose conductor. Status: Yet to be awarded.

Establishment of new 400/220kV substations as well as augmentation of transformation capacity in Northern Region:

Sl.	Name of Substation	MVA	Expected	Downstream connectivity by
No.		Capacity	Schedule	States
1	400/220kV Dwarka-I GIS (8 nos. of 220kV bays)	4x 500	Jun'21	No update received from DTL
2	220/66kV Chandigarh GIS (8 nos. of 66kV bays)	2x 160	Jun'21	No update received from Chandigarh
3	400/220kV Jauljivi GIS Out of these 8 nos. 220kV Line Bays, 4 nos. (Pithoragath-2, & Dhauliganga-2) would be used by the lines being constructed by POWERGRID and balance 4 nos. bays would be used by the lines being constructed by PTCUL.	2x315	May'21	 220kV Almora-Jauljibi line. 220kV Brammah-Jauljibi line No update received from PTCUL
	Roorkee 400/220kV S/s (Existing) (1 no. of 220kV bays)	1x500 (3rd)	Mar'21	No update received from PTCUL
	Sonepat 400/220kV S/s (Existing) (2 nos. of 220kV bays)	1x500 (3rd)	Mar'21	 220 kV D/C to Mohana Status: Commissioned LILO of both circuits of 220 kV Samalkha- Mohana line Status: Yet to be awarded.

Sl.	Name of Substation	MVA	Expected	Downstream connectivity by
No.		Capacity	Schedule	States
				 NIT likely to be floated by 10.03.2021. 220 kV D/C to HSIIDC Rai Status: Yet to be awarded. NIT likely to be floated by 10.03.2021.
	Lucknow 400/220kV S/s (Existing) (2 nos. of 220kV bays)	1x500 (Replacement)	Mar'21	No update received from UPPTCL
	Gorakhpur 400/220kV S/s (Existing) (2 nos. of 220kV bays)	1x315	Mar'21	No update received from UPPTCL
	Fatehpur 400/220kV S/s (Existing) (2 nos. of 220kV bays)	1x500 (3rd)	Mar'21	No update received from UPPTCL
	Abdullapur 400/220kV S/s (Existing) (2 nos. of 220kV bays)	-	Mar'21	 220 kV D/C to Jorian Status: Commissioned 220 kV D/C to Rampur Kamboyan Status: Commissioned 220 kV D/C to Tepla Status: Commissioned 220 kV D/C to Railway TSS Jagadhri Status: Commissioned 220 kV D/C to Rajokheri Status: Line charged however bay construction pending at both ends.

Annexure- E

Applications granted as per previous Connectivity and LTA meetings of NR

The details of Connectivity/LTA applications granted/agreed for grant in 38th – 42nd Connectivity and LTA meetings of NR is given below:

Stage-I Connectivity

SI. No.	Application No.	Applicant	Location	Date of Application	Connectivity Sought (MW)	Nature of Applicant	Proposed location for Connectivity	Dedicated Tr. System
1	1200002817	Ampyr Renewable Energy Resources Five Private Limited	Jaisalmer, Rajasthan	16-08-2020	300	Solar	Fatehgarh-III PS	Ampyr Renewable Energy Resources Five Private Limited Solar Power Project – Fatehgarh-III PS 220 kV S/c line
2	1200002835	O2 Power Sg Pte. Ltd.	Jaisalmer, Rajasthan	31-08-2020	400	Solar	Fatehgarh-III PS	O2 Power Sg Pte. Ltd. Solar Power Project– Fatehgarh-III PS 220 kV S/c (High Capacity) line
3	1200002808	Azure Power India Private Limited	Barmer, Rajasthan	10-08-2020	500	Solar	Fatehgarh-III PS	Common Pooling Station of Azure (500MW Solar Project (1200002808) & Azure (500MW Solar Project (1200002809) - Fatehgarh- III PS 400 kV (High Capacity) S/c line on D/c tower (Common 400 kV S/c line on D/c tower to be used for SI. no 3 &4 of Azure)
4	1200002809	Azure Power India Private Limited	Barmer, Rajasthan	10-08-2020	500		Fatehgarh-III PS	Common Pooling Station of Azure (500MW Solar Project

						Solar		(120002808) & Azure (500MW Solar Project (120002809) - Fatehgarh- III PS 400 kV (High Capacity) S/c line on D/c tower (Common 400 kV S/c line on D/c tower to be used for SI. no 3 &4 of Azure)
5	1200002810	Azure Power India Private Limited	Barmer, Rajasthan	10-08-2020	500	Solar	Fatehgarh-III PS	Common Pooling Station of Azure (500MW Solar Project (1200002810) & Azure (500MW Solar Project (1200002811) - Fatehgarh- III PS 400 kV (High Capacity) S/c line on D/c tower (Common 400 kV S/c line on D/c tower to be used for SI. no 5 & 6 of Azure)
6	1200002811	Azure Power India Private Limited	Jaisalmer, Rajasthan	10-08-2020	500	Solar	Fatehgarh-III PS	Common Pooling Station of Azure (500MW Solar Project (1200002810) & Azure (500MW Solar Project (1200002811) - Fatehgarh- III PS 400 kV (High Capacity) S/c line on D/c tower (Common 400 kV S/c line on D/c tower to be used for SI. no 5 & 6 of Azure)
7	1200002839	Ampyr Renewable Energy Resources Six Private Ltd.	Bikaner, Rajasthan	01-09-2020	300	Solar	Bikaner-II PS	Ampyr Renewable Energy Resources Six Private Limited Solar Power Project – Bikaner-II PS 220 kV S/c line

8	1200002852	Sunroot Energy Private Ltd.	Bikaner, Rajasthan	11-09-2020	175	Solar	Bikaner PS	Sunroot Energy Private Ltd. Solar Power Project– Bikaner PS 220 kV S/c line (suitable to carry minimum of 300 MW at nominal voltage)
9	1200002877	XL Xergi Power Private Ltd.	Jaisalmer, Rajasthan	30-09-2020	500	Solar	Fatehgarh-III PS	XL Xergi Power Private Ltd. Solar Power Project - Fatehgarh-III PS 220 kV D/c line. (suitable to carry minimum of 300 MW per circuit at nominal voltage)
10	1200002891	The Tata Power Company Limited	Jaisalmer, Rajasthan	16-10-2020	370	Solar	Fatehgarh-III PS	The Tata Power Company Limited Solar Power Project – Fatehgarh-III PS 220 kV S/c (high capacity) line
11	1200002935	Azure Power India Private Limited	Jodhpur, Rajasthan	23-11-2020	300	Solar	Bhadla PS	Azure Power India Private Limited Solar Power Project – Bhadla-II PS 220 kV S/c line
12	1200002938	Aravalli Surya (Project 1) Private Limited	Jodhpur, Rajasthan	25-11-2020	300	Solar	Bhadla-II PS	Aravalli Surya (Project 1) Private Limited Solar Power Project –Bhadla-II PS 220 kV S/c line
13	1200003001	ABC Renewable Energy Private Limited	Barmer, Rajasthan	31-12-2020	500	Hybrid	Fatehgarh-IV PS	ABC Renewable Energy Private Limited Hybrid Power Project – Fatehgarh-IV PS 220 kV D/c line (suitable to carry minimum 300 MW per circuit at nominal voltage)

Stage-II Connectivity

SI. No.	Application No.	Applicant	Location	Date of Application	Stage-II Connectivity Sought (MW)/date	Quantum won / Land & Auditor Basis	Proposed location for Grant of Stage-II Connectivity	Dedicated Tr. System
1	1200002812	Azure Power India Private Limited	Barmer, Rajasthan	10/08/2020	500/ 19-01-2024	Solar	Fatehgarh-III PS	Common Pooling Station of Azure (500MW Solar Project (1200002812) & Azure (500MW Solar Project (1200002813) - Fatehgarh-III PS 400 kV (High Capacity) S/c line on D/c tower along with bay at common PS- under the scope of applicant. (Suitable to carry at least 1000 MW at nominal voltage) 1 No. 400 kV Bay at Fatehgarh-III PS for above line to be implemented under ISTS.
2	1200002813	Azure Power India Private Limited	Barmer, Rajasthan	10/08/2020	500/ 19-01-2024	Solar	Fatehgarh-III PS	Common Pooling Station of Azure (500MW Solar Project (1200002812) & Azure (500MW Solar Project (1200002813) - Fatehgarh-III PS 400 kV (High Capacity) S/c line on D/c tower along with bay at common PS- under the scope of applicant. (Suitable to carry at least

								1000 MW at nominal voltage) 1 No. 400 kV Bay at Fatehgarh-III PS for above line to be implemented under ISTS.
3	1200002814	Azure Power India Private Limited	Barmer, Rajasthan	10/08/2020	500/ 19-01-2025	Solar	Fatehgarh-III PS	Common Pooling Station of Azure (500MW Solar Project (1200002814) & Azure (500MW Solar Project (1200002815) - Fatehgarh-III PS 400 kV (High Capacity) S/c line on D/c tower along with bay at common PS- under the scope of applicant. (Suitable to carry at least 1000 MW at nominal voltage) 1 No. 400 kV Bay at Fatehgarh-III PS for above line to be implemented under ISTS.
4	1200002815	Azure Power India Private Limited	Jaisalmer, Rajasthan	10/08/2020	500/ 19-01-2026	Solar	Fatehgarh-III PS	Common Pooling Station of Azure (500MW Solar Project (1200002814) & Azure (500MW Solar Project (1200002815) - Fatehgarh-III PS 400 kV (High Capacity) S/c line on D/c tower along with bay at common PS- under the

								scope of applicant. (Suitable to carry at least 1000 MW at nominal voltage)
								1 No. 400 kV Bay at Fatehgarh-III PS for above line to be implemented under ISTS.
5	1200002847	XL Xergi Power Private Limited	Jaisalmer, Rajasthan	04-09-2020	400/ 31-05-2022	Solar	Fatehgarh-III PS	XL Xergi Power Pvt. Limited Solar Power Project - Fatehgarh-III PS 220 kV S/c (high capacity) line (suitable to carry minimum of 400 MW at nominal voltage) 1 no. 220kV bay at Fatehgarh-III PS for above line to be implemented as ISTS.
6	1200002907	Energizent Power Private Limited	Jaisalmer, Rajasthan	04-11-2020	125/ 31-08-2022	Hybrid	Fatehgarh-III PS	Energizent Power Private Limited Solar Power Project - Fatehgarh-III PS 220 kV S/c line (suitable to carry at least 300 MW at nominal voltage)
7	1200002939	Energizent Power Private Limited	Jaisalmer, Rajasthan	01-12-2020	80/ 31-08-2022	Hybrid (Solar 53MW, Wind 27MW)	Fatehgarh-III PS	Energizent Power Private Limited Hybrid Power Project - Fatehgarh-III PS 220 kV S/c line (line already granted with Application No. 1200002907 for Stage-II Connectivity)- – to be implemented by applicant along with bay at generation switchyard.

								(suitable to carry minimum 300 MW at nominal voltage)
8	1200002948	Aravalli Surya (Project 1) Private Limited	Jodhpur, Rajasthan	08-12-2020	150/ 31-01-2023	Generator (Solar)	Bhadla-II PS	Aravalli Surya (Project 1) Private Limited Solar Power Project – Bhadla-III PS 220 kV S/c line (to be clubbed with St-II application at SI. No.5) – to be implemented by applicant along with bay at generation switchyard (suitable to carry minimum 300 MW at nominal voltage) 1 No. 220 kV Bay at Bhadla- III PS under ISTS.
9	1200002986	Ayana Renewable Power Three Private Limited	Bikaner, Rajasthan	30-12-2020	300/ 01-04-2022	Generator (Solar)	Bikaner PS	Ayana Renewable Power Three Power Plant- Common Plg Stn. of Ayana Renewable Power One & Three Pvt. Ltd Bikaner PS 400 kV S/c line (400 kV line already granted with Application No. 1200002228 for Stage-II Connectivity). (suitable to carry minimum 900 MW at nominal voltage) – to be implemented by applicant along with bay at generation switchyard & Common PS.
10	1200002987	AMP Energy Green Private Limited	Jodhpur, Rajasthan	30-12-2020	100 (Enhancement)/ 15-10-2022	Generator (Solar)	Bhadla-II PS	Common Pooling Station of AMP Energy Green Solar Power Plant – Bhadla-II PS 220 kV S/c line (Line already granted with St-II applications Nos. 1200002559 & 1200002676 of AMP Energy)– to be implemented by applicant

								along with bay at generation switchyard (suitable to carry minimum 300 MW at nominal voltage)
11	1200002995	Aravalli Surya (Project 1) Private Limited	Jodhpur, Rajasthan	31-12-2020	74/ 31-01-2023	Generator (Solar)	Bhadla-II PS	Aravalli Surya (Project 1) Private Limited Solar Power Project – Bhadla-III PS 220 kV S/c line (to be clubbed with St-II application at SI. No.2)– to be implemented by applicant along with bay at generation switchyard (suitable to carry minimum 300 MW at nominal voltage) 1 No. 220 kV Bay at Bhadla-III PS under ISTS.
12	1200003002	ABC Renewable Energy Private Limited	Barmer, Rajasthan	31-12-2020	380/ 30-06-2022	Generator (Hybrid) (Solar 254MW, Wind 126MW)	Fatehgarh-III PS	ABC Renewable Energy Private Limited Hybrid Power Plant- Fatehgarh-IV PS 220 kV S/c (High Capacity) line to be implemented by applicant along with bay at generation switchyard 1 No. 220 kV Bay at Fathegrah-IV PS under ISTS.

LTA Applications:

SI. No	Application No./Date (Online)	Applicant	Connectivity/ Injection Point	Drawl Point	LTA (MW)/ Start & End Date (Sought)	Transmission system for LTA
1	1200002789/ 01-08-2020	SBE Renewables Seventeen Private Limited	Fatehgarh-III PS	WR (Target): 320 MW NR (Target): 280 MW	600 (Start: 01/03/2022 End: 28/02/2047)	As per Annexure-I.
2	1200002782/ 18-08-2020	ReNew Surya Aayan Private Limited	Fatehgarh-III PS	ER (Target)	300 (Start: 30/04/2022 End: 30/04/2047)	As per Annexure-I.
3	1200002783/ 18-08-2020	ReNew Surya Vihaan Private Limited	Fatehgarh-III PS	ER (Target)	100/ (Start: 30/04/2022 End: 30/04/2047)	As per Annexure-I.
4	1200002804/ 07/08/2020	Tata Power Green Energy Limited	Bikaner PS	WR (Target)	225/ (Start: 31/12/2021 End: 31/12/2046)	As per Annexure-II.
5	1200002836/ 31/08/2020	NTPC Ltd.	NTPC Auraiya Gas Power Station Switchyard	UPPCL (Firm)	20/ (Start: 25/10/2020 (15 MW) 30.11.20 (5 MW) End: 14/03/2045	LTA was to M/s NTPC Ltd. for 20 MW Solar PV from NTPC Auraiya to UPPCL, NR(Firm) with existing ISTS system connected at Auraiya GPS
6	1200002846/ 08-09-2020	Essel Saurya Urja Company of Rajasthan Limited	Bhadla PS	Bihar, ER (Firm): 450 MW	450 (Start: 01-01-2021 End: to 31-12-2045)	Essel Saurya Urja Company of Rajasthan Limited (ESUCRL) was granted LTA vide letter dated 12/10/2017 for 750 MW from 765/400/220 kV

	Bhadla PS (PG) to
	NR & WR on target
	basis through
	following
	Transmission
	system:
	√ 765kV Bhadla
	(PG) – Bikaner
	(PG) D/c.
	✓ 400 kV Bhadla
	(PG) – Bhadla
	(RVPN) D/c
	(Quad).
	✓ Establishment of
	Pooling Station at
	Bhadla (PG)
	(765/400kV:
	3x1500 MVA and
	400/220kV:
	3x500 MVA).
	✓ 1x240MVAr
	switchable line
	reactor at each
	end (each circuit)
	of 765kV Bhadla
	(PG) – Bikaner
	(PG) D/c line.
	√ 1x240 MVAr
	(765kV) & 1x125
	MVAr (400kV)
	bus reactors at
	Bhadla Pooling
	Station.
	✓ 1x500MVA,
	400/220kV
	transformer (4 th
	ICT) at Bhadla
	Pooling Station
	(PG).

						M/s Essel has applied for change in region due to firming up of beneficiaries, accordingly LTAwas granted with above system.
7	1200002883/ 08-10-2020	Avikiran Surya India Private Limited	Bikaner PS	NR (Target): 100 MW WR (Target): 200 MW	300 (Start: 31-12-2021 End: to 31-12-2046)	As per Annexure-II.
8	1200002890/ 16-10-2020	Eden Renewable Passy Private Limited	Fatehgarh-II PS	WR, MPPMCL (Firm): 300 MW	300 (Start: 28-02-2022 End: to 27-02-2047)	As per Annexure-III.
9	1200002941/ 27-11-2020	Avaada Energy Private Limited	Bikaner PS	HPPC (Firm): 240 MW	240 (Start: 05-01-2022 End: to 05-01-2047)	As per Annexure-II.
10	1200002903/ 31-10-2020	Southern Power Distribution Company of Telangana Limited	Fatehgarh-II	TSSPDCL Revised Quantum: 105.83 MW (Firm)	105.83 (Start: 29-09-2021 End: to 28-09-2046)	As per Annexure-IV.
11	1200002904/ 31-10-2020	Southern Power Distribution Company of Telangana Limited	Bhadla-II	TSSPDCL Revised Quantum: 176.375 MW (Firm)	176.375 (Start: 29-09-2021 End: to 28-09-2046)	As per Annexure-V
12	1200002962 / 21-12-2020	Avaada Energy Private Limited	Bhadla-II PS (320 MW)	PSPCL: 300MW JKPCL: 20MW (Firm)	320 (Start: 19.04.2022 End: to 19.04.2047)	As per Annexure-VI.
13	1200002727/ 22-07-2020	THDC India Limited (Vishnugad Pipalkoti HEP)	Pipalkoti switching station, Uttarakhand, NR (444 MW)	PSPCL-26.9 MW, UPPCL-165.5 MW, Delhi (BRPL & TPDDL)-43.6 MW, Chandigarh (The Engineering Department)- 2 MW, UPCL-71.8 MW, HPSEB-11.5 MW, Rajasthan (JVVNL,AVVNL,JdVVNL)- 37.3 MW, JKPCL-23.6	444 (Start: 01/06/2023 End: 31/05/2048)	It was agreed to grant LTA to THDC for Pipalkoti HEP from 01/06/2023 to 31/05/2048 with firm beneficiaries in NR through: Khandukhal - Rampura 400 kV D/c (Quad)

	MW, HPPC-18.4 MW Unallocated-43.4	line *
		*line to be taken up under ISTS

Members may note.

Annexure-I

A. Transmission system for present LTA (1000 MW) for Fatehgarh-III PS (LTA Application No. 1200002789 & 1200002782 & 1200002783)

- 1) Establishment of 2x500 MVA (3rd & 4th) 400/220kV ICT at Fatehgarh-III Pooling station—Part-A
- 2) Fatehgarh-II PS Fatehgarh-III PS 400 kV (Twin HTLS) 400 kV D/c line—Part-A
- 3) Jaisalmer (RVPN) S/s Fatehgarh-III PS (Twin HTLS) 400 kV D/c line—Part-A

B. Common Transmission system (Part of Transmission system associated with SEZ in Rajasthan under 8.1 GW Phase-II scheme)

- 1) Augmentation with 765/400kV, 2x1500MVA Transformer (5th & 6th) at Fatehgarh-II PS—Part-B1
- 2) Fatehgarh-II PS Bhadla-II PS 765kV D/c line (2nd)—Part-B
- 3) 1x240 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-II Bhadla-II 765kV D/c line—Part-B

- 4) Establishment of 765/400kV, 2x1500 MVA S/s at suitable location near Sikar (Sikar-II Substation) with 1x125 MVAr at 400kV level & 2x330 MVAr bus reactors at 765kV level at Sikar -II—Part-C
- 5) Bhadla-II PS Sikar-II 765kV D/c line-Part-C
- 6) Sikar-II Neemrana 400kV D/c line (Twin HTLS)—Part-C
- 7) 1x330 MVAr Switchable line reactor for each circuit at Sikar-II end of Bhadla-II Sikar-II 765kV D/c line—Part-C
- 8) 1x240 MVAr Switchable line reactor for each circuit at Bhadla-II end of Bhadla-II Sikar-II 765kV D/c line—Part-C
- 9) Sikar-II Aligarh 765kV D/c line—Part-D
- 10) 1x330 MVAr switchable line reactor for each circuit at each end of Sikar-II Aligarh 765kV D/c line—Part-D

Annexure-II

A. <u>Transmission system for present LTA for Bikaner-II PS (LTA Application No. 1200002804, 1200002883 & 1200002941)</u>

- 1) Establishment of 400 kV Pooling Station at Bikaner –II PS with suitable bus sectionalisation at 400 kV along with 420kV (2x125 MVAR) bus reactor
- 2) Removal of LILO of one circuit of Bhadla-Bikaner (RVPN) 400kV D/c(Quad) line at Bikaner (PG). Extension of above LILO section from Bikaner (PG) upto Bikaner-II PS to form Bikaner-II PS – Part-F – Bikaner (PG) 400kV D/c(Quad) line – Part-F1
- 3) Bikaner-II PS Khetri 400 kV 2xD/c line (Twin HTLS* on M/c Tower) Part-F
- 4) 1x80MVAr switchable Line reactor on each circuit at Khetri end of Bikaner-II Khetri 400 kV 2xD/c Line– Part-F
- 5) Khetri- Bhiwadi 400 kV D/c line (Twin HTLS)* Part-F

1) ± 300 MVAr, STATCOM along with 2x125 MVAr MSC, 1x125 MVAr MSR at Bikaner-II– Part-F

2) Power reversal on ±500 KV, 2500 Balia- Bhiwadi HVDC line upto 2000 MW from Bhiwadi to Balia - Power reversal in Balia-Bhiwadi HVDC line *with minimum capacity of 2100 MVA on each circuit at nominal voltage

Annexure-III

A. Transmission system for present LTAs (300 MW) for Fatehgarh-II PS (LTA Application No. 1200002890)

1. Augmentation of 2x500 MVA, 400/220kV ICT (7th & 8th) at Fatehgarh-II Pooling station

- 1. Augmentation with 765/400kV, 2x1500MVA Transformer (5th & 6th) at Fatehgarh-II PS
- 2. Fatehgarh-II PS Bhadla-II PS 765kV D/c line (2nd)
- 3. 1x240 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-II Bhadla-II 765kV D/c line
- 4. Establishment of 765/400kV, 2x1500 MVA S/s at suitable location near Sikar (Sikar-II Substation) with 1x125 MVAr at 400kV level & 2x330 MVAr bus reactors at 765kV level at Sikar -II

- 5. Bhadla-II PS Sikar-II 765kV D/c line
- 6. Sikar-II Neemrana 400kV D/c line (Twin HTLS
- 7. 1x330 MVAr Switchable line reactor for each circuit at Sikar-II end of Bhadla-II Sikar-II 765kV D/c line
- 8. 1x240 MVAr Switchable line reactor for each circuit at Bhadla-II end of Bhadla-II Sikar-II 765kV D/c line
- 9. Sikar-II Aligarh 765kV D/c line
- 10. 1x330 MVAr switchable line reactor for each circuit at each end of Sikar-II Aligarh 765kV D/c line
- 11. STATCOM:

Fatehgarh – II S/s: STATCOM: ± 600 MVAr, 4x125 MVAR MSC, 2x125 MVAr MSR Bhadla – II S/s: STATCOM: ± 600 MVAr, 4x125 MVAR MSC, 2x125 MVAr MSR

Annexure-IV

A. Transmission system for present LTAs (105.83 MW) for Fatehgarh-II PS (LTA Application No. 1200002903)

1. Augmentation of 2x500 MVA, 400/220kV ICT (7th & 8th) at Fatehgarh-II Pooling station

- 2. Augmentation with 765/400kV, 2x1500MVA Transformer (5th & 6th) at Fatehgarh-II PS
- 3. Fatehgarh-II PS Bhadla-II PS 765kV D/c line (2nd)
- 4. 1x240 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-II Bhadla-II 765kV D/c line
- 5. Establishment of 765/400kV, 2x1500 MVA S/s at suitable location near Sikar (Sikar-II Substation) with 1x125 MVAr at 400kV level & 2x330 MVAr bus reactors at 765kV level at Sikar -II

- 6. Bhadla-II PS Sikar-II 765kV D/c line
- 7. Sikar-II Neemrana 400kV D/c line (Twin HTLS)*
- 8. 1x330 MVAr Switchable line reactor for each circuit at Sikar-II end of Bhadla-II Sikar-II 765kV D/c line
- 9. 1x240 MVAr Switchable line reactor for each circuit at Bhadla-II end of Bhadla-II Sikar-II 765kV D/c line
- 10. Sikar-II Aligarh 765kV D/c line
- 11. 1x330 MVAr switchable line reactor for each circuit at each end of Sikar-II Aligarh 765kV D/c line
- 12. STATCOM:
 - Fatehgarh II S/s: STATCOM: ± 600 MVAr, 4x125 MVAR MSC, 2x125 MVAr MSR Bhadla – II S/s: STATCOM: ± 600 MVAr, 4x125 MVAR MSC, 2x125 MVAr MSR

*with minimum capacity of 2100 MVA on each circuit at nominal voltage

Annexure-V

A. Transmission system for present LTAs (176.375 MW) for Bhadla-II PS (LTA Application No. 1200002904)

1. Augmentation of 1x1500 MVA, 765/400 kV ICT (2nd) at Bhadla-II Pooling station

- 1. 1x240 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-II Bhadla-II 765kV D/c line
- 2. Establishment of 765/400kV, 2x1500 MVA S/s at suitable location near Sikar (Sikar-II Substation) with 1x125 MVAr at 400kV level & 2x330 MVAr bus reactors at 765kV level at Sikar -II
- 3. Bhadla-II PS Sikar-II 765kV D/c line

- 4. Sikar-II Neemrana 400kV D/c line (Twin HTLS)*
- 5. 1x330 MVAr Switchable line reactor for each circuit at Sikar-II end of Bhadla-II Sikar-II 765kV D/c line
- 6. 1x240 MVAr Switchable line reactor for each circuit at Bhadla-II end of Bhadla-II Sikar-II 765kV D/c line
- 7. Sikar-II Aligarh 765kV D/c line
- 8. 1x330 MVAr switchable line reactor for each circuit at each end of Sikar-II Aligarh 765kV D/c line
- 9. STATCOM:

Fatehgarh – II S/s: STATCOM: ± 600 MVAr, 4x125 MVAR MSC, 2x125 MVAr MSR Bhadla – II S/s: STATCOM: ± 600 MVAr, 4x125 MVAR MSC, 2x125 MVAr MSR

*with minimum capacity of 2100 MVA on each circuit at nominal voltage

For LTA Application No. 1200002962

Annexure-VI

A. Transmission system for present LTAs (320 MW) for Bhadla-II PS

1. Augmentation of 2x1500 MVA, 765/400 kV ICT (2nd & 3rd) at Bhadla-II Pooling station

- 2. Establishment of 765/400kV, 2x1500 MVA S/s at suitable location near Sikar (Sikar-II Substation) with 1x125 MVAr at 400kV level & 2x330 MVAr bus reactors at 765kV level at Sikar -II
- 3. Bhadla-II PS Sikar-II 765kV D/c line
- 4. Sikar-II Neemrana 400kV D/c line (Twin HTLS) *
- 5. 1x330 MVAr Switchable line reactor for each circuit at Sikar-II end of Bhadla-II Sikar-II 765kV D/c line
- 6. 1x240 MVAr Switchable line reactor for each circuit at Bhadla-II end of Bhadla-II Sikar-II 765kV D/c line
- 7. Sikar-II Aligarh 765kV D/c line
- 8. 1x330 MVAr switchable line reactor for each circuit at each end of Sikar-II Aligarh 765kV D/c line
- 9. STATCOM:

Fatehgarh – II S/s: STATCOM: ± 2x300 MVAr, 4x125 MVAR MSC, 2x125 MVAr MSR Bhadla – II S/s: STATCOM: ± 2x300 MVAr, 4x125 MVAR MSC, 2x125 MVAr MSR

*with minimum capacity of 2100 MVA on each circuit at nominal voltage

In addition to above, following Connectivity system shall also be required for LTA:

1. Establishment of 1x500 MVA, 400/220kV ICT (1st ICT of 220kV section-II) at Bhadla-II PS and Bhadla PS-Bhadla-II PS 400 kV D/c line

or

Establishment of 1x1500 MVA, 765/400 kV ICT & 1x500 MVA, 400/220kV ICT at Bhadla-II PS and LILO of Ajmer – Bikaner 765 kV D/c at Bhadla-II S/s(New) or Bhadla-II – Fatehgarh-II 765kV D/c line & LILO of Fatehgarh (TBCB) – Bhadla (PG) 765kV D/c line (to be operated at 400kV) at Fatehgarh-II so as to establish Fatehgarh (TBCB) – Fatehgarh-II 400kV D/c line (765kV line operated at 400 kV) and Fatehgarh-II - Bhadla 765kV D/c line.



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

सेवा में / To

-As per enclosed list-

विषय: "ट्रांसमिशन पर राष्ट्रीय समिति" (एनसीटी) की 4th बैठक का कार्यवृत्त |

Subject: Minutes of the 5th Meeting of "National Committee on Transmission (NCT)"

महोदया / महोदय/Sir/Madam,

The 5th meeting of the "National Committee on Transmission" (NCT) was held through VC on 25.08.2021 and 02.09.2021 under the Chairmanship of Chairperson, CEA & Chairman, NCT. The minutes of the meeting is enclosed herewith.

भवदीय

(ईशान शरण /Ishan Sharan) मुख्य अभियन्ता एवं सदस्य सचिव/ Chief Engineer & Member Secretary (NCT)

Copy to:

(i) Joint Secretary (Trans), Ministry of Power, Shram Shakti Bhawan, New Delhi-110001.

List of addressees:

	or autressees.		r1
1.	Chairperson,	2.	Member (Power System),
	Central Electricity Authority		Central Electricity Authority
	Sewa Bhawan, R.K. Puram,		Sewa Bhawan, R.K. Puram,
	New Delhi – 110 066.		New Delhi – 110 066.
3.	Member (Economic & Commercial),	4.	Director (Trans), Ministry of Power
	Central Electricity Authority		Shram Shakti Bhawan,
	Sewa Bhawan, R.K. Puram,		New Delhi-110001.
	New Delhi – 110 066.		
5.	Sh. Dilip Nigam, Scientist 'G',	6.	Chief Operating Officer,
	MNRE, Block no. 14, CGO Complex,		Central Transmission Utility
	Lodhi Road, New Delhi – 110003		POWERGRID, Saudamini, Plot No. 2,
			Sector-29, Gurgaon – 122 001.
7.	Sh. Rajnath Ram,	8.	CMD, POSOCO,
	Adviser (Energy), NITI Aayog,		B-9, Qutub, Institutional Area,
	Parliament Street,		Katwaria Sarai, New Delhi – 110010
	New Delhi – 110 001.		
9.	Dr. Radheshyam Saha,	10	Shri Sushanta Kumar Ray Mohapatra,
	Ex. Chief Engineer,		Ex. Chief Engineer,
	Central Electricity Authority		Central Electricity Authority

Minutes of the 5th meeting of National Committee on Transmission held on held on 25.08.2021 and 02.09.2021 through VC.

The list of participants is at **Annexure IA**.

- 1. Confirmation of the minutes of the 4th NCT meeting held on 20.01.2021 and 28.01.2021.
- **1.1.** The two sittings of the 4th meeting of the "National Committee on Transmission" (NCT) were held on 20.01.2021 and 28.01.2021. Subsequently, the minutes of the meeting were issued vide CEA letter No. File No. CEA-PS-11-15(11)/1/2020-PSPA-I Division dated 22.03.2021.
- **1.2.** Subsequently, CTU vide email dated 26 .03.2021 intimated that some issues deliberated in the meeting have not been included in the minutes of the meeting. Accordingly, Corrigendum to the Minutes of the 4th meeting of the National Committee on Transmission was issued vide CEA letter no CEA-PS-11-15(11)/1/2020-PSPA-I Div dated 13.04.2021.
- **1.3.** Further, CTUIL vide email dated 23.07.2021 had conveyed the following observation on the Minutes of the Meeting and has requested for necessary modification in the minutes of the meeting:

In the minutes of the 4th NCT meeting under para 7.2.1, 5 nos. 400 kV bays were proposed to be implemented for RE generators at Bhadla-II PS (3 nos), Fatehgarh-II (1 no.), & Fatehgarh-III (1 no) (erstwhile Ramgarh-II) PS under ISTS. However, the same has been recorded as 6 nos. 400 kV bays [Bhadla-II PS (3 nos), Fatehgarh-II (2 no.) & Fatehgarh-III (1 no)] under the concluding para 7.2.11.

- **1.4.** CTUIL stated the following:
 - i) MoP vide its OM dated 16th July' 2021 has already allocated the implementation of 2 no. of 400 kV bays at Fatehgarh-II PS through RTM route to PGCIL. NCT may approve the corrigendum proposed, regarding implementation of 400 kV bays at Fatehgarh-II (one bay only), based on which modification of MoP OM may be taken up.
 - ii) MoP vide Gazette notification dated 19.07.2021 has issued fresh notification of the "Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II- Part F" for implementation through TBCB route based on the change in the scope of works of the scheme as agreed in the 4th meeting of NCT. The scope of works interalia, includes Bikaner-II PS Khetri 400 kV 2xD/c line (Twin HTLS* on M/c Tower) and Khetri- Bhiwadi 400 kV D/c line (Twin HTLS)* for which the ampacity of the lines has been specified as "*minimum capacity of 2200 MVA on each circuit at nominal voltage*". This needs to be revised as "*minimum capacity of 2100 MVA on each circuit at nominal voltage*". The scheme has already been awarded with ampacity of 2100 MVA. Accordingly, the same may be noted by 5th NCT.

- iii) MoP vide Gazette notification dated 19.07.2021 has issued fresh notification of the "Transmission system for evacuation of power from RE projects in Osmanabad area (1 GW) in Maharashtra for implementation through TBCB route based on the change in the future scope of works of the scheme as agreed in the 4th meeting of NCT. The implementation timeframe for the scheme has not been mentioned in the Gazette Notification. The implementation timeframe of 18 months from date of SPV acquisition has been incorporated in the bidding documents of the said scheme. The same may be noted by NCT.
- **1.5.** NCT approved the modifications proposed at 1.4(i) and noted the submission made by CTU at 1.4(ii) and (iii).
- **1.6.** The minutes of the 4th NCT meeting issued vide CEA letter No. File No. CEA-PS-11-15(11)/1/2020-PSPA-I Division dated 22.03.2021 and corrigendum issued vide CEA letter no CEA-PS-11-15(11)/1/2020-PSPA-I Div dated 13.04.2021 (enclosed as **Annexure IB**) were confirmed alongwith para 1.5 above.
- 2. Amendments in the Terms of Reference of the National Committee on Transmission vide MoP OM dated 20.05.2021.
- 2.1. MoP vide OM no. 15/03/2017 (Trans) dated 04.11.2019 had constituted the National Committee on Transmission (attached as Annexure IIA). MoP vide its OM no 15/03/2018-Trans Pt(5) dated 20/05/2021 (attached as Annexure IIB) has issued the following amendments in the Terms of Reference and constitution of the NCT:
 - "
 - *a) CMD, POSOCO will be a member of NCT*
 - b) The following functions would be added to the Terms of Reference of NCT:
 - (i) To formulate the packages for the Transmission Schemes for their implementation and to recommend their mode of implementation i.e. Tariff Based Competitive Bidding (TBCB)/Regulated Tariff Mechanism (RTM), as per the existing Tariff Policy, to Ministry of Power
 - *(ii)* To examine the cost of the Transmission Schemes
 - *(iii)* To allocate the task of carrying out survey amongst CTU, RECTPCL and PFCCL by maintaining a roster. "

Further, NCT while considering the Transmission Planning shall also keep in mind the following aspects:

- (i) Regional Power Committees (Transmission Planning) cannot decide on transfers across region.
- (ii) Growth of Renewable Energy, being the national Mission, areas with high RE potential needs to be identified and connected to bulk power evacuation systems.
- **2.2.** Subsequent to the issuance of the aforesaid amendments, in order to facilitate NCT in achieving the task of "*Examination of Cost of the Transmission Schemes*", Member (Power System), CEA vide letter no CEA-PS-11-16(11)1/2018 PSPA-I/I/15799 dated 02/06/2021 (attached as **Annexure IIC**) formulated the Cost Committee with the approval of Chairperson, CEA, and Chairman of the NCT. The composition of this Cost Committee is as follows:

1.	Chief Engineer (PSPA-I), CEA	Chairman
2.	Director (PSPA-I), CEA	Member & Convener
3.	Director (PSETD), CEA	Member
4.	Director (F&CA), CEA	Member
5.	Representative from CTUIL	Member
7.	Representative from Cost Engg. Dept, PGCIL	Member
8.	Representative from PFCCL	Member
9.	Representative from RECDPCL	Member
10.	Chief Engineer from STU/SEB/Electricity Department	Member
	of concerned State in which transmission scheme lies	

- **2.3.** The first meeting of this Cost Committee was held on 22.07.2021 wherein cost estimation of two schemes were done based on the Cost Matrix of March'2020 Price Level provided by POWERGRID alongwith inputs from other members. In line with amendments issued by MoP, the Transmission Schemes approved in the Regional Power Committees (Transmission Planning) has been proposed as transmission packages alongwith their estimated cost for approval of NCT. For cost estimation, methodology adopted by cost committee has been used by considering the approximate line lengths, as against the required details of the transmission route that can be obtained after the survey. NCT was requested to suggest way forward to be adopted to comply with the revised ToR.
- 2.4. Member (E&C), CEA, observed that allocation of survey works of the transmission schemes amongst CTU, RECTPCL and PFCCL on roster basis by NCT, would result in availability of adequate time for carrying out survey works. This would facilitate survey agency in carrying out detailed survey, which in turn would facilitate more realistic cost estimation of the transmission schemes. CTUIL clarified that the survey agency would carry out the preliminary route survey only whereas the detailed route survey would be carried out by the successful bidder.
- **2.5.** NCT members observed that at present the role of Bid Process Co-ordinator (BPC) is being carried out by PFCCL and RECPDCL for schemes to be implemented through TBCB route. Further, all the transmission schemes to be implemented through RTM route are now being allocated to CTUIL, therefore, CTUIL may be allocated the task of carrying out survey for RTM projects.
- **2.6.** CTUIL opined that since RTM projects mainly involves works pertaining to Augmentation/Technical Upgradation at existing S/stn/lines, as such there was no need of carrying out survey works for projects being awarded under RTM. Accordingly, the roster needs to be maintained only for schemes to be implemented through TBCB route.
- **2.7.** Regarding readiness of CTUIL to carry out the survey of the transmission schemes, CTUIL stated that it would be able to carry out the survey of the transmission schemes as stipulated in the amendments issued to the ToR of the NCT. As CTUIL is currently not functioning as Bid Process Coordinator, CTUIL would hand over the survey report to the respective BPCs (PFCCL, RECPDCL). As far as recovery of expenses done for carrying out survey is concerned, the same may be reimbursed by the BPC or provision for

recovery of the same can be kept in the Fees and Charges for CTUIL Regulations to be framed by CERC.

- **2.8.** NCT members observed that as there would be three agencies involved in carrying out the survey of TBCB schemes, there was a need to evolve Standard Specifications for carrying out the survey work. It was agreed that CTUIL in coordination with BPC's (RECPDCL & PFCCL) and CEA would prepare standard specifications for survey of transmission schemes being implemented through TBCB route.
- **2.9.** Expert Member (NCT), Shri S. K. Ray Mohapatra observed that the Cost Committee constituted vide CEA letter dated 02/06/2021 inte ralia comprises of representative from Cost Engineering Department of PGCIL. Since PGCIL is one of the transmission licensees, to avoid any conflict of interest, co-opting of representative from EPTA to the cost committee may also be considered.
- 2.10. Director, MoP stated that the Cost Committee needs to be a non-partisan body and there would be conflict of interest if any transmission licensee is included in the Cost Committee. Director (PSPA-I), CEA, stated that inclusion of PGCIL as a member of cost committee was done as the Cost Matrix for cost estimation is made available by PGCIL. Cost Matrix is the basic input for cost estimation of the transmission schemes. CTUIL stated that they were also dependent on PGCIL for the cost data required for estimation of cost of transmission schemes.
- **2.11.** Shri Dilip Nigam, Adviser, MNRE, suggested that as far as availability of Reference Cost Matrix from PGCIL is concerned, the same could be formally sought from PGCIL by Ministry of Power. Director, MoP agreed to the same and requested CEA to formally write to MoP so that necessary direction could be issued to PGCIL.
- **2.12.** Member (E & C), CEA, stated that there is a need to collect the per unit cost data of substation equipments, per km cost of transmission lines at various voltage levels from different STU's, Private transmission licensees, PGCIL and some derived cost could be arrived at by the Cost Committee for estimation purpose. Member (Power System), CEA, stated that the cost data collection was attempted in the past but large variations were observed in the data furnished by Private Transmission Licensees, PGCIL and STUs.
- **2.13.** After detailed deliberations on the Amendments in the ToR of NCT the following was agreed:
 - i) To examine the cost of the transmission schemes:
 - The cost estimation of the transmission scheme that is put for recommendation of the NCT, would be done by CEA and CTUIL based on the methodology followed by the Cost Committee. At this stage, no survey report of the scheme is available, therefore, cost estimation would be done using the available parameters/inputs.
 - After availability of the survey report, cost estimation would again be done by cost committee and put up for concurrence by NCT.

- PGCIL, being a transmission licensee, would not be a member of the cost committee. However, PGCIL would continue to provide cost inputs to cost committee. MoP to issue necessary directions to PGCIL for providing reference Cost Matrix data for cost estimation of transmission schemes on yearly basis.
- Accordingly, CEA to reconstitute the cost committee.
- ii) To allocate the task of carrying out survey:
 - CEA in coordination with BPC's (RECPDCL & PFCCL) and CTUIL would prepare standard specifications for carrying out survey of transmission schemes being implemented through TBCB route.
 - List of the transmission schemes recommended for implementation through TBCB route by NCT and their subsequent approval by Ministry of Power, to be maintained, for facilitating allocation of survey works.
 - NCT will allocate the surveying agency (CTUIL/RECPDCL/PFCCL) for the transmission schemes to be implemented through TBCB route.
 - CTUIL may take necessary directions from MoP regarding recovery of expenses for carrying out survey works.
- 3. Status of earlier schemes recommended by NCT.
 - A. Status of schemes recommended in the 4th NCT meeting is enclosed as Annexure-IIIA
 - **B.** Summary of the bidding status of transmission schemes currently under bidding by BPCs as given below:

Sl. No.	BPC	No. of projects under bidding	Bidding on hold	Bidding yet to start	Total
1	RECPDCL	3	1	6	10
2	PFCCL	6	2	1	9

As per the details furnished by BPC's (PFCCL & RECPDCL), the current status of transmission schemes which are under bidding is attached as **Annexure-IIIB**.

4. Evaluation of the functioning of the National Grid on quarterly basis.

The copy of the presentation made by POSOCO on the functioning of the National Grid is enclosed as **Annexure-IV**.

5. New Transmission schemes recommended by RPC(TP)

(i) CEA stated that the inter-state transmission schemes agreed in the Regional Power Committee (Transmission Planning) are reviewed and recommended by NCT, based on which, the schemes are notified in the Gazette/ allotted by MoP for implementation through TBCB/ RTM route respectively. However, it has been observed that some transmission schemes have been put on hold even after MoP order/Gazette notification. This has been due to various reasons like non-receipt of LTA, adequate land not being available for setting up RE generation projects and delay in setting up of RE generation in the identified potential energy zones. MoP is of the view that once the project is notified/allotted by MoP, the project should not be kept on hold. To avoid such situation NCT may also assess the likely implementation schedule of transmission schemes based on inputs from MNRE/ SECI/CTUIL/POSOCO etc., before recommending the same to MoP.

- (ii) Further, MoP vide letter dated 02.08.2021, forwarding the minutes of the 5th meeting of sub-committee on cross cutting issues of setting up of transmission lines in RE rich areas has advised CEA and CTU to explore different options for maximizing transmission capacity utilization, including BESS.
- (iii) Accordingly, NCT was requested to recommend the new schemes that has been included for deliberation, keeping in view the above observations of MoP.

Schemes agreed in Regional Power Committees (Transmission Planning)

A. New Inter-State Transmission Schemes in Western Region:

5.1. Transmission system for evacuation of power from Neemuch SEZ (1000 MW):

5.1.1. CEA stated that MNRE vide letter dated 15.04.2020 inter-alia granted approval for 1000 MW RE potential zones at Neemuch. In 3rd meeting of WRPC(TP), the following scheme was agreed for evacuation of power from Neemuch SEZ (1000 MW):

Transmission system for evacuation of power from Neemuch SEZ (1000 MW) A. Transmission system for providing connectivity and LTA.

- (i) Establishment of 2x500 MVA, 400/220 kV Pooling Station at Neemuch with 1x125 MVAr, 400 kV Bus Reactor
- (ii) Neemuch PS Chhittorgarh (PG) S/s 400 kV D/C line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage).
- B. Transmission system strengthening in matching timeframe of Neemuch SEZ.
 - (i) Neemuch PS- Mandsaur S/stn 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage).

Implementation of Part A and Part B of the scheme in same time frame would serve as inter-regional corridor for dispersal of RE power as well the evacuation system for Neemuch Solar Park.

The above scheme has been agreed by RPVNL in a meeting held on 08.07.2021 and the scheme would be put up for ratification of NPRC(TP) in its next meeting.

- **5.1.2.** Expert Member, Shri S K Ray Mohapatra enquired about the type of switchgear at the proposed Neemuch pooling station. CEA confirmed that it is an AIS S/stn.
- **5.1.3.** CTU stated that Stage-II Connectivity and LTA of 500 MW has already been granted at proposed Neemuch P.S. with start date of LTA as November, 2022 or availability of transmission system, whichever is later. However, the signing of LTA agreement and submission of CBG amount is still pending.
- **5.1.4.** NCT members observed that with November 2022 being the schedule of RE generation at Neemuch P.S., only 15 month time was available for implementation of the transmission scheme. MNRE informed that the bidding of Neemuch RE park has been

concluded in the month of August 2021, therefore its implementation schedule is likely to get revised.

- **5.1.5.** CTU informed that with the approval of the said scheme in 3rd meeting of WRPC (TP), it has initiated the parallel process of applying for Regulatory Approval for the scheme.
- **5.1.6.** After detailed deliberations NCT recommended the following:

Name of the scheme/est.	Mode of	Purpose /Justification
cost/schedule	implementation	
TransmissionsystemforevacuationofpowerfromNeemuchSEZ Estimated Cost: Rs547 Crore ImplementationTimeframe :18monthsfromdateofSPVacquisition	TBCB	 Evacuation of power from Neemuch SEZ Inter-regional link between NR & WR for facilitating dispersal of RE power

Implementation of the scheme to be taken up after receipt of LTA applications from RE developer at Neemuch Pooling Station.

The Detailed Scope of works in the scheme is as given below:

Transmission system for evacuation of power from Neemuch SEZ:

Sr. No	Scope of the Transmission Scheme	Capacity /km
1	Establishment of 2x500 MVA, 400/220	400/220 kV, 500 MVA ICT –2 nos.
	kV Pooling Station (AIS) at Neemuch	
	with 1x125 MVAr Bus Reactor	400 kV ICT bays – 2 nos.
		220 kV ICT bays – 2 nos.
	Future provisions:	
	Space for	400 kV line bays -4 (2 each for
	400/220 kV ICTs along with bays: 2	Chittorgarh & Mandsaur lines)
	nos.	220 kV line bays – As per
	400 kV line bays: 6 nos.	connectivity granted to RE developer.
	220 kV line bays: 5 nos.	(2 no. of bays considered at present
	420kV bus reactor along with bays:1	corresponding to 500 MW)
		125 MVAr, 420 kV reactor-1 no.
		420 kV reactor bay – 1 no.
2	Neemuch PS – Chhittorgarh (PG) S/s	Length ~ 130 km
	400 kV D/C line (conductor with	
	minimum capacity of 2100 MVA/Ckt at	
	nominal voltage)	
3	2 nos. of 400 kV line bays at	400 kV line bays – 2 nos. at Chhittorgarh (PG)
	Chhittorgarh (PG) 400 kV S/s for	at Chintorgani (10)

	Neemuch PS – Chhittorgarh (PG) S/s	
	400 kV D/C line (conductor with	
	minimum capacity of 2100 MVA/Ckt at	
	nominal voltage)	
4	Neemuch PS- Mandsaur S/stn 400 kV	Length ~120 km
	D/c line (conductor with minimum	
	capacity of 2100 MVA/Ckt at nominal	
	voltage)	
5	2 no. of 400 kV line bays at Mandsaur	400 kV line bays – 2 nos.
	400 kV S/s for Neemuch PS- Mandsaur	at Mandsaur
	S/stn 400 kV D/c line (conductor with	
	minimum capacity of 2100 MVA/Ckt at	
	nominal voltage)	
Mate	- ·	

Note:

- *i.* Powergrid to provide space for 2 no. of 400 kV line bays at Chhittorgarh (PG) 400 kV S/s for termination of Neemuch PS Chhittorgarh (PG) 400 kV D/c line.
- *ii.* MPPTCL to provide space for 2 no. of 400 kV line bays at Mandsaur 400 kV S/s for termination of Neemuch PS Mandsaur 400 kV D/c line.
- *iii.* Implementation of the scheme to be taken up after receipt of LTA applications from *RE* developer at Neemuch pooling station.

5.2. Transmission scheme for evacuation of power from Dholera UMSP:

- **5.2.1.** The Transmission system for evacuation of power from Dholera UMSP (2 GW in Phase-I) was agreed in the 3rd meeting of WRPC (TP) held on 14.06.2021 and put for recommendation of NCT.
- **5.2.2.** On being enquired about the implementation schedule of the project, MNRE informed that the project falls under coastal zone. The environmental studies, CRZ clearance for the project is yet to be done. Moreover, the RE potential of Dholera solar park is subject to the outcome of the potential studies. Accordingly, the scheme may be deferred for now.
- **5.2.3.** NCT agreed to defer the scheme.

5.3. System Strengthening in Gujarat associated with integration of RE projects from Khavda potential REZ:

- **5.3.1.** CEA stated that in the 3rd meeting of WRPC(TP) held on 14.06.2021, the following transmission system was agreed for System Strengthening in Gujarat associated with integration of RE projects from Khavda potential REZ:
 - (i) Banaskantha Ahmedabad 765 kV D/c line.
 - (ii) Establishment of 2x1500 MVA, 765/400 kV & 2x500 MVA, 400/220 kV Kosamba S/s alongwith Kosamba Kala (GIS) 400 kV D/c line and Kosamba Magarwada (GIS) 400 kV D/c line.
 - (iii) Kosamba Padghe (GIS) 765 kV D/c line.

- (iv) Augmentation of transformation capacity at Padghe (GIS) 765/400 kV substation by 1x1500 MVA ICT.
- (v) Augmentation of transformation capacity at Banaskantha 765/400 kV S/ s by 1x1500 MVA ICT and Banaskantha Sankhari 400 kV 2nd D/c line. The implementation of the above strengthening scheme was required in the matching time-frame Transmission for evacuation of power from Khavda RE park-Phase A (catering to evacuation of 8 GW from Khavda).
- **5.3.2.** GETCO vide email dated 19.08.2021 has informed that 220 kV outlets from the proposed 765/400/220 kV Kosamba substation would be required in 4-5 years timeframe if substation is located surrounding Surat city. The 400/220 kV, 2 x 500 MVA transformers along with 4 Nos. of 220 kV feeder bays for GETCO downstream system may not be taken-up for immediate implementation and only space/design provision shall be kept and same would be taken up in future as per requirement. If the proposed 765 kV Kosamba substation is located in South Gujrat, GETCO may not need 220 kV outlets in near future considering the fact that 4 nos. of 220 kV outlets are already being planned from 400 kV Vapi-II (under construction as an ISTS scheme in south Gujarat).
- **5.3.3.** Member (Power System), CEA, suggested that in view of the observations made by GETCO, the scheme may be deferred for now. Also the scheme could be re-studied with BESS for optimization of the proposed transmission system for evacuation of power from Khavda RE park.
- **5.3.4.** NCT agreed to defer the scheme.

5.4. Modification in the already agreed Transmission system for evacuation of 8 GW RE from Khavda RE park

- **5.4.1.** CEA stated that the transmission system for evacuation power Khavda RE park would be developed in three phases (Phase A-8 GW, Phase B-7 GW and Phase C-12.27 GW). Phase-A includes Phase- I & II which has already been approved and notified by MoP. Phase-I is associated with evacuation of 3 GW and is under bidding. Phase-II is associated with evacuation of additional 4.5GW and its bidding would be started on receipt of LTA beyond 3 GW from RE developers in Khavda RE park. The following modifications have been approved in the 3rd meeting of WRPC(TP) in respect of "Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II"
 - i) Establishment of 3 nos. of pooling stations namely, Khavda pooling station 1 (KPS1), Khavda pooling station 2 (KPS2) and Khavda pooling station 3 (KPS3) instead of single Khavda pooling station. Khavda pooling station re-designated as Khavda pooling station 1(KPS1).
 - ii) Splitting of Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II Part A into two parts.
 - iii) Modification in the Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II Part C.

 iv) Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part E not required in view of the transmission scheme proposed under System Strengthening in Gujarat associated with integration of RE projects from Khavda potential REZ.

The summary of the schemes is as given below:

Sl.No ·	Name of Transmission scheme	Broad Scope	Modification
1.	Transmission scheme for evacuation of 3 GW RE injection at Khavda P.S. under Phase-I	 Establishment of Khavda pooling station (GIS), 3x1500 MVA 765/400 kV and 2x500 MVA 400/220 kV. Khavda PS (GIS) – Bhuj PS 765 kV D/c line. 	 Khavda pooling station re-designated as Khavda pooling station 1 (KPS1) No change in scope. Establishment of KPS2 and KPS3 agreed as separate additional scheme
2.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part A	 Augmentation of Khavda PS by 4x1500 MVA, 765/400 kV and 2x500 MVA, 400/220 kV. Khavda PS (GIS) – Lakadia PS 765 kV D/c line 	 Augmentation of KPS1 by 4x1500 MVA, 765/400 kV and 2x500 MVA, 400/220 kV. KPS1-KPS2 765 kV D/ C line KPS2 – Lakadia PS 765 kV D/c line
4.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part B	• Lakadia PS – Ahmedabad 765 kV D/c line	• No change
5.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part C	 Establishment of 2x1500 MVA, 765/400 kV Ahmedabad substation. Ahmedabad – Vadodara 765 kV D/c line 	 Establishment of 3x1500 MVA, 765/400 kV Ahmedabad substation. Ahmedabad – Kosamba/ South Gujrat S/S 765 kV D/c line
6.	Transmission	• LILO of Pirana (PG) –	No change

	scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part D	Pirana (T) 400 kV D/c line at Ahmedabad S/s	
7.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part E	• Ahmedabad – Indore 765 kV D/c line	• Not required in view of new transmission lines proposed under the scheme System Strengthening in Gujarat associated with integration of RE projects from Khavda potential REZ.

- **5.4.2.** NCT members enquired about the need to establish three pooling station in Khavda RE park. CEA stated that initially the evacuation system with single pooling station at Khavda RE park was planned to accommodate the 10.5 GW Renewable Energy Zones which were shifted from other parts of Gujarat to Khavda due to change in policy of Govt. of Gujarat. Govt. of Gujarat has allocated approx. 50,000 acres of land to a mix of private and public sector project developers (5 nos.) for development of renewable energy projects in the Renewable Energy Park at Khavda for evacuation of appx 30 GW RE from Khavda. As per layout of Khavda RE park as finalized by GPCL, three ISTS Pooling stations in Khavda RE park has been identified to pool RE power for further evacuation. Accordingly, three nos. of pooling stations have been proposed.
- **5.4.3.** CTUIL stated that LTA of 1000 MW has already been granted at erstwhile Khavda Pooling Station which shall now be designated as Khavda Pooling Station 1 (KPS1). Further, LTA applications of 600 MW each has been received from GSECL and GIPCL at KPS2. Therefore, establishment of proposed Khavda Pooling Station 2 (KPS2) through LILO of one ckt of KPS1-Bhuj 765 kV D/C line at KPS2 is required.
- **5.4.4.** Director MoP, enquired that whether the possibility of implementation of Battery Energy & Storage systems with the proposed RE integration scheme for evacuation of 4.5 GW from Khavda RE park under Phase-II has been explored. CEA stated that no BESS has been studied with the Transmission scheme for evacuation of power from Khavda RE park Phase-I & II. The implementation of Battery Energy Storage systems can be studied with the transmission system proposed for evacuation of additional 7 GW RE scheme under Phase-B.
- 5.4.5. CEA stated that in view of the observations of GETCO regarding location of Kosamba 765/400/220 kV substation, the System Strengthening schemes would be re-looked and there is possibility of shifting of Kosamba 765/400/220 S/s to other location in South of Gujarat. Therefore, Kosamba can be designated as South Gujarat substation. Accordingly, the Ahmedabad Kosamba 765 kV D/c line can be renamed as

Ahmedabad – South Gujarat 765 kV D/c line under the scheme "Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part C".

5.4.6. NCT recommendations are as given below:

(1) Establishment of new pooling stations in Khavda to be taken up only after receipt of LTA applications from RE developers:

S.no	Name of the scheme/est. cost/schedule	Mode of implementation	Justification
1.	Establishment of Khavda Pooling Station-2 (KPS2) in Khavda RE Park	ТВСВ	For pooling of power from RE park developers and its further evacuation.
	Estimated Cost : Rs 789 Crore		
	Implementation		
	Timeframe : 24 months		
	from date of SPV acquisition		
2.	Establishment of Khavda Pooling Station-3 (KPS3) in Khavda RE Park	TBCB	For pooling of power from RE park developers and its further evacuation.
	Estimated Cost: Rs 665 Crore		
	Implementation		
	Timeframe : 24 months from date of SPV acquisition		

The detailed scope of works is attached as Annexure V

(2) Modification in following packages that have already been notified by MoP vide Gazette notification dated 23.09.2020 for Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II:

Sl. No.	Earlier Notified Transmission Scheme	Scope of works of earlier notified Transmission scheme	Modified Transmission Scheme approved by NCT
1.	Transmission scheme for evacuation of 4.5	• Augmentation of Khavda PS by	Scheme split into two parts:
	GW RE injection at Khavda PS under Phase-II Part A	4x1500 MVA, 765/400 kV and	Part –I : Transmission Scheme for evacuation of 4.5 GW RE

SI. No.	Earlier Notified Transmission Scheme	Scope of works of earlier notified Transmission scheme	Modified Transmission Scheme approved by NCT
		2x500 MVA, 400/220 kV ICTs. • Khavda PS (GIS) – Lakadia PS 765 kV D/c line	 injection at Khavda P.S. under Phase-II Part A: KPS2 (GIS) – Lakadia 765 kV D/C line with 330 MVAr switchable line reactor at Khavda end. 2 nos. of 765 kV line bays each at Lakadia PS & KPS2 (GIS) for Khavda PS2 (GIS) – Lakadia PS 765 kV D/c line Part-II: Transmission scheme for injection beyond 3GW RE power at Khavda PS1 (KPS1): a) Augmentation of Khavda PS1 by 765/400 kV transformation capacity* (max. upto 4x1500 MVA) with 1x330 MVAR 765 kV bus reactor and 1x125 MVAR 420 kV bus reactor on 2nd 765 kV and 400 kV bus respectively. KPS1- Khavda PS2 GIS (KPS2) 765 kV D/C line (to be established with bypassing of LILO of one ckt. of KPS1 - Bhuj at KPS2 and utilisation of LILO section) * Actual no. of ICTs may be decided based on LTA requirement.
2.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part C	Establishment of 2x1500 MVA, 765/400 kV, Ahmedabad S/s with 1x330 MVAR 765 kV bus reactor and 1x125 MVAR 420 kV bus reactor.	Establishment of 3x1500 MVA, 765/400 kV Ahmedabad S/s with 1x330 MVAR 765 kV bus reactor and 1x125 MVAR 420 kV bus reactor
		Ahmedabad – Vadodara 765 kV D/c line	Ahmedabad – South Gujarat 765 kV D/c line with 240 MVAr switchable line reactor

Sl. No.	Earlier Notified Transmission Scheme	Scope of works of earlier notified Transmission scheme	Modified Transmission Scheme approved by NCT
		2 nos. of 765 kV line bays at Vadodara for Ahmedabad – Vadodara 765 kV D/c line	at both ends (~line length 220 km) 2 nos. of 765 kV line bays at South Gujarat for Ahmedabad – South Gujarat 765 kV D/c line

The modifications recommended:

SI.	Name of the scheme/est. cost/schedule	Mode of	Justification
No.		Implementation	
1.	Transmission scheme for evacuation of	TBCB	Modification in
	4.5 GW RE injection at Khavda PS		the scope of
	under Phase-II Part A		already notified
	Estimated Cost: Rs 862 Crore		scheme.
	Implementation Timeframe : 24 months from date of SPV acquisition		
2.	Transmission scheme for injection	TBCB	Modification in
	beyond 3 GW RE power at Khavda PS1		the scope of
	(KPS1)		already notified
			scheme.
	Estimated Cost: Rs 780 Crore		
	Implementation Timeframe : 24		
	months from date of SPV acquisition		
3	Transmission scheme for evacuation of	TBCB	Modification in
	4.5 GW RE injection at Khavda P.S.		the scope of
	under Phase-II – Part C		already notified
	Estimated Cost: Rs 1440 Crore		scheme.
	Implementation Timeframe : 24 months		
	from date of SPV acquisition		

The detailed scope of the above scheme is enclosed at Annexure-VI.

- (3) Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II Part E already notified by MoP vide Gazette notification dated 23.09.2020 is not required in view of new transmission lines proposed under the scheme System Strengthening in Gujarat associated with integration of RE projects from Khavda potential REZ.
- 5.5. Transmission system for evacuation of additional 7 GW RE power from Khavda RE park Phase-B:
- **5.5.1.** CEA stated that in the 3rd meeting of WRPC(TP) held on 14.06.2021, the transmission system for evacuation of additional 7 GW (in addition to 8 GW under Phase-A) RE

power from Khavda RE park was agreed. It included establishment of a 765 kV corridor namely, KPS2- Halvad-Vataman-Kosamba and establishment of 765/400 kV switching stations at Halvad and Vataman. Implementation of the transmission system has been proposed through four nos. transmission schemes.

- **5.5.2.** Director, MoP stated that the possibility of implementation of Battery Energy & Storage systems can be explored alongwith with this additional 7 GW RE scheme under Phase-B.
- **5.5.3.** Adviser, MNRE, also opined that transmission system for evacuation of 8 GW power from Khavda RE park has already been recommended, therefore additional transmission system may be re-studied considering BESS.
- **5.5.4.** Expert member, Shri R. Saha, stated that with adoption of new technologies like BESS and other storage systems, the implication on overall cost of the scheme and the technoeconomic feasibility of the scheme also needs to be analysed while firming up the system.
- **5.5.5.** After deliberations, NCT deferred the scheme for re-study with consideration of BESS at Khavda RE park.

5.6. Transmission system strengthening beyond Kolhapur for export of power from Solar & Wind Energy Zones in Southern Region- Re-conductoring of Kolhapur (PG) – Kolhapur 400 kV D/c line.

- 5.6.1. CEA stated that in the 4th meeting of NCT held on 20th & 28th January, 2021, it was agreed that Strengthening of Kolhapur (PG) Kolhapur (MSETCL) 400 kV section may be deliberated in WRPC(TP) meeting based on the operational constraint reported by POSOCO. The issue was deliberated in the 3rd meeting of WRPC(TP) held on 14.06.2021 wherein re-conductoring of Kolhapur (PG) Kolhapur 400 kV D/c line with conductor of minimum capacity of 2100 MVA/Ckt was agreed.
- **5.6.2.** NCT made the following recommendation:

Sl.	Name of the scheme	Mode of	Justification
No.		implementation	
1.	Re-conductoring of Kolhapur (PG) -	RTM	Remedial measure to
	Kolhapur 400 kV D/c line		overcome operational
			constraint ('N-1' non-
	Estimated cost: Rs 54 cr.		compliance) reported
			by POSOCO.
	Implementation timeframe: 15 months		
	from date of issue of MoP OM		

The details of the scheme is given below:

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	Re-conductoring of Kolhapur (PG) – Kolhapur 400 kV D/c line with conductor of minimum capacity of	Re-conductoring length – 60 km approx.
	2100 MVA/Ckt at nominal voltage along with bay up-gradation work at Kolhapur (MSETCL).	400 kV bay upgradation- 2 nos.

Re-conductoring of Kolhapur (PG) – Kolhapur 400 kV D/c line

5.7. Scheme to control fault level at Indore S/s:

5.7.1. CEA stated that Indore 765/400/220 kV S/s in MP acts as a node for transfer of power from generation projects in MP and Gujarat to load centres in MP through high capacity 400 kV and 765 kV networks. A large number of RE generation projects are coming up in Gujarat whose power is getting dispersed through various substations (at 765 kV level) including Indore (PG) for onward transfer of power to other parts of the grid resulting in high short circuit levels of interconnected grid. As per system studies, it was observed that short circuit level at Indore (PG) 400 kV substation in 2022-2023 time-frame crosses 50 kA as against designed rating of 40 kA. The issue was deliberated in the 3rd meeting of WRPC(TP) held on 14.06.2021 wherein, 400 kV Bus Splitting of 765/400/220 kV Indore substation into two sections A&B and shifting of 765/400 kV, 1x1500 MVA ICT from section A to Section B (through jumpering arrangement) was agreed.

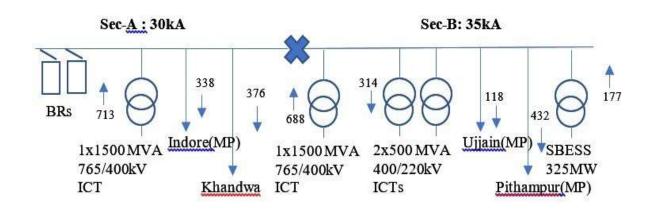
Transmission elements on 400 kV Bus Section A:

- (i) 1 no. of 765/400 kV 1x1500MVA ICT
- (ii) Indore (MP) 400 kV D/C line
- (iii) Khandwa 400 kV D/C line
- (iv) 2x125 MVA Bus reactors.

Transmission elements on 400 kV Bus Section B:

- (i) 1 no. of 765/400 kV 1500MVA ICT
- (ii) 2 nos. of 400/220 kV, 500MVA ICT
- (iii) Ujjain (MP) 400 kV D/C line
- (iv) Pithampur (MP) 400 kV D/C line.
- (v) 1 no. of 400/220 kV 500MVA ICT associated with M/s SBESS

The schematic of the 400 kV section after bus splitting is as given below:



- **5.7.2.** Regarding query on the actual scope of works involved in implementing the bus splitting scheme at Indore, CTUIL informed that the details of the same is to obtained from PGCIL.
- **5.7.3.** NCT suggested to put up the scheme again in the next meeting along with scope of works and estimated cost of the scheme.

5.8. Scheme for fault level control at Dehgam (PG) & Ranchhodpura (GETCO) S/s

- **5.8.1.** CEA stated that the following transmission scheme was agreed under ISTS in the 3rd WRPC(TP) meeting held on 14.06.2021 to control the fault level at Dehgam (PG) & Ranchhodpura (GETCO) S/s
 - Bypassing of Rachhodpura(GETCO) Dehgam(PG) 400 kV D/c line at Dehgam(PG) S/s and connecting it with Dehgam(PG) Pirana 400 kV D/c line (one circuit via Nicol) so as to form Ranchhodpura(GETCO) Pirana(PG) 400 kV D/c line (one circuit via Nicol).

GETCO vide its letter dated 19.08.2021 has raised issues with respect to ownership, transmission charges, O&M issues etc. of the Ranchodpura-Pirana 400 kV D/C line that would established with implementation of the above schemes. One section of this would be ISTS line and other section would be intra-state line. Accordingly, the scheme would be re-discussed in the WRPC(TP) meeting.

5.8.2. NCT agreed to defer the scheme.

5.9. Augmentation of 1x500 MVA, 400/220 kV ICT at Bhatapara (PG)

5.9.1. CEA stated that the 3rd 400/220 kV ICT at Bhatapara has been agreed in the 3rd meeting of WRPC(TP) to overcome the operational constraint ('N-1' non-compliance) during the high electricity demand of Chhattisgarh.

In addition to that, the loading on the Bhatapara (PG) – Bhatapara (CSPTCL) 220 kV S/ c line is high in present scenario even with the existing 2x315 MVA, 400/220 kV ICTs at Bhatpara(PG) substation. With additional ICT at Bhatpara(PG), the loading on Bhatapara (PG) – Bhatapara (CSPTCL) 220 kV S/c line would further increase. Therefore, LILO of one circuit of Bhatapara (PG) – Suhela 220 kV T/c line at Bhatapara (CSPTCL) has also been agreed to be implemented in matching time-frame

of implementation of 1x500 MVA, 400/220 kV ICT at Bhatapara (PG) by CSPTCL as intra-state scheme.

5.9.2. NCT made the following recommendation:

S.no	Name of the scheme	Mode of implement ation	Justification
1.	Augmentation of 1x500 MVA, 400/220 kV ICT (3 rd) at Bhatapara (PG) Estimated cost: Rs 30 cr. Implementation timeframe: 15 months from date of issue of MoP OM	RTM	Remedial measure to overcome operational constraint ('N-1' non compliance) of 400/220 ICTs at Bhatpara (PG) 400/220 kV substation. LILO of one circuit of Bhatapara (PG) – Suhela 220 kV T/c line at Bhatapara to be implemented by CSPTCL in matching time-frame of Bhatpara ICT.

Details of the scheme is given below:

Augmentation of 1x500 MVA, 400/220 kV ICT (3rd) at Bhatapara (PG)

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	Augmentation of 1x500 MVA, 400/220	400/220 kV, 500 MVA ICT –1 nos.
	kV ICT (3 rd) at Bhatapara (PG)	
		400 kV ICT bays – 1 nos.
		220 kV ICT bays – 1 nos.
	Approximate cost (Rs. Cr)	30

Note: To be implemented in the timeframe of implementation of LILO of one circuit of Bhatapara (PG) – Suhela 220 kV T/c line at Bhatapara (CSPTCL) under intra-state

B. Schemes agreed in Northern Regional Power Committees (Transmission Planning)

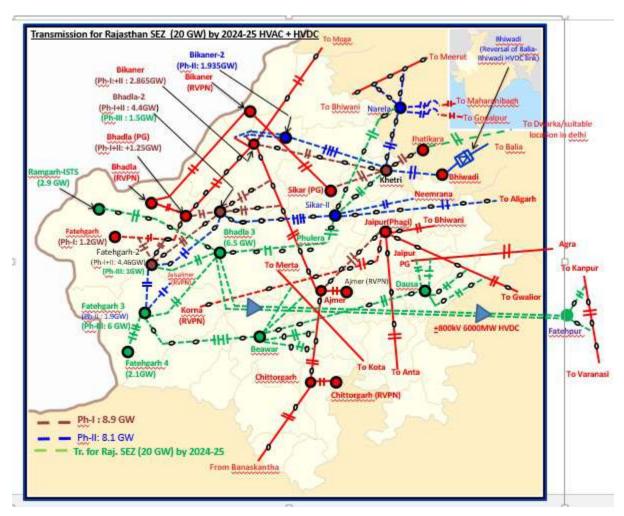
5.10 Transmission System requirement for additional 20 GW REZ in Northern Region (Phase-III)

Director (PSPA-I), CEA, stated that the transmission system for evacuation for 8.9 GW under Phase-I and 8.1 GW under Phase-II had been agreed and presently under implementation. Subsequently, SECI had requested to plan the transmission system for additional 20 GW SEZs envisaged in Rajasthan & proposed to be connected to the ISTS network in Bhadla, Fatehgarh and Ramgarh area. The locations of generation were identified by SECI based on the feedback of RE generation developers looking into the availability of land for setting up generation projects and proper access to these areas.

Further, these locations have the potential of both solar and wind generation. Considering it, load flow studies were carried out and discussed with NR constituents in various meetings. Based on the deliberations, transmission system for additional 20 GW REZ in Northern Region (Phase-III) was agreed in the 3rd NRPC (TP) meeting held on 19.02.2021 as given below:

- i) Establishment of 5x500 MVA 400/220 kV pooling station at Fatehgarh-4 along with 2x125 MVAr Bus Reactor
- Establishment of 2x1500 MVA 765/400kV & 10x500 MVA 400/220 kV pooling station at Bhadla-3 along with 2x330 MVAr (765kV) Bus Reactor & 2x125 MVAr (420kV) Bus Reactor
- Establishment of 3x1500 MVA 765/400kV & 2x500 MVA 400/220 kV pooling station at Ramgarh along with 2x240 MVAr (765kV) Bus Reactor & 2x125 MVAr (420kV) Bus reactor
- Fatehgarh-2 Bhadla-3 400kV D/c line (Quad) along with 50 MVAr Switchable line reactor for each circuit at both ends of Fatehgarh 2- Bhadla-3 400kV D/c line (200 km)
- v) Fatehgarh-4- Fatehgarh-3 400 kV 2xD/c twin HLTS line (50 km)
- vi) Fatehgarh 3- Bhadla-3 400kV D/c line(Quad) along with 50 MVAr Switchable line reactor for each circuit at both ends of Fatehgarh 3- Bhadla-3 400kV D/c line (200 km)
- vii) Ramgarh Bhadla-3 765kV D/c line (180 km) along with 240 MVAr line reactor at each circuit at Ramgarh end of Ramgarh Bhadla-3 765kV D/c line
- viii) Bhadla-3 Sikar-II 765 kV D/c line (380 km) along with 330 MVAr Switchable line reactor for each circuit at each end of Bhadla-3 Sikar-II 765 kV D/c line
- ix) Sikar-II Khetri 765 kV D/c line (90 Km)
- x) Sikar-II Narela 765 kV D/c line (260 Km) along with 240 MVAr Switchable line reactor for each circuit at each end of Sikar-II Narela 765 kV D/c line
- xi) Augmentation of 1x1500 MVA ICT (3rd), 765/400kV ICT at Jhatikara Substation (Bamnoli/Dwarka section)
- xii) Augmentation with 400/220kV, 1x500MVA Transformer (10th) at Fatehgarh-II PS
- xiii) Augmentation with 765/400kV, 1x1500MVA Transformer (5th) at Bhadla-II PS
- xiv) Augmentation with 765/400kV, 1x1500MVA Transformer (3rd) at Bikaner (PG)
- xv) Jhatikara Dwarka 400kV D/c line (Quad) (20km)
- xvi) Establishment of 6x1500 MVA 765/400kV & 5x500 MVA 400/220 kV pooling station at Fatehgarh-3 (new section*) (In addition to 4x500 MVA ICT proposed under Rajasthan SEZ Ph-II-of Section-1) along with 2x330 MVAr,765kV & 2x125 MVAr, 420kV Bus Reactors
- xvii) Augmentation of 1x500 MVA ICT (5th), 400/220kV ICT at Fatehgarh-3 Substation (section-1*)
- xviii) Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr, 765 kV Bus Reactor & 2x125 MVAr, 420 kVBus Reactor

- xix) Fatehgarh-3– Beawar 765 kV 2xD/c (350 km) along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line
- xx) LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar (45 km)
- xxi) LILO of 400kV Kota Merta line at Beawar (20 km)
- xxii) Establishment of 2x1500 MVA 765/400kV substation at suitable location near Dausa along with 2x330 MVAr 765 kV Bus Reactor & 2x125 MVAr, 420 kVBus Reactor
- xxiii)Beawar Dausa 765 kV D/c line (240 km) along with 240 MVAr Switchable line reactor for each circuit at each end
- xxiv) LILO of both circuits of Jaipur(Phagi)-Gwalior 765 kV D/c at Dausa (40km) along with 240 MVAr Switchable line reactor for each circuit at Dausa end of Dausa – Gwalior 765 kV D/c line
- xxv) LILO of both circuits of Agra Jaipur(south) 400kV D/c at Dausa (30km) along with
 50 MVAr Switchable line reactor for each circuit at Dausa end of Dausa Agra
 400kV D/c line
- xxvi) 6000MW, ±800KV HVDC terminal at Bhadla-3 substation
- xxvii) 6000MW, ±800KV HVDC terminal station at suitable location near Fatehpur (UP)
- xxviii) Establishment of 5x1500MVA, 765/400KV ICT at pooling station at suitable location near Fatehpur along with 2x330MVAr (765kV) bus reactor
- xxix) ±800 kV HVDC line (Hexa lapwing) between Bhadla-3 & Fatehpur (950km)
- xxx) LILO of both ckts of 765 kV Varanasi Kanpur (GIS) D/c at Fatehpur(30km)
- xxxi) Augmentation of 1x1500 MVA ICT at 765/400kV Kanpur(GIS) substation
- xxxii) STATCOM :
- Fatehgarh III S/s: STATCOM: ± 2x300 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR
- Ramgarh S/s : STATCOM : ± 2x300 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR



She further stated that the transmission lines envisaged in the 20 GW scheme would be passing through the GIB (Great Indian Bustard) potential zone as per the area marked in the Hon'ble Supreme Court of India Order dated 19.04.2021 in Writ Petition No. 838 of 2019 regarding GIB case. Further, in the aforesaid order, Hon'ble Supreme Court has constituted a committee for the specific purpose of assessing the feasibility of laying the transmission line after taking into consideration all technical details. Hon'ble Supreme Court has also directed that for all future cases of installing transmission lines in the priority zone or potential zone, feasibility for the lines to be laid underground is to be assessed. Wherever feasible, the transmission line has to be laid underground otherwise of overhead line with bird diverters can be installed only after ratification of its feasibility by the Committee constituted by Hon'ble Supreme Court.

COO(CTUIL) stated that earlier only priority zone was defined, so the transmission schemes were planned bypassing this zone. Now with the above mentioned order of Hon'ble Supreme Court, due to the newly defined Potential zone, some of the transmission schemes earlier approved under Part B, C and D of Phase-II (8.1 GW) are falling under this potential zone. CERC has directed Powergrid subsidiaries for the schemes: Part B, C and D of Phase-II to comply with the direction of Hon'ble Supreme Court.

Member (Power System), CEA, added that beside the transmission lines under the ISTS schemes, the dedicated lines of generators would also be falling under the GIB zone.

Therefore, the generators as well as the developers of these transmission schemes would require to comply with the direction of Hon'ble Supreme Court, which in turn would cause delay the completion of the projects and the transmission schemes. Considering this, the transmission developers may have to approach the Committee constituted by Hon'ble Supreme Court well in advance.

Regarding the transmission scheme under Phase –III in Rajasthan, Expert Member, Dr. R. Saha, suggested that the option of series compensation, SVC, Synchronous condenser should be considered in future before zeroing in for STATCOM which is comparatively costly device. In this regard, Director (PSPA-I), CEA, stated that Rajasthan has huge RE potential of around 190 GW. As of now, the planned Transmission system under Phase-III consists of STATCOM for providing voltage stability. Other option like SVC, Synchronous condenser and the other options like Battery Energy Storage system will also be explored in near future.

Director (PSPA-I), stated that the transmission system for additional 20 GW REZ in Northern Region (Phase-III) has been divided into the following packages for the ease of implementation:

5.10.1 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part A1:

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Establishment of 2x500 MVA, 400/220 kV pooling station at Fatehgarh-4 along with 2x125 MVAr Bus Reactor	400/220 kV, 500 MVA ICT - 2nos.
	<i>Future provisions</i> : Space for 400/220kV ICTs along with bays: 5 nos. 400 kV line bays along with switchable line reactor: 6 nos. 400kV Bus Reactor along with bays: 2 nos. 400kV Sectionalization bay: 1 nos. 220 kV line bays: 10 nos. 220kV sectionalization bay: 2 nos.	 400 kV ICT bays - 2 nos. 220 kV ICT bays - 2 nos. 400 kV line bays - 2 nos. 220 kV line bays- As per connectivity granted to RE developer. (4 no. of bays considered at present) 125 MVAr, 420 kV bus reactor - 2 nos. 420 kV reactor bay - 2 nos.
2.	Fatehgarh-4- Fatehgarh-3 400 kV D/c twin HLTS* line (50 km)	Length – 50 km
3.	Fatehgarh 3- Bhadla-3 400kV D/c line(Quad) along with 50 MVAr Switchable line reactor for each circuit at both ends of Fatehgarh 3- Bhadla-3 400kV D/c line	400 kV 50 MVAr Switchable

1. The scope of scheme is as under:

Sl.No.	Scope of the Transmission Scheme	Capacity /km
		Switching equipment for 400 kV 50 MVAR switchable line reactor –4 nos.
	Total Estimated Cost (Rs Crore)	660

* with minimum capacity of 2100 MW on each circuit at nominal voltage

Note:

- *(i) Provision of suitable sectionalization shall be kept at Fatehgarh-4 at 400kV & 220kV level to limit short circuit level*
- (ii) Developer of Fatehgarh-3 Substation (new section) to provide 2 nos. of 400 kV line bays at Fatehgarh-3 S/s for termination of Fatehgarh-4- Fatehgarh-3 400 kV D/c twin HLTS* line
- (iii) Developer of Fatehgarh-3 S/s(new section) to provide 2 nos. of 400 kV line bays along with space for switchable line reactors at Fatehgarh-3 for termination of Fatehgarh 3- Bhadla-3 400kV D/c line
- (iv) Developer of Bhadla –3 substation to provide 2 nos. of 400 kV line bays along with space for switchable line reactors at Bhadla -3
- (v) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey
- 2. CTUIL indicated that at Fatehgarh-4 PS, Stage-II connectivity applications have been granted for 510 MW, however no LTA application has been received yet. Therefore, implementation of Phase III –Part A1 is to be taken up upon receipt of LTA from RE developers at Fatehgarh-4 PS. In order to enable evacuation of RE power from Fatehgarh-4 PS, implementation schedule of phase III –Part A1 package is to match with package Phase III –Part E1 (Establishment of Fatehgarh-3 PS) & Phase III –Part F (Establishment of Beawar S/s, Fatehgarh-3 PS-Beawar line, LILO of Ajmer-Chittorgarh D/c at Beawar & LILO of Kota-Merta line at Beawar).
- **3.** CTUIL also suggested that the Fatehgarh 3- Bhadla-3 400kV D/c line may be taken up as a separate package or in A2 package and may be taken up later. Therefore, it was decided that Fatehgarh 3- Bhadla-3 400kV D/c line may be taken up as a separate package.

Name of the scheme/est. cost/schedule	Mode of implementatio	Purpose /Justification
	n	
Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part A1 Estimated Cost: Rs 210 Crore.	TBCB	For evacuation of RE power getting pooled at Fatehgarh –4.
ImplementationTimeframe:18months from date of SPV acquisition.		

4. After deliberations, NCT recommended the following:

5. The Detailed Scope of works in the scheme is as given below:

"Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under phase III –Part A1"

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	Establishment of 2x500 MVA, 400/220 kV pooling station at Fatehgarh-4 along with 2x125 MVAr Bus Reactor <u>Future provisions</u> : Space for 400/220 kV ICTs along with bays: 5 nos. 400 kV line bays along with switchable line reactor: 6 nos. 400 kV Bus Reactor along with bays: 2 nos.	 400/220 kV, 500 MVA ICT - 2nos. 400 kV ICT bays - 2 nos. 220 kV ICT bays - 2 nos. 400 kV line bays - 2 nos. 220 kV line bays- As per connectivity granted to RE developer. (4 no. of bays considered at present)
	 400 kV Sectionalization bay: 1 nos. 220 kV line bays: 10 nos. 220 kV sectionalization bay: 2 nos. 	125 MVAr, 420kV bus reactor - 2 nos. 420 kV reactor bay - 2 nos.
2.	Fatehgarh-4- Fatehgarh-3 400 kV D/c twin HLTS* line (50 km)	Length – 50km
3.	2 no. of 400 kV line bays at Fatehgarh-3	400 kV line bays - 2 nos.

* with minimum capacity of 2100 MW on each circuit at nominal voltage

Note:

- (i) Provision of suitable sectionalization shall be kept at Fatehgarh-4 at 400kV & 220kV level to limit short circuit level
- (ii) Developer of Fatehgarh-3 S/s(new section) to provide space for 2 nos. of 400 kV line bays at Fatehgarh-3 S/s for termination of Fatehgarh-4- Fatehgarh-3 400 kV D/c twin HLTS* line
- (iii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey
- (iv) Implementation of the scheme to be taken up after receipt of LTA applications from RE developer at Fatehgarh-4 pooling station.

5.10.2 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part A2

- 1. Director (PSPA-I), CEA, stated that the scheme "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part A2" has been planned to enable the evacuation of RE power from Fatehgarh-4 under Phase III.
- 2. After deliberations, NCT recommended the following:

Name of the scheme/est.	Mode of implementation	Purpose
cost/schedule		/Justification
Transmission system for evacuation of	RTM	For evacuation of
power from REZ in Rajasthan (20		RE power (beyond
GW) under Phase III –Part A2	(The above scheme	1000 MW) getting
	includes augmentation of	pooled at Fatehgarh
Estimated Cost: Rs 100 Crore	3 no. of transformers at	-4.
	Fatehgarh-4, which are	
Implementation Timeframe : 15	required to be taken up for	
months from MoP OM.	implementation at later	
	stage based on the number	
	of LTA applications	
	received)	

3. The detailed scope of scheme is as under:

"Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part A2"

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Augmentation of 3x500 MVA, 400/220 kV pooling station at Fatehgarh-4	 400/220 kV, 500 MVA ICT - 3nos. 400 kV ICT bays - 3 nos. 220 kV ICT bays - 3 nos. 220 kV line bays- As per connectivity granted to RE developer. (5 no. of bays considered at present)

Note:

- (ii) The implementation of number of 220 kV bays and 400/220 kV transformers shall only be taken up based on receipt of stage-II connectivity and commensurate LTA respectively (beyond 1000 MW at Fatehgarh-4).
- (iii) 220 kV line bays and Transformer augmentations shall be reviewed based on stage-II connectivity at 220kV voltage level and LTA applications respectively

5.10.3 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part A3

1. After deliberations, NCT recommended the following:

Name of the scheme/est.	Mode of implementation	-
cost/schedule		/Justification
Transmission system for evacuation of	TBCB	For evacuation of
power from REZ in Rajasthan (20		RE power (beyond
GW) under phase III –Part A3	(Fatehgarh 3- Bhadla-3	2000 MW) getting
	(Patengarii 5- Diladia-5	pooled at Fatehgarh

Estimated Cost: Rs 505 Crore Implementation Timeframe: 18 months from date of SPV acquisition.	400kV D/c line may be taken up for implementation on receipt of LTA beyond 2000 MW at Fatehgarh- 4)	-4.
	4)	

2. The detailed scope of the scheme is as follows:

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part A3"

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Fatehgarh 3- Bhadla-3 400kV D/c line(Quad) along with 50 MVAr Switchable line reactor for each circuit at both ends of Fatehgarh 3- Bhadla-3 400kV D/c line	Length – 200km 400 kV 50 MVAr Switchable line reactor – 4 nos. Switching equipment for 400 kV 50 MVAR switchable line reactor –4 nos. 400kV line bays Bhadla-3 S/s & Fatehgarh-3 S/s -4 nos. (2+2)

Note:

- (i) Fatehgarh 3- Bhadla-3 400kV D/c line may be taken up for implementation on receipt of LTA beyond 2000 MW at Fatehgarh-4.
- (ii) Developer of Fatehgarh-3 S/s(new section) to provide space 2 nos. of 400 kV line bays along with space for switchable line reactors at Fatehgarh-3
- (iii) Developer of Bhadla –3 substation to provide space for 2 nos. of 400 kV line bays along with space for switchable line reactors at Bhadla -3

5.10.4 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part B1

- 1. The scheme "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part B1" has been planned to establish connectivity as well as enable the evacuation of RE power from Bhadla-3 and Ramgarh PS (beyond Bhadla-3) under phase III.
- 2. CTUIL stated that at present Stage-II connectivity applications for 224MW quantum has already been granted at Bhadla-3 PS, however regulatory compliance is still pending in above connectivity case. Further Stage-II connectivity applications for 2600MW has been granted at Ramgarh PS. However, no LTA application has been received yet at both the above pooling stations. Therefore, implementation of Phase III –Part B1 may be taken up upon receipt of LTA from RE developers at Ramgarh PS/Bhadla-3 PS.

3. After detailed deliberations, NCT recommended the following :

Name of the scheme/est.	Mode of	Purpose
cost/schedule	implementation	/Justification
Transmission system for evacuation of	TBCB	For evacuation of RE
power from REZ in Rajasthan (20 GW)		power getting pooled
under phase III –Part B1	(Implementation of	at Bhadla-3.
Estimated Cost: Rs 2500 Crore	Phase III –Part B1 may be taken up upon	
Implementation Timeframe : 18 months from date of SPV acquisition.	receipt of LTA from RE developers at Ramgarh PS/ Bhadla-3 PS)	

4. Detailed scope of the scheme is given below:

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part B1"

 765/400kV 1500 MVA ICTs: 2 nos (7x500 MVA including one spare unit) 765kV ICT bays - 2 nos. 400/220 kV, 500 MVA ICT - 3nos. 400/220 kV, 500 MVA ICT - 3nos. 765kV line bays -2 nos. 400 kV ICT bays - 5 nos. 220 kV ICT bays - 3 nos. 400 kV line bays - 2 nos 220 kV line bays: <i>As per connectivity</i> granted to <i>RE developers (5 no. of bays</i> considered at present) 330 MVAr Bus Reactor-2 nos. (7x110 MVAr, including one spare unit) 765kV reactor bay- 2 nos. 125 MVAr, 420kV bus reactor - 2 nos. 420 kV reactor bay - 2 nos.
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Sl. No.	Scope of the Transmission Scheme	Capacity /km
	nos. 400kV Sectionalization bay: 2 nos. 220 kV line bays: 12 nos. 220kV sectionalization bay: 2nos.	
2.	Fatehgarh-2 – Bhadla-3 400kV D/c line (Quad moose) along with 50 MVAr Switchable line reactor for each circuit at both ends of Fatehgarh 2- Bhadla-3 400kV D/c line	Length – 200km 400 kV 50 MVAR switchable line reactor –4 Switching equipment for 400 kV 50 MVAR switchable line reactor –4
3.	2 nos. of 400 kV line bays at Fatehgarh-2 for Fatehgarh-2 – Bhadla-3 400kV D/c line	400 kV line bays - 2 nos.
4.	Bhadla-3 – Sikar-II 765 kV D/c line along with 330 MVAr Switchable line reactor for each circuit at each end of Bhadla-3 – Sikar-II 765 kV D/c line	Length – 380km Switching equipment for 765 kV 330 MVAR switchable line reactor –4 765 kV, 330 MVAr Switchable line reactor- 4
5	2 nos. of 765kV line bays at Sikar-II	765 kV line bays - 2nos

Note:

- (i) Implementation of the scheme to be taken up upon receipt of LTA from RE generation developers at Ramgarh PS/Bhadla-3 PS
- (ii) Provision of suitable sectionalization shall be kept at Bhadla-3 at 400kV & 220kV level to limit short circuit level
- (iii) Powergrid to provide space for 2 nos. of 400 kV line bays along with space for switchable line reactors at Fatehgarh-2 S/s
- (iv) The line lengths mentioned above are approximate, as the exact length shall be obtained after detailed survey.
- (v) Developer of Sikar-II S/s to provide space for 2 nos. of 765 kV line bays at Sikar-II S/s along with space for switchable line reactors

5.10.5 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part B2

1. After deliberations, NCT recommended the following:

	Mode of	Purpose
cost/schedule	implementation RTM (The implementation of number of 220kV bays and transformers to be taken up based on receipt of Stage-II connectivity and commensurate LTA respectively (beyond 1500MW at Bhadla-3))	/Justification For evacuation of RE power (beyond 1500 MW) getting pooled at Bhadla-3.

2. Detailed scope of the scheme is given below:

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part B2"

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Augmentation of 7x500 MVA 400/220 kV transformation capacity at Bhadla-3	 400/220 kV, 500 MVA ICT - 7nos. 400 kV ICT bays - 7 nos. 220 kV ICT bays - 7 nos 220 kV line bays: As per connectivity granted to RE developers (10 no. of bays considered at present). 220 kV bus sectionalizer-1 nos

Note:

- (i) The implementation of number of 220 kV bays and 400/220 kV transformers to be taken up based on receipt of stage-II connectivity and commensurate LTA respectively (beyond 1500 MW at Bhadla-3).
- (ii) 220 kV line bays and Transformer augmentations shall be reviewed based on stage-II connectivity at 220 kV voltage level and LTA applications respectively.

5.10.6 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part C1:

1. The scope of scheme is as under:

SI.	Scope of the Transmission Scheme	Capacity /km
No.		
	Establishment of 2x1500 MVA 765/400kV & 2x500 MVA 400/220 kV pooling station at Ramgarh along with 2x240 MVAr (765kV) Bus Reactor & 2x125 MVAr (420kV) Bus reactor	765/400kV1500 MVA ICTs : 2 nos (7x500 <i>MVA including one spare unit</i>) 765kV ICT bays –2 nos. 400/220 kV, 500 MVA ICT – 2nos.
	<u>Future provisions</u> : Space for 765/400kV ICTs along with bays: 3nos.	400 kV ICT bays – 4 nos. 220 kV ICT bays – 2 nos.
	765kV line bay along with switchable line reactor: 2nos.	400 kV line bays – 2 nos. (for RE connectivity)
	765kV Bus Reactor along with bays: 2 nos.	220kV line bays -4 nos. 765 kV line bays – 2 nos.
	400/220 kV ICTs along with bays: 6 nos. 400 kV line bays along with switchable	240 MVAr Bus Reactor-2 nos. (7x80 MVAr including one spare unit)
	line reactor: 4nos. 400 kV line bays: 4 nos.	765kV reactor bay- 2 nos. 125 MVAr, 420kV bus reactor – 2 nos.
	400kV Bus Reactor along with bays: 2 nos.400kV Sectionalization bay: 3 nos.	420 kV reactor bay – 2 nos. 400 kV bus sectionalizer- 1no
	220 kV line bays: 8 nos. 220kV sectionalisation bay: 2 nos.	
	Ramgarh – Bhadla-3 765kV D/c line(180 km) along with 240 MVAr switchable line reactor at each circuit at Ramgarh end of Ramgarh – Bhadla-3 765kV D/c line	Length – 180km 765 kV, 240 MVAr switchable line reactor- 2 nos Switching equipment for 765 kV 240 MVAR switchable line reactor –2 nos.
	STATCOM at Ramgarh S/s: ± 2x300 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR	
		765 kV line bays - 2nos

(i) Developer of Bhadla-3 S/s to provide space for 2 nos. of 765 kV line bays at Bhadla-3 S/s for termination of Ramgarh – Bhadla-3 765kV D/c line

- (ii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey
- (iii) Provision of suitable sectionalization shall be kept at Ramgarh at 400kV & 220kV level to limit short circuit level
- 2. CTU informed that at present 2600 MW Stage-II connectivity applications granted at Ramgarh PS, however no LTA application is received yet. Therefore, implementation of Phase III –Part C1 may be taken up upon receipt of LTA from RE developers at Ramgarh PS.
- **3.** Further, STATCOM package was deliberated to be excluded from this package in view of its requirement at later stage with adequate LTA applications.
- 4. POSOCO stated that Battery Energy Storage System could be treated as an alternative to STATCOM and therefore needs to be explored for evacuation of power from RE sources. In this regard, Member (PS) stated that studies pertaining to Battery Storage System could be done in and accordingly revised proposal could be taken up, if required.
- 5. After deliberations, NCT recommended the following:

Name of the scheme/est.	Mode of implementation	Purpose /Justification
cost/schedule		
Transmission system for evacuation of power from REZ in	TBCB	For evacuation of RE power getting pooled
Rajasthan (20 GW) under Phase III –Part C1	(Implementation schedule of Phase III –	at Ramgarh.
Estimated Cost: Rs 1160 Crore	Part C1 package is to matched with package	
Implementation Timeframe : 18 months from date of SPV acquisition.	Phase III –Part B1 (establishment of Bhadla- 3 PS, 765kV Bhadla-3 PS-Sikar-2 D/c line, 400kV Bhadla-3 PS- Fatehgarh-2 D/c line)	

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part C1"

SI.	Scope of the Transmission Scheme	Capacity /km
No.		
	Establishment of 2x1500 MVA 765/400kV & 2x500 MVA 400/220 kV pooling station at Ramgarh along with 2x240 MVAr (765kV) Bus Reactor & 2x125 MVAr (420kV) Bus reactor <i>Future provisions: Space for</i>	(7x500 MVA including one spare

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SI.	Scope of the Transmission Scheme	Capacity /km
No.		
	765/400kV ICTs along with bays: 3nos.	400/220 kV, 500 MVA ICT – 2nos.
	765kV line bay along with switchable line	400 kV ICT bays – 4 nos.
	reactor: 2nos.	220 kV ICT bays – 2 nos.
	765kV Bus Reactor along with bays: 2 nos.	400kV line bays - As per
	400/220 kV ICTs along with bays: 6 nos.	connectivity granted to RE
	400 kV line bays along with switchable line reactor: 4nos.	developer. (2 no. of bays considered at present)
	400 kV line bays: 4 nos.	220kV line bays -As per
	400kV Bus Reactor along with bays: 2 nos.	connectivity granted to RE
	400kV Sectionalization bay: 3 nos.	<i>developer. (4 no. of bays considered at present)</i>
	220 kV line bays: 8 nos.	765 kV line bays -2 nos.
	220kV sectionalisation bay: 2 nos.	240 MVAr Bus Reactor-2 nos. (7x80 MVAr considering one spare unit)
		765kV reactor bay- 2 nos.
		125 MVAr, 420kV bus reactor – 2 nos.
		420 kV reactor bay – 2 nos.
2.	Ramgarh – Bhadla-3 765 kV D/c line (180 km)	Length – 180km
	along with 240 MVAr switchable line reactor at each circuit at Ramgarh end of Ramgarh – Bhadla-3 765kV D/c line	765 kV, 240 MVAr switchable line reactor- 2 nos
		Switching equipment for 765 kV 240 MVAR switchable line reactor – 2 nos.
3.	2 nos. of 765kV line bays at Bhadla-3	765 kV line bays - 2nos
N	lote.	

Note:

- (i) Implementation schedule of Phase III –Part C1 package is to match with package Phase III –Part B1 (establishment of Bhadla-3 PS, 765kV Bhadla-3 PS-Sikar-2 D/c line, 400kV Bhadla-3 PS-Fatehgarh-2 D/c line)
- (ii) Developer of Bhadla-3 S/s to provide space for 2 nos. of 765 kV line bays at Bhadla-3 S/s for termination of Ramgarh – Bhadla-3 765kV D/c line
- (iii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey
- (iv) Provision of suitable sectionalization shall be kept at Ramgarh at 400kV & 220kV level to limit short circuit level
- (v) Implementation of the scheme to be taken up upon receipt of LTA from RE

generation developers at Ramgarh PS/Bhadla-3 PS

5.10.7 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part C2

1. After deliberations, NCT recommended the following:

Name of the scheme/est.	Mode of implementation	Purpose /Justification
cost/schedule		
Transmission system for	RTM	For evacuation of RE
evacuation of power from REZ in		power (beyond 1500
Rajasthan (20 GW) under Phase III	(The implementation of	MW) getting pooled
–Part C2	package comprising	at Ramgarh.
	number of 220kV bays and	-
Estimated Cost: Rs 80 Crore	transformers to be taken up	
	based on receipt of Stage-II	
Implementation Timeframe : 15	connectivity and	
months from MoP OM.	commensurate LTA	
	respectively (beyond	
	1500MW at Ramgarh PS))	

2. Detailed scope of the scheme is given below:

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part C2"

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Augmentation of 1x1500 MVA 765/400kV at Ramgarh	765/400kV 1500 MVA ICT : 1 no 765 kV ICT bay – 1 no 400 kV ICT bay -1 no 220 kV line bays: <i>As per</i> <i>connectivity granted to RE</i> <i>developer. (3 no. of bays</i> <i>considered at present)</i>

Note:

- (i) The implementation of package comprising number of 220kV bays and transformers. The 220kV bays to be taken based on receipt of Stage-II connectivity (beyond 1200 MW at 220kV level) and the implementation of transformer to be taken up upon receipt of LTA beyond 1500MW at Ramgarh PS.
- (ii) 220 kV line bays and Transformer augmentations shall be reviewed based on stage-II connectivity at 220 kV voltage level and LTA applications respectively

5.10.8 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part C3:

1. After deliberations, NCT recommended that the scheme be deferred at present and would be considered at a later stage based on requirement as per studies.

Name of the scheme/est.	Mode of implementation	Purpose /Justification
cost/schedule		
Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part C3	RTM (The implementation of Phase-III Part C3 to be	May be taken up based on the requirement as per
Estimated Cost: Rs 300 Crore	taken up after grant of LTA beyond 2000	the studies wrt BESS.
Implementation Timeframe : 15 months from MoP OM.	MW(about) at Ramgarh PS, if required, as per the studies)	

2. Detailed scope of the scheme is given below:

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part C3"

Sl.No.	Scope of the Transmission Scheme	Capacity (MVAr)
1.	Ramgarh S/s : STATCOM : ± 2x300MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR	± 2 x 300MVAr

Note:

- i) Transmission scheme "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part C3" may be taken up based on the requirement as per the studies with respect to Battery Energy Storage System.
- ii) The implementation of Phase-III Part C3 to be taken up after grant of LTA beyond 2000 MW(about) at Ramgarh PS, if required, as per the studies.

5.10.9 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part D:

1. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part D Estimated Cost: Rs 1680 Crore Implementation Timeframe: 18 months from date of SPV acquisition.	TBCB	For evacuation of RE power getting pooled at Ramgarh/Bhadla-3 and required to facilitate LTA to generators at Bhadla- 3 and/or Ramgarh.

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part D"

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Sikar-II – Khetri 765 kV D/c line	Length – 90km
2	Sikar-II – Narela 765 kV D/c line along with 240 MVAr Switchable line reactor for each circuit at each end of Sikar-II – Narela 765 kV D/c line	Length – 260km Switching equipment for 765 kV 240 MVAR switchable line reactor –4 nos.
		240 MVAr, 765kV Switchable line reactor- 4 nos.
3	Jhatikara – Dwarka 400kV D/c line (Quad) (20km)	Length – 20km
5	765kV line bays at Sikar -II for Sikar-II – Khetri 765 kV D/c line and Sikar-II – Narela 765 kV D/c line	765 kV line bays - 4nos
6	2 nos. of 765kV line bays at both Khetri and Narela S/s	765 kV line bays - 4nos
7	2 nos. of 400kV line bays at both Jhatikara and Dwaraka S/s	400 kV line bays - 4nos

Note:

- (i) Developer of Sikar-II S/s to provide space for 4 nos. of 765 kV line bays at Sikar-II S/s along with space for two nos. of switchable line reactors
- (ii) Developer of Narela S/s to provide space for 2 nos. of 765 kV line bays along with space for switchable line reactors at Narela S/s

- (iii) Powergrid to provide space for two nos. of 765 kV line bays at Khetri substation
- (iv) Powergrid and DTL to provide space for two nos. of 400kV line bays both at Jhatikara and Dwarka S/s respectively
- (v) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey.
- (vi) Scheme to be implemented in matching time frame of Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part C1

5.10.10 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part E1

1. The scope of scheme is as under:

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	Establishment of 4x1500 MVA 765/400kV	765/400kV 1500 MVA, ICT:
	&3x500 MVA 400/220 kV pooling station at Fatehgarh-3 (new section*)	4 nos (13x500 MVA, including one spare unit)
	(In addition to 4x500 MVA ICT proposed under Rajasthan SEZ Ph-II-of Section-1) along with 2x330 MVAr, 765kV & 2x125 MVAr, 420kV Bus Reactors	330 MVAr, 765 kV bus reactor- 2 nos. (7 <i>x</i> 110 MVAr, including one spare unit)
	WIVAI, 420KV BUS Reactors	765kV ICT bays - 4 nos.
		400/220 kV, 500 MVA ICT - 3nos.
		400 kV ICT bays -7 nos.
		220 kV ICT bays - 3 nos.
		765 kV line bays - 2nos.
		400 kV line bays - 4 nos.
		765kV reactor bay- 2 nos.
		125 MVAr, 420kV bus reactor - 2 nos.
		420 kV reactor bay - 2 nos.
2	Fatehgarh – III S/s : STATCOM : ± 2x300 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR	

Note:

- (i) Provision of suitable sectionalization shall be kept at Fatehgarh-3 at 400kV & 220kV level to limit short circuit level STATCOM to be placed at new section of Fatehgarh-III PS from where phase-III scheme emanating
- *(ii)* Developer of Fatehgarh-III substation to provide space for Fatehgarh-III new section

- 2. Director (PSPA-I), CEA, stated that 1.9 GW at Fatehgarh -3 (Phase –II) is already under implementation by the subsidiary of PGCIL. The above transmission scheme is for evacuating 6 GW potential at Fatehgarh-3 (Phase-III), which is utilising the future provision of the earlier approved scheme under Phase-II. Therefore, the future provisions mentioned in the proposed scheme would be deleted.
- 3. She further explained that some generators which are to be connected at 220 kV at Fatehgarh-III have been given connectivity in the new section and they have sought connectivity from March, 2022, onwards.
- 4. CTU stated that at present, 5425 MW Stage-II connectivity applications and 820MW LTA applications granted at Fatehgarh-3 PS. Therefore, implementation of Phase III Part E1 is to be taken up for evacuation of power from for RE developers at Fatehgarh-3 PS. Also based on the present application, it is worthwhile to consider only three 1500 MVA ICTs. Further, STATCOM package was deliberated to be excluded from this package and may be taken up as per requirement at later stage.
- 5. After deliberations, NCT recommended the following:

Name of the scheme/est.	Mode of implementation	Purpose /Justification
cost/schedule		
Transmission system for	RTM	For evacuation of RE
evacuation of power from REZ in		power getting pooled
Rajasthan (20 GW) under Phase III	[Transmission system for	at Fatehgarh-3.
–Part E1	1.9 GW at Fatehgarh -3	
	(Phase –II) is already under	
Estimated Cost: Rs 435 Crore	implementation by the	
	subsidiary of PGCIL.	
Implementation Timeframe : 18	Transmission system under	
months from MoP OM.	Phase-III- Part E1 is for	
	evacuating 6 GW potential	
	at Fatehgarh-3 (Phase-III),	
	which is utilising the future	
	provision of the earlier	
	approved scheme under	
	Phase-II. Hence, the	
	scheme is proposed to be	
	awarded under RTM]	
	L L	

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part E1"

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	Establishment of 3x1500 MVA 765/400kV	765/400kV 1500 MVA ICT: 3 nos

Sl. No.	Scope of the Transmission Scheme	Capacity /km
	&3x500 MVA 400/220 kV pooling station at Fatehgarh-3 (new section*) (In addition to 4x500 MVA ICT proposed under Rajasthan SEZ Ph-II-of Section-1) along with 2x330 MVAr, 765kV & 2x125 MVAr, 420kV Bus Reactors	 (10x500 MVA, including one spare unit) 330 MVAr, 765 kV bus reactor- 2 (7x110 MVAr, including one spare unit) 765kV ICT bays - 3 nos. 400/220 kV, 500 MVA ICT - 3nos. 400 kV ICT bays -6 nos. 220 kV ICT bays - 3 nos. 765 kV line bays - 2nos. 765kV reactor bay- 2 nos. 125 MVAr, 420kV bus reactor - 2 nos. 420 kV reactor bay - 2 nos.

Note:

(i) Provision of suitable sectionalization shall be kept at Fatehgarh-3 at 400kV & 220kV level to limit short circuit level

5.10.11Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part E2

1. After deliberations, NCT recommended the following:

For evacuation of RE power getting pooled at Fatehgarh-3.
power getting pooled
1 0 0 1
lementation to be at Fatehgarh-3
to be at rateligam-5.
up at later stage
l on the number of
applications received
nd 3000MW
llative at Fatehgarh-3
section) & Fatehgarh-

"Transmission system for evacu	lation of power from	n REZ in Rajasthan (20GW)
under Phase-III Part E2"		

Sl. No.	Scope of the Transmission Scheme	Capacity /km
	Augmentation of 3x1500 MVA 765/400kV & 2x500 MVA 400/220 kV pooling station at Fatehgarh-3 (new section)	765/400kV 1500 MVA ICT:3 nos. 400/220 kV 500 MVA ICT:2 nos 765kV ICT bay – 3 nos 400kV ICT bay -5 nos. 220 kV ICT bay- 2nos

Note: Implementation to be taken up at later stage based on the number of LTA applications received beyond 3000MW cumulative at Fatehgarh-3 (new section) & Fatehgarh-4 PS.

5.10.12 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III: Part E3

- 1. NCT stated that provision of STATCOM at Fatehgarh-III may be taken up as a separate package and implemented as per the requirement and studies wrt Battery Energy Storage System. Further, its requirement would be reviewed at a later date.
- 2. The revised scope of the scheme is as under:

SI.No.	Scope of the Transmission Scheme	Capacity /km	Remarks
	Fatehgarh – III S/s : STATCOM : ± 2x300 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR	2x±300MVAr	May be taken up based on the requirement as per the studies wrt BESS.

Note: STATCOM to be placed at new section of Fatehgarh-III PS from where Phase-III scheme emanating

5.10.13 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part F:

1. After deliberations, NCT recommended the following:

Name of the scheme/est.	Mode of implementation	Purpose /Justification
cost/schedule		
Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part F	TBCB	For evacuation of RE power getting pooled at Fatehgarh-3 (new section) and/or Fatehgarh-4
Estimated Cost : Rs 2220 Crore Implementation Timeframe : 18 months from date of SPV acquisition.		

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part F"

SI.	Scope of the Transmission Scheme	Capacity /km
No.		
1	 Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus Reactor <i>Future provisions: Space for</i> 765/400kV ICTs along with bays: 2 nos. 765kV line bay along with switchable line reactor: 6nos. 765kV Bus Reactor along with bays: 2 nos. 400/220 kV ICTs along with bays: 2nos. 400 kV line bays along with switchable line reactor: 4 nos. 400kV Bus Reactor along with bays: 1nos. 220 kV line bays: 4nos. 	765/400kV 1500 MVA ICTs: 2 nos (7 $x500$ MVA, including one spare unit) 330 MVAr, 765 kV bus reactor- 2 (7 $x110$ MVAr, including one spare unit) 765kV ICT bays – 2 nos. 400 kV ICT bays – 2 nos. 765 kV line bays – 6 nos 400kV line bay- 2 nos. 765kV reactor bay- 2 nos. 125 MVAr, 420kV bus reactor – 2 nos. 420 kV reactor bay – 2 nos.
2	LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar	Length – 45km
3	LILO of 400kV Kota –Merta line at Beawar	Length – 20km

SI. No.	Scope of the Transmission Scheme	Capacity /km
4	Fatehgarh-3– Beawar 765 kV D/c along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line	Length – 350km Switching equipment for 765 kV 330 MVAR switchable line reactor –4 nos. 765 kV, 330 MVAr Switchable line reactor- 4 nos.

Note:

- (i) Developer of Fategarh-3 S/s to provide 2 nos. of 765 kV line bays at Fatehgarh-3 S/s along with space for 765kV switchable line reactors
- (ii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey
- (iii) Scheme to be taken up subject to receipt of LTA applications at Fatehgarh-3 (new section and/or Fatehgarh-4.

5.10.14 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part G:

1. After deliberations, NCT recommended the following:

Name of the scheme/est.	Mode of implementation	Purpose /Justification
cost/schedule		
Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part G Estimated Cost: Rs 1530 Crore Implementation Timeframe: 18 months from date of SPV acquisition.	taken up upon receipt of LTA beyond 3000 MW cumulative at Fatehgarh-3 PS (new section) &	For evacuation of RE power (beyond 3000 MW) getting pooled at Fatehgarh-3 (new section) and/or Fatehgarh-4

2. Detailed scope of the scheme is given below:

[&]quot;Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part G"

Sl.N o.	Scope of the Transmission Scheme	Capacity /km
	Fatehgarh-3– Beawar 765 kV D/c(2 nd) along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line	Length – 350km Switching equipment for 765 kV 330 MVAR switchable line reactor –4 765 kV, 330 MVAr Switchable line reactor- 4
	2 nos. of 765kV line bays at both at Beawar & Fatehgarh-3	765 kV line bays - 4nos

Note:

- (i) Implementation to be taken up upon receipt of LTA beyond 3000 MW cumulative at Fatehgarh-3 PS (new section) & Fatehgarh-4 PS).
- (ii) Developer of Fategarh-3 S/s to provide space for 2 nos. of 765 kV line bays at Fatehgarh-3 S/s along with space for 765 switchable line reactors.
- (iii) Developer of Beawar S/s to provide space for 2 nos. of 765 kV line bays at Beawar S/s along with space for 765kV switchable line reactors.
- (iv) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey

5.10.15 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part H:

1. After deliberations, NCT recommended the following:

Name of the scheme/est.	Mode of implementation	Purpose /Justification
cost/schedule		
Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part H Estimated Cost: Rs 1910 Crore Implementation Timeframe: 18 months from date of SPV acquisition.	TBCB (Implementation to be taken up upon receipt of LTA beyond 3000 MW cumulative at Fatehgarh-3 PS (new section) & Fatehgarh-4 PS)	For evacuation of RE power getting pooled at Fatehgarh-3 (new section) and/or Fatehgarh-4

2. Detailed scope of the scheme is given below:

SI. No.	Scope of the Transmission Scheme	Capacity /km
1.	Establishment of 2x1500 MVA 765/400kV substation at suitable location near Dausa along with 2x330 MVAr, 765 kV Bus Reactor & 2x125 MVAr, 420 kV bus Reactor <u>Future provisions</u> : Space for 765/400kV ICTs along with bays: 2 nos. 765kV line bay along with switchable line reactor: 4nos. 765kV Bus Reactor along with bays: 2 nos. 400/220 kV ICTs along with bays: 2 nos.	 765/400kV 1500 MVA ICTs: 2 nos. (7x500 MVA, including one spare unit) 330 MVAr, 765 kV bus reactor- 2nos. (7x110 MVAr, including one spare unit) 765kV ICT bays – 2 nos 400 kV ICT bays – 2 nos. 765 kV line bays – 6 nos. 400kV line bay- 4 nos.
	reactor: 4 nos. 400kV Bus Reactor along with bays: 1 nos. 220 kV line bays: 4nos.	 765kV reactor bay- 2 nos. 125 MVAr, 420kV bus reactor – 2 nos. 420 kV reactor bay – 2 nos.
2.	LILO of both circuits of Jaipur(Phagi)-Gwalior 765 kV D/c at Dausa along with 240 MVAr Switchable line reactor for each circuit at Dausa end of Dausa – Gwalior 765 kV D/c line	Length – 40km Switching equipment for 765 kV 240 MVAR switchable line reactor –2 240 MVAr 765 kV Switchable line reactor- 2 (<i>7x80 MVAr considering one spare</i> <i>unit</i>) (also to be used as spare reactor at Dausa end for 765kV Beawar – Dausa D/c line)
3	LILO of both circuits of Agra – Jaipur(south) 400kV D/c at Dausa along with 50 MVAr Switchable line reactor for each circuit at Dausa end of Dausa – Agra 400kV D/c line	Length – 30km Switching equipment for 420 kV, 50 MVAR switchable line reactor –2 420 kV, 50 MVAr Switchable line reactor-2 nos.

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part H"

SI. No.	Scope of the Transmission Scheme	Capacity /km
	Beawar – Dausa 765 kV D/c line (240 km) along with 240 MVAr Switchable line reactor for each circuit at each end	Length – 240km Switching equipment for 765 kV 240 MVAR switchable line reactor –4 765 kV, 240 MVAr Switchable line reactor- 4 nos.
5	2 nos. of 765kV line bays at Beawar for Beawar – Dausa 765 kV D/c line	765 kV line bays – 2 nos

Note:

- (i) Implementation of the scheme to be taken up upon receipt of LTA beyond 3000MW (about) cumulative at Fatehgarh-3 PS (new section) and Fatehgarh-4 PS.
- (ii) Developer of Beawar S/s to provide space for 2 nos. of 765 kV line bays along with space for 765kV switchable line reactors at their substations
- (iii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey

5.10.16 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part I:

1. The scope of scheme is as under:

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Establishment of 6000MW, ±800KV Bhadla(HVDC) terminal station at a suitable location near Bhadla-3 substation	
2.	Establishment of 6000MW, ±800KV Fatehpur(HVDC) terminal station at suitable location near Fatehpur (UP)	
3.	Bhadla-3 - Bhadla(HVDC) 400kV 2xD/c quad moose line along with the line bays at both substations	Line length- 2km 400kV line bays -8 nos.
4	±800KV HVDC line (Hexa lapwing) (4x1500 MW) between Bhadla-3 & Fatehpur (950km)	Length – 950km
5.	Establishment of 5x1500MVA, 765/400KV ICTs at Fatehpur (HVDC) along with	765/400kV 1500 MVA ICT : 5 nos (16x500 MVA, including one spare

 2x330MVAr (765kV) bus reactor Future provisions: Space for 765/400kV ICTs along with bays: 1 nos. 765kV line bay along with switchable line reactor: 4nos. 765kV Bus Reactor along with bays: 2 nos. 400/220 kV ICTs along with bays: 4nos. 400 kV line bays along with switchable line reactor: 4 nos. 400kV Bus Reactor along with bays: 1 nos. 220 kV line bays: 6nos. 	unit) 765kV ICT bays – 5 nos. 400 kV ICT bays – 5 nos. 765 kV line bays – 4 nos. 330 MVAr, 765kV Bus Reactor-2 nos. (7x110 MVAr, including one spare unit) 765kV reactor bay- 2 nos.
LILO of both ckts of 765kV Varanasi – Kanpur (GIS) D/c at Fatehpur(30km)	Length – 30km
Total Estimated Cost (Rs Crores)	12700

Note:

- (i) Developer of Bhadla-3 S/s to provide space 4nos. of 400kV bays at their substation
- *(ii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey*
- 2. CTUIL stated that at present 2824MW Stage-II connectivity applications granted at Ramgarh/Bhadla-3 PS, however no LTA application yet granted. For further dispersal of RE power from Ramgarh PS/Bhadla-3 PS, 765kV D/c HVAC corridor towards Sikar-2 and 6000MW HVDC corridor towards Fatehpur was agreed in 3rd NRPC(TP) meeting. However, due to longer time in implementation and higher cost of HVDC system, 765kV HVAC corridor towards Sikar-2 is to be taken up for implementation in first phase. It is emerged that when LTA at Ramgarh/Bhadla-3 PS is beyond 3500 MW, there shall be need for implementation of HVDC system additionally which may be reviewed in next NCT meeting based on LTA status at Ramgarh/Bhadla-3.
- **3.** Member (Power System), CEA, stated that it would be better to defer this scheme and simultaneously option of Battery Storage System could be explored which could reduce the requirement of HVDC lines. Accordingly, the revised proposal could be discussed in the next NCT meeting.
- **4.** POSOCO also stated that due to the uncertainty of GIB issue, it would be better to defer this scheme at this stage.
- **5.** After deliberations, NCT recommended that Transmission scheme "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under phase III –Part I" may be deferred and to be reviewed in next NCT meeting.

5.10.17 Name of Scheme: Transformer augmentation at various substations for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part J:

1. The scope of scheme is as under:

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Augmentation with 400/220kV, 1x500MVA Transformer (10 th) at Fatehgarh-2 PS	400/220kV 500 MVA ICT:1 no 400 kV ICT bays – 1 nos. 220 kV ICT bays – 1 nos.
2.	Augmentation with 765/400kV, 1x1500MVA Transformer (5 th) at Bhadla-2 PS	765/400kV 1500 MVA ICT: 1 no. 765kV ICT bays – 1no. 400 kV ICT bays – 1 no.
3.	Augmentation with 765/400kV, 1x1500MVA Transformer (3 rd) at Bikaner (PG)	765/400kV 1500 MVA ICT: 1 no 765kV ICT bays – 1no. 400 kV ICT bays – 1 no.
4.	Augmentation of 1x500 MVA ICT (5 th), 400/220kV ICT at Fatehgarh-3 Substation (section-1*)	400/220kV 500 MVA ICT:1 no. 400 kV ICT bays – 1 no. 220 kV ICT bays – 1 no.
5.	Augmentation of 1x1500MVA ICT at 765/400kV Kanpur(GIS) substation	765/400kV 1500 MVA ICT: 1 no. 765kV ICT bays – 1no. 400 kV ICT bays – 1 no.
6.	Augmentation of 1x1500 MVA ICT (3 rd), 765/400kV ICT at Jhatikara Substation (Bamnoli/Dwarka section)	

- 2. CTUIL stated that one of the pilot project of Battery Storage System of 250 MW is being planned at perspective location near Fatehgarh-3, therefore there might be a possibility that the 5th ICT of 500 MVA at Fatehgarh-3 S/s may not be required and hence this item needs to be reviewed. Also, augmentation of 1x1500MVA ICT at 765/400kV Kanpur(GIS) substation is linked with HVDC system (LILO of Varanasi-Kanpur at Fatehpur) and since the timeframe of HVDC has now been delayed, therefore, this item could also be taken up later.
- 3. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part J Estimated Cost: Rs 225 Crore Implementation Timeframe: The Implementation timeframe of the package is linked with the implementation of various schemes under Phase-III.	RTM	For evacuation of RE power getting pooled at Fatehgarh-2, Bhadla-2, Bikaner (PG) and Jhatikara Substation.

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part J"

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Augmentation with 400/220kV, 1x500MVA Transformer (10 th) at Fatehgarh-2 PS	400/220kV 500 MVA ICT:1 no 400 kV ICT bays – 1 nos. 220 kV ICT bays – 1 nos.
2.	Augmentation with 765/400kV, 1x1500MVA Transformer (5 th) at Bhadla-2 PS	765/400kV 1500 MVA ICT: 1 no. 765kV ICT bays – 1no. 400 kV ICT bays – 1 no.
3.	Augmentation with 765/400kV, 1x1500MVA Transformer (3 rd) at Bikaner (PG)	765/400kV 1500 MVA ICT: 1 no 765kV ICT bays – 1no. 400 kV ICT bays – 1 no.
4.	Augmentation of 1x1500 MVA ICT (3 rd), 765/400kV ICT at Jhatikara Substation (Bamnoli/Dwarka section)	765/400kV 1500 MVA ICTs : 1 no 765kV ICT bays – 1no. 400 kV ICT bays – 1 no.

Note:

Implementation schedule of above transmission elements under Part J is as under:

a) Augmentation with 400/220kV, 1x500MVA Transformer (10th) at Fatehgarh-2 PS: Implementation shall be taken up after LTA of 4490MW at 220kV level of Fatehgarh-2 (Presently 3660MW LTA granted at 220kV level of Fatehgarh-2)

- b) Augmentation with 765/400kV, 1x1500MVA Transformer (5th) at Bhadla-2 PS : At present 5945MW Stage-II connectivity applications and 2645MW LTA applications granted at Bhadla-2 PS. Implementation of 765/400kV, 1x1500MVA Transformer (5th) at Bhadla-2 PS shall be taken up after receipt of LTA of about 4000MW at Bhadla-2 PS
- c) Augmentation with 765/400kV, 1x1500MVA Transformer (3rd) at Bikaner (PG) : *At* present 3935MW Stage-II connectivity applications and 2975MW LTA applications granted at Bikaner/Bikaner-2 PS. Implementation of 1x1500MVA transformer (3rd) at Bikaner (PG) shall be taken up upon additional 1000MW (about) LTA at Bikaner(PG)/Bikaner-2 PS
- d) Augmentation of 1x1500 MVA ICT (3rd), 765/400kV ICT at Jhatikara Substation (Bamnoli/Dwarka section): Implementation shall be taken up after receipt of LTA at Bhadla-3 PS/Ramgarh PS matching with transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part D

5.11 Name of Scheme: Creation of 400/220 kV, 2x315 MVA S/S at Siot, Jammu & Kashmir

1. Director, PSPA-1 stated that in the 3rd meeting of NRPC (TP) held on 19.02.2021, JKPTCL stated that they are in urgent requirement of a 400 kV substation at Siot as they are facing shortfall of transmission capacity in the areas of Jammu, Rajouri and Punch district. The proposed 400 kV substation would feed the areas near Akhnoor and Jammu region and the interconnection with Katra-II would also improve reliability of supply, considering the importance of Katra being a holy town with lots of visiting pilgrims. The substation would also provide relief from the low voltage issues at Draba/Chandak. The details of the scheme are as under:

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Establishment of 2x315MVA, 400/220kV Siot S/s with 1x125 MVAR (420 kV) bus reactors <u>Future provisions</u> : Space for 400/220kV ICTs along with bays: 2 nos. 400 kV line bays along with switchable line reactor: 4nos. 220 kV line bays: 4 nos.	400/220 kV, 315 MVA ICT – 2 nos. 400 kV ICT bays - 2 nos. 220 kV ICT bays - 2 nos. 400 kV line bays - 4 nos. 220 kV line bays - 6 nos. 125MVAr, 420kV bus reactor - 1 nos. 420 kV reactor bay - 1 nos.
	LILO of 400 kV D/c Amargarh (Kunzer)- Samba line at 400/220 kV Siot S/s	Length – 15 km

^{2.} CTUIL opined that considering the transportation constraints due to difficult terrain,

single phase units for transformers may be considered in place of three phase transformer at proposed Siot S/s. Further, bus reactor of 80MVAr suggested in place of 125MVAr due to above limitation.

3. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
Creation of 400/220 kV, 2x315 MVA S/S at Siot, Jammu & Kashmir Estimated Cost: Rs 270 Crore Implementation Timeframe: March, 2024	TBCB	To feed the areas near Akhnoor and Jammu region and the interconnection with Katra-II would also improve reliability of supply

4. Detailed scope of the scheme is given below:

"Creation of 400/220 kV, 2x315 MVA S/S at Siot, Jammu & Kashmir"

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Establishment of 7x105 MVA, 400/220kV Siot S/s with 1x80 MVAR (420 kV) bus reactors <i>Future provisions: Space for</i> 400/220kV ICTs along with bays: 2 nos. 400 kV line bays along with switchable line reactor: 4 nos. 220 kV line bays: 4 nos.	 315 MVA, 400/220 kV ICT (7x105 MVA, including one spare) 400 kV ICT bays - 2 nos. 220 kV ICT bays - 2 nos. 400 kV line bays - 4 nos. 220 kV line bays - 6 nos. 80 MVAr, 420kV bus reactor - 1 nos. 420 kV reactor bay - 1 nos.
2.	LILO of 400 kV D/c Amargarh (Kunzer)- Samba line at 400/220 kV Siot S/s	Length – 15 km

5.12 400 kV Khandukhal(Srinagar)-Rampura (Kashipur) D/c line:

1. Director, PSPA-1 stated that Uttarakhand Integrated Transmission Project (UITP) scheme

is under implementation by PTCUL. CERC vide order dated 31.01.2013 had declared the scheme as a deemed ISTS scheme. The scheme comprises of transmission system for evacuation of power from proposed HEP's in various river basins of Uttarakhand. There are certain deemed Inter-State Transmission System (deemed ISTS) elements of UITP, where PTCUL had not been able to achieve the targeted timeline (deadlines). Amongst these are the 400 kV D/C Srinagar (Khandukhal) – Kashipur (Rampura)Transmission line which was required to evacuate power from upcoming projects in the Alaknanda basin (Vishnugad Pipalkoti HEP of THDC and Tapovan Vishnugad HEP of NTPC), and the 220 kV D/C Mori-Dehradun line which was proposed to evacuate power from proposed generators in Yamuna basin. M/s PTCUL vide letter dated 12.01.2021 conveyed that Board of Directors of PTCUL had accorded approval for handing over of construction of 400 kV Khandukhal-Rampura Transmission Line to Central Sector.

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

Sl. No.	Scope of the Transmission Scheme	Capacity /km
	400 kV D/c Khandukhal(Srinagar)-Rampura (Kashipur) line	Length – 195 km
	2 nos. of 400 KV bays both at Khandukhal Srinagar) & Rampura(Kashipur) S/s	400 kV line bays -4

Note:

- *(i)* The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey
- *(ii) PTCUL to provide space for2 nos. of 400kV bays each at Rampura (Kashipur) & Khandukhal(Srinagar) S/s respectively.*
- 3. CTU stated that the conductor configuration of the line, Quad Bersimis needs to be mentioned. Also, earlier the line length noted was 150 km and now, it has been modified to 195 km, which would require the need of line reactor. 2x80 MVAR switchable line reactors with inter-tripping arrangement could be utilized at both ends.
- 4. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
400 kV Khandukhal(Srinagar)- Rampura (Kashipur) D/c line	ТВСВ	To evacuate power from upcoming projects in the
Estimated Cost: Rs 800 Crore		Alaknanda basin (Vishnugad Pipalkoti
Implementation Timeframe: The		HEP of THDC and
timeline to be considered as matching time frame of commissioning of Vishnugad Pipalkoti HEP (Dec'23) of THDC or Tapovan Vishnugad HEP of NTPC, whichever is earlier.		Tapovan Vishnugad HEP of NTPC)

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	400 kV D/c Khandukhal(Srinagar)- Rampura (Kashipur) line (Quad Bersimis)	Length – 195 km
2	1x80MVAr swithcable line reactor at Khandukhal(Srinagar) end at each ckt of Khandukhal(Srinagar) -Rampura (Kashipur) line (Quad Bersimis)	Switching equipment for 420 kV 80 MVAR switchable line reactor –2 420 kV, 80 MVAr Switchable line reactor- 2
	2 nos. of 400 KV bays both at Khandukhal Srinagar) & Rampura(Kashipur) S/s	400 kV line bays -4

Note:

- (i) The timeline to be considered as matching time frame of commissioning of Vishnugad Pipalkoti HEP (Dec'23) of THDC or Tapovan Vishnugad HEP of NTPC, whichever is earlier.
- (ii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey
- PTCUL to provide space for 2 nos. of 400kV bays each at Rampura (Kashipur) & Khandukhal(Srinagar) S/s respectively along with the space for switchable line reactor

5.13 System Strengthening scheme for reconductoring of portion of Dulhasti-Kishtwar-Kishenpur 400 kV (Quad) S/c:

- Director, PSPA-1 stated that earlier Ratle HEP (690 MW) was planned to be developed in the downstream of Dulhasti HEP and it was agreed that Dulhasti-Kishenpur D/c Quad (S/ c strung) would be LILOed at Ratle HEP and 2nd quad circuit shall be strung from Kishenpur and terminated at Ratle matching with the commissioning of Ratle HEP. For cost optimization, it was agreed to implement Dulhasti-Kishenpur 400kV S/c line (Quad) with Twin Moose conductor till Ratle LILO point. Beyond Ratle LILO point, line was implemented with Quad Moose conductor. However, LTA & Connectivity application for Ratle HEP was revoked at later stage due to non-signing of requisite agreements.
- 2. For connectivity of Pakaldul HEP (1000 MW), LILO of one circuit of Dulhasti Kishenpur 400 kV line (quad) has been agreed at Kishtwar Pooling station. However, as location of proposed Kishtwar S/s is above Ratle location and towards Dulhasti, portion of Dulhasti-Ratle LILO tap Point of Dulhasti (TW loc 10 indicated at Fig-1) Kishenpur 400 kV line (TW loc 49-indicated at Fig-1) (approx. 13 kms) implemented through twin moose conductor, needs to be re-conductored with Quad moose conductor. This reconductoring of approx. 13 km section (LILO tap Point of Dulhasti Kishenpur 400 kV line) would be needed to cater to power transfer requirement from hydro projects (Pakaldul, Kiru & Kwar) including LTA of Pakaldul (1000 MW) HEP. An exhibit depicting above arrangement is at Fig-1.

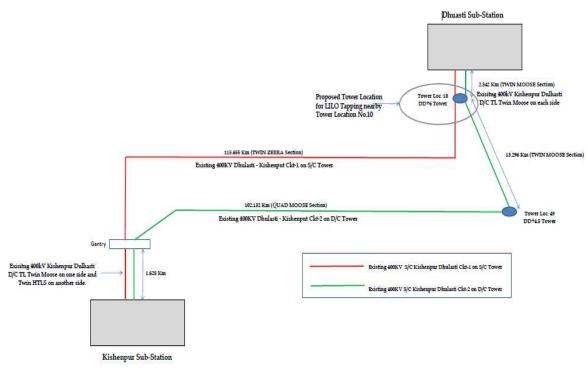


Fig-1

- 3. Also, the matter was deliberated in 3rd meeting of NRPC (TP) held on 19.02.2021 wherein reconductoring of Dulhasti-Ratle LILO tap Point of Dulhasti Kishenpur 400 kV line (approx. 13 kms) implemented through twin moose conductor with Quad moose conductor in matching time frame of Pakaldul HEP generation was agreed.
- 4. After deliberations, NCT recommended the following:

Name of the scheme/est.	Mode of implementation	Purpose /Justification
cost/schedule		
System Strengthening scheme for	RTM	To cater to power
reconductoring of portion of	(Existing line of	transfer requirement
Dulhasti-Kishtwar- Kishenpur 400	POWERGRID)	from hydro projects
kV (Quad) S/c		(Pakaldul, Kiru &
		Kwar) including LTA
Estimated Cost: Rs 13 Crore		of Pakaldul (1000
Implementation Timeframe : In		MW) HEP
matching time frame of Pakaldul		
HEP generation.		

 5. Detailed scope of the scheme is given below:
 "System Strengthening scheme for reconductoring of portion of Dulhasti-Kishtwar-Kishenpur 400 kV (Quad) S/c"

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	Reconductoring of Dulhasti-Ratle LILO tap Point of Dulhasti - Kishenpur 400 kV line (approx. 13 kms) implemented through twin moose conductor, with Quad moose conductor in matching time frame of Pakaldul HEP generation.	-

Note: To be implemented in matching time frame of Pakaldul HEP generation.

5.14 Grant of 400 kV & 220 kV bays to RE generators at Fatehgarh-III (erstwhile Ramgarh-II) PS under ISTS:

- Director, PSPA-1 stated that the establishment of 4x500MVA, 400/220kV Fatehgarh-III PS Ramgarh-II Pooling Station was agreed in the 5th meeting of NRSCT held on 13.09.2019 under "Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II –Part A". The Transmission scheme is currently under bidding through TBCB.
- 2. In the 3rd meeting of NRPC (TP) held on 19.02.2021, CTU intimated that several Stage-II Connectivity applications have been received at Fatehgarh-III PS at various voltage levels i.e. 400kV & 220kV level for which 6 nos. of 220kV bays and 3 nos. of 400kV bays are required at Fatehgarh-III PS and proposed that bays may be implemented under ISTS matching with RE generators.

- 3. Accordingly, as per the detailed procedure for grant of connectivity to RE generators, it was agreed that 6 nos. of 220kV bays and 3 nos. of 400kV bays at Fatehgarh-III PS may be implemented under ISTS matching with RE generators.
- 4. After deliberations, NCT recommended the following:

Name of the scheme/est.	Mode of implementation	Purpose /Justification
cost/schedule		
Grant of 400 kV & 220 kV bays to RE generators at Fatehgarh-III (erstwhile Ramgarh-II) PS under ISTS	RTM	To grant connectivity to RE generators
Estimated Cost: Rs 75 Crore		
Implementation Timeframe : 15 months from MoP OM		

"Grant of 400 kV & 220 kV bays to RE generators at Fatehgarh-III (erstwhile Ramgarh-II) PS under ISTS"

SI. No.	Scope of the Transmission Scheme	Capacity /km
1.	bus as well as bus sectionaliser arrangement between both the levels i.e 400 kV new section	400 kV line bays - 3 nos. 220kV line bays - 6 nos. 400kV bus sectionaliser : 1 no. 220kV bus sectionalizer : 1 no.

5.15 Addition of new 1x315 MVA, 400/220kV ICT at Amargarh, J&K:

- 1. Director, PSPA-1 stated that JKPDD had submitted DPRs for Jammu Region & Kashmir region for strengthening of the transmission network of J &K considering a load of around 4800 MW by 2026-27. Considering the same, system studies were carried out by CEA and as per the system studies, it emerged that 2x315MVA, 400/220kV ICTs at Amargarh (Kunzar) are 'N-1' non complaint in 2025-26 scenario.
- 2. Further, Matter was deliberated in the 3rd meeting of NRPC (TP) held on 19.02.2021 wherein addition of new 1x315 MVA, 400/220kV ICT at Amargarh was agreed to be taken up under ISTS with the time frame of March 2026.
- 3. It was opined that considering transportation constraints due to difficult terrain, single phase units for transformers may be considered in place of three phase transformer at Amargarh S/s.

"Addition of new 1x315 MVA, 400/220kV ICT at Amargarh, J&K"

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1	Augmentation with 400/220kV, 1x315MVA Transformer (3 rd) at Amargarh, J&K	400/220kV 105 MVA single phase ICT: 3 no
		400 kV ICT bays – 1 nos.
		220 kV ICT bays – 1 nos.
	Total Estimated Cost (Rs Crores)	40

Time frame as per NRPC(TP) – March, 2026

5. NCT recommended that the scheme may be implemented through RTM route. However, since the timeframe of Amargarh is March, 2026, therefore, this could be deferred and may be taken up later.

5.16 Establishment of 400/220kV Nange Pooling Station for proposed SJVN Hydro Power Plant Luhri Stage-I, II & Sunni Dam:

- Director, PSPA-1 stated that in the 2nd NRSCT meeting held on 13.11.18, transmission system for connectivity to Luhri-I (210 MW), Luhri-II (172 MW) & Sunni Dam (382 MW) HEP were agreed. It was decided that power from all the three stages of Luhri HEP would be evacuated at 220 kV level and would be pooled at 400/220 kV proposed ISTS Nange pooling station located near Luhri-II HEP and further evacuated to Koldam through 400 kV D/c line.
- 2. Matter was further deliberated in the 3rd meeting of NRPC (TP) held on 19.02.2021, wherein SJVNL intimated that commissioning schedules for Luhri Stage-I (210 MW), Sunni Dam (382 MW) and Luhri Stage -II (172 MW) are April 2025, January 2027 and October 2027 respectively. Accordingly, 2x315 MVA ICT capacity at Nange Pooling station shall be required in the time frame of Luhri Stage-I HEP (210 MW).
- **3.** After deliberations, it was agreed that following transmission system may be taken up for implementation with the time frame of Luhri-I HEP (April 2025):

Sl. No.	Scope of the Transmission Scheme	Capacity /km
	Establishment of 7x105 MVA, 400/220kV Nange GIS Pooling Station	400/220 kV 105 MVA ICT - 7nos.
		400 kV ICT bays - 2 nos.
	<i>Future provisions</i> : Space for	220 kV ICT bays - 2 nos.
	400/220kV ICTs along with bays: 2 nos.	400 kV line bays - 2 nos.
	400 kV line bays along with switchable line	125 MVAr, 420kV bus

	reactor: 2nos. 220 kV line bays: 10 nos.	reactor – 1 no. 420 kV reactor bay - 1no.
	Nange GIS Pooling Station – Koldam 400 kV D/c line	Length – 50 km
3.	2 nos. of 400kV GIS line bays at Koldam	400 kV line bays (GIS) - 2 nos
	Total Estimated Cost (Rs Crores)	330

Note:

- (i) NTPC to provide space for 2 nos. of 400 kV line bays at Koldam S/s
- *(ii)* The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey

The above transmission system would also be utilized for connectivity of Sunni Dam and Luhri-II HEPs of M/s SJVNL. Time frame as per NRPC (TP)- April, 2025.

4. Member (PS) informed that NTPC has forwarded some observation regarding the availability of space at Koldam S/s for 2nos. of 400kV bays, therefore the scheme may be deferred presently. The same would be put up again after resolution of the issue with NTPC.

Members noted the same.

5.17 1x500 MVA, 400/220 kV ICT augmentation (3rd) at Sohawal (PG) under system strengthening.

- 1. Director, PSPA-1 stated that in the 3rd meeting of NRPC (TP) held on 19.02.2021, UPPTCL intimated that 2x315 MVA ICTs at Sohawal(PG) have been observed to be 'N-1' non-compliant under peak load conditions and requested for its augmentation. Accordingly, 1x500 MVA, 400/220 kV ICT augmentation (3rd) at Sohawal (PG) was agreed under system strengthening. Also, UPPTCL has requested to implement the ICT at the earliest due to increase in load.
- **2.** CTUIL stated that UPPTCL vide letter 24.08.21 again requested that transformer augmentation work at Sohawal (PG) substation may be implemented on top priority to maintain reliable supply besides TTC enhancement perspective.
- **3.** After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
 1x500 MVA, 400/220 kV ICT augmentation (3rd) at Sohawal (PG) under system strengthening Estimated Cost: Rs 30 Crore Implementation Timeframe: 15 months from MoP OM 	RTM	To maintain reliable supply besides TTC enhancement perspective.

"1x500 MVA, 400/220 kV ICT augmentation (3rd) at Sohawal (PG) under system strengthening"

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1	Augmentation with 400/220kV, 1x500 MVA Transformer (3 rd)at Sohawal (PG)	400/220kV 500 MVAICT:1 no 400 kV ICT bays – 1 nos. 220 kV ICT bays – 1 nos.

5.18 One no of 220 kV bay at Chamera Pooling point for 2nd Circuit stringing of 220 kV Karian – Chamera Pool line under implementation by HPPTCL with time fame of December 21.

- Director, PSPA-1 stated that construction of 220/33 kV substation at Karian in Ravi Basin had been approved in 29th meeting of SCPSPNR held on 29.12.2010. Accordingly, 2 No. of 220 kV Bays were approved for termination of 220 kV D/C line from Karian at 400/220 kV, 2x315 MVA Chamera Pooling station of PGCIL at Rajera. Subsequently, in the 30th SCPSPNR meeting held on 19.12.2011, HPPTCL had informed that one bay would be required in first instance.
- 2. Subsequently, in order to strengthen the intra-state transmission system, HPPTCL has planned 2nd circuit stringing of 220 kV Karian to Chamera transmission line, for which 220kV bay is required to be implemented at Chamera Pool and the same was approved in 3rd meeting of NRPC(TP). HPPTCL had requested that the implementation of the above scheme may be carried out by December 2021.
- 3. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
One no of 220 kV bay at Chamera Pooling point for 2 nd Circuit stringing of 220 kV Karian – Chamera Pool line	RTM	To strengthen the intra-state transmission system of HP
Estimated Cost : Rs 4 Crore Implementation Timeframe : 12 months from MoP OM.		

"One no of 220 kV bay at Chamera Pooling point for 2nd Circuit stringing of 220 kV Karian – Chamera Pool line"

Sl. No.	Scope of the Transmission Scheme	Capacity /km
	One no of 220kV bay at Chamera Pooling point (PG) for 2 nd Circuit stringing of 220 kV Karian – Chamera Pool line	220 kV line bay -1 no

5.19 220 kV bays at 400 kV substation PGCIL Khatkar (Jind) & Naggal (Panchkula) substation:

- 1. Director, PSPA-1 stated that the following 220kV bays have been agreed in the 3rd meeting of NRPC(TP):
 - For LILO of both circuits of 220 kV Jind HVPNL to PTPS D/C line at 400 kV substation PGCIL Khatkar (Jind), 4 nos. of bays are required, out of which 2 nos. of bays are already existing. Therefore, implementation of 2 nos. of bays has been agreed. HVPNL has indicated the timeframe for implementation of the above 2 bays as July 2023.
 - For termination of 220 kV D/C line from 400 kV PGCIL Naggal (Panchkula) to proposed 220 kV substation Sadhaura, 2 nos. of 2 nos. of bays has been agreed. HVPNL has indicated the timeframe for implementation of the 2 bays at 400 kV PGCIL Naggal as September, 2023.
- 2. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
 220 kV bays at 400 kV substation PGCIL Khatkar (Jind) & Naggal (Panchkula) substation Estimated Cost: Rs 16 Crore Implementation Timeframe: PGCIL Khatkar (Jind)- July, 2023 Naggal (Panchkula) substation- September, 2023 	RTM	 For LILO of both circuits of 220 kV Jind HVPNL to PTPS D/C line at 400 kV substation PGCIL Khatkar (Jind). For termination of 220 kV D/C line from 400 kV PGCIL Naggal (Panchkula) to proposed 220 kV substation Sadhaura

"220 kV bays at 400 kV substation PGCIL Khatkar (Jind) & Naggal (Panchkula) substation"

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1	220 kV bays at 400 kV substation PGCIL Khatkar (Jind) for LILO of both circuits of 220 kV Jind HVPNL to PTPS D/C line at 400 kV substation PGCIL Khatkar (Jind)	220 kV line bays -2nos
2	220 kV bays at 400 kV PGCIL Naggal (Panchkula) substation for 220 kV D/C line from 400 kV PGCIL Naggal (Panchkula) to proposed 220 kV substation Sadhaura	220 kV line bays -2 nos

5.20 Strengthening of 220 kV Alusteng (Srinagar)- Leh Transmission System:

- 1. Director, PSPA-1 stated that Powergrid vide letter dated 25.02.2021 has submitted a proposal for strengthening of 220 kV Alusteng (Srinagar)- Leh Transmission System with following elements with total estimated cost of Rs 226 Crores:
 - (a) Laying of cable for about 15km between Minamarg and Zojila Top section of Alusteng –Drass 220kV section.
 - (b) Installation of 2x25 MVAR, 220kV bus reactors at 220/66kV Drass S/s
 - (c) Installation of 1x25 MVAR, 220kV bus reactors at 220/66kV Alusteng S/s

2. She further informed that Srinagar- Leh 220 kV S/c transmission line has become an ISTS line after bifurcation of state of J&K into UT of J&K and UT of Ladakh and the transmission line has been transferred to Powergrid by MoP vide letter dated 23.03.2021. MoP has directed CEA to take up the proposal of Powergrid in the NCT meeting for taking decision regarding its implementation under RTM The detail scope is as under:

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1	Laying of cable about 15km provided between Minamarg and Zojila Top section of Alusteng – Drass 220kV section	Length- 15 km
2	2x25 MVAR, 220kV bus reactors at 220/66kV Drass S/s	25 MVAr, 220kV bus reactor – 2 nos. 220 kV reactor bay – 2 nos.
3	1x25 MVAR, 220kV bus reactors at 220/66kV Alusteng S/s	25 MVAr, 220kV bus reactor – 1 no. 220 kV reactor bay – 1 no.
	Estimated Cost (Rs. Crore) (as provided by Powergrid)	226

- **3.** NCT recommended that since the line is an ISTS line, the scheme need to be first deliberated in the meeting of NRPC (TP) and may be put up in the next meeting of NCT.
- **5.21** Summary of the new transmission schemes recommended by NCT in Western and Northern region along with mode of implementation and survey agency.

Mode of Implementati on	New schemes	Modification s in earlier notified	Schemes assigned for survey No. (Estimated cost of the schemes)			
		schemes	PFCCL	RECPDCL	CTUIL	
ТВСВ	14	2 (allotted to RECPDCL	5 (Rs 5015 cr.)	5 (Rs. 5614 cr.)	4 (Rs 4937 cr.)	
RTM	13	0				

		Scheme (New/	Implem		Estimat ed cost
SI. No.	Transmission scheme	Modificatio n of Notified scheme)	entation mode	Survey agency	(Rs. Crs.)
1.	Transmission system for evacuation of power from Neemuch SEZ (1000 MW)	New	ТВСВ	CTUIL	547
2.	Establishment of Khavda Pooling Station-2 (KPS2) in Khavda RE Park	New	TBCB	RECPDC L	789
3.	Establishment of Khavda Pooling Station-3 (KPS3) in Khavda RE Park	New	TBCB	RECPDC L	665
4.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part A	Modificatio n	ТВСВ	RECPDC L	862
5.	Transmission scheme for injection beyond 3 GW RE power at Khavda PS1 (KPS1)	New	TBCB	RECPDC L	780
6.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part C	Modificatio n	TBCB	RECPDC L	1440
7.	Transmission system strengthening beyond Kolhapur for export of power from Solar & Wind Energy Zones in Southern Region- Re- conductoring of Kolhapur (PG) – Kolhapur 400 kV D/c line	New	RTM		54
8.	Augmentation of 1x500 MVA, 400/220 kV ICT (3rd) at Bhatapara (PG)	New	RTM		30
9.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase- III Part A1	New	TBCB	PFCCL	210
10.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase- III Part A2	New	RTM		100
11.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase- III Part A3	New	TBCB	PFCCL	505
12.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase- III Part B1	New	TBCB	PFCCL	2500
13.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-	New	RTM		235

SI. No.	Transmission scheme	Scheme (New/ Modificatio n of	Implem entation mode	Survey agency	Estimat ed cost (Rs. Crs.)
	III Part B2				
14.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase- III Part C1	New	TBCB	RECPDC L	1160
15.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase- III Part C2	New	RTM		80
16.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase- III Part D	New	TBCB	CTUIL	1680
17.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase- III Part E1	New	RTM		435
18.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase- III Part E2	New	RTM		245
19.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase- III Part F	New	TBCB	RECPDC L	2220
20.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase- III Part G	New	TBCB	PFCCL	1530
21.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase- III Part H	New	TBCB	CTUIL	1910
22.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase- III Part J	New	RTM		225
23.	Creation of 400/220 kV, 2x315 MVA S/S at Siot , Jammu & Kashmir	New	TBCB	PFCCL	270
24.	Implementation of 400 kV D/c Khandukhal(Srinagar)-Rampura (Kashipur) line to be taken up under central sector as an ISTS scheme	New	TBCB	CTUIL	800

Sl. No.	Transmission scheme	Scheme (New/ Modificatio n of	Implem entation mode	Survey agency	Estimat ed cost (Rs. Crs.)
25.	System Strengthening scheme for Reconductoring of portion of Dulhasti-Kishtwar- Kishenpur 400 kV (Quad) S/c	New	RTM		13
26.	Grant of 400kV & 220kV bays to RE generators at Fatehgarh-III (erstwhile Ramgarh-II) PS under ISTS	New	RTM		75
27.	1x500 MVA, 400/220 kV ICTaugmentation (3rd) at Sohawal(PG))understrengthening	New	RTM		30
28.	One no of 220kV bay at Chamera Pooling point for 2ndCircuit stringing of 220 kV Karian – Chamera Pool line under implementation by HPPTCL	New	RTM		4
29.	220 kV bays at 400 kV substation PGCIL Khatkar (Jind)&Naggal (Panchkula) substation	New	RTM		16

Annexure IA

Sr. No.	Name (Sh./Smt.)	Designation	1 st meeting held on 25.08.2021	2 nd meeting held on 02.09.2021
	Cent	ral Electricity Authority		
1.	Dinesh Chandra	Chairperson	Yes	Yes
2.	Goutam Roy	Member (PS) CEA	Yes	Yes
3.	Gorityala Veera Mahendar	Member (E&C) CEA	Yes	Yes
4.	Ishan Sharan	Chief Engineer (PSPA- I)	Yes	Yes
5.	Awdhesh Kumar Yadav	Director (PSPA-I)	Yes	Yes
6.	Manjari Chaturvedi	Director (PSPA-I)	Yes	Yes
7.	J. Ganeshwara Rao	Dy. Director	Yes	Yes
8.	Priyam Srivastava	Dy. Director	Yes	Yes
9.	Vikas Sachan	Dy. Director	Yes	Yes
		Ministry of Power		
10.	Goutam Ghosh	Director (Trans)	Yes	No
		MNRE		
11.	Irfan Ahmad	Director	Yes	Yes
12.	Dilip Nigam	Adviser	Yes	Yes
13.	Rohit Thakwani	Scientist-C	Yes	No
	I	Technical Experts		
14.	S. K. Ray Mohapatra	Technical Expert	Yes	Yes
15.	Radheshyam Saha	Technical Expert	Yes	Yes
	Central Tran	smission Utility of India	Limited	
16.	Subir Sen	COO	Yes	Yes
17.	Ashok Pal	Dy. COO	Yes	Yes
18.	Partha Sarthi Das	Sr. General Manager	No	Yes
19.	Kashish Bhambhani	Sr DGM	Yes	No
20.	Puneet Tyagi	Sr GM	No	Yes
21.	Chinmay Sharma	Sr. Engineer	No	Yes
	1	POSOCO	1	1
22.	KVS Baba	CMD	Yes	No

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23.	S.R. Narasimhan	Director (System	Yes	Yes
		Operation)		
24.	Rajiv Porwal	Chief General Manager	Yes	Yes
		(NLDC)		
25.	Vivek Pandey	General Manager	Yes	No
26.	Priyam Jain	Manager	Yes	Yes
27.	Prabhankar Porwal	Dy. Manager	Yes	No

Annexure-IIIA

Status of schemes recommended in 4th NCT meeting

Sl. No	Name of the Transmission Scheme	MoP Approval	BPC
1.	Transmission system for evacuation of power from RE projects in Rajgarh (1500 MW) SEZ in Madhya Pradesh: Phase-I	MoP Gazette Notification dated 19.07.2021	RECPDCL
2.	Transmission system for evacuation of power from RE projects in Rajgarh (1000 MW) SEZ in Madhya Pradesh: Phase- II	Referred back to NCT. NCT to recommend the same to MoP as and when there is certainty of RE generation.	
3.	Transmission Scheme for Solar Energy Zone in Gadag (1000 MW), Karnataka: Phase-I.	MoP Gazette Notification dated 19.07.2021	RECPDCL
4.	Transmission Scheme for Solar Energy Zone in Gadag (1500 MW), Karnataka: Phase-II	Referred back to NCT. NCT to recommend the same to MoP as and when there is certainty of RE generation.	
5.	Transmission Scheme for Evacuation of power from RE sources in Karur/Tirrupur Wind Energy Zone (Tamil Nadu) (1000 MW)- Phase I	MoP Gazette Notification dated 19.07.2021	PFCCL
6.	Transmission Scheme for Evacuation of power from RE sources in Karur/Tirrupur Wind Energy Zone (Tamil Nadu) (1500 MW): Phase II	Referred back to NCT. NCT to recommend the same to MoP as and when there is certainty of RE generation.	
7.	Transmission system for evacuation of power from Chhatarpur SEZ (1500 MW	MoP Gazette Notification dated 19-07.2021	PFCCL
8.	ICT Augmentation at 2x315 MVA, 400/220 kV Shujalpur (PG) substation	MoP OM No.15/3/2018- Trans - Part(1) dated 16.07. 2021	RTM (PGCIL)
9.	Transmission scheme for providing connectivity and LTA to M/s SBESS for its 325 MW Wind Project in Dhar, Madhya Pradesh to be implemented under ISTS	MoP OM dated 13.04.2021	RTM (PGCIL)
10.	Implementation of 400kV bays for RE generators at Bhadla-II PS, Fatehgarh-II.	MoP OM No.15/3/2018- Trans - Part(1) dated 16.07. 2021	RTM (PGCIL)

11.	Implementation of 400kV bay for RE generators at Fatehgarh-III (erstwhile Ramgarh-II) PS	MoP OM No.15/3/2018- Trans - Part(1) dated 16.07. 2021	RTM (Powergrid Ramgarh Trans. Ltd., subsidiary of PGCIL)
12.	Implementation of 220 kV bay at Shahjahanpur 400/220 substation (PGCIL)	MoP OM No.15/3/2018- Trans - Part(1) dated 16.07. 2021	RTM (PGCIL)
13.	Implementation of 1x80 MVAR, 765kV Spare Reactor at Bhadla-II S/s	MoP OM No.15/3/2018- Trans - Part(1) dated 16.07. 2021	RTM (PGCIL)
14.	Implementation of the 1x500 MVA, 400/220kV ICT (8th) at Bhadla Pooling Station	MoP OM No.15/3/2018- Trans - Part(1) dated 16.07. 2021	RTM (PGCIL)
15.	Regional System Strengthening scheme to mitigate the overloading of 400 kV NP Kunta-Kolar S/C line	MoP OM No.15/3/2018- Trans - Part(1) dated 16.07. 2021	RTM (PGCIL)
16.	Augmentation of transformation capacity at existing Hiriyur and Kochi S/stns	MoP OM No.15/3/2018- Trans - Part(1) dated 16.07. 2021	RTM (PGCIL)
17.	Restoring of one circuit of Kudankulam – Tuticorin PS 400 kV (quad) D/c line at Tirunelveli to control loadings/un-balancing on Kudankulam – Tirunelveli 400 kV (quad) lines.	MoP OM No.15/3/2018- Trans - Part(1) dated 16.07. 2021	RTM (PGCIL)
18.	Implementation of 1 no. of 230 kV bay at Tuticorin-II GIS PS	MoP OM No.15/3/2018- Trans - Part(1) dated 16.07. 2021	RTM (PGCIL)
19.	Transmission system for connectivity to Teesta-IV HEP (520 MW)	Referred back to NCT. The project is likely to be commissioned in 2026-27. NCT to send its recommendation to MoP at appropriate time to avoid creation of stranded asset.	
20.	System Strengthening Scheme for Eastern and North Eastern Regions:A: Eastern Region Strengthening Scheme-XXV (ERSS-XXV)B. North Eastern Region Strengthening Scheme-XV (NERSS-XV)	MoP Gazette Notification dated 19-07.2021.	RECPDCL
21.	Transmission system for evacuation of power from Pakaldul HEP in Chenab Valley HEPs - Connectivity System	MoP Gazette Notification dated 19-07.2021 modified the scope of transmission scheme.	PFFCCL

	Scheme already notified vide Gazette of India dated 25.09.2020.		
22.	Transmission system for evacuation of power from RE projects in Osmanabad area (1 GW) in Maharashtra	MoP Gazette Notification dated 19-07.2021 modified the scope of transmission scheme.	RECTPCL
	Scheme already notified vide Gazette notification dated 24.01.2020.		
23.	Transmission scheme for evacuation of 3 GW RE injection at Khavda P.S. under Phase-I	MoP Gazette Notification dated 19-07.2021 modified the scope of transmission scheme.	PFCCL
	Scheme already notified vide Gazette Notification dated 25.09.2020.		
24.	Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under PhaseII- Part F	MoP Gazette Notification dated 19-07.2021 modified the scope of transmission scheme.	PFCCL
	Scheme already notified vide Gazette notification dated 24.01.2020.		
25.	Reconductoring of ISTS lines of POWERGRID. Already notified vide MoP OM	MoP OM No.15/3/2018- Trans – Part (1) dated 16.07. 2021 modified the scope of transmission	RTM (PGCIL)
	dated 25.09.2020.	scheme	

Annexure-IIIB

Status of ISTS TBCB projects furnished by RECPDCL (as on 31.08.2021)

S.N.	Name of the project	Status
	Projects und	er bidding
1.	Transmission system for evacuation of power from RE projects in <u>Osmanabad</u> area (1 GW) in <u>Maharashtra</u>	Present bid deadline 23.09.2021
2.	Transmission system for evacuation of power from RE projects in Rajgarh (2500 MW) SEZ in <u>Madhya Pradesh</u>	NCT in its meetings held on 20.01.2020 and 28.01.2020 recommended the phasing of transmission projects into two projects.
		Subsequently, MoP issued Gazette Notification dated 19.07.2021 with modified scope.
		Present bidding process is being annulled and has been re-initiated
		SPV expected to be transferred in Q3 of FY 2021-22.
3.	Transmission Scheme for Solar Energy Zone in <u>Gadag</u> (2500 MW), <u>Karnataka</u> - Part – A	NCT in its meetings held on 20.01.2020 and 28.01.2020 recommended the phasing of transmission projects into two projects.
		Subsequently, MoP issued Gazette Notification dated 19.07.2021 with modified scope
		Present bidding process is being

		annulled and has been re-initiated.
		SPV expected to be transferred in Q3 of FY 2021-22.
	Projects on hold due to unavailabilit	y of land for setting up RE generations
4.	Transmission Scheme for Solar Energy Zone in <u>Bidar (</u> 2500 MW), <u>Karnataka</u>	As per directions of SECI, bidding process on hold due to non-availability of land for setting up RE generations.
		Present bid deadline 23.08.2021
		Bid deadline may have to be extended
		SPV expected to be transferred in Q4 of FY 2021-22 subject to availability of land.
	Projects whose bidd	ing is yet to be initiated
5.	System Strengthening Scheme for Eastern and North Eastern Regions	• MoP vide its Gazette Notification dated 19.07.2021 allocated the project to RECPDCL
		• Bidding Process will be initiated upon receipt of RFP inputs from CTU
		• SPV expected to be transferred in Q4 of FY 2021-22.
6.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part A, Gujarat	Bidding process to be initiated after submission of LTA by Developers/ Generators.
7.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part B, Gujarat	
8.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part C, Gujarat	
9.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part D, Gujarat	
10	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda	

Status of ISTS TBCB projects furnished by PFCCL (as on 31.08.2021)

S. No.	Name of ITP	Present Status			
	Projects under bidding				
1.	Evacuation of Power from RE Sources in Koppal Wind Energy Zone (Karnataka) (2500 MW)	 Bid process was initiated with the issuance of RfQ documents on 21.10.2019 and RfP documents on 20.12.2019; RfP bid submission was originally scheduled on 20.02.2020 which has been extended 18 times up to 06.09.2021 due to non-availability of LTTCs and regulatory approval; CEA vide mail dated 30.07.2021 has forwarded the letter of CTU dated 07.07.2021, informing that M/s Renew Surya Ojas Pvt. Ltd. is identified as LTTC for the scheme; RfP bid submission to be done as per scheduled date on 06.09.2021. However, the SPV shall be transferred only after receipt of regulatory approval. 			
2.	Transmission System Strengthening Scheme for Evacuation of Power from Solar Energy Zones in Rajasthan (8.1GW) under Phase-II Part-G	 Single Stage bid process initiated on 06.03.2020; RfP bid submission was originally scheduled on 08.05.2020 which has been extended 8 times up to 11.01.2021 due to non-availability of LTA application; Bid process was kept on hold as no Connectivity/LTA applications are received; Regulatory Approval has been received on 12.05.2020; CTU vide letter dated 30.06.2021 has forwarded the list of LTTCs for the Scheme; Bid process has been reinitiated with the last date of RfP bids submission scheduled on 15.09.2021. 			
3. Establishment of new 220/132kV substation at Nangalbibra		 Single Stage bid process initiated on 04.02.2021; RfP bid submission was originally scheduled on 12.04.2021 which has been extended up to 18.08.2021. RfP bids are submitted by four (04) bidders namely Adani Transmission Ltd., Power Grid Corporation of India Ltd., Megha Engineering & Infrastructure Ltd. and Sterlite Grid 26 Ltd. on 18.08.2021 and RfP (Technical) bids are opened on the same day; Evaluation of RfP (Technical) bids is under progress and 			

		SPV is likely to be transferred during September 2021.
4.	Transmission scheme for evacuation of 3 GW RE injection at Khavda P.S. under Phase-I	 Single Stage RfP bid process initiated on 06.05.2021; RfP bid submission was originally scheduled on 09.07.2021 which has been extended 2 times up to 27.08.2021 due to non-availability of LTTCs and regulatory approval; CTU vide mail dated 03.08.2021 has informed that Adani Renewable Energy Holding Four Limited has been identified as LTTC for the scheme; The RfP bid submission is likely to be extended till 17.09.2021 on request of bidders seeking time for re-survey on account of clarification provided on transmission line route being fixed from PS-I to India Bridge. RfP bid submission to be done as per scheduled date 17.09.2021. However, SPV shall be transferred only receipt of regulatory approval.
5.	Transmission system for evacuation power from Pakaldul HEP in Chenab Valley HEPs - Connectivity System	 Single Stage bid process initiated on 04.02.2021; RfP bid submission was originally scheduled on 12.04.2021 which has been extended 3 times up to 13.09.2021 due to change in scope of the transmission scheme and lockdown imposed by Govt. for Covid-19; During the 4th meeting of NCT held on 20.01.2021, it was decided that 400/132 kV ICT along with bays at Kishtwar PS to be added to the existing scheme; MoP vide Gazette Notification dated 19.07.2021 has notified the revised scope of the transmission scheme; PFCCL vide letter dated 23.07.2021 has requested CTU to provide the revised RfP inputs for the transmission scheme.
6.	Evacuation of Power from RE Sources in Karur/ Tiruppur Wind Energy Zone (Tamil Nadu) (2500 MW)	 Bid process was initiated with the issuance of RfQ documents on 21.10.2019 and RfP documents on 20.02.2020; RfP bid submission was originally scheduled on 24.04.2020 which has been extended 7 times up to 01.12.2020; Bid process has been kept in Abeyance as no Connectivity/ LTA applications are received; Further, during the 4th meeting of NCT held on 20.01.2021, it was decided that the scheme may be implemented in two phases; MoP vide Gazette Notification dated 19.07.2021 has notified the revised scope of the transmission scheme; CTU vide letter dated 05.08.2021 has provided the revised RfP inputs for the transmission scheme to CEA for review. The revised RfP document under single stage bidding is likely to be issued on 27.08.2021.

	Projects on hold			
7.	Transmission System Strengthening Scheme for Evacuation of Power from Solar Energy Zones in Rajasthan (8.1GW) under Phase-II Part-E	 Single Stage bid process initiated on 06.03.2020; RfP bid submission was originally scheduled on 08.05.2020 which has been extended 11 times up to 12.05.2021 due to non-availability of LTA applications; Bid process on hold as no Connectivity/LTA applications have been received; Regulatory Approval has been received on 12.05.2020. 		
8.	Transmission scheme for Solar Energy Zone in Ananthpuram (Ananthapur) (2500 MW) and Kurnool (1000 MW), Andhra Pradesh	 Single Stage bid process initiated on 06.03.2020; RfP bid submission was originally scheduled on 08.05.2020 which has been extended 6 times up to 01.12.2020; Bid process has been kept in Abeyance as there are issues with availability of land for setting up RE generation projects and no Connectivity/LTA applications are received; List of LTTCs and Regulatory approval is awaited. 		
		Bidding yet to Start		
9.	Transmission system for evacuation of power from Chhatarpur SEZ (1500 MW)	 MoP vide Gazette Notification 19.07.2021 has appointed PFCCL as BPC; PFCCL vide letter dated 23.07.2021 requested CTU to provide technical inputs for issuance of RfP documents. Single stage RfP documents to be issued shortly on receipt of RfP inputs. 		

File No.CEA-PS-11-15(11)/1/2020-PSPA-I Division

Annexure-V

Detailed scope of works of Establishment of new pooling stations in Khavda

1.0 Establishment of Khavda Pooling Station-2 (KPS2) in Khavda RE Park:

SI. No.	Scope of the Transmission Scheme	Capacity /km
1	Establishment of 765/400 kV, 4x1500MVA, KPS2 (GIS) with 2x330 MVAR 765 kV bus reactor and 2x125 MVAR 400 kV bus reactor.	1500MVA, 765/400kV ICT- 4 nos. (13x500 MVA including one spare unit) 765 kV ICT bays – 4 nos. 400 kV ICT bays – 4 nos.
	Adequate space for future expansion of 5x1500 MVA 765/400 kV ICT's Bus sectionalizer at 765kV & 400kV. On each bus section, there shall be 2x1500MVA 765/400kV ICTs, 1x330MVAr, 765 kV & 1x125MVAr 420kV bus reactor, space for future expansion.	765 kV line bays – 2 nos. 400 kV line bays – 3 nos. Actual nos. as per connectivity granted to RE developer (3 no. of bays considered at present, one each for NTPC, GSECL & GIPCL)
	Bus sectionalizer at 765 kV level shall normally be closed and bus sectionalizer at 400 kV level shall normally be open	1x330 MVAr, 765 kV bus reactor-2 (7x110 MVAr, including one spare unit) 765 kV reactor bay – 2
	Future provisions: Space for 765/400 kV ICTs along with bays: 5 nos. 765kV line bays: 8 nos.	1x125 MVAr 400 kV bus reactor-2 400 kV reactor bay – 2
	400kV line bays: 10 nos. To take care of any drawal needs of area in future: 400/220 kV ICT: 2 nos. 220 kV line bays: 4 nos.	765 kV bus sectionalizer bay – 2 400 kV bus sectionalizer bay – 2
2.	LILO of one ckt. of KPS1- Bhuj PS 765 kV D/c line at KPS2	Line length – 1 km
	Approximate cost (Rs.)	789 Cr.

Note: Implementation to be taken up only after receipt of LTA applications from RE developers at KPS2

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1	Establishment of 765/400 kV, 3x1500 MVA,	1500MVA, 765/400kV ICT- 3
	KPS3 (GIS) with 1x330 MVAR 765 kV bus	(10x500 MVA, including one spare unit)
	reactor and 1x125 MVAR 400 kV bus	765 kV ICT bays – 3
	reactor.	400 kV ICT bays – 3
	Adequate space for future expansion of	
	5x1500 MVA 765/400 kV ICT's	765 kV line bays – 2 nos.
		400 kV line bays – 3 nos, actual nos.
	Future provisions:	as per connectivity granted to RE
	Space for	developer
	765/400 kV ICTs along with bays: 5 nos.	
	765kV line bays: 4 nos.	
	400kV line bays: 10 nos.	1x330 MVAr, 765 kV bus reactor-1
		(4x110 MVAr, including one spare
	765 kV Bus sectionalizer breaker: 2 nos.	unit)
	400 kV Bus sectionalizer breaker: 2 nos.	765 kV reactor bay – 1
	To take care of any drawal needs of area in	1x125 MVAr 400 kV bus reactor-1
	future:	400 kV reactor bay – 1
	400/220 kV ICT: 2 nos.	
	220 kV line bays: 4 nos.	
2.	KPS3- KPS2 765 kV D/c line	20 km
3.	2 no. of 765 kV line bays at KPS2 765 kV S/s	765 kV line bays: 2 nos.
	for KPS3-KPS2 765 kV D/c line	at KPS2 end
	Approximate cost (Rs.)	665 Cr.

2.0 Establishment of Khavda Pooling Station-3 (KPS3) in Khavda RE Park:

Note:

- *(i)* Pooling station shall be created with bus section-I with 765/400 kV, 3x1500MVA ICTs and 1x330 MVAR 765 kV & 1x125 MVAR 400 kV bus reactors.
- (ii) Bus section II (future) shall be created with 765/400 kV, 4x1500MVA ICTs and 1x330 MVAR 765 kV & 1x125 MVAR 400 kV bus reactors.
- *(iii)* Bus sectionalizer at 765kV level shall normally be closed and bus sectionalizer at 400kV level shall normally be open
- (iv) Developer of KPS2 765 kV S/s to provide space for 2 no. of 765 kV line bays at KPS2 765 kV S/s for termination of KPS3-KPS2 765 kV D/c line.
- (v) Implementation to be taken up only after receipt of LTA applications from RE developers at KPS3

Annexure-VI

Detailed Scope of works of Transmission Schemes already notified by MoP for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II- Part A & C after approved modifications.

1. Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part A

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	KPS2 (GIS) – Lakadia 765 kV D/C line with 330 MVAr switchable line reactors at KPS2 end	159 km
2.	330 MVAR switchable line reactors at KPS2 end of KPS2 (GIS) – Lakadia 765 kV D/C line	 330 MVAr, 765 kV switchable line reactor- 2. Switching equipments for 765 kV line reactor- 2 1x110 MVAr spare bus reactor available at KPS2 (GIS) to be used as spare
3.	2 nos. of 765 kV line bays each at Lakadia PS & KPS2 (GIS) for Khavda PS2 (GIS) – Lakadia PS 765 kV D/c line	765 kV line bays (GIS) – 4
	Approximate cost (Rs)	862 Crs

Note: (i) Transmission system for evacuation of 3 GW RE injection at Khavda is being taken up under Phase-I. Phase-II RE scheme for evacuation of 4.5 GW RE injection at Khavda needs to be taken up for evacuation requirement beyond 3 GW from Khavda RE park.

(ii) Implementation of all the transmission packages proposed for evacuation of 4.5 GW RE injection at Khavda RE park under Phase-II (Part A to Part D) needs to be taken up in similar timeframe.

2. Transmission scheme for injection beyond 3 GW RE power at Khavda PS1 (KPS1)

SI. No.	Scope of the Transmission Scheme	Capacity /km
	Augmentation of Khavda PS1 by 765/400 kV transformation capacity * (max. upto 4x1500 MVA) with 1x330 MVAR 765 kV bus reactor and 1x125 MVAR 420 kV bus reactor on 2 nd 765 kV and 400 kV bus section respectively	unit)

	765 kV reactor bay – 1
	125 MVAr, 420 kV reactor- 1 400 kV Reactor bay- 1
	765 kV bus sectionalizer- 2 400 kV bus sectionalizer- 2
KPS1-Khavda PS GIS (KPS2) 765 kV D/C line (to be established with bypassing of LILO of one ckt. of KPS1-Bhuj at KPS2 and utilisation of LILO section)	Length ~ 20 km
Approximate cost (Rs.)	780 Crs

* Actual no. of ICTs may be decided based on LTA requirement

Note: Implementation to be taken up only after receipt of LTA applications from RE developers beyond 3 GW at KPS1

3. Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part C

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	Establishment of 3x1500 MVA, 765/400 kV Ahmedabad S/s with 1x330 MVAR 765 kV bus reactor and 1x125 MVAR 420 kV bus reactor.	765/400 kV, 1500 MVA- 3 (10x500 MVA, including one spare unit)
	Establishment of 3X1500 MVA, 765/400 kV, Ahmedabad S/s with 1X330 MVAR 765 kV bus reactor and 1X125 MVAR 420 kV bus reactor.	765 kV ICT bays – 3 400 kV ICT bays - 3 765 kV lin1440e bays-4 (2 for
	Future Scope: Space for 765/400 kV, ICT along with bays- 2	Lakadia-Ahmedabad and 2 for Ahmedabad to South Gujarat)
	400/220 kV, ICT along with bays- 4	400 kV line bays – 4 (for LILO of Pirana (PG) – Pirana (T) 400kV D/c
	765 kV Line bays- 8	line at Ahmedabad
	400 kV Line bays- 8	1x330 MVAr, 765 kV bus reactor- 1
	220 kV Line bays- 7	(4x110 MVAr, including one spare unit)
	765 kV reactor along with bays- 1	765 kV reactor bay – 1
	400 kV reactor along with bays- 1	125 MVAr, 420 kV reactor- 1 400 kV Reactor bay- 1
2.	Ahmedabad – South Gujarat 765 kV D/c line with 240 MVAr switchable line reactor at both ends (~line length 220 km)	220 km
3.	2 nos. of 765 kV line bays at South Gujarat end for Ahmedabad – South Gujarat 765 kV D/c line	765 kV line bays – 2
4.	240 MVAr switchable line reactor at both ends of Ahmedabad – South Gujarat 765 kV D/c line	• 1x240 MVAr, 765 kV switchable reactor- 4

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	• Switching equipments for 765 kV line reactor - 4
Approximate cost (Rs.)	1440 Crs

Note: (i) Transmission system for evacuation of 3 GW RE injection at Khavda is being taken up under Phase-I. Phase-II RE scheme for evacuation of 4.5 GW RE injection at Khavda needs to be taken up for evacuation requirement beyond 3 GW from Khavda RE park.

(ii) Implementation of all the transmission packages proposed for evacuation of 4.5 GW RE injection at Khavda RE park under Phase-II (Part A to Part D) needs to be taken up in similar timeframe.





Government of India विद्युत मंत्रालय

Ministry of Power केन्द्रीय विद्युत प्राधिकरण

Central Electricity Authority विद्युत प्रणाली योजना एवं मूल्यांकन - । प्रभाग Power System Planning & Appraisal - I Division

सेवा में / To

-As per enclosed list-

विषय: "ट्रांसमिशन पर राष्ट्रीय समिति" (एनसीटी) की 4th बैठक - मिनट Subject: Corrigendum to the Minutes of the 4th Meeting of "National Committee on Transmission" (NCT)

Sir/Madam,

The two sittings of the 4th meeting of the "National Committee on Transmission" (NCT) were held on 20.01.2020 and 28.01.2020 respectively under the Chairmanship of Shri P. S. Mhaske, Chairperson, CEA. Minutes of the meeting were issued vide vide CEA letter No. CEA-PS-11-15(11)/1/2020-PSPA-I Division dated 22.03.2021.

Subsequently, CTU vide email dated 26.03.2021 conveyed its observations on the issued minutes. The same have been examined and the Corrigendum to the Minutes of the 4th meeting of the National Committee on Transmission held on 20.01.2020 and 28.01.2020 are attached herewith

भवदीय,

(Ishan Sharan) Chief Engineer (PSPA-I) & Member Secretary (NCT)

Copy to:

- (i) Joint Secretary (Trans), Ministry of Power, Shram Shakti Bhawan, New Delhi-110001.
- (ii) CMD (POSOCO), B-9, Qutub, Institutional Area, Katwaria Sarai, New Delhi 110010

List of addressees:

1.	Chairperson, Central Electricity Authority Sewa Bhawan, R.K. Puram, New Delhi – 110 066.	2.	Member (Power System), Central Electricity Authority Sewa Bhawan, R.K. Puram, New Delhi – 110 066.
3.	Member (Economic & Commercial), Central Electricity Authority Sewa Bhawan, R.K. Puram, New Delhi – 110 066.	4.	Director (Trans), Ministry of Power Shram Shakti Bhawan, New Delhi-110001.
5.	Sh. Dilip Nigam, Scientist 'G', MNRE, Block no. 14, CGO Complex, Lodhi Road, New Delhi – 110003	6.	Chief Operating Officer, Central Transmission Utility POWERGRID, Saudamini, Plot No. 2, Sector-29, Gurgaon – 122 001.
7.	Sh. Rajnath Ram, Adviser (Energy), NITI Aayog, Parliament Street, New Delhi – 110 001.	8.	Sh. P. K. Pahwa, Ex. Member (GO&D), CEA 428 C, Pocket -2, Mayur Vihar, Phase -1, Delhi – 110091.
9.	Shri Prabhakar Singh, Ex. Director (Projects), POWERGRID D 904, Tulip Ivory, Sector-70, Gurgaon – 122 001.		

Corrigendum to the Minutes of the 4th meeting of the National Committee on Transmission held on 20.01.2020 and 28.01.2020

The Minutes of 4th meeting of the National Committee on Transmission were issued vide CEA letter No. CEA-PS-11-15(11)/1/2020-PSPA-I Division dated 22.03.2021. Following corrigendum is issued based on the observations received from CTU vide their email dated 26.03.2021.

(A) <u>Item No. 3.3.2</u>: Transmission Scheme for Solar Energy Zone in Gadag (2500 MW), Karnataka – Part A:

1.1. The following Table is mentioned in para 3.3.2 of the minutes of the 4th NCT meeting:

Modification	Agreed Phases	Transmission System	Remarks
in Gadag			
Scheme			
Recent Develop	ment :		
affidavit to CERC has submitted that implementation of transmission system for Gadag may be taken up in two phases.	Phase I-1000MW needs to be carried out after TSA signing Phase II-1500MW (to be taken up for implementation after receipt of LTA beyond 1000 MW)	 Establishment of 400/220 kV, 3x500 MVA at Pachora SEZ PP Pachora SEZ PP-Bhopal (Sterlite)400 kV D/ c line (Quad/HTLS) Pachora-Shujalpur 400 kV D/c line (Quad/HTLS) (to be taken up only after receipt of connectivity/LTA applications beyond 1000 MW) 	The same was noted down in the meeting held on 16.10.2020 and it was agreed amongst CEA, CTU, MNRE and SECI. As there is no change in overall scope of the works involved in the scheme, the phases formulated for the scheme would be apprised in the next SRPC (TP) and NCT meeting.

The above Table is being modified as given below:

Modification	Agreed Phases	Transmission System	Remarks
in Gadag			
Scheme			
Recent Develop	oment :		
SECI in its	Phase I-1000MW	• Establishment of 400/220 kV, 2x500	The same was
affidavit to	needs to be carried	MVA Gadag Pooling Station	noted down in the
CERC has	out after TSA	• Gadag PS-Narendra (New) PS 400 kV	meeting held on
submitted that	signing		incetting neta on

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implementatio n of		(high capacity equivalent to quad moose) D/C Line	16.10.2020 and it was agreed
transmission system for Gadag may be taken up in two phases. However there would be no change in the scope of work	Phase II -1500MW (to be taken up only after receipt of Connectivity/LTA applications beyond 1000 MW at Gadag or beyond 1500 MW at Koppal P.S)	 400/220 kV, 3x500 MVA ICT Augmentation at Gadag Pooling Station Gadag PS-Koppal PS 400 kV (high capacity equivalent to quad moose) D/c line (to be taken up only after receipt of Connectivity/LTA applications beyond 1000 MW at Gadag or beyond 1500 MW at Koppal P.S) 	amongst CEA, CTU, MNRE and SECI. As there is no change in overall scope of the works involved in the scheme, the phases formulated for the scheme would be apprised in the next SRPC (TP) and NCT meeting.

- (B) The following agenda items (part of additional agenda) were discussed in the meeting, however, the same have been inadvertently left out from being documented in the issued minutes of the 4th meeting of NCT.
 - Additional Agenda Item-1: Reconductoring of ISTS lines of POWERGRID North Eastern Region Strengthening Scheme-XII (NERSS-XII)
 - Additional Agenda Item-3: Modifications in the transmission schemes approved/noted in the 3rd meeting of Reconstituted NCT

Accordingly, the following item/para is being added to the minutes of the meeting:

- 10. Reconductoring of ISTS lines of Powergrid North Eastern Region Strengthening Scheme-XII (NERSS-XII)
- **10.1.** Reconductoring of various lines in NER was agreed in the 3rd meeting of NCT held on 26th-28th May 2020. Thereafter, following reconductoring works have been assigned to POWERGRID under Regulated Tariff Mechanism (RTM) by MoP vide their OM dated 25.09.2020. These works are being taken up as NERSS-XII:

Sl. No.	Transmission line	Reconductoring with HTLS	Ampacity of Single HTLS Conductor
1	400 kV D/C Siliguri-Bongaigaon line (Twin Moose)	Twin HTLS	1596 A
2	220 kV D/C Alipurduar-Salakati line (Single Zebra)	Single HTLS	1596 A
3	220 kV D/C BTPS-Salakati line (Single Zebra)	Single HTLS	1596 A
4	132 kV S/C Dimapur-Imphal line (Single Panther)	Single HTLS	798 A
5	132 kV S/C Loktak-Jiribam line (Single Panther)	Single HTLS	798A

10.2. However, based on the technical difficulties (constraints due to design of existing towers) in achieving the approved current rating through HTLS and considering power flow requirement as

per studies, it was agreed in the meeting taken by CEA on 21.12.2020 that the ampacity of HTLS conductors for these lines in NER, as mentioned below in col (E) meets the technical requirement. Hence, in the said meeting, it was also agreed that the proposed modifications may be taken up in the forthcoming meeting of NCT/ERPC(TP)/NERPC(TP).

Sl. No.	Name of transmission line	Ampacity of existing ACSR sub- conductor (A)	Ampacity of Single HTLS Conductor as per MoP order (A)	Ampacity of single HTLS sub-conductor agreed considering technical constraints and system requirement (A)
(A)	(B)	(C)	(D)	(E)
1	400kV D/C Siliguri-Bongaigaon line (Twin ACSR Moose)	707	1596	1400
2	220kV D/C Alipurduar-Salakati line (Single ACSR Zebra)	451	1596	1100
3	220kV D/C BPTS-Salakati line (Single ACSR Zebra)	451	1596	1100
4	132kV S/C Dimapur-Imphal line (Single ACSR Panther)	93	798	450
5	132kV S/C Loktak-Jiribam line (Single ACSR Panther)	185	798	600

10.3. After deliberations, NCT noted and approved the above revised rating of HTLS conductors for reconductoring of lines under NERSS-XII. It was also agreed that the scheme would be ratified in the ERPC(TP) and NERPC(TP).

11. Modifications in the transmission schemes approved/noted in the 3rd meeting of Reconstituted NCT:

11.1. NCT in its 3rd meeting held on 26.05.2020 and 28.05.20202, had approved the Transmission scheme for evacuation of 8 GW RE injection at Khavda P.S. MoP vide its Gazette Notification dated 23.09.2020 has notified six number of packages for this scheme alongwith their scope of works and have recommended their implementation through TBCB route.

Subsequent to notification in the gazette, CTU vide letter dated 8.10.2020, pointed out the inadvertent error in the no. of 765 kV GIS line bays in the transmission package "Transmission scheme for evacuation of 3 GW RE injection at Khavda P.S. under Phase-I". In the scope of works for this package, the no. of 765 kV line bays at 765/400 kV Khavda (GIS) substation has been inadvertently mentioned as 1 instead of 2 nos. of bays. In addition, 3.5 GW Stage-II connectivity has been granted to M/s Adani Renewables Holding Four Ltd at Khavda. This would require 3 no of 400 kV line bays at Khavda P.S. for termination of the dedicated connectivity line. In the scope of works notified in Gazette, only 1 no of 400 kV bay has been mentioned as against current requirement of 3 no of 400 kV line bays.

11.2. Accordingly, the following corrigendum has been approved by the 4th NCT in the column no. 3 (capacity/km) of the table elucidating the scope of works of the "Transmission scheme for evacuation of 3 GW RE injection at Khavda P.S. under Phase-I" at Page no 10, Sl.no. 2 of Gazette Notification dated 23.09.2020:

2. Transmission scheme for evacuation of 3 GW RE injection at Khavda P.S. under Phase-I.

Scope:

Sl No	Scope of the transmission Scheme	Capacity /km as mentioned in Gazette Notification	Capacity /km after incorporating the corrections
•			
1	765/400 kV ,1500	765/400 kV ,1500 MVA ICT-	765/400 kV ,1500 MVA ICT-3
	MVA ICT-3	3	765 kV ICT bays-3
	765 kV ICT bays-3	765 kV ICT bays-3	400 kV ICT bays-3
	400 kV ICT bays-3	400 kV ICT bays-3	330 MVAR 765 kV bus
	330 MVAR 765 kV bus	330 MVAR 765 kV bus	reactor-1
	reactor-1	reactor-1	765 kV reactor bay-1
	765 kV reactor bay-1	765 kV reactor bay-1	765 kV line bays-2
	765 kV line bay-1	765 kV line bay-1	400 kV reactor bay-1
	400 kV reactor bay-1	400 kV reactor bay-1	400 kV line bay-3*
	400 kV line bay-1	400 kV line bay-1	500 MVA, 765/400 kV Spare
	500 MVA, 765/400 kV	500 MVA, 765/400 kV Spare	ICT-1
	Spare ICT-1	ICT-1	110 MVAR , 765 kV, 1-ph
	110 MVAR , 765 kV,	110 MVAR , 765 kV, 1-ph	reactor (spare unit)-1
	1-ph reactor (spare	reactor (spare unit)-1	
	unit)-1		

*For 3.5 GW Stage-II connectivity granted to M/s Adani Renewables Holding Four Ltd

11.3. NCT noted and approved the same.



No.15/3/2017-Trans Government of India Ministry of Power Shram Shakti Bhawan, Rafi Marg, New Delhi

Dated, the 4th November, 2019

OFFICE ORDER

Subject: - Re-constitution of the "National Committee on Transmission" (NCT) - reg.

In supersession of this Ministry's Office Order of even number dated 13.4.2018, constituting the National Committee on Transmission (NCT), the undersigned is directed to state that the composition and terms of reference of existing NCT is amended as mentioned follows:

Chairperson, Central Electricity Authority (CEA)	Chairman
Member(Power System), CEA	Member
Member(Economic & Commercial), CEA	Member
Joint Secretary level officer looking after transmission in M/o	Member
New & Renewable Energy, Govt. of India @	
Director(Trans), M/o Power, Govt. of India	Member
	Member
(POWERGRID)	
Advisor, NITI Aayog #	Member
Two experts from Power Sector *	Members
Chief Engineer (from Power System Wing), CEA #	Member Secretary
	Member(Power System), CEA Member(Economic & Commercial), CEA Joint Secretary level officer looking after transmission in M/o New & Renewable Energy, Govt. of India Director(Trans), M/o Power, Govt. of India Chief Operating Officer, Central Transmission Utility (POWERGRID) Advisor, NITI Aayog [#] Two experts from Power Sector *

[@] To be nominated by Secretary (MNRE).

[#] To be nominated by NITI Aayog/ CEA.

* To be nominated by the Ministry of Power, Govt. of India from time to time, for a maximum period of two years from the date of their nomination.

- 2. Revised Terms of Reference (ToR) of the Committee are to:
 - i. Evaluate the functioning of the National Grid on quarterly basis.
 - ii. Consider the review / recommendations of the RPCTP for system expansion/ strengthening of the transmission system to be presented before the NCT at the end of every quarter i.e. by 15th July, 15th October; 15th January and 15th April.
 - iii. CTU, as mandated under the Electricity Act, 2003, is to carry out periodic assessment of transmission requirement under ISTS. The CTU shall also make a comprehensive presentation before the National Committee every quarter for ensuring development of an efficient, co-ordinated and economical inter- State transmission system for smooth flow of electricity. CTU, in the process, may also take inputs from the markets to identify constraints and congestion in the transmission system
- iv. After considering the recommendations of the CTU and the Regional Committees, the NCT shall assess the trend of growth in demand and generation in various regions; identify the constraints, if any, in the inter- State, inter- Region transfer system and propose construction of transmission lines, grid stations and other infrastructures in order to meet the requirements, which are likely to arise in the near term/ medium term, so that transmission does not constrain growth. The NCT will also draw up perspective plans, keeping the 10 to 15 years' time horizon in mind.

3. While making their recommendations, the NCT will keep the guidelines of the Tariff Policy in mind.

4. Since the NCT will be looking at the National Transmission System i.e. transmission across regions and across States, therefore, prior concurrence of Regional Power Committees

(Transmission Planning) (RPCTPs) will not be relevant. The views of the RPCTP views of transmission issues within the region; but for transmission issues across region, the views of RPCTPs will be inadequate because they will not have a national perspective. However, for inter-regional transmission lines crossing across States and Regions, the RPCTP of the originating location of these lines and the RPCTP of the terminating locations shall be consulted by the NCT.

5. The recommendations of the NCT shall be placed before the Ministry of Power, Government of India for decision.

6. The Empowered Committee constituted vide this Ministry's Office Order of even number dated 13.4.2018 stands dissolved.

7. This issues with the approval of the Hon'ble Minister of State (Independent Charge) for Power and New & Renewable Energy.

(Bihari Lal)

(Bihari Lal) Under Secretary to the Govt. of India Telefax: 23325242 Email: transdesk-mop@nic.in

То

- 1. All members of NCT.
- 2. Secretary, Ministry of New & Renewable Energy, Govt. of India.
- 3. Chairperson, CEA, New Delhi.
- 4. CMDs of all CPSUs under the Ministry of Power, Govt. of India.
- 5. Heads of all autonomous bodies under the Ministry of Power, Govt. of India.
- 6. Finance/ Budget Section, Ministry of Power.
- 7. Power/ Energy Secretaries of all States/UTs.
- 8. Chief Executives of all State Power Transmission Utilities.

Copy to:

- (i) PS to Hon'ble MoSP(IC)/ PPS to Secretary(Power)/ SS&FA/ AS(Trans)/ all Joint Secretaries/ EA/ Directors/ Dy. Secretaries, Ministry of Power.
- (ii) Technical Director, NIC, M/o Power, for publishing this order on the website of M/o Power.

2 | 2

Annexure-IIB

No.15/3/2018-Trans-Pt(5) Government of India Ministry of Power Shram Shakti Bhawan, Rafi Marg, New Delhi

Dated, the 20th May 2021

OFFICE ORDER

Subject: - National Committee on Transmission (NCT) – amendment thereof.

In continuation of this Ministry's Office order no. 15/3/2017-Trans dated 04.11.2019 regarding constitution of the National Committee on Transmission (NCT), following amendments are hereby ordered with immediate effect:

- a) CMD, POSOCO will be a member of NCT.
- b) The following functions would be added to the Terms of Reference of NCT:
 - To formulate the packages for the transmission schemes for their (1) implementation and to recommend their mode of implementation i.e. Tariff Based Competitive Bidding (TBCB) / Regulated Tariff Mechanism (RTM), as per the existing Tariff Policy, to Ministry of Power.
 - To examine the cost of the transmission schemes. **(ii)**

- To allocate the task of carrying out survey amongst CTU, RECTPCL and **(iii)** PFCCL by maintaining a roster.

Further, NCT, while considering the Transmission Planning shall also keep in 2. mind the following aspects:

- The Regional Power Committees (Transmission Planning) can make (i) meaningful recommendations only regarding their own Region. They cannot decide on transfers across region.
- For enabling growth of Renewable Energy (RE) capacity areas which have high **(ii)** solar/ wind energy potential, will need to be identified and connected to bulk power evacuation systems so that capacity can come up there. This is a national mission as a part of our energy transition goal.

3. This issues with the approval of the Hon'ble Minister of State (Independent Charge) for Power and New & Renewable Energy and Minister of State for Skill Development and Entrepreneurship.

(Bihari Lal)

Under Secretary to the Govt. of India Telefax: 23325242

Email: transdesk-mop@nic.in

All Members of NCT. **(i)**

То

- Secretary, Ministry of New & Renewable Energy, Govt. of India. **(ii)**
- Chairperson, CEA, New Delhi. **(iii)**
- CMD, POSOCO, New Delhi (iv)
- CMDs of all CPSEs under the Ministry of Power, Govt. of India. (v)

(vi) Heads of all autonomous bodies under the Ministry of Power, Govt. of India.

-2-

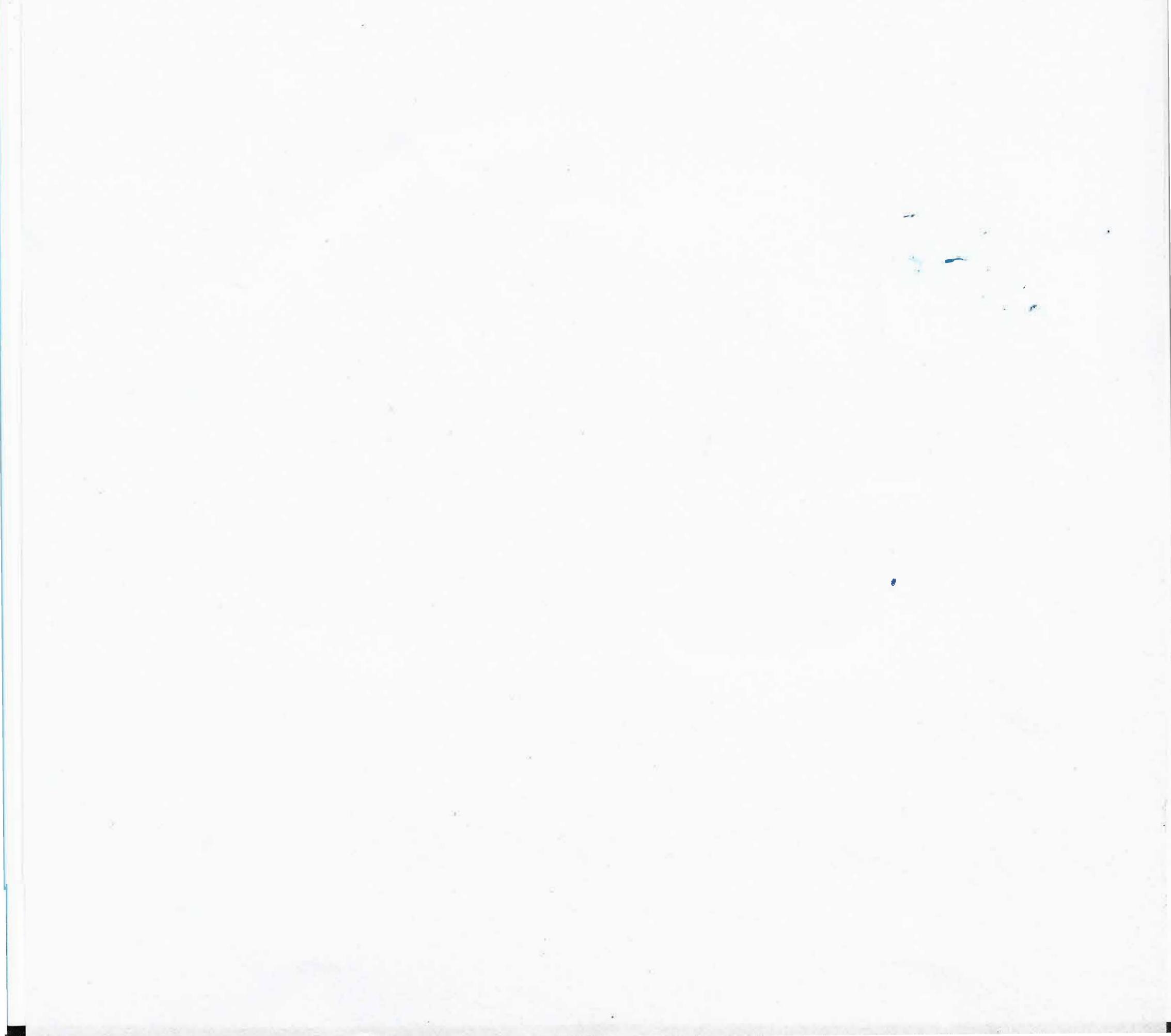
- (vii) Finance/ Budget Section, Ministry of Power.
- (viii) Power/ Energy Secretaries of all States/UTs.
- (ix) Chief Executives of all State Power Transmission Utilities.
- (x) CEO, NITI Aayog, New Delhi.

Copy to:

- PS to Hon'ble MoSP(IC)/ Sr PPS/ PPS/ PS to Secretary(Power)/ AS&FA/ AS(SKGR)/ AS(VKD)/ all Joint Secretaries/ Sr. Advisor/ Chief Engineer(Th)/ all Directors/ Dy. Secretaries, Ministry of Power.
- (ii) Technical Director, NIC, M/o Power, for publishing this order on the website of M/o Power.

asptnz 20/5/2+24

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भारत सरकार

Government of India विद्युत मंत्रालय Ministry of Power केन्द्रीय विद्युत प्राधिकरण Central Electricity Authority पावर सिस्टम विंग Power System Wing

सेवा में / To As per address list

विषय/ Subject: Constitution of the Cost Committee for estimation of cost of the transmission schemes - reg.

संदर्भ/Reference: MoP OM No. 15/3/2018-Trans Pt(5) dated 20.05.2021.

Sir,

MoP vide letter under reference has issued the amendments to its OM no 15/03/2017 (Trans) dated 04.11.2019 regarding Constitution of the National Committee on Transmission (enclosed as Annexure). The amendments inter-alia includes the function of formulation of packages for the transmission schemes and examining the cost of the transmission schemes within the ToR of the NCT.

The transmission scheme to be formulated by NCT would include schemes to be implemented through TBCB route as well as RTM route. For estimation of the cost of the transmission schemes, it is proposed to formulate a Cost Committee with the following composition:

1.	Chief Engineer (PSPA-I), CEA	Chairman						
2.	Director (PSPA-I), CEA	Member & Convener						
3.	Director (PSE&TD), CEA	Member						
4.	Director (F&CA), CEA	Member						
5.	Representative from CTUIL	Member						
6.	Representative from Cost Engg. Dept., PGCIL	Member						
7.	Representative from PFCCL	Member						
8.	Representative from RECPDCL	Member						
9.	Chief Engineer from STU/SEB/Electricity Department of	Member						
	the concerned state in which transmission scheme lies							

The practice of constitution of the Cost Committee by the National Committee on Transmission (NCT) for the purpose of examination of the cost of the transmission schemes is in line with that of the procedure adopted by the erstwhile NCT.

The Cost Committee is being formulated with the approval of Chairperson, CEA & Chairman of the National Committee on Transmission (NCT).

भवदीय. 2/06/2021 (Goutam Roy)

Member (Power System)

I/15799/2021

Address list:

- 1. Member(E&C), CEA (With a request to nominate one suitable officer for the cost Committee)
- 2. CMD, PGCIL, Saudamini, Plot no 2, Sector 29, Gurugram-with a request to nominate a suitable officer.
- 3. COO, CTUIL, Saudamini, Plot no 2, Sector 29, Gurugram- with a request to nominate a suitable officer.
- 4. CEO, PFCCL, Urjanidhi 1, Barakhamba Lane, Connaught Place, New Delhi- with a request to nominate a suitable officer.
- 5. CEO, RECPDCL, Plot no I-4, Sector 29, Gurugram- with a request to nominate a suitable officer.
- 6. CMD of STU/SEB/Electricity Department.

Copy for kind information to:

Joint Secretary (Trans), Ministry of Power, Shram Shakti Bhawan, New Delhi-110001



5th Meeting of

National Committee on Transmission

Grid Performance – 3rd, 4th (2020-21) & 1st Quarter (2021-22)



Power System Operation Corporation Limited

National Load Despatch Center

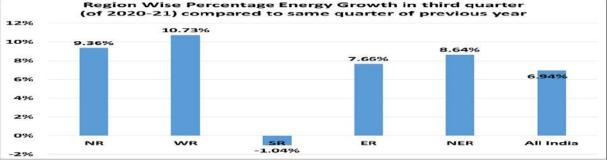


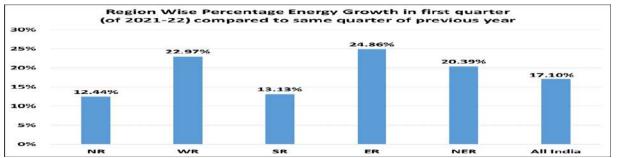


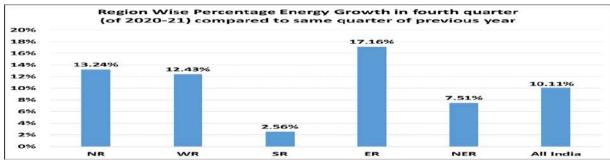
- Overview of Grid Operation Q1, Q2 of FY 2020-21 and Q1 of FY 2021-22
 - Energy Growth compared to Previous Year
 - Number of Grid Incidents/Disturbances
 - All time highest in last quarters
 - No of grid incidence/disturbance
 - Frequency Response Characteristics
 - Major Grid Incidents/Events
- All India Demand Profile & Load Factor
- All India Generation Stack in Q1 (2021-22)
- Automatic Generation Control (AGC) Summary Q1 (2021-22)
- All India Generation Stack in Q1 (2021-22)
- Cyclones Q1, Q2 of FY 2020-21 and Q1 of FY 2021-22
- Major Elements Commissioned Q1, Q2 of FY 2020-21 and Q1 of FY 2021-22
- Enhancement in Transfer Capability Limits Q1, Q2 of FY 2020-21 and Q1 of FY 2021-22
- Constraints faced during Grid Operation
 - Transmission Line and ICT Constraints
 - High and Low Voltage Nodes
- Actions taken to Mitigate Constraints
 - Lines opened on High Voltage
 - Lines opened to Network Constraints
- Important Grid Elements under long Outage
- Important Elements under Construction

Transmission Planning

Energy Growth compared to Previous Years







Highlights

In Q3, All the regions have registered a positive growth rate except southern region for quarter 3 of 2020-21. All India demand revived to pre-Covid levels and during Q3 2020-21, all India energy consumption has even surpassed previous years' consumption for the same quarter.

SOC

In Q4, All the regions have registered a positive growth rate for quarter 4 of 2020-21.Western Region recorded its maximum demand met of 62395 MW on 22nd Jan 2021 and highest ever energy met of 1345 on 09th March 2021.

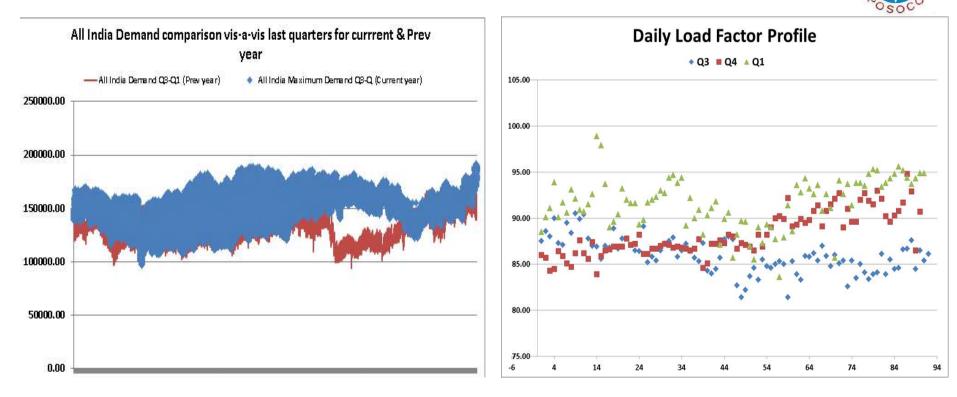
In the first quarter of 2020-21, all the regions have registered a positive growth rate. Northern region have recorded its maximum demand during the day as 72370 MW on 30th June 2021. Eastern region have recorded its maximum demand during the day as 24651 MW on 27th April 2021. Southern Region recorded its maximum demand met of 58433 MW on 02nd April ' 21 and highest ever energy met of 1255 MUs on 03rd April ' 21.

Details available at: - https://posoco.in/download/nldc-operational-feedback_oct_2020_final/?wpdmdl=32657_and https://posoco.in/download/nldc-operational-feedback_jul_2020/?wpdmdl=30531_

Transmission Planning

25th Aug 2021

All India Demand Profile & Load Factor



In the second wave of NCOVID-19, there is no as such demand reduction was observed at All India level. All the regions have registered a positive growth rate. Load factor above 85% was observed for most of the time duration.

Transmission Planning

5th NCT Meeting

25th Aug 2021



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All Time Highest in last three quarters²¹¹



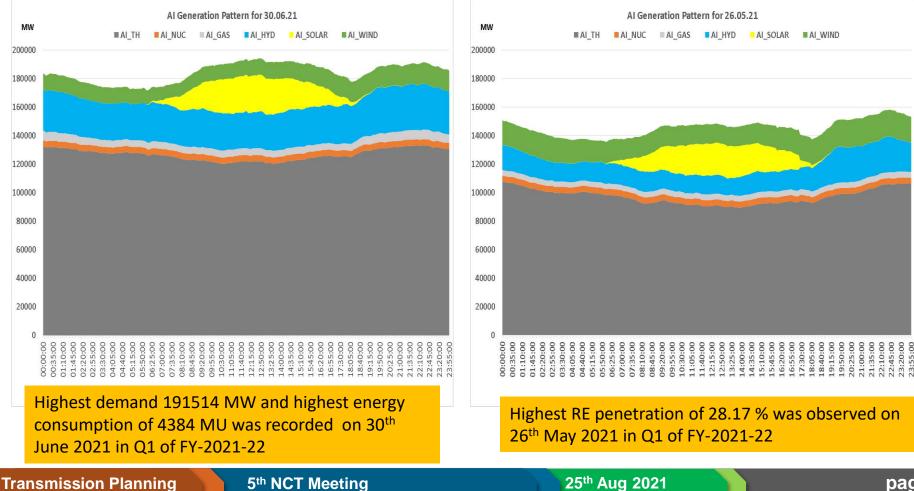
Regions	Maximum Demand Met during the day(MW)	Demand Met During Evening Peak hrs(MW)	Energy Met(MU)	Hydro Gen(MU)	Wind Gen(MU)	Solar Gen(MU)
NR	73232	68018	1642	389	71	58
	02-07-2021	10-07-2021	07-07-2021	12-08-2017	27-07-2021	25-05-2021
WR	62396	56711	1388	167	268	43
	22-01-2021	09-03-2021	08-04-2021	18-12-2014	29-07-2021	11-05-2021
SR	58433	50436	1255	208	246	122
	02-04-2021	24-02-2020	03-04-2021	31-08-2018	22-07-2021	09-03-2021
ER	25069 19-07-2021	24422 26-07-2021	542 16-07-2021	152 18-07-2020	-	6 19-04-2021
NER	3215 16-06-2021	3067 03-08-2021	60 05-08-2021	37 03-07-2019	-	2 19-12-2020
All	200570	190660	4507.9	815.8	541.4	220.7
India	07-07-2021	14-08-2021	07-07-2021	09-09-2019	27-07-2021	01-04-2021

Transmission Planning

5th NCT Meeting

25th Aug 2021

All India Generation Stack of highest energy consumption 290 highest RE penetration recorded days



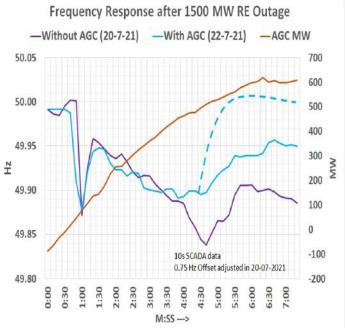
FRC for 3rd, 4th (2020-21) & 1st Quarter (2021-22)

S.No.	Date	Time	Event	NR	ER	WR	NER	SRos	INDIA
1	12-Oct-20	10:05	Total load loss was observed to be 2600MW (2200MW of Mumbai, 400MW of Khargar, Navi Mumbai, Bhiwandi and Thane). Total Generation loss was around 840MW at TATA) and 220MW at Uran.	5698	1894	2694	2993	93	15248
2	26-Dec-20	10:18	B-Phase CT of Unit-5 main bay in Wanakbori substation busted which resulted in tripping of Bus-2 at Wanakbori S/S. Generation loss of 1000MW observed (Unit-8:802MW & Unit 5-210MW).	15970	6885	21640	7866	484	43957
3	19-Feb-21	15:26	Multiple trippings occurred at Bhadla(PG) station while availing planned shutdown of 220kV Bus-II at Bhadla(PG). Total generation loss in the event was around 1300MW.	1399	2811	15059	83	8707	27660
4	10-Mar-21	19:35	400kV Rango-Kishanganj & 400kV Teesta III - Kishenganj tripped due to R-B-N Fault resulting into complete outages of Stations at 400kV(Rangpo, Teesta III, Dikchu) ,220kV (Jorethang,Tashiding,New Melli) & 132kV (Chuzachen,Gangtok) level. Generation loss of 1561 MW due to loss of evacuation path and Load loss of 54 MW occurred in Sikkim.	4959	3659	6365	3	4424	20365
5	24-Mar-21	12:16	Due to Multiple tripping at 400kV Bikaner (RS) station & 220kV side at Bhadla(PG), Solar Generation loss of 2036 MW and Load loss of around 450 MW was observed.	1237	1605	9717	69	4291	13791
6	08-Apr-21	03:29	230 kV TTPS-TTN AUTO-1 and 230 kV TTPS_STERLITE tripped at 03:29 hrs due to Y-phase conductor cut and All other 230KV evacuating lines connected from Tuticorin Thermal Power station tripped. Generation loss of 1045 MW in all five units (5x210 MW) was observed	3205	1489	7909	86	10875	10568
7	11-Jun-21	16:02	220 kV Akal-Bhu -1&2 tripped due to snapping of B-phase jumper resulting into 1200MW wind & 300MW solar generation loss in NR	6353	5007	9939	475	4233	20000
Transmission Planning5th NCT MeetingFRC data in MW/Hz25th Aug 2021page 7									



Automatic Generation Control (AGC) Summary Q1 (2021-22)^{14⁴} Plants which completed closed loop testing

NR WR SR ER NER Koteshwar 400 Mauda-2 1320 Simhadri-2 Barh-2 1320 500 1000 Bongaigaon Nathpa Jhakri 1500 CGPL 4150 Simhadri-1 1000 MPL 1050 Loktak 105 Chamera-3 231 1000 NTECL Vallur 1500 Kahalgaon-2 1500 Sipat-2 Dulhasti 390 Vindhyachal-2 1000 Ramgundam-II 1500 Teesta-V 510 Korba-1&2 Tehri 1000 2100 Ramgundam-III 500 Rangit 66 Rihand-I 1000 Korba-3 500 NTPL 1000 **Riahnd-II** 1000 1980 Sipat-1 Rihand-III 1000 Vindhyachal-4 1000 Anta 419.3 Vindhyachal-3 1000 Chamera-2 300 Vindhyachal-5 500 Chamera-1 540 Solapur 1320 Dhauliganga 280 Gandhar 657 Unchahar-III 210 Unchahar-IV 500 NR Total 8770 WR Total 16527 SR Total 6500 ER Total 4446 NER Total 605



Frequency Control with High RE

Total 36849 MW, as on 15th August 2021

5th NCT Meeting

25th Aug 2021

Number of Grid Incidents/Disturbances15 in 1st Quarter of 2021-22

Region	Grid in	cidents	Grid Disturbances					Total
	GI-1	GI-2	GD-1	GD-2	GD-3	GD-4	GD-5	
NR	2	31	35	0	0	0	0	68
WR	12	9	23	0	0	0	0	44
SR	3	6	28	0	0	0	0	37
ER	0	1	28	0	0	0	0	29
NER	6	16	50	0	0	0 0		72
All India	23	63	164	0	0	0	0	250

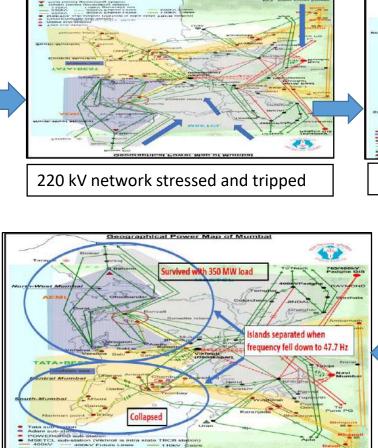
Details available at: - https://posoco.in/download/nldc-operational-feedback oct 2020 final/?wpdmdl=32657 and https://posoco.in/download/nldc-operational-feedback jul 2020/?wpdmdl=30531

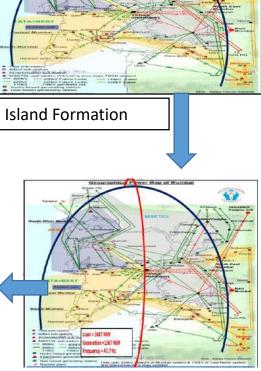
25th Aug 2021

Major Events - Grid Disturbance in Mumbai on 12th Oct, 2020



- 1. Around 50% load met by import
- 2. Prior to incident: Two out of four major infeed under outage.
- 3. Tripping of a hydro unit inside Mumbai increased the import
- 4. 09:58 hrs: 400 kV Kalwa Phadge II tripped on fault.
- 1000 hrs: Inadvertently, healthy circuit 400 kV Pune – Kharghar hand tripped on observance of heavy sparking on 400 kV Kharghar - Kalwa.
- 6. Islanding: Islands formed (AEML, TPC, MSETCL) and two collapsed





Transmission Planning

5th NCT Meeting

25th Aug 2021

Mumbai Event Observations and Lessons

Importance of inherent load-generation balance for successful islanding Strengthening of transmission schemes and expeditious implementation of planned system

Prior approval of any

changes in cranking

path and regular mock

drills

Proper asset management of substation elements and close monitoring Imparting regular training to substation staff to handle contingencies

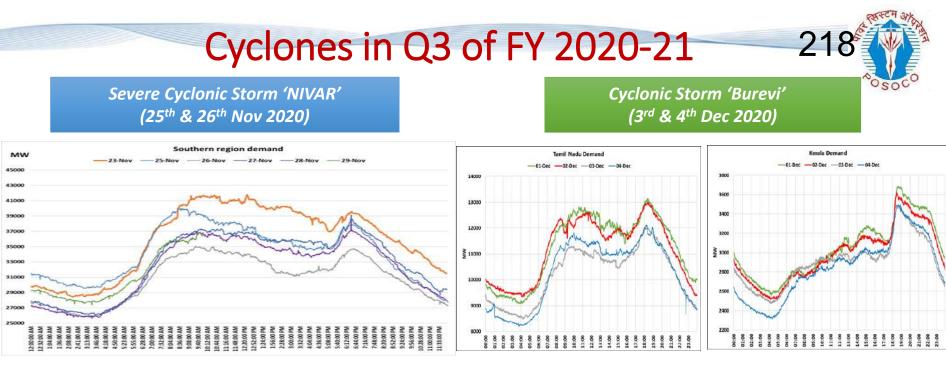
Periodic review of Under Frequency Load shedding scheme (s) Hydro/Gas based plants as synchronous condensers for early restoration Planning of Energy Storage and rooftop solar in metropolitan areas to cut down imports

page 11

Sufficient dynamic shunt compensation devices in high load pockets

Review of protection settings of generating units Communication and data visibility at control centres including PMUs

5th NCT Meeting



- TANTRANSCO has reported approximately 2600 MW of load outage, which was restored within 24 hours
- Puducherry has also reported load loss of 140 MW during the cyclone period.
- Generation Outage during Cyclone 2140 MW (Vallur TPS Unit -1, Vallur TPS Unit -2, Vallur TPS Unit -3, Neyveli2 stage2 Unit-6, MAPS U#2, North Chennai TPS U#3): All generators were revived within 48 hours.
- Total 96 lines of state & ISTS tripped during the event.

- During the cyclone period, there was no outage of transmission element in a short time.
- Only demand of Tamil Nadu and Kerala for 03rd December 2020 was less by 1300 MW & 150 MW respectively in comparison to demand of 02nd December 2020

Thunderstorms/Cyclones/Floods etc. are low probability high impact events and system resiliency needs to be enhanced to minimize the impact and quickly restore the system from these events. Learnings in this regard are highlighted in subsequent slides.

Detailed Report of cyclones is available at https://posoco.in/download/nldc-operational-feedback_jan_2021-2/?wpdmdl=34776

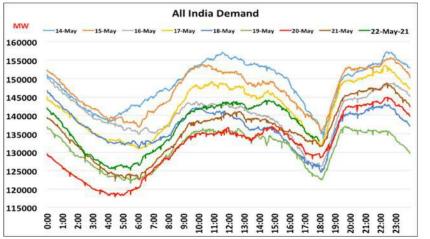
Transmission Planning

5th NCT Meeting



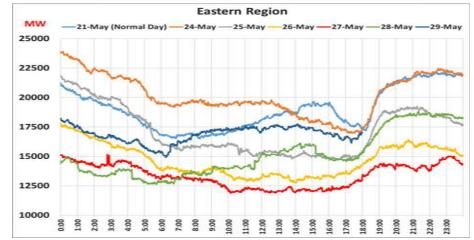
Cyclones in Q1 of FY 2021-22

Extremely Severe Cyclonic Storm 'Tauktae' (15th & 16th May 2021)



- Demand reduction of around 7 GW was observed in SR on 16th May vis-à-vis 14th May. 07 nos. thermal generating units with a cumulative capacity of 2150 MW were taken under RSD. 12 nos. transmission lines at 220 kV and 110 kV level (all in Kerala) tripped on various faults due to heavy rainfall and lightning during 14-16 May.
- WR demand reduction of around 19 GW was observed on 18th May vis-à-vis 14th May. Thermal Generation with a cumulative capacity of 4800 MW were taken under RSD.
- Demand reduction of around 15 GW was observed in Northern region too on 19th and 20th May compared with 17th May.

Severe Cyclonic Storm 'Yaas' (26th & 27th May 2021)



- ER demand reduction of around 6.5 GW was observed on 26th and 27th May compared with 21st May demand.
- 13 nos. generating units with a cumulative capacity of 4575 MW were taken out on Low demand/Reserve shutdown during 25-28 May.
- 53 nos. (03 nos. Power supply interruption occurred on 02 nos. 220 kV (viz. Jasidih and Giridih) and 03 nos. 132 kV (viz. Saria, Jamua and Dumka) substations; all in Jharkhand (JUSNL)
- 400 kV, 07 nos. 220 kV and 43 nos. 132 kV) transmission lines tripped on various faults during 25-27 May, including 01 no. ISTS line

Detailed Report of cyclones is available at

https://posoco.in/download/nldc-operational-feedback_july_2021/?wpdmdl=38883

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Transmission Planning

5th NCT Meeting

Major Elements Commissioned in 3rd , 4th of (2020-21) & 1st Quarter (2021-22)



Element	First time Charging / Synchronization Date	Remarks
Operation of Muzaffarpur-Dhalkebar D/C lines at rated voltage (400kV)	Line-I & II / 11.11.20	Lines were earlier charged at 220kV level.
400kV Imphal-New Kohima D/C	Line-I /10.11.20 Line-II /13.11.20	It will enhance reliability of power to Nagaland capital (Kohima). Owned by Kohima-Mariani Transmission Ltd. (KMTL)
400kV New Kohima-Mariani(PG) D/C (Ownership : Kohima-Mariani Transmission Ltd. (KMTL)	30.12.20	30.12.20 Strengthening of transmission network to Nagaland capital (Kohima) and connectivity of south NER also.
COD of Unit-4 at Kameng HEP	22.01.21	Ownership : NEEPCO
765/400kV Medinipur substation	23.01.21	Under system strengthening scheme in Eastern region. 765/400kV ICTs at Medinipur and
765kV New Ranchi-Medinipur D/C lines	Line-I/23.01.21 Line-II/24.01.21	downstream network (from Medinipur) are under implementation.
765/400kV ICTs at Medinipur	1500 MVA ICT-I/ 06.02.21 1500 MVA ICT-II/ 06.02.21	Under system strengthening scheme in Eastern region.
400/220kV ICT at New Mariani	500 MVA ICT-I/ 03.02.21	Under system strengthening scheme in NER. Improved connectivity at 400kV and below in East Assam.
400kV Silchar-Misa D/C lines	Line-I/25.02.21 Line-II/25.02.21	Under system strengthening scheme in NER. Enhanced connectivity of Southern NER with rest of the grid at 400kV level.
	Operation of Muzaffarpur-Dhalkebar D/C lines at rated voltage (400kV) 400kV Imphal-New Kohima D/C 400kV New Kohima-Mariani(PG) D/C (Ownership : Kohima-Mariani Transmission Ltd. (KMTL) COD of Unit-4 at Kameng HEP 765/400kV Medinipur substation 765kV New Ranchi-Medinipur D/C lines 765/400kV ICTs at Medinipur 400/220kV ICT at New Mariani	LiementSynchronization DateOperation of Muzaffarpur-Dhalkebar D/C lines at rated voltage (400kV)Line-I & II / 11.11.20400kV Imphal-New Kohima D/CLine-I /10.11.20 Line-II /13.11.20400kV New Kohima-Mariani (PG) D/C (Ownership : Kohima-Mariani Transmission Ltd. (KMTL)30.12.20COD of Unit-4 at Kameng HEP22.01.21765/400kV Medinipur substation23.01.21765kV New Ranchi-Medinipur D/C linesLine-I/23.01.21 Line-II/24.01.21765/400kV ICTs at Medinipur1500 MVA ICT-I/ 06.02.21 1500 MVA ICT-II/ 06.02.21400/220kV ICT at New Mariani500 MVA ICT-I/ 03.02.21Line-I/25.02.21Line-I/25.02.21

of (2020-21) & 1st Quarter (2021222 Major Elements Commissioned in 3rd, 4th First time Charging / S.No. Element **Remarks Synchronization Date** Super Thermal Power plant 10 COD of Unit-II at Gadarwada 01.03.21 (2x800MW) of NTPC at Gadarwada (MP) Under system strengthening scheme Line-I/06.03.21 in NER. Enhanced connectivity of 11 400kV Silchar-P K Bari D/C lines Line-II/29.03.21 Southern NER with rest of the grid at 400kV level For flexible and reliable management 12 400/132kV Thoubal Substation 12.03.21 of intra-state power supply system Under evacuation system 13 765kV Agra(UP)-G Noida(UP) S/C establishment of Ghatampur(Kanpur) 18.03.21 3x660MW TPS Power flow capacity on lines and reliability of Sikkim generation Reconductoring of 400kV Rangpo-Binaguri D/C 14 29.03.21 evacuation have been enhanced by this reconductoring Under Interstate transmission system 15 765/400kV ICT-4, ICT-3 at Bhuj Substation ICT 4:01.04.21 strengthening scheme for Renewable ICT 3:02.05.21 Energy in WR-I & WR-II Line-I/12.04.21 16 765kV Ajmer-Phagi D/C lines **Ownership** : POWERGRID Line-II/24.04.21 More reliable transmission of power to 04.05.21 (both circuits) 17 400kV Misa-New Mariani D/C Nagaland & Manipur 25th Aug 2021 page 15 Transmission Planning 5th NCT Meeting

Major Elements Commissioned in 3rd, 4th of (2020-21) & 1st Quarter (2021-22)



S.No.	Element	First time Charging / Synchronization Date /COD	Remarks
18	400kV Baharampur (India)-Bheramara (Bangladesh) ckt-3	14.06.21	Enhanced reliability & connectivity of India with Bangladesh.
19	400 kV Alipurduar(India)-Jigmeling (Bhutan) D/C	18.06.21 (Circuit II) 22.06.21 (Circuit I)	Enhanced connectivity from Bhutan and evacuation of Mangdechu HEP and Punatsangchu HEP(Future)
20	156 MVA, 400/30.5KV Converter Transformer at Vindhyachal HVDC BTB Station	23.06.21 (Block#1)	For the replacement of old converter transformer along with refurbishment of Block #1.
21	HVDC Raigarh – Pugalur Pole I	06.09.21	
22	HVDC Raigarh – Pugalur Pole II	09.03.21	
23	HVDC Raigarh – Pugalur Pole III	13.07.21	
24	HVDC Pugalur – Trichur Pole I	08.06.21	
25	HVDC Pugalur – Trichur Pole II	09.03.21	



Enhancement/modification in Transfer Capability Limits

S. No.	Corridor	Previous Transfer Capability (MW)	Enhanced/modified Transfer Capability (MW)	Delta (MW)	Reason
	WR-SR	6950	9350	2400	TTC/ATC has been revised after
1	ER-SR	5950	5750	-200	commissioning of HVDC Raigarh –
	Import of SR	12900	15100	2200	Pugalur Pole -1 & II
	WR-NR	17850	18450	600	a) Reversal in HVDC APD-Agra power
2	ER-NR	5500	6850	1350	Flow direction (b) Commissioning of 765kV Ajmer-Phagi
	Import of NR	23350	25300	1950	D/C and 765kV G.Noida-Fatehabad S/C

Transmission Line and ICT Constraints 224[£]



S. No	Region	Element	Description of the constraints	
1		400 kV Anpara-Sarnath D/C	Remarks: Commissioning of 765 kV Anpara D-Unnao to be expedited.	
2		765 kV Anpara C-Unnao	Remarks: Commissioning of 765 kV Anpara D-Unnao to be expedited.	
3	Northern	400 kV Anta-Kota line		
4	Northern	3x500 MVA, 400/220 kV ICTs at Bhadla (Raj) and Bhadla (PG)	During high solar generation, loading of ICTs are N-1 non-compliant for considerable duration. New ICTs need to be planned.	
5		2x1500 MVA , 765/400 kV ICTs at Phagi	Remarks: 3rd planned ICT of 1500MVA capacity at Phagi should be expedited.	
6		2X315 MVA, 400/220kV ICTs at Dipalpur, Rajpura, Nakodar, Jodhpur, Kurukshetra, Moga, Sohawal and Chhittorgarh (Raj)	Augmentation/ new ICT be explored needs to be planned at these locations	

25th Aug 2021



Transmission Line and ICT Constraints 5

S. No	Region	Element	Description of the constraints									
1		400 kV Kudus-Kala D/C	Remarks: Commissioning of 400 kV Padghe (GIS) –Kharghar and Padghe (GIS)-									
1			Vikhroli line would relieve loading of Kudus-Kala D/C.									
			Remarks: Commissioning of 400 kV Ghatkopar S/S and Padghe (GIS)-Kharghar,									
2		400 kV Padghe- Kalwa D/C	Padghe-Navi Mumbai-Ghatkopar and Kharghar-Ghatkopar would give additional									
			infeed to Mumbai and relieve loading of Padghe-Kalwa D/C									
			Remarks: 400 kV Lonikhand -Karad LILO at Jejuri was planned for commissioning by									
3		400 kV Lonikhand - Jejuri S/C	2018 - 19. This LILO shall be done on priority basis to avoid any disturbance in Jejuri									
0			area. MSETCL informed revised schedule of Dec 2021.									
		400 kV Chandrapur-Chandrapur (II) D/C	LILO of one D/C line of 400 kV Chandrapur -I – Bhadravati 2xD/C line at Chandrapur									
			-II is approved in 2 nd WRPC (TP). To be expedited.									
4		400 kV Warora(MS)- Wardha(PG) S/C and 3 rd WRPRCTP formed Committee of MSETCL & POWERGRID to have joint										
		Koradi-II - Wardha(PG) S/C	for bypassing of outlets & bus splitting at 400 kV Wardha (PG).									
	Western	400kV Parli(PG) - Parli(MS) D/C	Bypassing of 400 kV Koradi -II -Wardha(PG) & 400 kV Wardha(PG) -Warora(MS) at									
5			400 kV Wardha(PG) and making 400 kV Koradi -II -Warora(MS) S/C would, in addition to controlling the fault level at Wardha(PG), would also relieve 400kV									
5			Parli(PG) – Parli (MS)									
		2x315 MVA, 400/220 kV ICTs at Astha,										
		Bhatapara, NSPCL, Akola, Satna, Raigarh (PG),										
6											Korba (West) , Kirnapur , Itarsi , Morena and	Augmentation/additional ICTs or agreed arrangement need to be expedited.
		Akola (MSETCL)										
7		2x315MVA+ 1x500MVA 400/220 kV Dhule	Augmentation work of 400/220///ICT II from 215 M//A to 500 M/A works are seen									
/		MSETCL ICTs	Augmentation work of 400/220KV ICT-II from 315 MVA to 500MVA under progress									
8		400 kV Lara Baigarh D/C	Lines are N-1 non-compliant in case of reverse power flow on HVDC Raigarh –									
0		400 kV Lara –Raigarh D/C	Pugalur with high generation in Raigarh complex and low generation at Lara TPS.									
9		400 k) (Kolhapur (MS) – Kolhapur (BC) D/C	Lines are N-1 non-compliant during high generation at Kudgi TPS as well during high									
		400 kV Kolhapur (MS) – Kolhapur (PG) D/C	in SR.									
ansmi	ssion Pla	anning 5 th NCT Meeting	25 th Aug 2021 page 1									

Transmission Line and ICT Constraint²²⁶



S. No	Region	Element	Description of the constraints
1		Constraints in Nagjheri PH evacuation	KPTCL to expedite reconductoring of emanating 220 kV lines
2		Tamilnadu 230 kV System	Several 230 kV lines in TN intra-state network are heavily loaded. (Details available at https://posoco.in/download/nldc-operational-feedback_oct_2020_final/?wpdmdl=32657)
3		Downstream network of Mysore 400/220kV SS	220 kV outlets from Mysore are heavily loaded particularly during peak demand scenario of Karnataka.
4	Southern	220 kV Bangalore Metro Network	Most of the 220 kV network in Bengaluru is radialised during peak season to prevent overloading of lines. The radialisation of lines decreases the reliability of supply & thus results in Low Voltage situation during peak period and High Voltage during Off-Peak period of the day
5		Andhra Pradesh 220kV Network	Several 220 kV lines in AP intra-state network are heavily loaded. (Details available at https://posoco.in/download/nldc-operational-feedback_oct_2020_final/?wpdmdl=32657
6		Downstream network of UPCL 400/220kV SS	220kV UPCL-Kemar D/C is heaviliy loaded during UPCL full generation and Peak demand scenario of Karnataka
7	400/220 kV ICTs at Kolar, Mysore, Cochin, Narendra, Neyveli II TPS, Hassan, Ramagundam, Somanhalli, Tiruvallam, UPCL, Allundur SS, Jindal SS		Most of the constraint observed during high demand period of SR. Some even observed for whole year. (Details available at https://posoco.in/download/nldc-operational- feedback_oct_2020_final/?wpdmdl=32657)
ransmis	sion Planni	ng 5 th NCT Meeting	25 th Aug 2021 page 2

Transmission Line and ICT Constraint²²⁷



S. No	Region	Element	Description of the constraints
9	Cauthana	400/220kV 2x500 MVA ICTs at Kaiga	
10	Southern	400/220 kV 3X500 MVA ICTs at Hoody and Nelamangla	
1		400/132 kV 2 X 200 MVA Motihari ICT	Constraint observed particularly during peak demands of Bihar and Nepal. Third 315 MVA ICT could not be charged due to problem in Bus extension module at Motihari.
2	Eastern	400/220 kV Ranchi 2 X 315 MVA ICTs	Additional ICT at 400/220 kV Ranchi has been agreed in 3 rd ERPCTP. To be expedited.
3		220 kV Waria-Bidhan Nagar D/C	Operational planning and fault level planning study needs to be performed in joint coordination with DVC .
4		220 kV Patna-Sipara T/C	220 kV Patna-Sipara 1 & 2 HTLS conversion was approved during the 2^{nd} ERPCTP meeting. To be expedited.
1	North- Eastern	220/132 kV, 160 MVA ICT at Kopili	The proposal of replacement of existing 60 MVA, 220/132kV ICTs by 1x160 MVA, 220/132 kV ICT at Kopili HEP of NEEPCO by POWERGRID was agreed in joint standing committee meeting. Kopili Substation is under outage since 07.10.19 due to flooding.
2		220 kV BTPS - Salakati I & II lines	Upgradation of the 220 kV BTPS-Salakati I & II lines with HTLS conductor to be expedited

Transmission Planning





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Low Voltage Nodes Q1 (2021-22)

S. No	Region	Areas
1	Northern	Hindaun, Alwar, Bhadla -PG (during high solar), Bhadla-RS (during high solar), Akal
2	Western	Padghe, Lonikhand, Lonikhand(II), Jejuri (during peak load), 400kV Solapur(MH) observed in 1 st quarter of 2021-22.
3	Southern	400kV Kudgi-PG, 400kV Pondicherry, 400kV SVChatram – During morning peak
4	Eastern	NIL
5	North-Eastern	NIL

High Voltage Nodes



S. No	Region	Areas
1	Northern	Suratgarh, Mahendragarh, Allahabad, Fatehpur, Shree Cement, Bawana, Harshvihar, Jalandhar, Makhu, Nakodar, Muktsar, Khedar, Fatheabad, Jind, Jhajjar, Maharaninagh, Bhiwani, Malerkotla, Kubulpur, Mundka
2	Western	Aurangabad(MH), 400kV Bhadrawati (PG), 400kV Chandrapur & Chandrapur(II), 400kV Dhariwal CTU, 400kV EMCO Warora, 400kV New Koyna, 400kV Nanded (MSETCL), 400kV Wardha(PG), 400kV Vadinar, 400kV Sami, 400kV Kirnapur (MPPTCL), 400kV Seoni(PG), 400kV Jagdalpur, 400kV Korba West, 400kV Raita (CSPTCL), NSPCL
3	Southern	765kV Chilkaluripeta, 765 kV Cuddapah, 765 kV Nizamanabd, 400 kV Asupaka, 400 kV Bellary TPS, 400kV Bidadi, 400kV BTPS, 400kV Chandulapur, 400kV Chilkaluripeta, 400kV Cuddapah-PG, 400kV Dharamapuri, 400kV Dichipalli, 400kV Dindi, 400kV Gajwel, 400kV Pavagada, 400kV Podili, 400kV Nirmal, 400kV Nizamabad, 400kV Raita (CSPTCL).
4	Eastern	New PPSP, New Dubri, Maithon-A, 400 kV Durgapur STPS (DSTPS), 400 kV Teesta V, Dikchu , Barh, 400 kV Maithon A
5	North-Eastern	Ranganadi, Balipara, Misa, BNC, Byrnihat



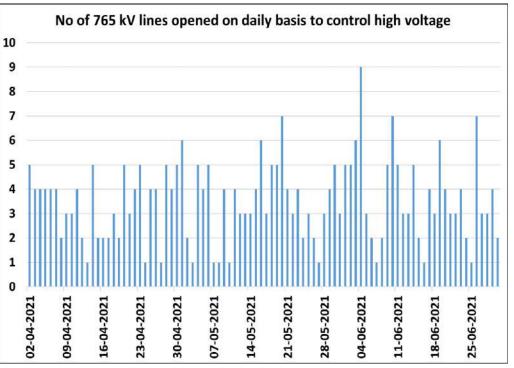




Lines Opened on High Voltage – Q1 FY 2021-22

- 765 kV Lines 279 no. of times opened for all openings greater than 3 of the same line
- Lines with most switching operations:
 - 765 kV Bikaner-Moga (PG) D/C
 - ■765 kV Moga-Meerut (PG) Ckt-1
 - ■765 kV Ajmer-Chittorgarh (PG) D/C
 - ■765 kV Agra-Fatehpur (PG) D/C
 - ■765KV-NIZAMABAD-MAHESHWARAM_PG-2
 - 765KV-RAIPUR-PS (DURG)-JHARSUGUDA-1
 - ■765 kV Angul-Jharsuguda-3 & 4
 - ■765KV-CUDDAPAH-THIRUVALAM-2
 - ■765KV-WARDHA-AURANGABAD-3
- Line opening considered as last resort for voltage control. L/Rs that can be taken in service as B/Rs must be utilized.

Details available at: - https://posoco.in/download/nldc-operational-feedback_july_2021/?wpdmdl=38883



Lines Opened on High Voltage – Q1 FY 2021-2231



• 400 kV Lines - 924 no. of times opened for all openings greater than 3 of the same line

S. No.	Region	No. of time 400 kV Lines opened*	Frequently Opened Lines	
1.	Northern	586	Bhadla-Jodhpur (RS) Ckt-1 Bhadla-Merta (RS) Ckt-1 Jodhpur-Kankani (RS) Ckt-1	
2.	Western	97	400 kV Bhusawal – Aurangabad –M (Waluj)-1 400 kV Amreli – Hadala-1	
3.	Southern	241	400KV-Pavagada-Tumkur-1 400KV-Pavagada - Mysore-1	
4.	Eastern			
5.	North- Eastern	_		
6.	All India	924		

*Considering lines opened 03 times or more during the quarter

Details available at: - https://posoco.in/download/nldc-operational-feedback_oct_2020_final/?wpdmdl=32657_and https://posoco.in/download/nldc-operational-feedback_jul_2020/?wpdmdl=30531

Major transmission elements opened in Q1 of 2021-22 to

control overloading of associated elements

S. No.	Region	Line/ICT Opened at 400 kV level and above	Reason	
1.		400kV Taptitanda-Deepnagar-1, 400kV Taptitanda-Aurangabad (Waluj) S/c	To control loading of 765/400kV Ektuni ICT-1 during emergency S/d of Ektuni ICT.	
2.	Western	400kV Asoj-Kosamba S/C line & generation backing down at SSP	To control loading of 400kV SSP-Asoj S/C line. SSP generation is high, this constraint is observed.	
3.			HVDC Raigarh-Pugalur Pole-1 reverse power order,HVDC Bhandrawati power order reversal	To control loading of 400kV Kolhapur-Kolhapur (MH) D/C line During high generation of Kudgi and RE in SR.
4.	Southern	400 kV Talaguppa Nelamangala S/C	To control loading of 220 kV Sharavathi - Talaguppa circuits during high generation at Sharavathy	
5.	North-	132kV Nirjuli-Gohpur Line	To control loading of 132kV Pare-Lekhi Line (Commissioning of 132 kV Pare -North Lakhimpur D/ C line and LILO of one circuit of 132 kV Pare -North Lakhimpur at Nirjuli to be expedited)	
6.	Eastern	132 kV Umtru – Kahilipara D/C and 132 kV Umtru Sarusajai D/C	To control loading of 132 kV EPIP 2 – Umtru D/C and 132 kV New Umtru – Umtru line	
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Important Grid Elements under Long Outage

S.No.	Line	Voltage (in kV)	Owner	Outage Date	Revival Date	Remarks
1	400kV IBEUL- Jharsuguda D/C (INDBHARAT)	400kV	POWERGRID	17:30 (29.04.18)	Still out	Tower collapse at Loc. 44, 45
2	220kV Kishenpur (PG)–Ramban Ckt-1	220kV	PDD JK	16:43 (31.03.2020)	Still out	Due to heavy land slide damages occurred to 220 KV D/C KPTL at location no: -187,188 &189 and there is every apprehension of collapsing Tower Loc. No 189
3	220kV Pandiabili – Samangara D/C	220kV	POWERGRID	03.05.2019	Still out	49 Towers collapsed
4	220kV Kishenpur (PG)–Mirbazar (JK)	220kV	PDD JK	08:38 (06.1.21)	Restored on ERS tower 19:00 (14.01.21)	Tower collapsed at location no 107 near Samroli, Udhampur
5	400 KV Akal — Kankani ckt-1	400kV	POWERGRID	21:22(02.06. 21)	Still out	R-N fault, Zone-1, Dist. 49.79km, Fault current 5.118kA from Akal end. (Tower Collapse in the line)

5th NCT Meeting

Fixed Series Compensator under Long Outage



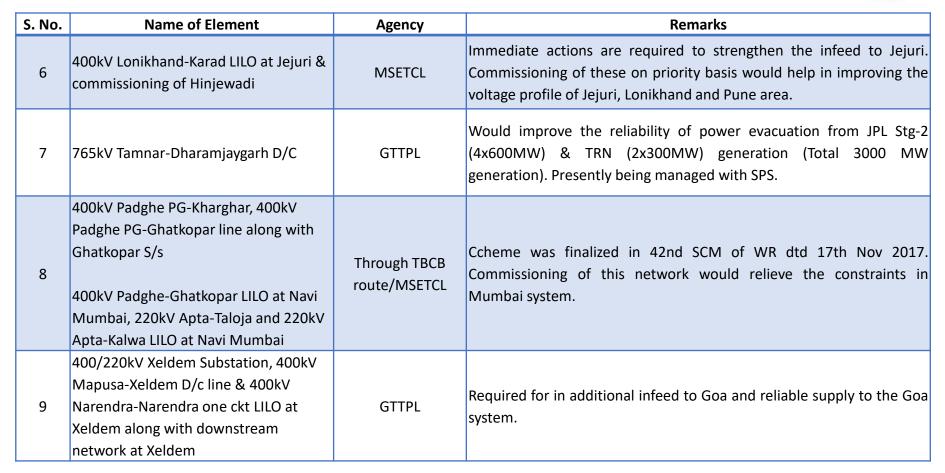
	S.No.	Line	Voltage (in kV)	Owner	Outage Date	Remarks
	1	FSCs – 400 kV Kanpur - Ballabhghar D/C	400	POWERGRID	14-03-17 16-03-19	Ckt I FSC has been out due to B-phase Signal column blast. Ckt II FSC hand tripped due to fire in FSC-II of B-phase at Ballabhgarh.
	2	FSCs – 765 kV Meerut – Koteshwar D/C	765	POWERGRID	20-02-21 15-05-21	FSCs taken out for upgradation work at 765 kV. Not taken back in service yet.
	3	FSC- 400kV Aligarh- Muradnagar	400	POWERGRID	09-10-2015	FSC is out due to LILO of 400 kV Panki –Muradnagar at Aligarh.
	4	FSC of Pampore-1 & Pampore-2 at Kishenpur*	400	POWERGRID	30-12-2012	FSC are out due to LILO at Mirbazar (one ckt. of Kishenpur- Mirbazar has been LILOed at Ramban)
	5	FSCs – 400 kV Raipur – Wardha D/C	400	POWERGRID	01-02-18 17-11-18	Damping resistor burnt
	6	FSC + TCSC - Raigarh- Raipur I, II & III	400	POWERGRID	06-07-16 08-07-16	Fire at TCSC / Main control system failure
	7	FSCs- 400 kV Balipara – Bongaigaon 3 & 4	400	POWERGRID	02-09-20	Fire in B-ph capacitor bank of FSC (ckt-3)
	8	FSC - 400 kV Rengali- Indravati	400	POWERGRID	23-02-2021	FSC R phase damping resistor got damage during successful autoreclose of the circuit.
Transmission Planning 5 th NCT Meeting 25 th Aug 2021 page						



Important Grid Elements under Construction

S. No.	Name of element	Agency	Remarks
1	765kV Anpara D- Unnao	UPPTCL	Scheduled Commissioning: Jan 2012. Would reduce loading of 400 kV Anpara-Sarnath D/C, Anpara-Mau, and Anpara-Obra lines.
2	765kV Bara -Mainpuri ckt-1 and 2 nd 765/400 kV ICT at Mainpuri	SEUPPTCL	Scheduled Commissioning: Jun 2017. Would strengthen the evacuation of Bara TPS generation in case of N-1 contingency of 765kV Bara-Mainpuri ckt-2.
3	765/400 kV 1500 MVA ICT 3 at Phagi	RRVPNL	Two existing 1500 MVA ICTs of Phagi become N-1 non-compliant during winter (High Rajasthan demand time). After commissioning of ICT-3, loading on other two ICTs would reduce and ICTs would be N-1 compliant. This would be good from reliability point of view as 765kV Phagi-Gawalior connects NR-WR and plays important role in transfer capability of Rajasthan
4	400/220kV 500MVA ICT-3 at Rajpura	PSTCL	Would address the N-1 non-compliance at Rajpura ICTs during paddy season.
5	5 th , 6 th & 7 th 400/220 kV 500 MVA ICTs at Bhadla PG	POWERGRID	Would address N-1 of ICTs at Bhadla PG during high solar generation. 4 th ICT commissioned on 31 st Dec 2020.

236 Important Grid Elements under Construction



5th NCT Meeting

Important Grid Elements under Construct



S. No.	Name of Element	Agency	Remarks	
10	765 kV Warora – Warangal – Maheswaram – Kurnool link and 765 kV Warangal - C'peta D/C	WKTL	Will form the WR-SR & ER-SR ring and significantly enhance the import of NEW- SR. Resiliency of the system will also improve and outages of major HVDC links towards SR could be managed after commissioning of these lines.	
11	400kV Kadakola SS and Associated system	KPTCL	Will relieve over loading Mysore ICTs and downstream	
12	400kV Kottayam SS and Associated system	KSEBL	Will enhance the TTC/ATC of S3(KERALA)	
13	400/220kV Cochin ICT-3	Powergrid	Will enhance the TTC/ATC of S3(KERALA)	
14	Upgradation of 220/132 kV, 2x100 MVA ICT to 2x160 MVA at Dimapur	POWERGRID	Enhance reliability of Nagaland & Manipur power system	
15	220/132 kV, 3rd 30 MVA ICT at Mokokchung (PG)	POWERGRID	Enhance transfer capability of Mokokchung Area of Nagaland Power System	
16	220 kV Balipara-Sonabil line II	AEGCL	Enhance reliability and transfer capability of NER power system. As per minutes of 179th OCCM, Assam informed that LOA has been issued and will take 8 months from then	



Important Grid Elements under Construct



S. No.	Name of Element	Agency	Remarks
			Enhance reliability of NER Power system.
17	Bay of 220 kV Balipara – Sonabil II at Balipara	AEGCL	As per minutes of 179th OCCM, Assam informed that Award
			delayed due to MCC
18	132 kV Monarchak – Surjamaninagar D/C	TSECL	Enhance reliable evacuation of Monarchak Power Station. As
10		ISECE	per 180th OCCM, target date is Sep'21.
19	220/132 kV, 1x160 MVA ICT with GIS Bay at Kopili	POWERGRID	Enhance reliability of Southern Part of NER power system
20	Reconductoring of 132 kV Imphal(PG)- Imphal II	MSPCL	Enhance transfer capability of Manipur Power System
21	Bay at Agia S/S for 132 kV Agia Nangalbibra Ckt #II	AEGCL	Enhance reliability of Assam & Meghalaya power system



- All India Studies considering different scenarios for Renewable Generation evacuation planning
- Planning for Reactive Power Management on all India level
- Adequate Short Circuit Ratio at RE Interconnection point to be ensured
- N-1 of ICTs at RE pooling stations



Thank you !!





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

सं.उक्षेविस/वाणिज्यिक/209/ आरपीसी (49^{वी})/2021/ **10880 - 10974** No. NRPC/Comml/209/ RPC (49th)/2021/ दिनॉक : 25 नवंबर, 2021 Dated: 20 November, 2021

सेवा में / To,

उ.क्षे.वि.स. के सभी सदस्य Members of NRPC/TCC

विषय: उत्तर क्षेत्रीय विद्युत समिति की 49^{वां} तथा तकनीकी समंवय उप-समिति की 47^{वां} बैठक-कार्यवृत्त। Sub: 49th meeting of NRPC and 47th meeting of TCC – Minutes.

महोदय / महोदया,

उत्तरी क्षेत्रीय विद्युत समिति की 49^{वाँ} बैठक दिनांक 27 सितम्बर, 2021 को तथा तकनीकी समंवय उप-समिति की 47^{वाँ} बैठक दिनांक 23 व 24 सितम्बर, 2021 को विडियो कॉन्फ़्रेंसिंग के द्वारा आयोजित की गयी थी। इन बैठकों के कार्यवृत की प्रति आपकी सूचना व आवश्यक कार्यवाही हेतु इस पत्र के साथ संलग्न है।

The 49th meeting of NRPC was held on 27th September, 2021 and 47th meeting of TCC was held on 23rd and 24th September, 2021 via video-conferencing. A copy of the minutes of the meetings is enclosed herewith for your information and necessary action.

भवदीय/Yours faithfully,

ot 213 25.11.21

(नरेश भण्डारी) (Naresh Bhandari) सदस्य सचिव Member Secretary

List of NRPC Members

- 1. Managing Director, PTCUL, Dehradun-248001, (Fax- 0135-2764496)
- 2. MD, UPPTCL, Lucknow-226001, (Fax-0522-2287792)
- 3. CMD, RRVPNL, Jaipur-302005, (Fax -01412740168)
- 4. Member (GO&D), CEA, New Delhi, (Fax-011-26108834)
- 5. CMD, PSTCL, Patiala-147001, (Fax-0175-2307779)
- 6. Commissioner/Secretary, PDD, J&K, Jammu, (Fax-0191-2545447/01942452352)
- 7. Managing Director, HVPN Ltd, Panchkula -134109 (Fax-0172-2560640)
- 8. Chairman, BBMB, Chandigarh-160019, (Fax-0172-2549857/2652820)
- 9. Chief Engineer, UT of Chandigarh, Chandigarh-160066, (Fax-0172-2637880)
- 10. Managing Director, DTL, New Delhi-110002, (Fax-011-23234640)
- 11. General Manager, SLDC, DTL, New Delhi-110002, (Fax-011-23221069)
- 12. Managing Director, IPGCL, New Delhi-110002, (Fax-011-23275039)
- 13. Chief Engineer (SO&C), SLDC, HVPNL, Panipat , (Fax-0172-2560622/2585266)
- 14. Managing Director, HPGCL, Panchkula-134109, (Fax-0172-5022400)
- 15. Representative of DHBVNL (Haryana Discom)
- 16. Managing Director, HPSEB Ltd, Shimla -171004 (Fax-0177-2658984)
- 17. Managing Director, HPPTC Ltd, Himfed Bhawan, Shimla-171005, (Fax-0177-2832384)
- 18. Managing Director, HPSLDC, HP State Load Despatch Authority, Totu, Shimla, (Fax-0177-2837649)
- 19. Managing Director, J&K State Power Dev. Corp., Srinagar, J&K, (Fax-0194-2500145)
- 20. Chairman and Managing Director, PSPCL, Patiala-147001, (Fax-0175-2213199)
- 21. Chief Engineer (LD), SLDC, Heerapur, Jaipur-302024, (Fax-0141-2740920)
- 22. CMD, RRVUNL, Jaipur-302005, (Fax-0141-2740633)
- 23. Representative of JVVNL (Rajasthan Discom)
- 24. Managing Director, SLDC, UPPTCL, Lucknow-226001, (Fax-0522-2287792)
- 25. Managing Director, UPRVUNL, Lucknow-226001, (Fax-0522-2288410)
- 26. Representative of MVVNL (UP Discom)
- 27. Managing Director, SLDC, PTCUL, Rishikesh, (Fax-0135-2451160)
- 28. Managing Director, UJVNL, Dehradun-248001, (Fax-0135-2763507)
- 29. Managing Director, UPCL, Dehradun-248001, (Fax-0135-2768867/2768895)
- 30. Director (Technical), NHPC, Faridabad-121003, (Fax-0129-2258025)
- 31. Director (Finance), NPCIL, Mumbai-400094, (Fax-022-25563350)
- 32. Director (Commercial), NTPC, New Delhi-110003, (Fax-011-24368417)
- 33. Representative of CTUIL, Gurgaon-122001
- 34. CMD, SJVNL, New Delhi, (Fax-011-41659218/0177-2660011)
- 35. Director (Technical), THDC, Rishikesh-249201, (Fax-0135-2431519)
- 36. Director (Commercial), POSOCO, New Delhi-110016, (Fax-011-26560190)
- 37. ED, NRLDC, New Delhi-110016, (Fax-011-26853082)
- 38. CEO, Aravali Power Company Pvt. Ltd., NOIDA, (Fax-0120-2591936)
- 39. CEO, Jhajjar Power Ltd., Haryana, (Fax-01251-270105)
- 40. Representative of Lanco Anpara Power Ltd., (Fax-124-4741024)
- 41. Station Director, Rosa Power Supply Company Ltd., (Fax-05842-300003)
- 42. Director and head regulatory and POWER Sale, JSW Energy Ltd., New Delhi (Fax- 48178740)
- 43. COO, Adani Power Rajasthan Ltd., Ahmedabad-380006 (Fax No- 07925557176)
- 44. COO, Talwandi Sabo Power Ltd. Distt: Mansa, Punjab-151302(Fax: 01659248083)
- 45. MD, Lalitpur Power Generation Company Ltd., Noida-201301(Fax: 01204045100/555, 2543939/40)
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- 47. CEO, Nabha Power Limited, (Fax: 01762277251 / 01724646802)
- 48. Representative of Prayagraj Power Generation Co. Ltd.
- 49. Representative of Greenko Budhil Hydro Power Private Limited (Member IPP<1000 MW)
- 50. Representative of TPDDL (Delhi Private Discom)

Special Invitee:

- i. Member Secretary, WRPC, Mumbai-400 093.
- ii. Member Secretary, SRPC, Bangalore-560 009
- iii. Member Secretary, ERPC, Kolkata-700 033.
- iv. Member Secretary, NERPC, Shillong-793 003.

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- 41. Addl. Vice President, Rosa PSCL, (Fax-05842-300003)
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- 46. ED (Marketing), PTC India Ltd., New Delhi (Fax- 011-41659144,41659145)
- 47. Head (O&M), Nabha Power Limited, (Fax: 01762277251 / 01724646802)
- 48. Representative of Prayagraj Power Generation Co. Ltd.
- 49. Representative of Greenko Budhil Hydro Power Private Limited (Member IPP<1000 MW)
- 50. Representative of TPDDL (Delhi Private Discom)
- 51. CEO, Meja Urja Nigam (P) Limited, Prayagraj

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MINUTES OF 47th MEETING OF TECHNICAL COORDINATION SUB-COMMITTEE & 49th MEETING OF NORTHERN REGIONAL POWER COMMITTEE

Time & Date of TCC meeting: 11:00 Hrs. on 23.09.2021 and 24.09.2021 Time & Date of NRPC meeting: 11.00 Hrs. on 27.09.2021 Venue: Via Video Conferencing

Proceedings of 47th TCC Meeting

Shri Naresh Bhandari, MS, NRPC welcomed all the members of Technical Coordination Committee and other delegates to the 47th TCC meeting of NRPC held virtually through video-conferencing. He appreciated efforts of NRLDC and SLDCs for managing the grid within prescribed frequency range. He highlighted the need of better forecasting in current scenario. He muted an idea for creating a forecasting desk at LDC level.

Shri Anil Kumar, Director (Projects), PTCUL & Chairman, TCC welcomed the participants. He expressed profound gratitude in representing Uttarakhand in the TCC/NRPC meetings for the past few years and thanked for being chosen to chair this forum for FY 2021-22. He stated that several regulatory changes have taken place since the last meeting. CERC (Sharing of ISTS charges and losses) Regulations have been notified w.e.f. November 2020. Energy exchanges have been allowed to trade renewable energy under Green Term Ahead market. Recently CERC has also published Draft Regulations for Ancillary Services and Deviation Settlement Mechanism, which link these regulations more closely with power markets with better price discovery.

Further, Government of India has also circulated a discussion paper regarding Market Based Economic Dispatch which aims to establish "One Nation, One Grid, One Price". All utilities should welcome these developments. Power Sector has bounced back after demand had initially plummeted after the Covid-19 crisis last year. India's peak electricity demand recorded an all-time high of more than 200 GW this year in July. Also, in a reaffirmation of India's push for green energy sources, solar and wind generation recorded an all-time high of more than 43 GW on 27th July this year.

These developments have come with their own sets of challenges. Due to coal crisis at the end of August, spot prices in the power exchange crossed Rs 20 in some time blocks as several plants were under shutdown.

This highlights the importance of coordinated planning and forums like NRPC where issues of all stakeholders can be discussed and bottlenecks resolved. Several operational and commercial issues will be discussed in today's meeting. He urged all participants to actively take part and educate the forum when agenda regarding their issues are discussed. Further, all decisions taken in this meeting should be strictly adhered to and all in the given timeline.

The last TCC/NRPC meetings were also held via video conferencing in September 2020. He expressed his hope that the Covid situation improves further, so that this forum will not have to wait another year to meet. Uttarakhand has to host the next TCC/NRPC meeting and it would be pleasure for the state if those meetings can be held in FY 2021-22 only.

Proceedings of 49th NRPC Meeting

Shri Naresh Bhandari, MS, NRPC welcomed all the members of Northern Regional Power Committee and other delegates to the 49th NRPC meeting held virtually through video-conferencing. He informed the members of NRPC that very healthy deliberation was held during the two days of TCC meeting. The recommendations of TCC would now be placed for the approval of NRPC.

Shri Deepak Rawat, MD, PTCUL & Chairman, NRPC welcomed all the participants. He stressed that the power sector is pivotal for growth and is a determining factor for other sectors also. Use of IT has made it a very dynamic sector. He highlighted the role of NRPC as enumerated in resolution of RPCs and stressed on problem solving approach with co-ordination among various stakeholders.

Confirmation of Minutes (TCC and NRPC)

A.1 Minutes of 45th meeting of TCC/48th meeting of NRPC and Special (46th) TCC meeting

Minutes of 45th meeting of TCC held on 27th and 28th August, 2020 and 48th meeting of NRPC held on 02nd September, 2020 were circulated vide letter dated 20th November, 2020.

Minutes of Special (46th) meeting of TCC held on 15th June, 2021, were circulated vide letter dated 25th June, 2021.

Members were informed that no comments were received on Minutes of meetings mentioned above.

TCC and NRPC members confirmed the minutes.

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B.1 System Study for Capacitor Requirement in NR for the year 2019-20

TCC Deliberations

- B.1.1 TCC forum was apprised about the progress of the project and deliberations in different meetings held regarding the agenda. It was highlighted that inputs received from states was submitted to NRLDC on 21.09.2021 for tuning of base-case. NRLDC will tune the base case and will also ensure that regional generators shall not absorb reactive power in the base-case.
- B.1.2 NRLDC intimated that base-case file after tuning can be submitted by 30th September, 2021. It was discussed that after receipt of tuned base-case file, same may be forwarded to CPRI along with comments of States.
- B.1.3 MS, NRPC highlighted that NRPC approval regarding payment has already been taken in 48th NRPC meeting. The payment to CPRI for the study will be processed after the acceptance of report. It was stressed that efforts will be taken to complete the project at the earliest and support of all states was appreciated.

NRPC Deliberations

B.1.4 NRPC concurred with deliberation held in the TCC meeting.

B.2 NR Islanding Schemes

TCC Deliberations

- B.2.1 TCC was apprised about the agenda and status of different islanding schemes. Further, deliberations of different islanding schemes was done which as followed:
- B.2.2 <u>Punjab</u>: Punjab informed that all 3 schemes of Punjab are being finalized and will be submitted to CPRI for study within one month. Based on study results, PSDF will be approached for funding. Feeder wise details of the load for all islanding schemes will be submitted within 15 days.
- B.2.3 Target date for implementation of 3 islanding schemes was intimated as 30th June, 2022.
- B.2.4 TCC recommended proposal of Punjab SLDC to discontinue the Islanding scheme of GHTP Lehra Mohabat as there is only remote possibility of Island creation for GHTP due to less scheduling.
- B.2.5 <u>UT of Ladakh</u>: NRLDC intimated that steady state study was carried out and shared in the meeting dt. 6th July 2021. For performing dynamic study, NHPC has been requested to share complete dynamic data of Nimoo Bazgo and Chutak plants. Further, it was also highlighted that dynamic study may be vetted from third party before implementation.
- B.2.6 NHPC informed that dynamic data has been shared with NRLDC, except generic model information as it is awaited from BHEL.

- B.2.7 <u>Himachal Pradesh</u>: HPSLDC informed that reliability studies of Islanding schemes are pending at HPSEBL end. HPSEBL informed that study outcome will be shared by 15th October, 2021. Further, BBMB raised concerns regarding Kullu Dehar IS to be deliberated in separate meeting.
- B.2.8 <u>Uttar Pradesh:</u> NAPS shall be nodal agency for all data regarding NAPS IS. In case of NAPS, data regarding healthiness of communication channel will be given by NRLDC and data regarding healthiness of communication of UFR/Islanding Relays will be given by NAPS on monthly basis. UPSLDC was requested to submit MIS report for Lucknow-Unchahar IS and Agra-Lalitput IS.
- B.2.9 **<u>Rajasthan</u>**: Rajasthan intimated that proposal is under consideration of management which will be shared within a week. Rajasthan SLDC was requested to submit MIS report for Islanding schemes.
- B.2.10 <u>Uttarakhand</u>: SLDC informed that all stakeholders for Dehradun Islanding schemes have been approached for appointing Nodal officers. Generators are not having must run status and RGMO/FGMO is also not available. Viability of scheme will be shared within a month.
- B.2.11 **Delhi**: No representative was present during discussions.
- B.2.12 All the states were requested to submit MIS report on monthly basis. The format has been circulated vide agenda of 187th OCC meeting.

NRPC Deliberations

B.2.13 NRPC concurred with deliberations held in the TCC meeting.

B.3 Revised Under Frequency Relay based automatic load shedding scheme

TCC Deliberations

- B.3.1 TCC was informed that in the 10th NPC meeting, held on 09.04.2021, it has been decided that the AUFLS scheme (with 4 stages) viz. 49.4, 49.2, 49.0 & 48.8 Hz with existing quantum of load shedding shall be implemented in all the Regions. The quantum of load shedding would be reviewed based on the recommendation of the Sub-Committee to study the AUFLS scheme.
- B.3.2 In compliance of NPC decision, NR states/constituents agreed to raise the AUFR settings by 0.2 Hz. It was also highlighted that quantum of load shedding at four stages can be worked out and implemented after the receipt of recommendation of Sub-Committee of NPC. It was also decided that Compliance of revised setting to be monitored in monthly OCC meetings.

NRPC Deliberations

B.3.3 NRPC concurred with deliberation held in the TCC meeting.

B.4 Deemed Availability for shifting of towers to facilitate construction of projects of national interest

TCC Deliberations

B.4.1 TCC was informed that Ministry of Power vide letter dt. 31.08.2021 to CERC requested to suitably modify the CERC (Terms and Conditions of Tariff) Regulations, 2019 so that RPC Sectt can issue deemed availability certificate for the shutdown period availed by transmission licensees for shifting of their

transmission lines in NHAI projects, provided that transmission customers are not affected by the shutdown of the line.

- B.4.2 POWERGRID requested to issue Transmission availability certificates by considering deemed availability for the shutdown period availed by them for shifting of their transmission lines in NHAI projects as NHAI is not agreeing to reimburse the availability loss.
- B.4.3 NRLDC, Punjab, U.P., and Rajasthan submitted that deemed availability for the shutdown period availed by transmission licensees for shifting of their transmission lines in NHAI projects may be provided, only after suitable amendment in the extant CERC (Terms and Conditions of Tariff) Regulations.
- B.4.4 MS, NRPC opined that in view of NHAI projects of National importance, deemed availability for the shutdown period availed by transmission licensees for shifting of their transmission lines in NHAI projects may be allowed. He expressed that Provisional Transmission availability certification may be done till Commission takes final call on Tariff Regulations. Based on the decision of the Commission on the applicable Regulations, provisional certificate(s) may be later reviewed. It was also decided that issue will be discussed in the upcoming meeting of RPCs and CERC. Chairperson, TCC seconded the views of MS, NRPC.

NRPC Deliberations

B.4.5 NRPC concurred with deliberation held in the TCC meeting.

B.5 Review of SPS for Jhakri-Karcham complex

TCC Deliberations

- B.5.1 TCC was informed that SPS in Karcham-Jhakri-Rampur complex was revised after the charging of Gumma (HP) substation for evacuation of Sawara Kuddu plant and with the proposed additional 100MW injection by Sorang in the complex. The modified SPS logic was discussed and approved in the 183rd OCC meeting.
- B.5.2 Himachal Sorang Power Pvt Ltd vide letter dt. 26.08.2021 have intimated that they have implemented SPS at Sorang HEP as per the directions and proposed scheme of NRPC.
- B.5.3 TCC recommended scheme for post facto approval of NRPC.

NRPC Deliberations

- B.5.4 NRPC gave post facto approval to revise SPS in Karcham-Jhakri-Rampur complex.
- B.6 Schemes agreed in 2nd Northern Regional Power Committee (Transmission Planning) meeting held on 01.09.2020

TCC Deliberations

Following schemes were deliberated in the TCC meeting which were agreed in 2nd Northern Regional Power Committee (Transmission Planning) meeting held on 01.09.2020:

B.6.1 Implementation of 400/132kV transformer at Kishtwar Pooling Station (Agenda by CTU)

- B.6.1.1 CTU informed that 2x200MVA, 400/132kV ICT along with associated bays and 4 nos. of 132kV line bays (GIS) at Kishtwar Pooling Station (GIS) are to be implemented as a system strengthening scheme in matching timeframe of Kishtwar PS i.e. by 01.04.2025.
- B.6.1.2 This ISTS system strengthening scheme is to be combined with "Transmission System for Evacuation of power from Pakaldul HEP in Chenab Valley HEPs-Connectivity System" for implementation purpose which has been already been agreed in 48th Northern Region Power Committee (NRPC) meeting held on 02.09.2020.
- B.6.1.3 TCC recommended scheme as system strengthening scheme for approval of NRPC.

B.6.2 Grant of 400kV bays to RE generators at Bhadla-II PS, Fatehgarh-II, & Fatehgarh-III (erstwhile Ramgarh-II) PS under ISTS (Agenda by CTU)

B.6.2.1 Accordingly, 5 nos. of 400 kV bays (Bhadla II - 3 nos., Fatehgarh-II - 1 no.
& Fathegarh-III - 1 no.) have been agreed for implementation under ISTS with following details:

Sr. No.	Application No.	PS	Applicant	400kV Bays	Connectivity Start Date as per Intimation
1	1200002340	Bhadla-II	NTPC Ltd.	1	01.09.2021
2	1200002401	Bhadla-II	Azure Power India Pvt. Ltd.	1	07.04.2021
3	1200002428	Bhadla-II	Adani Renewable Energy Holding Four Ltd. (Erstwhile Adani Green Energy Four Ltd.)	1	31.01.2022
4	1200002400	Fatehgarh- II	Azure Power India Pvt. Ltd.	1	07.04.2024
5	1200002402	Fatehgarh- III	Azure Power India Pvt. Ltd.	1	07.04.2025

- B.6.2.1 It was also highlighted that establishment of pooling stations viz. Bhadla-II, Fatehgarh-II has been agreed as part of Transmission system for Solar Energy Zones in Rajasthan (8.9GW) under Phase-I, and Fatehgarh-III as part of strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II in 45th & 46th NRPC meeting held on 08.06.19 & 24.09.19 respectively.
- B.6.2.2 TCC recommended scheme for approval of NRPC.

B.6.3 2 nos. of 765kV GIS line bays modules at Aligarh S/s (Agenda by CTU)

- B.6.3.1. CTU informed that transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II was agreed in 46th NRPC meeting held on 24.09.2019 which included Sikar-II – Aligarh 765kV D/c line along with 765kV line bays & line reactors at each end.
- B.6.3.2. However, 2 nos. of 765kV GIS line bay modules are already available at Aligarh S/s which have been agreed to be utilized for termination of Sikar-II Aligarh 765kV D/c line. Hence, provision for 2 nos. of bays at Aligarh S/s has been deleted from the earlier scope.
- B.6.3.3. TCC recommended scheme for approval of NRPC.

B.6.4 Additional 80 MVAR, 765kV Spare Reactor at Bhadla-II S/s (Agenda by CTU)

- B.6.4.1. CTU informed that Fatehgarh II Bhadla II 765kV D/C (2nd) line along with 2x240 MVAr switchable line Reactors at both ends has been envisaged without additional spare reactor under Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II which has already been agreed in 46th NRPC meeting held on 24.09.2019.
- B.6.4.2. In order to avoid complex layout constraints, additional 1x80 MVAR, 765kV Spare Reactor at Bhadla-II S/s as strengthening scheme was agreed in the 2nd meeting of NRPCTP which can be utilized as spare reactor for 240 MVAR line reactors on each circuit of Bhadla-II – Sikar-II 765kV 2xD/c line at Bhadla-II end. It was suggested that 1x80 MVAR, 765kV Spare Reactor at Bhadla-II S/s may be taken up for implementation as strengthening scheme.
- B.6.4.3. TCC recommended scheme as strengthening scheme for approval of NRPC.

B.6.5 Additional 1x500 MVA, 400/220kV ICT (8th) at Bhadla Pooling Station (Agenda by CTU)

- B.6.5.1. CTU informed that 4x500MVA, 400/220kV ICTs are existing at Bhadla (PG) S/s. Further, 3 nos. of 500 MVA ICTs are under various stages of implementation.
- B.6.5.2. It was highlighted that 3530MW LTA has already been granted to RE

developers at Bhadla (PG) S/s against the planned transformation capacity of 3500MVA. Hence, additional 1x500 MVA, 400/220kV ICT (8th) at Bhadla Pooling Station as strengthening scheme for meeting the n-1 criteria has been agreed in the 2nd meeting of NRPCTP.

B.6.5.3. TCC recommended scheme as strengthening scheme for approval of NRPC.

B.6.6 1x80MVAr switchable Line reactor on each circuit at Khetri end of Bikaner-II – Khetri 400 kV 2xD/c Line

- B.6.6.1. CTU informed that Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II was agreed in 46th NRPC meeting held on 24.09.2019. The scheme also includes:
 - i. Establishment of 400/220 kV, 6x500 MVA Pooling Station at Bikaner–II PS with suitable bus sectionalisation at 400 kV and 220 kV level and with 400kV (2x125 MVAR) bus reactor
 - ii. Bikaner-II PS Khetri 400 kV 2xD/c line (Twin HTLS* on M/c Tower)
 - iii. 1x80MVAr switchable Line reactor on each circuit at Khetri end of Bikaner-II – Khetri 400 kV 2xD/c Line
 - iv. 4 no. of 400 kV line bays at Khetri for Bikaner–II PS Khetri 400kV 2xD/c line
 - v. Khetri- Bhiwadi 400 kV D/c line (Twin HTLS)
 - vi. 2 no. of 400 kV line bays at Khetri for Khetri Bhiwadi 400kV D/c line
 - vii. 2 no. of 400 kV (GIS) line bays at Bhiwadi for Khetri- Bhiwadi 400 kV D/c line
 - viii. STATCOM at Bikaner–II S/s
- B.6.6.2. However, due to space constraints at Khetri S/s, it was agreed in 2nd NRPCTP meeting that in place of 1x80MVAr switchable Line reactor on each circuit at Khetri end of Bikaner-II – Khetri 400 kV 2xD/c Line, 1x80MVAr fixed line reactors would be installed.
- B.6.6.3. TCC recommended scheme for approval of NRPC.

NRPC Deliberations

- B.6.7 NRPC approved above schemes which were deliberated in 2nd Northern Regional Power Committee (Transmission Planning) meeting held on 01.09.2020.
- B.7 Schemes agreed in 3rd Northern Regional Power Committee (Transmission Planning) meeting held on 19.02.2021 (Agenda by CTU)

Following schemes were deliberated in the TCC meeting which were agreed in 3rd Northern Regional Power Committee (Transmission Planning) meeting held on 19.02.2021:

B.7.1 Transmission System requirement for additional 20GW REZ in Northern Region (Phase-III)

- B.7.1.1 TCC was apprised about Transmission System requirement for additional 20GW REZ in Northern Region (Phase-III) which was agreed in 3rd NRPC (TP) meeting held on 19.02.2021. Scheme details is in agenda.
- B.7.1.2 It was highlighted that PSTCL has submitted comments on the studies carried out by CEA and CTU. Further, point wise reply was given by CTU on the comments of Punjab. Director (PSTCL) was satisfied with the above response of CTU with no further comments.
- B.7.1.3 TCC recommended scheme for approval of NRPC.

B.7.2 Creation of 400/220 kV, 2x315 MVA S/S at Siot (earlier Akhnoor/Rajouri) as ISTS (Agenda by CTU)

- B.7.2.1 CTU informed that proposal for creation of 400/220 kV, 2x315 MVA S/S at Siot (AIS) under ISTS as a system strengthening scheme has been agreed in 3rd NRPCTP meeting with timeline as March, 2024. The scheme is also posed to 5th NCT meeting for approval. The detailed scope is as given below:
 - Establishment of 2x315 MVA, 400/220kV Siot S/ s with 1x125 MVAR, 420 kV bus reactor, 4 nos. of 400kV line bays and 6 nos. of 220kV line bays
 - LILO of both circuits of 400 kV D/c Amargarh (Kunzer)- Samba line at 400/220 kV Siot S/s
- B.7.2.2 It was also informed that steps to mitigate the issue of low voltages in J&K would be taken up by power department of J&K who will also complete their downstream network for drawl as per the timeline of establishment of Siot S/s i.e. Mar'24.
- B.7.2.3 CTU further informed that in 5th NCT meeting held on 25.08.2021 & 02.09.21, (MoM awaited), 7X105MVA ICTs along with 1x80MVAr Bus Reactor (420kV) have been decided to be implemented instead of 2X315MVA & 1x125MVAr bus reactor due to transportation constraint in hilly terrain.
- B.7.2.4 TCC recommended scheme as system strengthening scheme (subject to decision in the MoM of 5th NCT reg. single phase units of transformer & bus reactor) for approval of NRPC.

B.7.3 Handing over of 400 kV D/c Khandukhal-Rampura line and 220 kV D/c Mori-Dehradun line of PTCUL under UITP scheme (deemed ISTS) to

Central Sector (Agenda by CTU)

- B.7.3.1 CTU informed that in the 3rd NRPC-TP meeting it was agreed to implement 400 kV D/c Khandukhal (Srinagar)-Rampura (Kashipur) line under central sector as an ISTS scheme with the matching time frame of commissioning of Vishnugad Pipalkoti HEP of THDC i.e June 2023 or Tapovan Vishnugad HEP of NTPC whichever is earlier. Further, implementation of 220 kV D/c Mori-Dehradun line may be considered in future under central sector with materialisation of projects other than Naitwar Mori in Yamuna basin.
- B.7.3.2 PTCUL highlighted that project is to be implemented in TBCB mode and central sector is well equipped with TBCB project. Hence, project was handed over to central sector and not because of inability of PTCUL to achieve the targeted deadline. Hence, it was requested to consider the same and revise the language in the agenda.
- B.7.3.3 It was informed that agenda has been put up for deliberation as per minutes of 3rd NRPCTP meeting held on 19.02.2021, hence PTCUL was advised to take up the issue in 4th NRPC (TP) meeting scheduled to be held in the 1st week of October.
- B.7.3.4 After detailed deliberations, TCC recommended scheme for approval of NRPC.

B.7.4 Transmission Scheme for evacuation of power from hydro projects in Yamuna Basin (Agenda by CTU)

- B.7.4.1 CTU informed that in 3rd NRPC-TP meeting, following alterative scheme was agreed for evacuation of power from Naitwar Mori hydro project (60 MW) of SJVN
 - Creation of 220kV Pooling station near Snail with LILO of both circuits of Snail–Hatkoti 220kV D/c line, 6 nos. of 220kV line bays, 50 MVAR bus reactor along with reactor bay.
 - II. SJVN to construct 220 kV Naitwar Mori to Hatkoti/Snail PS D/c line and the 220 kV Pooling Station near Snail S/S as a dedicated system.
- B.7.4.2 TCC recommended scheme for approval of NRPC.

B.7.5 Reconductoring of portion of Dulhasti-Kishtwar- Kishenpur 400 kV (Quad) S/c (Agenda by CTU)

B.7.5.1 CTU informed that establishment of common pooling station at Kishtwar by LILO of one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line (Single Circuit Strung) as part of a comprehensive system for providing connectivity to Pakaldul (1000MW), Kiru (624 MW) and Kwar (540 MW) HEPs of CVPPL is ensviaged. It was further informed that Ratle HEP (690 MW) was planned to be developed in the downstream of Dulhasti HEP and it was agreed that Dulhasti-Kishenpur D/c Quad (S/c strung) would be LILOed at Ratle HEP and 2nd quad circuit shall be strung from Kishenpur and terminated at Ratle matching with the commissioning of Ratle HEP

- B.7.5.2 It was also agreed during 35th NR Standing Committee Meeting held on 03.11.2014 that as outlet beyond Dulhasti is Dulhasti-Kishenpur 400kV line is a single circuit line, the amount of power that can be exported/imported is limited. Hence, Dulhasti-Ratle section would be optimized to the extent possible. Further, bay rating at Dulhasti is 2000 A which is further reduced to 700/800A due to reduced capacity of XLPE/OIL cable for connection of line to GIS bus at Dulhasti end. Accordingly, Dulhasti-Kishenpur 400kV S/c line (Quad) was implemented with Twin Moose conductor till Ratle LILO point. Beyond Ratle LILO point, line was implemented with Quad Moose conductor. However, LTA & Connectivity application for Ratle HEP was revoked at later stage due to non-signing of requisite agreements
- B.7.5.3 For connectivity of Pakaldul HEP (1000 MW), LILO of one circuit of Dulhasti Kishenpur 400 kV line (quad) has been agreed at Kishtwar Pooling station. However, as location of proposed Kishtwar S/s is above Ratle location and towards Dulhasti, portion of DulhastiRatle LILO tap Point of Dulhasti Kishenpur 400 kV line (approx. 13 kms) implemented through twin moose conductor, needs to be reconductored with Quad moose conductor. Accordingly, to cater to power transfer requirement from hydro projects (Pakaldul, Kiru & Kwar) including LTA of Pakaldul (1000 MW) HEP, , following was agreed in 3rd NRPC-TP meeting as system strengthening scheme:
 - Reconductoring of Dulhasti-Ratle LILO tap Point of Dulhasti -Kishenpur 400kV line (approx. 13 kms) implemented through twin moose conductor with Quad moose conductor in matching time frame of Pakaldul HEP generation.
 - Termination of 400kV Kishtwar- Kishenpur 400kV S/c (Quad) line (second ckt) [LTA system of Pakaldul HEP] in bus reactor bay (125 MAVAR) in view of unavailability of spare bay as well as space for new diameter in 400 kVswitchyard for Kishenpur substation and conversion of bus reactor to switchable line reactor at Kishenpur S/s.
- B.7.5.4 TCC recommended scheme as system strengthening scheme for approval of NRPC.

B.7.6 Grant of 400kV & 220kV bays to RE generators at Fatehgarh-3 (erstwhile Ramgarh 2) PS under ISTS (Agenda by CTU)

B.7.6.1 CTU informed that at Fatehgarh –III PS 6 nos. of 220kV bays and 3 nos. of 400kV bays along with bus extension of 220 kV & 400kV bus as well as bus sectionalizer arrangement between both the levels i.e. 400 kV new section and 220 kV new section with under implementation section at Fatehgarh-3 PS is to be implemented under ISTS which was agreed in the 3rd NRPC-TP

meeting. The details are as follows:

S. No.	Applicant	Applications No.	Stage-II Connectivity Sought (MW)/Date	Connectivity Point	Agreed for grant*/Granted bays for providing Connectivity
1	Adani Green Energy Four Limited	1200002683	1500/ 30-06-2022	Fatehgarh-III	400kV-1 no. 220kV-2*nos. (*1 no. of 220kV bay is part of 7 nos. of 220kV bays, currently under bidding at Fatehgarh-III PS)
2	IB VOGT SOLAR SEVEN PRIVATE LIMITED	1200002700	300/ 05-04-2022	Fatehgarh-III	220kV-1 no.
3	ABC Renewable Energy Private Limited	1200002699	400/ 31-01-2022	Fatehgarh-III	220kV-1 no.
4	ReNew Surya Jyoti Private Limited	1200002746	210/ 31-03-2022	Fatehgarh-III	220kV-1 no. (This bay shall also be utilized for providing connectivity to ReNew Surya Pratap Private Limited Application No. 1200002778 - 210MW))
5	Azure Power India Pvt. Ltd.	1200002812	500/ 19-01-2024	Fatehgarh-III	400kV-1 no. (This bay shall also be utilized for providing connectivity to another Azure Power India Pvt. Ltd. (Application No 1200002813- 500MW))

S. No.	Applicant	Applications No.	Stage-II Connectivity Sought (MW)/Date	Connectivity Point	Agreed for grant*/Granted bays for providing Connectivity
6	Azure Power India Pvt. Ltd.	1200002814	500/ 19-01-2025	Fatehgarh-III	400kV-1 no. (This bay shall also be utilized for providing connectivity to another Azure Power India Pvt. Ltd. (Application No 1200002815- 500MW))
7	XL Xergi Power Pvt. Ltd.	1200002847	400/ 31-05-2022	Fatehgarh-III	220kV-1 no.
8	Energizent Power Pvt Ltd	1200002907	125/31-08-22	Fatehgarh-III	220kV-1 no*.

B.7.6.2 After detailed deliberations, TCC recommended scheme for approval of NRPC.

B.7.7 Establishment of 400/220kV Nange Pooling Station for proposed SJVN Hydro Power Plant Luhri Stage-I, II & Sunni Dam (Agenda by CTU)

- B.7.7.1 CTU informed that in the 3rd NRPC TP meeting, following transmission system for implementation with the time frame of Luhri-I HEP (April 2025) was agreed:
 - Establishment of 7x105MVA (single phase units, 400/220kV Nange GIS Pooling Station (tentatively Identified near Luhri Stage-II HEP)
 - Nange GIS Pooling Station Koldam 400kV D/c line along with associated bays at both ends (GIS bays at Koldam)
 - 125 MVAR Bus Reactor at Nange GIS PS.
- B.7.7.2 The above transmission system would also be utilized for connectivity of Sunni Dam and Luhri-II HEPs of M/s SJVN.
- B.7.7.3 TCC recommended scheme for approval of NRPC.

B.7.8 1x500 MVA, 400/220 kV ICT augmentation (3rd) at Sohawal (PG). (Agenda by CTU)

B.7.8.1 CTU informed that in the 3rd NRPC-TP meeting, UPPTCL intimated that 2x315 MVA ICTs at Sohawal(PG) have been observed to be 'N1' noncompliant under peak load conditions and requested for its augmentation. Accordingly, 1x500 MVA, 400/220 kV ICT augmentation (3rd) at Sohawal (PG) was agreed under system strengthening. Also, UPPTCL has requested to implement the ICT at the earliest due to increase in load.

- B.7.8.2 CTU further informed that UPPTCL vide letter 24.08.21 again requested that transformer augmentation work at Sohawal (PG) substation may be implemented on top priority to maintain reliable supply besides TTC enhancement perspective. Accordingly, augmentation of transformation capacity by1x500 MVA, 400/220 kV ICT augmentation (3rd) at Sohawal (PG) under system strengthening may be agreed.
- B.7.8.3 TCC recommended scheme as system strengthening for approval of NRPC.

B.7.9 One no. of 220kV Line bay at Chamera Pool for 2nd ckt stringing of 220kV Karian to Chamera transmission line (Agenda by CTU)

- B.7.9.1 CTU informed that 220/33 kV substation at Karian in Ravi Basin had been approved in 29th meeting of SCPSPNR held on 29.12.2010. Accordingly, 2 No. of 220 kV Bays were approved for termination of 220 kV D/C line from Karian at 400/220 kV, 2x315 MVA Chamera Pooling station of PGCIL at Rajera. Subsequently, in the 30th SCPSPNR meeting held on 19.12.2011, HPPTCL had informed that one bay would be required in first instance.
- B.7.9.2 Subsequently, in order to strengthen the intra-state transmission system, HPPTCL has planned 2nd circuit stringing of 220 kV Karian to Chamera transmission line, for which 220kV bay is required to be implemented at Chamera Pool. Accordingly, in 3rd NRPC-TP meeting, following Transmission element was approved under ISTS:
 - One no. of 220kV bay at Chamera Pool for 2nd circuit stringing of 220kV Karian to Chamera transmission line.
- B.7.9.3 TCC recommended scheme for approval of NRPC.

B.7.10 Addition of new ICT of 1X315 MVA at Amargarh s/s by March 2026 as approved in 3rd NRPCTP (Table Agenda by CTU)

- B.7.10.1 CTU informed that addition of new ICT of 1X315 MVA at Amargarh s/s by March 2026 has been approved in 3rd NRPCTP meeting held on 19.02.2021.
- B.7.10.2 The scheme was also discussed in 5th NCT meeting held on 25.08.2021
 & 02.09.2021 wherein considering transportation constraints due to difficult terrain, single phase units for transformers were agreed in place of three phase transformer at Amargarh S/s (MOM awaited).
- B.7.10.3 TCC recommended scheme regarding addition of new ICT of 1x315MVA (3x105MVA, single phase units) at Amargarh S/s (subject to decision in the MoM of 5th NCT on single phase units for transformers) for approval of NRPC.

NRPC Deliberations

B.7.11 NRPC approved above schemes which were deliberated in 3rd Northern Regional Power Committee (Transmission Planning) meeting held on 19.02.2021.

B.8 Proposed Evacuation Plan (Transmission System) for Shahpur Kandi Power Project (SKPP). (*agenda by PSTCL*)

TCC Deliberations

- B.8.1 Punjab informed that scheme is yet to be discussed in NRPC (TP) meeting and agenda regarding the same has been submitted for discussion in next NRPC (TP) meeting scheduled to be held on 5th October, 2021.
- B.8.2 TCC recommended scheme (subject to the decision of minutes of upcoming NRPCTP meeting) for approval of NRPC.

NRPC Deliberations

B.8.3 NRPC approved the scheme (subject to the decision in upcoming NRPC-TP meeting).

B.9 Emergent enhancement of ATC/TTC for Punjab due to unprecedented load growth of summer (*agenda by PSTCL*)

TCC Deliberations

- B.9.1 PSTCL informed that load flow studies have been carried out and it is proposed to plan Transmission Works for enhancing ATC/TTC limits to 10,000/10,600MW (considering 1000 MW annual load growth for FY 2022-23). It was also highlighted that general consumption in the state of Punjab has increased unprecedentedly so the works listed above need to be approved to meet the power supply demand of the state in the coming season.
- B.9.2 It was again highlighted that scheme may be brought up for discussion in upcoming NRPC (TP) meeting and then may be included in NRPC meeting after approval by NRPC (TP) meeting.
- B.9.3 POWERGRID highlighted that timeline for May, 2022 is very ambitious and unlikely to be achieved.
- B.9.4 Punjab highlighted that SPS scheme can be implemented as an alternative; however, requested for expeditious augmentation at Ludhiana.

NRPC Deliberations

B.9.5 NRPC concurred with the decisions of TCC that scheme may be brought up for discussion in upcoming NRPC (TP) meeting and then may be included in NRPC meeting after approval by NRPC (TP) meeting.

B.10 Laying of 400 KV OPGW links on Transmission lines (agenda by PSTCL)

TCC Deliberations

B.10.1 PSTCL informed that they have requirement for erection of OPGW on 2 no. 400 kV Transmission lines totaling 149 Kms. approx. and proposed for execution of this requirement by PGCIL through inclusion of these links in Package-I(a) or any other suitable project of PGCIL. The concerned 400 kV Lines are following-

- i. 400 kV D/C line from 400kV S/s Muktsar to 400 kV S/s Makhu
- ii. 400 kV D/C line from 400kV S/s Makhu to 400 kV S/s Nakodar
- B.10.2 It was informed that matter was deliberated during 18th meeting of TeST subcommittee of NRPC recently held on 10-08-2021 wherein POWERGRID informed that links may be included under Reliable Communication Scheme whose deadline will be extended to June 2022 and the tariff for the investment made is to be shared by PSTCL as per CERC notification.
- B.10.3 TCC recommended scheme for approval of NRPC. NRPC Deliberations
- B.10.4 NRPC approved the scheme as per deliberations in TCC.

B.11 Incorporation of left out OPGW links of HPSEBL in ULDC Package (*Agenda by HPSEBL*)

TCC Deliberations

B.11.1 TCC was informed that in the 18th TeST sub-committee meeting of NRPC held on dated 10.08.2021, HPSEBL requested PGCIL to include following transmission line for laying of OPGW to establish connectivity as redundant path for data reporting at SLDC/ALDC control centre Shimla.

Sr. No.	Name of Link	Voltage Level	OPGW	Route Length (In KM)
1.	Bassi-Hamirpur (Anu)	132kV	24F OPGW	50

B.11.2 The TeST sub-committee of NRPC has approved inclusion of this line for laying OPGW under Reliable Communication Scheme and the tariff for the investment made is to be shared by HPSEBL as per CERC notification.

NRPC Deliberations

B.11.3 NRPC approved the scheme as per deliberations in TCC.

B.12 Revision of Technical specification of Power Transformer in HVPNL as per CEA standard specifications (*agenda by HVPNL*)

TCC Deliberations

B.12.1 HVPNL informed that Standard Specifications of Technical Parameters for Transformers and Reactors 66kV and above voltage Class has been approved by Ministry of Power and memorandum has also been issued by HVPNL for uniform implementation of availability of vendors for supply of Power transformers in the Northern constituent's states.

- B.12.2 PSTCL informed that they will adopt one nation one spec for reactors and 400kV class transformers. Further, most of the Transformers in PSTCL are in parallel operation hence change in specification (especially impedance) might not suit PSTCL. It was informed that comments have been forwarded to CEA also.
- B.12.3 It was highlighted that these specifications may be for new installations and its applicability for old installation needs to be investigated. Hence, it was advised that further issue may be taken up with CEA

B.12.4 NRPC concurred with the deliberations held in the TCC meeting.

B.13 Frequent opening of Lines due to High Voltage (agenda by POWERGRID)

TCC Deliberations

- B.13.1 POWERGRID highlighted regarding frequent switching operations at higher voltage level (765 kV and 400 kV) causes stress on Circuit breakers and other equipment, leading to premature ageing of the equipment. It was also highlighted that IEGC provides mechanism for the control of VAR injection/drawl by regional entities as a method of voltage control. Hence, opening of high voltage lines may be used as last resort and adequate reactive power planning need to be ensured.
- B.13.2 NRLDC highlighted that line opening is always last resort during lightly loaded conditions. The lightly loaded condition is generally observed in winter. Further, RE evacuating lines are also at higher voltage in night. Hence, line opening at higher voltage is being done without any option. It was requested that reactor compensation may be planned more effectively.
- B.13.3 CTU informed that reactor compensation is being taken care while planning which needs to be commissioned at the earliest. Further, it was highlighted that capacitor and reactor compensation need to be planned simultaneously and capacitor switching at lower voltage level must be closely monitored which will help in maintaining voltage profile.

NRPC Deliberations

B.13.4 NRPC concurred with the deliberations held in the TCC meeting.

B.14 Non-Auto mode on 400 kV Banala-Amritsar for live line OPGW installation (*Agenda by POWERGRID*)

B.14.1 Agenda was withdrawn by POWERGRID.

B.15 Power supply position of Northern region (Agenda by NRLDC)

- B.15.1 NRLDC representative mentioned following with regard to Power supply position of 2020-21 winter:
 - Frequency was within band for more than 75% of time
 - NR demand met was in the range of 46-52 GW

- Energy consumption was in the range of 900-1061 MUs/day
- Rajasthan (14441 MW), Uttarakhand (2372 MW), Himachal Pradesh (1931MW) and Jammu & Kashmir (2680 MW) recorded all time maximum demand in winter.
- Himachal Pradesh (34.11 MU) and Jammu & Kashmir (55.30 MU) met new record of highest energy consumption in winter.
- B.15.2 Major challenges faced during winter months were also deliberated along with the suggested remedial measures. Utilities were requested to follow these measures to ensure safe and secure grid operation during winter. These are described in detail as follows:

Load generation portfolio management/ Minimizing grid indiscipline:

- 1. Meticulous load forecasting
- 2. Staggering of large load connection/disconnection
- 3. Flexing of internal generation
- 4. Synchronization of units at hourly boundaries may be delayed till frequency stabilizes
- 5. Portfolio management in advance

High voltage management

- 1. Switching off capacitor
- 2. Ensuring healthiness and availability of Bus and line reactor
- 3. Generator MVAr absorption/support as per capability curve
- 4. Promoting synchronous condenser operation of generating units to the possible extent
- 5. Tap optimization
- 6. Reliability study for switching off the lines & voltage relief under line opening for voltage regulation
- 7. Reactor planning studies and expediting the reactor already planned

8. Review overflux setting of transformers to avoid any undesirable tripping

Tripping during dense fog

- 1. Locate fog prone tripping area, cleaning and washing of insulators
- 2. Preventive action plan to avoid any mal-operation

3. Check all defense mechanism i.e. SPS, UFR, df/dt, Protection setting etc.

B.15.3 NRLDC representative stated that on average nearly 50-60 lines are being opened on daily basis during winter months. Plot depicting lines opened in Q3 and Q4 of 2020-21 were also presented in the meeting. This depicted the rising trend in opening of EHV lines with onset of winters from October onwards. Further, to mitigate the high voltage issues DTL had planned 7 reactors in their control area but out of 7 only 2 reactors are installed yet. Delhi SLDC was requested to expedite the commissioning of reactor and to share status of their progress. The status could not be updated from Delhi side as no representative from Delhi was present in the meeting.

- B.15.4 MS NRPC expressed concern that 7 reactors were planned in 2018 and only 2 are installed yet, this delay is not appreciable and if Delhi is not able to expedite it then Delhi may approach PGCIL and explore the possibility of awarding the work to PGCIL on Tariff based bidding as per CERC norms to expedite the reactors installing project in Delhi control area.
- B.15.5 PSTCL representative stated that 175MVAR of reactors at 400kV Dhuri and 400kV Nakodar Sub stations are already planned and will be commissioned soon.
- B.15.6 Incharge, NRLDC stated that lot of units are under shutdown in Punjab on merit order so Punjab may explore the possibility of staggering the load to mitigate the high voltage issues. Moreover, ICTs are generally kept out by Punjab to avoid tripping due to overflux. So, instead of all these actions Punjab should take necessary actions as discussed in OCC/TCC/ NRPC meetings to control high voltage in their control area.
- B.15.7 NRLDC representative stated that units of Tehri and Pong are operating in synchronous condenser mode, other generators and IPPs should also explore the possibility to operate in synchronous condenser mode and absorb MVAR as per their capability. Chamera-II units have also been successfully tested for synchronous condenser mode of operation.
- B.15.8 AD Hydro, Budhil, Singoli HEPs were requested to operate in synchronous condenser mode. HP representative that OEM has been called at Larji, after OEM visit they would update the status in OCC forum.
- B.15.9 Representative from Punjab stated that there are issues in High pressure air compressor of machine in Ranjeet Sagar HEP and this would be resolved by the month of November 2021. Punjab also resolved to the point that it would be operating machines of Ranjeet Sagar HEP in synchronous condenser mode by the end of November'21. TCC appreciated the efforts of Punjab.
- B.15.10NRLDC representative suggested that possibilities of operating Old conventional units (Thermal plants) in synchronous condenser mode may be explored. Units of Lehramohhabat/Ropar/Bhatinda may be considered for trial operation in synchronous condenser mode. Representative from Punjab SLDC replied that they would carry out the study, explore the possibilities and will give the feedback accordingly.
- B.15.11 Incharge NRLDC suggested to conduct separate meeting with IPPs and other generating stations to discuss possibility of operation as synchronous condenser. MS NRPC concurred with view of Incharge, NRLDC. It was decided that separate meeting would be called under NRPC Sectt. to discuss and explore possibility of operating more generating units as synchronous condenser.
- B.15.12NRLDC representative stated that Real-time Fog monitoring application has been developed collaboratively by NRLDC/POSOCO and ISRO and same application was used in NRLDC Control room in last winter on pilot basis that helped significantly on close monitoring of Fog and to take proactive actions by Control room executives. NRLDC stated that NRLDC will share the Fog

monitoring tool with all the SLDCs heads. Monitoring fog proactively and taking the necessary actions will eventually reduce the tripping due to dense fog. Incharge, NRLDC also highlighted the utility of this portal by system operators and suggested SLDCs also to utilize the tool proactively.

- B.15.13NRLDC representative stated that generators should absorb adequate MVAR to mitigate the high voltage issue during night hour of winter. SLDCs were also asked to advise state generators to absorb MVAR as per their capability and grid requirements. NRLDC representative also presented examples of reactive power performance monitoring and tap optimization exercise carried out by NRLDC during last winter. SLDCs were also requested to study and carry out necessary tap change exercise at lower voltage levels at least twice in a year.
- B.15.14MS NRPC stated that as synchronous mode of operation by generating units is not commercial and not linked to any financial gain/incentive for generators, hence it is hard to encourage all generators to operate in the synchronous mode. MS NRPC stated that NRPC will put this as agenda in coming CERC-NRPC meeting which is scheduled in Oct'2021, to initiate some commercial operation for synchronous condenser mode and to provide incentive for operation in synchronous condenser mode to ensure the smooth operation of grid during high voltage time.
- B.15.15 In-charge NRLDC stated that POSOCO has already approached to CERC and submitted the report on Reactive power management and Voltage control ancillary services, recommending incentive if support is provided from generator side in grid operation during high voltage time. The report is also available at POSOCO website (https://posoco.in/wpcontent/uploads/2021/08/Reactive_Power_VCAS_CERC_22Mar2021-002.pdf)

NRPC deliberations:

- B.15.16NRLDC representative presented the gist of discussions of TCC meeting to NRPC forum. NRPC appreciated the concerns raised by NRLDC and asked members to take necessary actions as discussed in detail in TCC meeting.
- B.15.17 Low voltages and N-1 non-compliance in Rajasthan control area

- B.15.18NRLDC representative presented the issues related to Rajasthan faced during winter 2020-21. It was highlighted that severe low voltages are observed in Hindaun and Alwar area. Moreover, N-1 non-compliance was also observed at 765/400kV ICTs at Phagi and 400/220kV Ajmer, Merta, Chittorgarh and Jodhpur ICTs.
- B.15.19Rajasthan STU representative stated that 765/400kV 1500MVA ICT-3 at 765kV Phagi will be commissioned by Nov'21. Rajasthan stated that ICTs at 400kV Chittorgarh, 400kV Merta and 400kV Jodhpur are already planned and sent for approval of 500MVA capacity at each S/s. Rajasthan stated that, to mitigate the low Voltage issue at 400kV Alwar, LILO of 400kV Agra-Sikar line at Alwar was proposed by Rajasthan. Rajasthan has already approached to

PGCIL and will raise the proposal in Standing committee meeting.

- B.15.20NRLDC representative suggested that till implementation of these schemes, if considerable generation at Dholpur GTPS would be running, the voltages at Hindaun and Alwar would not be that low. Rajasthan representative replied that as DISCOMs do not agree due to costly power and due to non-availability of cheap gas, Dholpur GTPS would not be running.
- B.15.21NRLDC representative presented the power supply position during summer/monsoon 2021. The new records during these months were also presented.
- B.15.22Incharge, NRLDC stated that Northern region has met maximum during this season with cooperation of all stakeholders. It was highlighted that some of the states are keeping internal generation under outage in spite of over drawl from the grid. It was suggested that all states shall try and maximize their internal generation and follow strict grid discipline. Any issues related to coal shortage should be immediately flagged and taken up with respective authorities.
- B.15.23 The opening of feeders shall be required in case of threat to grid security and non-adherence to RLDC instructions to manage over drawl by SLDCs/DISCOMs. SLDC/Transmission Licensee may be directed (As per Clause 5.4.2 of IEGC) to open these radial feeders on the direction of NRLDC/SLDCs. All SLDCs/ISTS licensees/STUs need to adhere to instructions of NRLDC/SLDC sLDC as the case maybe. All efforts would be taken to open the lines on rotational basis.
- B.15.24NRLDC representative stated that constraints observed in assessment by Delhi SLDC were at, 400/220kV Bamnauli and Mundka ICTs. It was discussed that due to radial feeding of load from most of the stations, reliability is reduced and requirement of SPS may be explored by Delhi SLDC to avoid complete load loss as was seen in few events in July 2021. With SPS, loss of power supply to super critical loads such as DMRC may be avoided. DMRC feeders' telemetry to also be made available to Delhi SLDC and NRLDC control rooms.

NRPC deliberations

B.15.25 Incharge, NRLDC stated that states need to improve their load-generation balance during evening hours especially 17:45-18:30 hrs. Outage of 800/1000MW could lead to severe disturbance in grid during this interval. Hence, it is necessary that states strictly draw as per their respective schedules especially during evening time and try and match load-generation as much as possible.

B.15.26 N-1 non-compliance at RE stations

TCC Deliberations

B.15.27 It was discussed that subgroup has already been formed under CEA to discuss issues related to planning criteria including that for renewable generation and it would be covered by the subgroup. Meanwhile, sub-group formed at NRPC level as approved in 44th TCC and 47th NRPC meeting may also take up this issue during their discussion.

- B.15.28 POWERGRID representative stated that cost estimate for SPS at Bhadla(PG) has already been approved and tender was floated but no bids were received, therefore, tender will be floated again. Contract finalization is getting delayed as no response from the vendors were received. TCC expressed concern on the slow progress of work and asked POWERGRID to expedite the work.
- B.15.29POWERGRID representative stated that 6th ICT at Bhadla(PG) would be commissioned by 1st week of Sept'21 and 7th ICT would be commissioned in Oct'21. Rajasthan representative stated that SPS is under consideration at 400kV Bhadla(Raj) and no SPS is planned at 400kV Akal.

NRPC deliberations

NRPC noted the discussions of TCC.

B.16 Congestion management- Computation& Monitoring of ATC/TTC by State control area (Agenda by NRLDC)

TCC deliberations

B.16.1 State-wise import capability constraints were discussed in the meeting:

State	Available Transfer Capability (ATC) (MW) (TTC-RM)	Limiting Constraints	Discussion in TCC meeting
Punjab	7300	N-1 contingency of 400/220kV Rajpura, Nakodar, Moga and Ludhiana ICTs . Punjab SLDC stated that loading has slightly increased at 400/220kV Ludhiana after bus-split at Moga.	Punjab is assessing its ATC on regular basis in consultation with NRLDC and uploading it at its website. ATC/TTC of Punjab state control area was revised on several occasions in June and July 2021 due to outage of Talwandi Saboo generating units. SPS have been implemented at Rajpura and Nakodar.
UP	13200	N-1 contingency of 400/220kV Sohawal (PG), Gorakhpur (UP), Sarnath, Obra and Agra(PG) ICTs, 400/132kV Mau ICTs	UP is assessing its ATC on regular basis in counsulation with NRLDC and uploading it at its website.
Rajasthan	5900	N-1 contingency of 400/220kV Chittorgarh, Merta, Jodhpur ICTs, Bhilwara and Ajmer ICTs	Rajasthan is assessing its ATC and uploading at its website. NRLDC suggested Rajasthan for ICT augmentation/ SPS implementation at constrained stations. Rajasthan STU to expedite SPS implementation.
Haryana	7900	N-1 contingency of 400/220kV ICTs at Deepalpur,	Haryana is assessing its ATC on regular basis in consultation with NRLDC and uploading it at its website. NRLDC recommended ICT

		Kurukshetra(PG),	augmentation/ SPS implementation at
		Sonepat(PG), Panipat	Deepalpur. Haryana STU to expedite SPS implementation.
Delhi	6500	N-1 contingency of 400/220kV Mundka and Bamnauli ICTs.	ATC is not being uploaded in website, only violation of ATC is being shown. Delhi to expedite implementation of SPS at Mundka and Bamnoli ICTs.
J&K and Ladakh	1550	N-1 contingency of 400/220kV Amargarh ICTs	Not assessing its ATC
HP	1100	N-1 contingency of 400/220kV Nallagarh ICTs and 220kV Nallagarh-Uperanangal D/C	HP started its ATC assesment from previous two months in consulation with NRLDC
Uttarakhand	1500	N-1 contingency of 400/220kV Dehradun and Kashipur ICTs	Not assessing its ATC

- B.16.2 N-1 violations at these stations were presented in the meeting by NRLDC representative and asked states to ensure loading at these stations below their N-1 contingency limit.
- B.16.3 Representative from Uttarakhand and J&K stated that they would be assessing and sharing ATC/TTC of respective control area from next month (Oct'21). Uttarakhand representative also stated they are already in touch with NRLDC officers and have also shared few changes in All India basecase.
- B.16.4 Incharge, NRLDC highlighted importance of ATC/TTC assessment and asked all states to timely share the same with NRLDC and NRPC. All states were also asked to make sure that net power requested is within their ATC limits. SLDCs should also submit their feedback in this regard to STU to take necessary actions to increase their ATC/TTC limits.

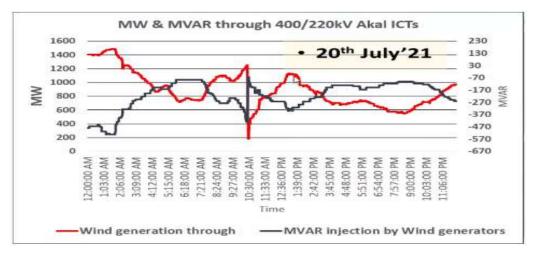
B.16.5 NRPC concurred the deliberations of TCC. NRPC asked Uttarakhand, J&K and Ladakh UTs to assess ATC/TTC limits of their control area and share with NRLDC/NRPC in Oct/Nov 2021.

B.17 Low Voltage Ride Through (LVRT) capability of Renewable generators (Agenda by NRLDC)

TCC deliberations

B.17.1 NRLDC representative presented few instances where it can be seen that possibly there was LVRT non-compliance by intra-state wind generators in Rajasthan. In event on 20th Jul 2021, it can be seen that wind plant is drawing MVAr from the grid. After the grid event at 10:30 a.m., it can be seen that there is delay in generation recovery at Akal end indicating non-compliance of LVRT. Rajasthan was asked to take up LVRT compliance at wind generating stations

in their control area.



- B.17.2 Representative from Rajasthan stated that they had conducted meeting with Wind plant on 4th Aug'21 and found around 2500MVA wind capacity are LVRT non-compliant. Rajasthan SLDC was asked to take lead and prepare estimated cost of retrofitting.
- B.17.3 MS NRPC stated that the wind generators commissioned before 2014 can't be obligated with regulation of 2014 but as LVRT compliance is very important for secure grid operation so cost of retrofitting for LVRT of those wind plants (before 2014) may be funded from PSDF.
- B.17.4 I/C NRLDC stated that Rajasthan may approach to SERC/CERC or MNRE for green energy fund for funding the cost of retrofitting for LVRT compliance of these wind plants (before 2014). Rajasthan has not approached for PSDF funding even after discussion on the issue in last 2-3 meetings.
- B.17.5 TCC deliberated that Rajasthan should prepare DPR on behalf of turbine developers for getting allocation from govt. funding. Based on request of Rajasthan, TCC may also request Member (GO &D), CEA and MoP for funding as there were no regulatory provisions for wind turbines installed earlier.

NRPC deliberations

- B.17.6 MS NRPC enquired from Rajasthan representative regarding the actions already taken at their end. Rajasthan representative informed that they had raised the issue with developers, however the big challenge which remains is that the old turbines are not able to provide cost estimates for LVRT compliance.
- B.17.7 MS NRPC stated that without proper cost estimates no action can be taken at TCC/NRPC level.
- B.17.8 Incharge, NRLDC stated that till the time proper cost estimates are available, mapping of wind generators may be done as per their locations. If there is risk of losing 2.5GW LVRT non-compliant wind generators, then by other means such as protection settings etc. generation loss may be minimized by Rajasthan SLDC in coordination with NRLDC/ NRPC.

B.18 Issues related to Power System Operation of J&K/Ladakh (Agenda by NRLDC)

- B.18.1 NRLDC representative presented following issues related to J&K U/T:
 - Expediting commissioning of 2nd ckt of 220kV New Wanpoh-Mirbazar and restoration of 220kV Kishenpur-Ramban.
 - 2X315 MVA ICTs have been commissioned at New Wanpoh, however till date only one out of the six bays have been utilised till date.
 - As per the agreed quantum relief for NR, total target in respect of J&K for UFR and df/dt are 336 MW and 270 MW respectively. Confirmation on relief quantum is yet to be received from J & K.
 - Expediting intra-state transmission projects in J&K under Prime Minister Development Package-2015
 - N-1 non-compliance of Baglihar HEP stage-I & II (total 900 MW). Expediting the coupling of two buses of Baghlihar stage-1 & 2 to minimize the probability of generation loss (450 MW)
 - One Main and transfer bus scheme instead of double main transfer (DMT) at major 220kv stations
 - Mock black start exercises of URI-I & URI-II HEP, Lower Jhelum HEP is yet to be conducted.
 - Need for establishment of SLDC Control Room (manned 24x7 by trained grid operators) in the UT of Ladakh
 - Allocation of power from Central Generating Stations to Ladakh
 - Adequate reactive compensation i.e. reactor & capacitors shall be planned
 - Tree/vegetation cutting may be carried out before onset of winters to minimize tripping even in case of early snowfall
 - Delayed clearance of fault captured in most of the grid events in UTJ&K/Ladakh control area.
 - Availability of automatic DR (disturbance recorder) and station event logger needs to be ensured for all the 220 kV and above stations
 - Data for monthly PoC case to calculate transmission losses and charges to be shared with NRLDC/NLDC
- B.18.2 J&K U/T representative informed following:
 - 95%-96% of the grid in J&K control area is having the facility of df/dt and UFR and within one month it would be operational after financial assistance was received from PSDF. NRLDC requested J&K to share the details with NRLDC/NRPC.
 - 2nd ckt of 220kV New Wanpoh-Mirbazar would be commissioned within 20 days (2nd week of Oct'21) and restoration of 220kV Kishenpur-Ramban would be accomplished within 2 months (1st week of Nov'21).
 - New stations are coming with double main and transfer schemes and for the stations where space is available, one bus would be added to one bus and transfer scheme. The cost for the same would be included in next year's capex budget.

- Mock Black start exercise of URI-I & URI-II HEP, Lower Jhelum HEP will be raised in internal meeting of J&K and details will be shared with NRLDC.
- Generally, tree cutting is done in November and April, however based on past events of snowfall in November, tree cutting would be done in October and April months.
- N-1 non-compliance of Baglihar HEP Stage-I & II and expediting coupling of two buses of Baglihar stage-1 & 2 would be taken up with J&K PDD (Generation dept.).
- Representative from J&K stated that JERC has been established at Jammu.

B.18.3 NRPC concurred the deliberations of TCC. J&K representative was not available for comments on the remaining issues.

B.19 Frequent tripping of 2*3000MW 800kV HVDC Champa-Kurukshetra

TCC deliberations

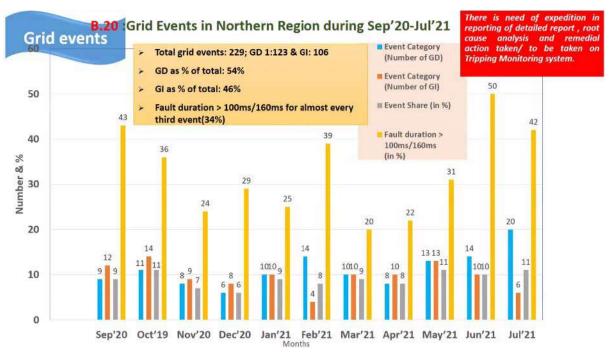
- B.19.1 NRLDC representative stated that HVDC Champa-Kurukshetra is an important 2*3000MW capacity link between NR and WR and its frequent tripping has been observed in each month due to one or another reason such as mal-operation/sensitive protection setting in the HVDC control either at Champa or at Kurukshetra end. HVDC link has been used to transfer up to 4500MW power from WR to NR and in future, utilization at rated capacity may be required on regular basis during high demand periods of NR. Frequent outage of this link during summer months/ peak demand period of Northern Region may adversely impact the reliability and security of the grid.
- B.19.2 PGCIL representative stated that Shutdown of 800kV HVDC Champa-Kurukshetra is already applied in Oct'21 and most of the Control protection work/issue would be resolved after that. Upgradation of GE control protection software would resolve most of the issues.
- B.19.3 TCC expressed concern on frequent tripping of Champa-Kurukshetra poles and asked POWERGRID to immediately take the corrective actions.

NRPC deliberations

B.19.4 MS NRPC asked POWERGRID to take the necessary actions and carry out software upgradation work as early as possible and highlighted the importance of Champa-Kurukshetra line for Northern region. NRPC forum expressed concern on frequent tripping of Champa-Kurukshetra poles and asked POWERGRID to immediately take the corrective actions.

B.20 Grid Events in Northern Region during Sep'20-Jul'21

B.20.1 NRLDC representative presented statistics related to grid events in Northern region.



B.20.2 TCC deliberated that NRLDC has successfully implemented the web portal for online submission of tripping related information. However, there is need to expedite reporting of detailed report, root cause analysis and remedial actions taken/ to be taken on Tripping monitoring system.

NRPC deliberations

B.20.3 NRPC concurred the deliberations of TCC and asked utilities to ensure timely submission of tripping related information at NRLDC tripping portal.

B.21 Frequent tripping in J&K control area

TCC deliberations

- B.21.1 NRLDC representative stated almost in all grid events in J&K control area delayed clearance of fault is observed. There also seems to be issue of protection settings coordination at J&K substations which are not regularly discussed in OCC and PSC meetings due to absence of J&K representatives.
- B.21.2 Representative from J&K stated that root cause analysis for various tripping is being done, a committee with PGCIL engineers have been made to analyse the issues, problem in Ziankote was identified and resolved. Momentarily tripping occurs due to wind storms, tilting of tall trees.
- B.21.3 Representative from J&K stated that insulator failure at Amargarh and Wagoora was reported. He further added that Insulator replacement and conductor replacement to HTLS is planned for 220kV Wagoora-Ziankote line.

NRPC deliberations

B.21.4 NRPC concurred the deliberations of TCC and asked J&K to take necessary actions to minimise frequent tripping of transmission lines.

B.22 Summary of load crash events during Thunderstorm/Dust storm

TCC deliberations

- B.22.1 It was deliberated that high frequency for considerable time was experienced in the grid during load crash events due to heavy under drawl by states. Large number of tripping incidents observed during these events. Several actions including warning/alert messages were issued to SLDC Control Centers. During 184th OCC meeting held in June 2021, NRLDC representative suggested that Standard Operating Procedure may be developed by SLDCs so that in case of such load crash events actions are taken in accordance with SOP
- B.22.2 It was observed that during weather-initiated load throw off, some generating units under state control area are ramped down up to only 70- 75% of their capacity. It has been previously deliberated in several OCC/TCC/NRPC meetings that states shall ensure that generators are backed down up to 55% or 60% (if some design issue). SLDCs were also advised to approach SERC in this regard.
- B.22.3 In TCC meeting, Punjab representative stated that continuous underdrawl is also because DISCOM consent is required before selling in real-time market. However, discussion is going on with PSPCL to minimise underdrawal during load crash by asking generators to back down and selling power in RTM.
- B.22.4 PSPCL representative stated that bids were not cleared during selling power in real-time market and load of Punjab is heavily weather dependent during paddy season. These posed as challenges for managing underdrawl during load crash events.
- B.22.5 MS NRPC advised Punjab to bid based on experience so that bids are cleared and deviations can be minimised and also asked Punjab to focus on load forecasting which would also help to manage their portfolio in a better manner. He also suggested that SLDCs should utilise real-time market better and may have separate REMC/ forecasting desk in their SLDCs to continuously monitor and suggest actions to control room operators.
- B.22.6 TCC deliberated that Standard Operating Procedure may be developed by SLDCs so that in case of such load crash events actions are taken in accordance with SOP. With ever increasing RE penetration, forecasting and renewable energy resource management has become more challenging and should be taken up on priority by all SLDCs.

NRPC deliberations

- B.22.7 NRPC concurred the deliberations of TCC and agreed that SOPs may be developed by SLDCs which would assist SLDCs for action in real-time.
- B.23 Automatic Generation control (AGC) (Trial run of 24x7 continuous operation of Automatic Generation Control (AGC) from 20nd July 2021)

- B.23.1 Trial run of 24x7 continuous operation of Automatic Generation Control (AGC) of identified regional entity generators has commenced from 20th July 2021. AGC will help in automatic and efficient frequency control. Depending upon ACE of each region, continuous signals for frequency control and / or area interchange control will be sent every few seconds from NLDC to different interstate generating stations situated pan India.
- B.23.2 TCC noted the information.

B.23.3 NRPC noted the information.

B.24 Important regulatory / regulatory related change

TCC deliberations

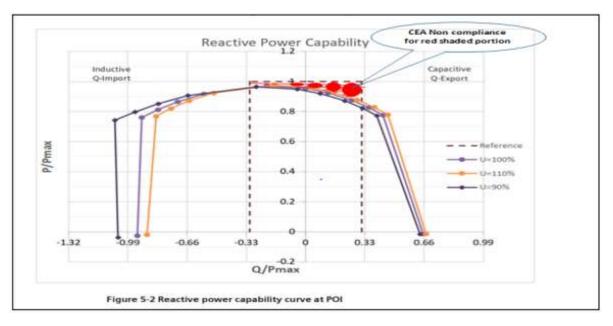
- B.24.1 Following important regulatory changes were informed to the members:
 - Sharing of transmission charges & losses regulation, 2020
 - Pilot project on 5-minutes scheduling, metering and settlement in Tehri HEP w.e.f. 27/11/2020
 - Implementation of Regulation 7(10)(b) as amended vide DSM Fifth Amendment Regulations
- B.24.2 TCC noted the information.

NRPC deliberations

B.24.3 NRPC noted the information.

B.25 Performance of Grid connected RE plants

- B.25.1 NRLDC representative presented the reactive power performance of solar plants commissioned at Bhadla and operation in different modes of operation (voltage control, p.f. control, Q control). Non-compliance of inverters at 50 deg Celsius was also highlighted. Following major issues encountered while registering RE plants were presented:
 - Plants operating between +0.95 p.f. and -0.95 p.f., however, voltage not specified, so plants are absorbing MVAR even in case voltage <1 p.u.
 - Some plants are complying with reactive power requirement at 40deg C but not complying at 50deg C.
 - Need for capacitor installation at plant if reactive power capability not as per regulations
 - Plant to operate in Voltage control mode, such that it generates / absorbs reactive power as required (some plants are already operating)



- B.25.2 CTU representative stated that a meeting was organised on 22nd Sept'21 with CEA and it was decided in meeting that there will be a working group, the group will submit the recommendations on RE compliances as per CEA standard for connectivity to the grid and issue necessary clarifications.
- B.25.3 MS NRPC enquired if temperature is mentioned or not in CEA standard for connectivity to the grid 2007, Amendment 2013 & 2019 Regulations and it was deliberated that no specific temperature is mentioned as ambient temperature in case of RE.
- B.25.4 NRLDC recommended that RE plants may be operated in voltage control mode to improve the voltage profile at ISTS POI. CTU suggested that it may also be recommended as a part of working group recommendations.
- B.25.5 TCC suggested that working group constituted by Member (GO&D) is already working on the same and may come up with recommendations to resolve the issues. It was also suggested that sub-group constituted at NRPC level may also provide their recommendations to the sub-group.

B.25.6 NRPC concurred the deliberations of TCC and suggested that sub-group constituted at NRPC level may provide their recommendations to the sub-group.

B.26 Important order on RE curtailment

TCC deliberations

B.26.1 NRLDC representative stated that in recent order of APTEL in petition APL 197 of 2019 NSEFI Vs TN, APTEL directed following in regards of RE curtailment:

> I. For Future, any curtailment of Renewable Energy shall not be considered as meant for grid security if the backing down instruction were given under following conditions:

- a. System Frequency is in the band of 49.90Hz-50.05Hz
- b. Voltage level is between: 380kV to 420kV for 400kV systems & 198kV to 245kV for 220kV systems
- c. No network over loading issues or transmission constraints
- d. Margins are available for backing down from conventional energy sources
- e. State is overdrawing from the grid or State is drawing from grid on short-term basis from Power Exchange or other sources simultaneously backing down power from intrastate conventional or non-conventional sources.
- II. As a deterrent, the curtailment of Renewable Energy for the reasons other than grid security shall be compensated at PPA tariff in future. The compensation shall be based on the methodology adopted in the POSOCO report. POSOCO is directed to keep the report on its website.
- III. The State Load Dispatch Centre (SLDC) shall submit a monthly report to the State Commission with detailed reasons for any backing down instructions issued to solar power plants.
- IV. The above guiding factors stipulated by us would apply till such time the Forum of Regulators or the Central Government formulates guidelines in relation to curtailment of renewable energy.
- B.26.2 TCC noted the information.

B.26.3 NRPC noted the information.

B.27 Constitution of a Steering Committee to monitor and implementing a Pilot Project on Battery Energy Storage System (BESS) and other activities

TCC deliberations

- B.27.1 NRLDC representative stated that Ministry of Power (MoP) decided to take up a Pilot Project on Battery Energy Storage System (BESS) for Hybrid usages like ancillary services, ramp up and ramp down, meeting peaking requirement, RE balancing needs, deferment of the transmission system and optimum utilization of the existing transmission systems etc. In this direction, MoP office order vide No.23/16/2020-R&R-(Part 1) dated 16th July 2021 formulated Steering Committee to monitor and implementing a Pilot Project on Battery Energy Storage System (BESS) and other activities.
- B.27.2 Composition of steering committee and terms of reference were presented in the meeting.
- B.27.3 TCC noted the information.

NRPC deliberations

B.27.4 NRPC noted the information.

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TCC deliberations

- B.28.1 It was deliberated that M/s SOLVINA and SIEMENS were awarded the work of testing generator PFR. As on (27th Sep 2021), M/s Solvina has performed PFR testing of 30 units at 10 nos of plants in Northern region.
- B.28.2 TCC noted the information.

NRPC deliberations

B.28.3 NRPC noted the information.

B.29 Facilitation of RE integration to Grid

TCC deliberations

- B.29.1 NRLDC representative described the targets set by Govt. of India for renewable integration to the grid. Integration of large scale RE with grid is a challenging task. Hon'ble commission and CEA has come up with various provisions to facilitate the RE integration with grid ensuring safety and reliability of grid. In this direction, NLDC, POSOCO has also formulated a procedure for registration and first time charging of RE plants, for which they are required to submit requisite data details regarding simulation study. The procedure & other details for registration and first time charging is available on each RLDC website.
- B.29.2 State/SLDCs were also requested to facilitate RE integration at intra-state system ensuring all the CEA/CERC/SERC compliances before final approval. SLDCs may also refer POSOCO procedure for RE registration and first time charging of RE plant.
- B.29.3 With cooperation from all stakeholders, Northern region was able to commission the plants, which were planned to be added before 15th August 2021. Three (3) nos of RE stations comprising of 725 MW were commissioned and charged during 2nd to 15th August 2021. NRLDC would like to thank all stakeholders for their cooperation, which made sure that India was able to achieve 100GW renewable capacity (excluding large hydro) before 15th August 2021.
- B.29.4 TCC noted the information.

NRPC deliberations

B.29.5 NRPC concurred the deliberations of TCC

B.30 Winter Preparedness 2021-22

- B.30.1 The challenges faced during winter 2020-21 were highlighted in detail in agenda 15.
- B.30.2 TCC advised all members to take actions as deliberated in agenda 15 to ensure smooth and secure grid operation during winter 2021-22.

B.30.3 NRPC concurred the deliberations of TCC and asked all members to take actions as deliberated in agenda 15 to ensure smooth and secure grid operation during winter 2021-22.

B.31 PTCUL Telemetry Issues

TCC deliberations

Non-availability of Real-Time data from PTCUL

- B.31.1 NRLDC representative stated following telemetry issues from PTCUL are pending since long:
 - As per details submitted by PTCUL out of 51 Sub-Station/Generating Stations data from only 28 Sub-stations are integrated at SLDC.
 - Matter regarding non-availability of telemetry has been taken up with PTCUL in various forums.
 - During previous meetings Director (Operations) PTCUL informed that they are in process of award of tender for installation of RTUs and they will segregate RTU and OPGW work in the tender and give priority to RTU replacement.
 - In addition to the above it is to inform that many feeders are not integrated even at the locations where RTUs are installed.
- B.31.2 In TCC meeting, representative from PTCUL informed that they are in the process of tendering of RTU and OPGW Installation work and informed that they would expedite the installation works, and is expected to be completed in 6 months. Further, representative from PTCUL informed that faulty CMRs/Transducers replacement work is in progress and same would be completed within 3 months.
- B.31.3 TCC expressed concern on the delay and asked PTCUL to expedite the work. <u>ICCP integration between PTCUL and Backup NRLDC</u>
- B.31.4 During SCADA upgradation at NRLDC Backup NRLDC at Kolkata was also established. As per system architecture all states shall be connected through ICCP to main and Backup NRLDC.
- B.31.5 It was informed that PTCUL is still not connected to Backup NRLDC. It was requested to take up with OEM for ICCP integration with Backup NRLDC.
- B.31.6 Further issue of ICCP integration of ICCP integration with Backup NRLDC was also discussed in 18th TeST Meeting and there was no update from PTCUL regarding the same. It may be noted that during operation of Backup Control centre, data of PTCUL is not available at Backup NRLDC
- B.31.7 Representative from PTCUL informed that they would establish the ICCP communication with their SCADA upgrade project. The work is delayed due to delay in funding process. After detailed discussion it was agreed that PTCUL should establish the connection on priority basis. PTCUL agreed for the same

and confirmed the same would be completed at the earliest.

NRPC deliberations

- B.31.8 NRPC concurred the deliberations of TCC and asked PTCUL to expedite the work.
- B.32 Non-availability of Reliable / Redundant Communication System for PTCUL, SLDC

TCC deliberations

- B.32.1 SLDC Uttarakhand is connected to NRLDC through radial network from Dehradun SLDC – Roorkee and all services like ICCP, PMU/PDC and VOIP are working on this. Any issue in this link leads to outage of Voice and Telemetry data communication between SLDC Uttarakhand and NRLDC.
- B.32.2 Matter of reliable communication to NRLDC was also discussed in Special Meeting with PTCUL on 07th July 2020 conducted by NRPC, 45th TCC/48th NRPC Meeting where PTCUL/POWERGRID assured that reliable communication link would be available in 6 months.
- B.32.3 PTCUL representative informed that they are in the process of tendering of RTU and OPGW Installation work and it is expected to be completed in 6 months. POWERGRID mentioned that after completion of OPGW works by PTCUL on Majra (Dehradun SLDC) to Dehradun PG line, POWERGRID will immediately integrate the communication equipment and establish redundant communication route for Dehradun SLDC.

NRPC deliberations

B.32.4 NRPC concurred the deliberations of TCC and asked PTCUL to expedite the work.

B.33 J&K Telemetry Issues

- B.33.1 NRLDC representative stated that real-Time data availability from Jammu and Kashmir is very poor. There is zero visibility of data from many J&K stations.
- B.33.2 J&K representative informed that during last one month around 10 links out of total 77 has been established and they have the remaining amount in CAPEX for this financial year and would release complete payment to POWERGRID in some time.
- B.33.3 POWERGRID informed that they would start pending work as and when payment is made by J&K. Further, they informed that even if communication link is established RTU data will not report to SLDC since CT/PT cables to RTU are removed at many locations.
- B.33.4 TCC expressed concern on the slow progress of the work and asked POWERGRID and J&K to resolve the issues at the earliest to make the

telemetry available. Without proper telemetry, system operation will remain a big challenge.

B.33.5 J&K confirmed they will resolve the issues mutually with POWERGRID so that data starts reporting to SLDC/ NRLDC.

NRPC deliberations

B.33.6 NRPC concurred the deliberations of TCC and asked POWERGRID and J&K to resolve the issues at the earliest to make the telemetry available.

B.34 Non-Availability / Reliability of Telemetry

TCC deliberations

- B.34.1 In order to have proper visualization and Situational awareness to control room operator for ensuring reliable grid operation, uninterrupted availability of telemetry is essential. It is essential to ensure 100% availability of the data from all the Sub-stations. However, it is seen that data is highly intermittent even for some of the 400kV/ 765kV Substations.
- B.34.2 As per CERC communication regulation also it is required that data shall be available to control centre with dual channel and availability of data with redundant channel shall be 100%. However, even after deliberation in previous many meetings, matter is still pending.
- B.34.3 In TCC meeting, all concerned confirmed that they will take up for rectification of telemetry issues and will arrange for improvement of telemetry at SLDC/RLDC.

NRPC deliberations

B.34.4 NRPC concurred the deliberations of TCC and asked all concerned to carry out rectification of telemetry issues.

B.35 Establishment of dedicated backup Control Centers for SLDC

TCC deliberations

B.35.1 In SCADA upgrade/replacement project under ULDC Phase-II concept of backup control centers was introduced. However, NRLDC /UPPTCL/Jammu and Kashmir has dedicated backup control centers. Whereas other SLDCs are backup of each other as given below:

S.No	Main SLDC	Backup
1.	Delhi	Rajasthan
2.	Rajasthan	Delhi
3.	Haryana	Himachal Pradesh
4.	Himachal Pradesh	Haryana

5.	BBMB	Punjab
6.	Punjab	BBMB

- B.35.2 Database modelling of one SLDC has to be done by other SLDC, but due to dependency on other SLDC database, modelling work is delayed leading to non-synchronization of data between Main and backup Control centers. Keeping in view of the above constraints, it is essential that separate dedicated backup control centers should be established by these states.
- B.35.3 MS NRPC opined that this is very critical and this philosophy will be discussed at TeST meeting in detail and will be put up in next TCC/NRPC meeting for approval. TCC agreed for the same.

B.35.4 NRPC concurred the deliberations of TCC.

B.36 Regularization of newly added OPGW Links of PSTCL under Package 1(a) (Agenda by POWERGRID)

B.36.1TCC was informed that 18th TeST sub-committee approved the addition of the OPGW links mentioned below under the Fibre Optics Communication System (Additional Requirement) scheme.

B.36.2The following	links to be	regularized	under package	1(a) scheme.
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Sr.	Name of links	Line length	Addition /
No		(Km)	deletion
1	220 kV Jamsher 220 - Jadla	67.326	Addition
2	LILO of 132 kV ASPH-I 132 Kv - ASPH II 132 at	2.993	Addition
	Anandpur Sahib 132	2.335	
3	LILO portion of Jamsher 220-Jadla 220 at	7.490	Addition
	Goraya220	7.490	
4	220 kV Jadla 220 - GGSSTP(RTP) 220	43.395	Addition
5	LILO of 220 kV Wadala Granthian 220 Kv - FC	9.080	Addition
	Churian 220 at Kotli Surat Mali 220	9.000	
6	LILO of 220 kV FC Churian 220 - Civil Lines Asr	5.440	Addition
	220 at Majitha		
7	LILO of 220 kV Civil Lines Asr 220 - Khassa	5.848	Addition
	220 at Chugawan 220	5.040	
8	LILO of 220 kV Sultanpur 220 - Patti 220 at	4.760	Addition
	Chola Sahib 220 Kv	4.700	
9	LILO of Talwandi Bhai- Ferozpur at Sadiq	23.605	Addition
10	LILO of 220 kV Ablowal 220 - Rajila 220 at	1.102	Addition
	Passiana	1.102	
11	LILO of 220 kV Rajila 220 - Patran 220 at	3.389	Addition
	Kakrala	5.509	
12	LILO of 220 kV Rajila 220 - Patran 220 at	6	Addition
	Patran	0	

Sr.	Name of links	Line length	Addition /
No		(Km)	deletion
13	LILO of 220 kV Patran 220 - Sunam 220 at Bangan 220	13	Addition
14	LILO of 220 kV sunam 220 - Mansa at Jhunir 220	33.585	Addition
15	LILO of 220 kV Mansa 220 - GHTP at Dhanoula	37.89	Addition
16	LILO Portion of GHTP 220 - Mansa at Talwandi Sabo	29.122	Addition
17	LILO Portion of GHTP 220 - Mansa at Mour	9.475	Addition
18	LILO of Muktsar 220 - Bathinda 220 at Malout 220	24.035	Addition
19	LILO of Muktsar 220 - Bathinda 220 at Badal 221	25.457	Addition
20	LILO of 220 kV Sahnewal 220 - GGSSTP LILO Point – Kohara 220	2.843	Addition
21	LILO of 220 kV Sahnewal 220 - GGSSTP at Gaunsgarh 220	16.685	Addition

Name o	New	Voltag	Route			
Link Name as per LOA	From	То	Length (in kms)	e Level (in Kv)	Lengt h (in kms)	Remarks
Bilaspur 132 - Doraha 132 - Sahnewal 220	Bilaspur 132kV	Sahnew al 220kV	21	132	21	Modified, (Doraha deleted)
MPH-I-II-III-IV - Shri Har Gobindpur - Wadala Granthian 220	MPH-I- II-III-IV	Wadala Granthi an 220kV	80	132	80	Modified, (Sri Har govindpur deleted)

- B.36.3 It was also informed that these additional links, as requested by PSTCL, are being put up for post facto approval of NRPC for inclusion under Fibre Optic Communication Scheme (Additional Requirement) - Package 1(a) and most of the works have already been completed, and balance installation works/commissioning are also likely to be completed shortly.
- B.36.4 TCC recommended scheme for approval of NRPC.

B.36.5 NRPC approved the scheme as per deliberations in TCC.

B.37 Implementation and funding of Unified Load Despatch and Communication (ULDC) Phase–III (SCADA/EMS upgradation Project) (Agenda by POWERGRID)

TCC Deliberations

- B.37.1TCC was apprised that as decided in the 18th TeST sub committee meeting, upgradation/replacement of existing SCADA/EMS system (ULDC Phase-III) for all SLDCs of Northern Region except Himachal Pradesh would be implemented by POWERGRID in Tariff mode. The Tariff for the same shall be recovered as per existing CERC regulations. The scheme shall become part of existing Commercial Agreement signed for ULDC Projects.
- B.37.2NRLDC will implement the project independently along with Himachal Pradesh (as per MoU signed between them) in CAPEX mode.
- B.37.3Representative from HVPNL mentioned that, this is very critical project for Grid operation and should be implemented in unified manner as done in earlier ULDC Phases (I & II) wherein SCADA/EMS System was implemented in all RLDCs and their SLDCs in integrated manner. He further referred CERC orders for implementation of the ULDC Projects in integrated manner for getting economy of scale and avoid integration issues at later stage.
- B.37.4MS, NRPC also urged POSOCO to become a member of the committee constituted by POWERGRID for finalization of technical specifications to ensure uniformity. However, NRLDC representative did not agree and mentioned that NRLDC would restrict itself within its own tender only.
- B.37.5TCC recommended scheme for the approval of NRPC.

NRPC Deliberations

- B.37.6 NRPC approved the scheme as per deliberations in TCC.
- B.38 Unreliable power evacuation from Lalitpur Power station (3x660 MW) (agenda by UPPTCL)

NRPC Deliberations

- B.38.1 It was apprised that in 48th NRPC meeting, it was decided that a separate meeting may be held with participation from CTU, UPPTCL, POSOCO, Lalitpur TPS and CEA so as to come out with some alternative path for anchoring of LPGCL generation.
- B.38.2 UPPTCL vide letter dt. 24.09.2021 has mentioned that desired meeting among the constituents has not been held. Resolution in 49th NRPC meeting may be taken for arranging the above meeting.
- B.38.3 NRPC decided that UP may approach CEA's upcoming NRPCTP forum for the issue.

C. COMMERCIAL ISSUES

C.1 Default in payment of outstanding dues and surcharge by beneficiaries TCC Deliberations

- C.1.1 Representative of THDC informed that BRPL and BYPL have submitted a liquidation plan and have been making regular payments. Uttar Pradesh has also made some payments and their overdue amount is around 70 crores. J&K is the major defaulter with maximum outstanding dues.
- C.1.2 Representative of J&K informed that loan has been sanctioned under Atmanirbhar Package Tranche-2, of which Rs 188 crore has been earmarked for making payments against bills raised by THDC. The same will be paid in the next 2-3 days. For the remaining amount, matter has been taken up with the finance department.
- C.1.3 Representative of SJVNL requested J&K to liquidate their outstanding on priority as it is seriously affecting their cash flow and would also hamper the MOU targets assigned by MOP.
- C.1.4 Representative of J&K assured that payment under Atmanirbhar Tranche-2 will be released in the next few days.
- C.1.5 Representative of CTU enquired about the payment expected from J&K under the Atmanirbhar package against their dues. Representative of J&K informed that Rs 387.9 crore has been earmarked for payment against bills raised by CTU/POWERGRID. Regarding balance amount, matter has been taken up with the finance department.
- C.1.6 Representative of Himachal Pradesh stated that they do not have any outstanding dues for CTU bills beyond 45 days. He was urged to reconcile the same with CTU.
- C.1.7 Representative of PTC India informed that J&K has an outstanding of around Rs 770 crore for power supplied through PTC. Representative of J&K informed that payment of Rs 154 crore would be made in the next few days.
- C.1.8 TCC urged all utilities to clear their outstanding dues at the earliest.

NRPC Deliberations

C.1.9 NRPC expressed concern over non-payment of dues by defaulting entities and advised all members to clear the dues on priority.

C.2 Opening of Letter of Credit

TCC Deliberations

C.2.1 TCC urged to open the LC as per CERC regulations.

NRPC Deliberations

- C.2.2 NRPC noted the TCC deliberations.
- C.3 Consent for purchase of Power (Agenda by SJVN) <u>TCC Deliberations</u>

- C.3.1 Representative of SJVN informed that they are executing works on a couple of hydro stations. He urged NR utilities to give consent for purchase of power from these projects. The details of the projects is as under.
- C.3.2 Luhri Hydro Electric Project Stage-I (LHEP Stage-I), 210 MW on the river Satluj in the downstream of Rampur HPS in the state of Himachal Pradesh. It is a run-of-river with limited pondage type scheme and is designed to generate Annually 758.18 MUs in 90 % dependable year. Commissioning of the project is expected in May, 2025. The levelized tariff of the generated power is Rs 5.84 per Kwh, calculated based on the project completion cost.
- C.3.3 Dhaulasidh Hydro Electric Project (DSHEP), 66 MW on the river Beas in district Hamirpur in the state of Himachal Pradesh. It is a run–of- river with limited pondage type scheme and is designed to generate Annually 303.86 MUs in 90 % dependable year. The Main Packages i.e. Civil & Hydro Mechanical packages has already been awarded and construction activities of the project has been started and the commissioning of the project is expected in June, 2026. The levelized tariff of the generated power is Rs 5.86 per Kwh, calculated based on the project completion cost.
- C.3.4 Naitwar Mori Hydro Electric Power Project (NMHEP) (2X30 MW) on the river Tons (a tributary of river Yamuna) in district Uttarkashi in the state of Uttarakhand. It is a run–of- river type scheme and is designed to generate Annually 215.57 MUs in 90 % dependable year. It is commissioning of the project is expected in April, 2022.
- C.3.5 He further informed that SJVN plans to offers 850 MW of Power to DISCOMS from the Solar Power Projects (PAN India) to be developed under CPSU Scheme Phase-II (Tranche-III) at the rate of Rs. 2.45/kWh. He urged interested utilities to give their consent for the same.
- C.3.6 TCC urged all utilites to either indicate their willingness to purchase power so that PPA can be signed or indicate unwillingness so that the power can be offered to beneficiaries of other regions.

C.3.7 NRPC noted the TCC deliberations.

C.4 Proof of export for the purpose of giving input tax credit under GST for electricity export

- C.4.1 Representative of NRPC Sectt informed that a meeting was held under the chairmanship of Joint Secretary (Transmission), MoP on 06.08.2021 to discuss the proof of export for the purpose of giving input tax credit under GST for electricity export.
- C.4.2 In line with the decision taken in the said meeting, all generators using imported fuel and exporting power outside the country may provide details mentioned at S.No.1 to 6 of Annexure II of the MoM of the MoP meeting (attached with Agenda note), by the last date of the month so that required format may be issued by NRPC Secretariat along with monthly REAs.

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C.4.3 NRPC noted the TCC deliberations.

C.5 Diversion of 01 No. 250 MVA Transformer from Moga (POWERGRID) to Nawada (HVPNL) (Agenda by POWERGRID)

TCC Deliberations

- C.5.1 Representative of POWERGRID informed that on the request of HVPN due to failure of one no. 400/20KV ICT at Nawada substation, POWERGRID diverted 1 no. 250MVA 400/200KV spare ICT from Moga substation to Nawada (HVPNL) substation in March'2016 as per deliberation held in NRPC. This ICT is in service since May'2016. The said 250MVA ICT (DOCO: 01.03.2000) was to be used as spare after its replacement.
- C.5.2 For use by HVPNL at their Nawada substation, an amount of Rs. 4.11 Lakhs / month was worked out based on unclaimed depreciation of the said ICT as hiring charges.
- C.5.3 As this ICT is in service at Nawada substation, POWERGRID has raised the hiring charges for this ICT w.e.f. 20/03/2016. Vide last Invoice dt. 03/07/2021 an amount for Rs. 3.078 Cr. upto 30th June'2021 is pending on M/s HVPNL. However, M/s HVPNL has not yet released any payment in this regard.
- C.5.4 Chairman TCC stated that since this is a bilateral issue, the same may be resolved mutually between POWERGRID and HVPNL. A meeting in this regard may be held by the second week of October 2021. POWEGRID and HVPNL agreed for the same.

NRPC Deliberations

C.5.5 NRPC concurred with the TCC deliberations.

C.6 FSC Refurbishment at Kanpur Ballabhgarh 400 kV Line-1 (Agenda by POWERGRID)

- C.6.1 Representative of POWERGRID informed that electronic devices for Control and Protection installed in Fixed Series Compensator (FSCs) at Ballabhgarh are of old generation for which spares and service support is no more available. Lot of problems are being faced in Control & protection system, Bypass circuit breaker etc at Ballabhgarh and BHEL is not able to provide the spare and service support for this FSC due to obsolescence of technology.
- C.6.2 Therefore, the refurbishment of BHEL make FSC was planned. Accordingly, POWERGRID has approached CERC during truing up petition of transmission tariff in respect of FSC at Ballabhgarh S/S for tariff block 2019-24. CERC directed POWERGRID to approach concerned RPC and CTU for reviewing the requirement of FSC.
- C.6.3 As per the direction of CERC, POWERGRID approached CTU vide letter dated 06-07-2021. CEA, CTU and other stakeholders had a meeting on 03-08-2021 on the issue (Copy of MOM attached). After deliberations, following was agreed-

"There is no requirement of refurbishment of FSC at Kanpur-Ballabhgarh Line-1".

- C.6.4 Representative of CTU informed that as noted in the MoM of the meeting held on 03.08.21, there was no requirement of the FSC in present load flow conditions. Hence FSC refurbishment for Kanpur-Ballabhgarh Line-1 was declined. He further informed that the matter will also be deliberated in upcoming 4th NRPC (TP) meeting.
- C.6.5 Representative of POWERGRID informed that balance unrecovered Depreciation (up to 90%) for this FSC is about Rs. 2.0 Crores as on 31.03.2021. If the FSC in Line-1 is being de-capitalized due to no utility in present network condition, the balance unrecovered depreciation may be reimbursed.

TCC decided that POWERGRID may approach CERC based on the decision taken in the upcoming CEA's NRPCTP meeting regarding utility of the FSC

NRPC Deliberations

- C.6.6 NRPC concurred with the TCC deliberations.
- C.7 Utilization of FSC installed at Muradnagar substation (UPPTCL) in 400 kV Panki- Muradnagar line (UPPTCL) or feasibility of shifting at any other location (Agenda by POWERGRID)

- C.7.1 Representative of POWERGRID informed that Fixed Series Compensation (FSC) of 40% was installed by POWERGRID in 400 kV Panki (UPPTCL)-Muradnagar S/c Line (396 km Twin Moose) at Muradnagar station end and the same was commissioned on 01.02.2004.
- C.7.2 Subsequently, LILO of Panki Muradnagar line at Aligarh (UPPTCL) was approved in 26th SCPSPNR meeting held on 13th October 2008, as part of "Evacuation System for Parichha TPS Extn". The LILO was subsequently commissioned in October 2015 by UPPTCL. After LILO, the length of lines are as given below:
 - Panki-Aligarh 400 kV S/c line (285 km)
 - Aligarh-Muradnagar 400 kV S/c line (177 km) with FSC (due to reduction in line length the % compensation increases to 90%)
- C.7.3 Based on the system condition, FSC was kept out of service by System Operator since Oct'15.
- C.7.4 POWERGRID approached CERC with true up petition in respect of FSC at Muradnagar S/S for tariff block 2019-24. Since the FSC is out of service, CERC directed POWERGRID to approach concerned RPC and CTU for feasibility of shifting/using the FSC.
- C.7.5 As per the direction of CERC, POWERGRID approached CTU vide letter dated 09-07-2021. CEA, CTU and other stakeholders had a meeting on 03-08-2021 on the issue (Copy attached). During the meeting, CTUIL stated that in case of shifting the FSC to any new location, short circuit level of new substation where

FSC would be shifted should match with design short circuit level of Panki /Muradnagar substation at the time of FSC planning and the length of line where the FSC would be shifted should approximately match with the original length of the line where FSC is to be installed. After deliberations, following was agreed:

- i) FSC installed at Muradnagar substation (UPPTCL) in 400 kV Panki-Muradnagar line (UPPTCL) has no utilization in the present scenario. However, views of NRPC also need to be taken in this regard.
- ii) POWERGRID to carry out cost benefit analysis, comparing the remaining life of the FSC alongwith the cost of shifting the FSC and installation of the same at any new location versus cost of installation of a new FSC at the new location. In case, relocation of the FSC is not feasible or is not found to be economically viable, POWERGRID is to approach CERC regarding tariff issues for remaining life of the asset.
- C.7.6 Representative of CTU highlighted that cost benefit analysis (comparing the cost involved with shifting existing FSC: remaining life of FSC + cost of shifting the existing FSC & installing the same at any new location V/s cost of installation of a new FSC at the new location) is to be done by POWERGRID.
- C.7.7 Representative of POWERGRID mentioned that cost of relocation would be much higher and may be equivalent to installation of new FSC, hence balance unrecovered depreciation, which works out to Rs. 4.66 Cr, may be reimbursed.
- C.7.8 TCC advised POWERGRID to do the cost benefit analysis and present the same before upcoming CEA's NRPCTP. CTU may provide locations where FSC is required for this purpose. In case, relocation of the FSC is not feasible or is not found to be economically viable, POWERGRID may act as per upcoming CEA's NRPCTP meeting.

NRPC Deliberations

C.7.9 NRPC concurred with the TCC deliberations.

C.8 Status of Regulatory Accounts (Agenda by NRLDC) TCC Deliberations

C.8.1 Representative of NRLDC informed that there is a long pending outstanding of J&K towards

Deviation Charges: Rs. 4994.24 Lakhs

Reactive Energy Charges: Rs. 1760.45 Lakhs

Congestion Charges: Rs. 1.73 Lakhs

- C.8.2 He further stated that last payment against Deviation Charges &Reactive Energy Charges was received on 05-05-2021 and against congestion charges on 17.10.2020. He appraised that, these are statutory pool accounts and the payments to the receivable constituents/Ancillary service providers are getting delayed due to long pending outstanding by J&K.
- C.8.3 Representative of J&K informed that, amount to the tune of Rs. 3.78 crore against Deviation Charges, Rs. 3.54 crore against Reactive Energy Charges and the total balance amount against congestion charges will be released by end of this week.

C.8.4 Representative of NRLDC, insisted JKPCL to release the balance outstanding by making regular payment in the pool accounts.

NRPC Deliberations

C.8.5 NRPC advised J&K to expedite the settlement of long pending outstanding so that payment to the receivable constituents may be settled without any further delay.

C.9 Reconciliation of Charges (Agenda by NRLDC)

TCC Deliberations

- C.9.1 Representative of NRLDC stated that, reconciliation statement for the month of August 2021 regarding pool accounts has been uploaded in the portal on 13-09-2021. All Members of these Pool Accounts are requested to reconcile the statement on monthly basis through web portal.
- C.9.2 He informed that out of 39 users of DSM pool account reconciliation from 7 users are pending. Defaulters in reconciliation of Deviation Charges are NFL, APCPL, J&K, Railways, Haryana, Delhi, & Punjab. Defaulters in reconciliation of Reactive Energy Charges are J&K, Delhi & Punjab.
- C.9.3 Regarding STOA charges, NRLDC has sent the reconciliation statement of open access disbursement for the Quarter-1 of financial year 2021-22 on 27th July 2021. The applicants/STU/SLDCs were requested to verify /check the reconciliation statement & comment if any on the same by 16th August 2021.
- C.9.4 Regarding NRLDC fee and charges, NRLDC vide letter dated 30/07/2021 has sent the reconciliation statements of NRLDC Fee and Charges for the quarter -1, 2021-22 to all the users. The users were requested to send the duly signed and verified copy of reconciliation statement as a token of acceptance by 23-08-2021.
- C.9.5 TCC advised all concerned utilities of pool accounts, STOA & NRLDC Fee & Charges to verify and sign the quarterly reconciliation statement within one week from the date of meeting to avoid any disputes in future else the statement stands deemed reconciled.

NRPC Deliberations

C.9.6 NRPC concurred with the TCC deliberations.

C.10 Status of NRLDC Fee & Charges (Agenda by NRLDC) <u>TCC Deliberations</u>

- C.10.1 Representative of NRLDC informed that only J&K and Delhi had outstanding dues towards NRLDC Fee & charges to the tune of Rs. 145.28 and Rs. 4.05 Lakhs respectively.
- C.10.2 Representative of J&K Representative informed that, an amount to the tune of 44 Lakhs will be released by end of this week.
- C.10.3 Representative of NRLDC insisted J&Kto settle the balance outstanding by making regular payments in the NRLDC Fees and Charges account.

- C.10.4 Representative of Delhi SLDC stated that, matter for clearing the outstanding is taking up with NDMC through DERC. They further clarified that NDMC is also not paying the dues of other users.
- C.10.5 TCC/NRPC advised J&K and Delhi to clear all the outstanding at the earliest.

NRPC Deliberations

C.10.6 NRPC noted the TCC deliberations.

C.11 Scheduling, accounting and other treatment of the legacy shared projects in Northern Region (Agenda by NRLDC)

TCC Deliberations

C.11.1 The matter could not be taken up in the TCC meeting due to technical issues. Chairman TCC stated that the matter may be deliberated in the 49th NRPC meeting directly.

NRPC Deliberations

- C.11.2 Representative of NRLDC informed that the issue of scheduling, accounting and other treatment of legacy shared projects in Northern Region is a long pending issue and has been under discussion since the 40th CSC meeting held on 12th September 2019.
- C.11.3 As per discussions held in the 45th TCC/48th NRPC meeting, where the issue was last deliberated, concerned states were supposed to hold bilateral meetings and submit their inputs to NRPC. In case of no observations/objections, treatment of Category 2, 3 and 4 projects would be done similar to Category 1 projects. However, states are yet to hold any bilateral meeting.
- C.11.4 Representative of Himachal Pradesh informed that they have written to other states for the bilateral meeting, but the same could not be held due to COVID pandemic.
- C.11.5 NRPC advised to all the concerned entities for holding bilateral meeting and submit their inputs to NRPC latest by 31/12/2021, so that the issue can be resolved by the next NRPC meeting.

C.12 STATUS of AMR Integration work (Agenda by NRLDC)

TCC Deliberations

- C.12.1 Representative of NRLDC informed that, out of 380 Elster make meter from 40 locations, data of only 169 meter is received through AMR. NRLDC is not receiving any data from 19 Nos of meter location where Elster Meter Installed. He also emphasized to speed up the meter procurement to ensure timely new meter installation for the first time changing element.
- C.12.2 Representative of POWERGRID stated that, integration of only L&T make meters is possible with existing AMR system in Northern Region. POWERGRID has tried integration of Elster make meter with AMR, however frequent failures have been reported in past subsequent to integration. Accordingly, the integration of Elster make meter is not being taken up. POWERGRID suggested replacement of

Elster make meters with AMR compatible meter, which may be taken up with CTU, and may be implemented after finalization of methodology / financial implication in this regard.

- C.12.3 Further with respect to Secure & EDMI Meters, new meters do not support secure meter communication and needs to be developed.
- C.12.4 He stated that integration of meters from GPRS (474 meters: L&T- 449 nos. & Elster 25 nos.) to fiber network would be taken up after confirmation from utilities regarding laying of fiber cable from Kiosk to Control room (communication penal to metering room).
- C.12.5 TCC urged to CTU/POWERGRID to resolve all the issue related to AMR integration and expedite the AMR integration work on priority.

NRPC Deliberations

C.12.6 NRPC noted the TCC deliberations.

C.13 Issues related with Interface Energy Meter/DCD (Agenda by NRLDC) <u>TCC Deliberations</u>

- C.13.1 Representative of NRLDC highlighted the status of Replacement/Rectification of IEM meters/DCD and shared the detail list with the members (attached with agenda note of the meeting).
- C.13.2 Regarding status of procurement of DCD/meters CTU/POWERGRID confirmed that 260 no. of meters and 36 no. of DCDs are in procurement stage.
- C.13.3 Representative of NRLDC informed that NRLDC has implemented a web-based portal (<u>https://meterdata.nrldc.in/</u>) for smooth meter data transfer to NRLDC from various locations where AMR is not implemented.
- C.13.4 He requested all constituents to upload IEM data on web-based portal every week to NRLDC by Tuesday noon as per IEGC provision. Data received after Tuesday may delay in timely processing of meter data and energy accounting.
- C.13.5 He informed that through this newly developed portal individual users need not to send the meter data through emails and they have to directly upload the meter data on the web portal itself. Now onwards sending data through email is discontinued. Nodal officers can monitor the status of uploading the data from locations pertaining to their control area and should expedite the data uploading in case the status appears "File Not Uploaded" for any location.
- C.13.6 TCC advised CTU/POWERGRID to replace faulty meters as per list provide by NRLDC by 31.12.2021 and also speed up the meter/DCD procurement to ensure timely new meter installation for the first time changing element.
- C.13.7 TCC further advised all users to share the details of nodal officers for metering related issues with NRDLC at the earliest and upload Interface Energy Meter data on web-based portal every week to NRLDC by Tuesday noon as per IEGC provision.

NRPC Deliberations

C.13.8 NRPC noted the TCC deliberations.

C.14 DSM billing issue for Punjab for the period 23.07.2021 to 07.08.2021 <u>TCC Deliberations</u>

C.14.1 The matter could not be taken up in the TCC meeting due to technical issues. Chairman TCC stated that the matter may be deliberated in the 49th NRPC meeting directly.

NRPC Deliberations

- C.14.2 Representative of NRPC Sectt gave a detailed presentation explaining the agenda (Annexure 14.1). It was informed that a letter was received from Chief Engineer/PP&R, PSPCL on 03.09.2021 wherein it was informed that high Ul/ Deviation charges (around 96 crores) have been imposed on PSPCL (DISCOM) due to erroneous data received from NRLDC end (Moga ICTs). PSPCL in its letter informed that NRLDC while carrying out changes in its SCADA on 23.07.2021, erroneously made some changes in the tag of Moga ICTs (400kV tag was changed to 765kV tag) which resulted in incorrect data display at NRLDC control room as well as at Punjab SLDC control room. The error persisted from 23.07.2021 to 07.08.2021, during which there was a difference of around 5-6% between the SCADA drawal data available at Punjab SLDC end and actual SEM based figure. Punjab scheduled its power based on the SCADA data, which was indicating under drawal (due to erroneous figures from Moga ICTs) whereas it was actually overdrawing heavily from the grid. This resulted in huge DSM penalties.
- C.14.3 A special meeting in this regard was called on 08.09.2021 to discuss the issue. Based on the discussion held in the meeting. It was observed that there was underdrawal from the grid by Punjab on all days from 01.07.21 to 22.07.21. From 23.07.21 to 07.07.21 however, the pattern changed completely and Punjab resorted to overdrawal on most days. In terms of daily DSM charges, Punjab was receivable on most days between 01.07.21 to 22.07.21, whereas from 23.07.21 to 07.07.21, huge penalties were levied on Punjab on account of overdrawal, sometimes to the tune of 12-13 crore. This change in trend can be attributable to the erroneous NRLDC SCADA data being received by Punjab.
- C.14.4 As per CERC (Communication System for inter-State transmission of electricity) Regulations, 2017, RLDC is the nodal agency responsible for monitoring, supervision and control of Power system of ISTS, ISGS, SLDCs and IPPs at RLDC end. The drawal data for all SLDCs of NR is being monitored through SCADA at NRLDC end as per these regulations. Punjab utilized this data for monitoring its drawal.
- C.14.5 The regulations also stipulate that SLDC is responsible for monitoring supervision and control of power system in the intra-state network, distribution system and generating stations at SLDC end. In case Punjab was monitoring SCADA data of their downstream network as per these regulations, the error could have been identified much earlier than 15 days for which it persisted.
- C.14.6 NRPC Secretariat issues statement for deviation based on CERC (DSM) Regulations as per data provided by NRLDC. Revised accounts are also issued in case of any error in the value of scheduled data or actual data provided by

NRLDC, or calculation error at NRPC end. However, in this particular case, schedule data, actual data and calculation by NRPC Secretariat based on these data is correct. Only SCADA data which was used by Punjab for scheduling in real time in incorrect, which has not been mentioned anywhere in the CERC DSM Regulations. The power to relax has also been vested with CERC as per these regulations.

C.14.7 Regarding possible solutions for resolution of this problem, it was informed that Punjab has actually consumed the energy that was overdrawn from the grid. Accounting for this energy needs to be done. Hence, complete waiver of DSM charges, as requested by Punjab may not be possible. The following 2 options may be explored:

<u>Option 1:</u> Punjab may be levied only base DSM charges for the period 23.07.21 to 07.08.21, whereas additional DSM and sustained DSM charges, which are additional penalties for non-adherence to grid discipline, may be exempted for the said period.

<u>Option 2:</u> The deviation done by the Punjab during the period may be bifurcated under 2 parts, Part 1 which is attributable to the erroneous SCADA data at Moga ICTs and Part 2 which is not attributable to the erroneous SCADA data. At present, energy drawn under both Part 1 and Part 2 is being treated as deviation, and all 3 deviation charges i.e. base DSM, additional DSM and sustained DSM are being levied on it. It is proposed that additional energy consumed by Punjab under Part 1, which is attributable of erroneous SCADA data, may be charged at either Area Clearing Price (ACP) or Average Power Purchase Cost (APPC). Only Part 2, which is not attributable to erroneous SCADA data may be treated as deviation and deviation charges may be levied on it accordingly.

Punjab showed preference for Option 1.

- C.14.8 Member Secretary, NRPC opined that NRPC is already issuing revised DSM accounts if there has been any error schedule data or meter data provided by NRLDC or any calculation error at NRPC end. CERC is not being approached in such cases. In the present case as well, there was man made (by NRLDC) error in their SCADA data due to which this huge deviation took place. Hence, NRPC Secretariat may issue revised accounts.
- C.14.9 Representative of Punjab stated that as explained in their letter, overdrawal by Punjab during the period 23.07.2021 to 07.08.2021 was on account of incorrect NRLDC SCADA data hence entire DSM charges for the said period may be waived off.
- C.14.10Chairperson, NRPC enquired about the measures taken to ensure that such errors do not take place in the future.
- C.14.11CGM (I/C) NRLDC stated that in NR, only Punjab and Haryana are totally dependent on NRLDC SCADA data. Other states of NR are also monitoring drawal through their downstream network. If Punjab would have done the same, as mandated in the regulations, the error could have been rectified much earlier. He further stated that Punjab should have suspected that something was amiss when they suddenly began to underdraw heavily after the erroneous NRLDC SCADA data was relayed, and instead of adding more load to the grid, they should have intimated NRLDC.

- C.14.12Member Secretary, NRPC expressed concern regarding the issue as along with commercial implications, error in NRLDC SCADA data is a serious issue in terms of grid security and could have led to some grid incident. Even, NRLDC shift staff could not detect this error and operated the grid with their erroneous SCADA for 15 days.
- C.14.13Regarding the use of NRLDC data by Punjab SLDC, Member Secretary, NRPC stated that NRLDC is the nodal agency for grid operations in the Northern region. All states treat the data being received from NRLDC as sacrosanct, hence there is nothing wrong with Punjab using that data to monitor its grid. He equated RLDCs & NLDC with Election Commission, where correct information is always expected. Moreover, CERC Communication Regulations provide that RLDC is responsible for monitoring of ISTS points, hence responsibility for ensuring adequate data from Moga ICT resides with NRLDC. He advised NRLDC to put in place robust internal systems, with proper checks and balances, so that such incidents do not take place in the future. He also advised Punjab SLDC to build its drawal calculation system at 220kV level as double check, and not rely 100% on NRLDC data so that errors like this one can be easily identified and rectified immediately. He stated that additional and sustained deviation charges are levied for indiscipline, but Punjab was disciplined before and after this period, and indiscipline of Punjab was due to erroneous NRLDC SCADA data. Therefore, additional and sustained deviation charges may be waived off.
- C.14.14Chairperson, TCC stated that as observed from the presentation, Punjab was disciplined in their drawal before and after the period for which NRLDC SCADA data was erroneous. Hence, huge penalty levied on Punjab for the said period seems unjustified. He proposed that charges for overdrawal for the period for which NRLDC SCADA data was erroneous may be levied at Average Power Purchase Cost (APPC).
- C.14.15Director (Market Operations), POSOCO stated that in since CERC has been vested with the power to relax or waive of DSM charges, the matter may be referred to CERC for taking a final call.
- C.14.16NRPC concluded that since Punjab was maintaining grid discipline before and after these two weeks, so huge DSM penalty during the period of erroneous NRLDC SCADA data should not be levied on Punjab. Hence additional deviation and sustained deviation charges for the period of erroneous NRLDC SCADA data may be waived off. NRPC Secretariat may also intimate CERC regarding the same once revised accounts are issued.

D. ITEMS FOR NRPC

D.1 Reimbursement of Expenditure of NRPC Sectt. for FY 2021-22 by the members of NRPC

- D.1.1 Member Secretary, NRPC stated that keeping in view the budget estimates approved by GoI for the financial year 2021-22 through NRPC fund and balance amount available in the NRPC Fund, the per member contribution for the year 2021-22 is proposed to be Rs.10.0 lakh.
- D.1.2 NRPC approved the proposal.

D.2 Reimbursement of Expenditure of NRPC Sectt. by the members of NRPC for the previous years

- D.2.1 Member Secretary, NRPC stated that for reimbursing NRPC expenditure to Gol and meeting the expenditure for meetings at Secretariat and other expenditure as approved by Chairperson, NRPC, constituent members are to pay annual contribution as decided in NRPC meetings from time to-time. However, contribution from some members is pending, details of which were enclosed with the agenda note of the meeting.
- D.2.2 NRPC urged all members to clear their outstanding dues at the earliest.
- D.2.3 Representative of Bajaj Energy stated that since they were permanent member of NRPC for FY 2019-20 on account of their generating station Lalitpur Power, their membership as representative of generating company having installed capacity less than 1000 MW may not be considered and NRPC charges for the said period may be waived off.
- D.2.4 Member Secretary, NRPC opined that Bajaj Energy should have raised this issue at the time when it was nominated for membership or during FY 2019-20, as some other generating company could have been nominated for membership then.
- D.2.5 Chairperson, TCC stated that the request of Bajaj Energy is time barred and cannot be entertained now. Hence, they were requested to clear their dues for FY 2019-20 as well as past dues at the earliest.
- D.2.6 To have timely payment, NRPC also decided to levy 1% simple interest per month on late payment. NRPC would issue demand letter by 01.10.21 and interest for current FY 2021-22 would be levied from 15.11.2021 onwards i.e. beyond 15.11.21, 1% interest upto 30.11.21 for November month, and so on. Payment made during month would also invite 1% interest.

D.3 Membership in NRPC for Rotational Members

D.3.1 The following rotational members were approved for the FY 2021-22:

- Haryana: Dakshin Haryana Bijli Vitaran Nigam Ltd.
- Rajasthan: Jaipur Vidyut Vitran Nigam Ltd.
- Uttar Pradesh: Madhyanchal Vidyut Vitaran Nigam Ltd.
- Private Discom: Tata Power Delhi Distribution Limited
- Genco (<1000 MW): Greenko Budhil Hydro Power Private Limited
- D.3.2 Further following permanent members have joined NRPC since the last meeting:
 - Meja Urja Nigam Limited (Generating Company > 1000 MW)
 - CTUIL (Designated as CTU by Government of India)

D.4 Verification of NRPC Fund Account

D.4.1 NRPC approved the statement of Internal and External Audit reports of NRPC Fund for the FY 2019-20 and FY 2020-21 as given in agenda.

D.5 Verification of Regional Board Fund

D.5.1 NRPC approved the statement of Internal and External Audit reports of Regional Board Fund (RBF) for the FY 2019-20 and FY 2020-21 as given in agenda.

D.6 HOSTING OF NEXT MEETINGS OF NRPC / TCC

D.6.1 Member Secretary, NRPC informed that the next meetings of TCC (48th) & NRPC(50th), which would be due in early next year are to be hosted by PTCUL. He hoped that COVID situation in the country will improve further by that time.

D.7 Improper operation & Accounting and delays in annual contribution from the constituent members

D.7.1 NRPC gave the post facto approval to the reply given by NRPC Secretariat for the audit para as given in the agenda note.







Background

- A letter was received from Chief Engineer/PP&R, PSPCL wherein it was informed that high Deviation charges (around 96 crores) have been imposed on Punjab due to erroneous data received from NRLDC end (Moga ICTs).
- It was informed that while carrying out changes in SCADA display at NRLDC end, some changes were made in the summation tag of drawl calculation by NRLDC, which resulted into incorrect display data at Punjab SLDC control room.



Background

- The error persisted from 23.07.2021 to 07.08.2021, wherein there was a difference of around 5-6% between the SCADA drawal available at Punjab SLDC end and actual SEM based figure.
- The following deviation charges were imposed on Punjab during the said period:

Sr. No.	Period	DSM Charges
1	23-07-2021 to 25-07-2021	Rs. 1640.89 Lakhs
2	26-07-2021 to 01-08-2021	Rs.1937.28 Lakhs
3	02-08-2021 to 08-08-2021	Rs. 6058.55 Lakhs
	Total	Rs.9636.72 Lakhs

CERC (Communication System for inter-State transmission of electricity) Regulations, 2017

- Role of RLDCs: (i) The Regional Load Despatch Centre shall be nodal agency for integration and supervision of Communication System of the ISTS, ISGS,SLDCs and IPPs at RLDC end for monitoring, supervision and control of Power System and adequate data availability in real time. (ii) The Regional Load Despatch Centre (RLDC) shall collect and furnish data related to Communication System of various users, CTU, RLDC, STU and SLDC to RPCs. (iii) RLDCs shall provide operational feedback to CTU.
- Role of SLDCs: (i) The State Load Despatch Centres shall be nodal agency for integration of Communication System in the intra-State network, distribution system and generating stations at SLDC end for monitoring, supervision and control of Power System and adequate data availability in real time. (ii) SLDC shall provide operational feedback to CTU and STU.



Deviation trends





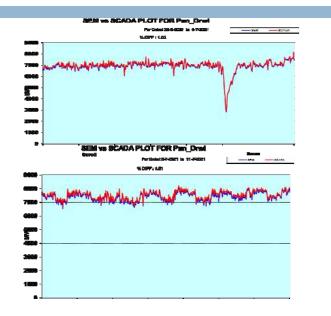
Deviation trends

Date	Schedule	Actual	Deviation	DSM Charges
01-07-2021	1719	1691	-28	-27.2
02-07-2021	1698	1663	-35	-16.2
03-07-2021	1604	1500	-104	38.5
04-07-2021	1739	1725	-14	-10.7
05-07-2021	1792	1760	-32	-61.5
06-07-2021	1781	1757	-24	21.2
07-07-2021	1756	1725	-31	-35.8
08-07-2021	1829	1791	-37	-42.2
09-07-2021	1806	1769	-37	-47.8
10-07-2021	1843	1805	-38	-53.2
11-07-2021	1857	1823	-33	-60.4
12-07-2021	1653	1563	-90	-5.2
13-07-2021	1609	1566	-43	-25.8
14-07-2021	1728	1685	-44	-27.8
15-07-2021	1772	1721	-51	-38.0
16-07-2021	1806	1753	-52	-59.4
17-07-2021	1811	1730	-81	-26.8
18-07-2021	1827	1779	-48	-17.8
19-07-2021	1766	1700	-66	-10.6
20-07-2021	1531	1357	-174	23.7
21-07-2021	1580	1442	-139	-20.8
22-07-2021	1747	1706	-41	-19.6

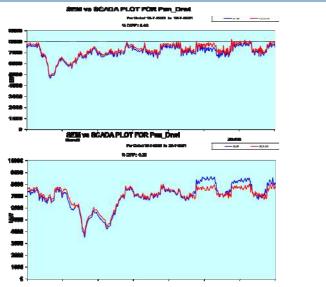
Date	Schedule	Actual	Deviation	DSM Charges
23-07-2021	1759	1781	22	319.2
24-07-2021	1797	1890	92	944.0
25-07-2021	1808	1859	51	377.7
26-07-2021	1779	1854	75	498.0
27-07-2021	1772	1840	68	425.6
28-07-2021	1499	1486	-13	90.1
29-07-2021	1442	1405	-37	173.5
30-07-2021	1612	1628	16	185.3
31-07-2021	1647	1692	45	266.4
01-08-2021	1666	1728	62	298.5
02-08-2021	1677	1781	104	861.4
03-08-2021	1663	1766	103	937.4
04-08-2021	1647	1745	98	827.8
05-08-2021	1579	1721	142	1277.4
06-08-2021	1583	1680	96	872.8
07-08-2021	1559	1679	121	1264.8
08-08-2021	1579	1580	1	17.0
09-08-2021	1396	1389	-7	-3.2
10-08-2021	1588	1597	9	36.4
11-08-2021	1650	1631	-19	-5.5
12-08-2021	1653	1626	-28	-47.0
13-08-2021	1640	1602	-38	-55.8
14-08-2021	1704	1653	-51	-33.1
15-08-2021	1636	1589	-48	-53.2



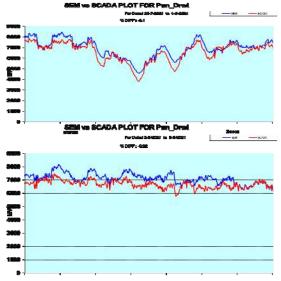
SCADA vs SEM plots













Deviation trends

Week	Date	Schedul e (LU)	Actual (LU)	Base DSM (Rs Lakh)	Add DSM (Rs Lakh)	Sus DSM (Rs Lakh)	Sus Count	Adj DSM (Rs lakh)	Net DSM (Rs Lakh)
14	28.06 to 04.07	11800	11556	-210	145	35	33	2	-26
15	05.07 to 11.07	12663	12431	-436	58	95	43	3	-279
16	12.07 to 18.07	12205	11796	-456	35	214	72	5	-200
17	19.07 to 25.07	11988	11733	526	521	563	84	2	1613
18	26.07 to 01.08	11417	11634	936	477	520	78	3	1937
19	02.08 to 08.08	11286	11952	2570	1646	1841	81	0	6058
20	09.08 to 15.08	11268	11086	-335	27	144	47	3	-161



CERC DSM Regulations

- A statement of charges for deviations, including additional charges for deviation levied under these regulations shall be prepared by the Secretariat of the respective RPCs on weekly basis based on the data provided by the concerned RLDC(s)
- Deviation: Deviation in a time block for a buyer means its total actual drawal minus its total scheduled drawal.
- Actual drawal: Actual drawal in a time block means electricity drawn by a buyer, as the case may be, measured by the interface meter.
- SCADA data has not been mentioned anywhere in the DSM regulations, nor is it used in the calculation of DSM charges.



CERC DSM Regulations

- Revised DSM statements are issued by RPC Secretariat mainly on account of following 3 reasons:
- Revised schedule data provided by NRLDC
- Revised meter data provided by NRLDC
- Error in calculation at NRPC end
- Regulation 12 (Power to Relax) and Regulation 13 (Power to issue directions) are both vested with CERC
- Commission may by general or special order, for reasons to be recorded in writing, and after giving an opportunity of hearing to the parties likely to be affected by grant of relaxation, may relax any of the provisions of these regulations on its own motion or on an application made before it by an interested party"

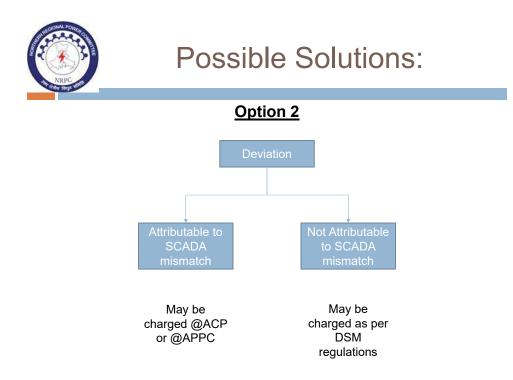


Possible Solutions:

Option 1

Additional Deviation and sustained deviation charges for the said period may be waived off by the Commission.

Sr. No.	Period	Base DSM	Add DSM	Sus DSM	Net DSM
1	23-07-21 to 25-07-21	734	488	417	1641
2	26-07-21 to 01-08-21	936	477	520	1937
3	02-08-21 to 08-08-21	2570	1646	1841	6058
	Total	4240	2611	2778	9636





Possible Solutions:

Option 2

- Suppose incorrect SCADA reading at Moga ICT = 'x'
- SCADA reading after correcting tag = 'y'
- Error due to incorrect SCADA reading (z)= y-x
- Power 'z' was overdrawn by Punjab on account of error in SCADA value, hence unintentional.
- At present, power 'z' is being treated as overdrawal and charges as per DSM regulations are being levied on it.
- Punjab may be levied charges @ ACP or @ APPC for Power 'z' since this overdrawal was unintentional.
- Deviation charges for Punjab may be recalculated after subtracting 'z' from the drawal of Punjab.



Special Meeting 08.09.21

- Member Secretary, NRPC expressed serious concern over erroneous data being received due to changes made by NRLDC in its SCADA system.
- Besides commercial implications, error in SCADA data at NRLDC end illusioned both Punjab SLDC as well as NRLDC who were unaware of quantum of power being drawn through Moga ICTs. Such a scenario could have led to serious grid incident.
- He advised NRLDC to put in place robust internal systems, with proper checks and balances, so that such incidents do not take place in the future.
- He also advised Punjab SLDC build its drawal calculation system at 220kV level as double check so that errors like this one can be easily identified and rectified immediately.



- Regarding waiver of DSM charges, MS, NRPC stated that NRPC is already issuing revised DSM accounts if there has been any error schedule data or meter data provided by NRLDC or any calculation error at NRPC end. CERC is not being approached in such cases.
- In the present case as well, there was man made (by NRLDC) error in their SCADA data due to which this huge deviation took place. Hence, NRPC Secretariat may issue revised accounts.
- However, the matter may be placed before TCC/RPC to take a final view in this matter.





Annexure-2

रजिस्ट्री सं. डी.एल.- 33004/99

REGD. No. D. L.-33004/99



HRA ASUA The Gazette of India

सी.जी.-डी.एल.-अ.-08122021-231686 CG-DL-E-08122021-231686

असाधारण EXTRAORDINARY

भाग II---खण्ड 3---उप-खण्ड (ii)

PART II-Section 3-Sub-section (ii)

प्राधिकार से प्रकाशित PUBLISHED BY AUTHORITY

सं. 4661] No. 4661] नई दिल्ली, सोमवार, दिसम्बर 6, 2021/अग्रहायणं 15, 1943 NEW DELHI, MONDAY, DECEMBER 6, 2021/AGRAHAYANA 15, 1943

विद्युत मंत्रालय

अधिसूचना

नई दिल्ली , 3 दिसम्बर, 2021

का.बा. 5032(अ).—विद्युत अधिनियम, 2003 (2003 की संख्या 36) की धारा 63 के तहत परिचालित दिशानिर्देशों के पैरा 3 के उप-पैरा 3.2 द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए, केंद्र सरकार पारेषण स्कीम के लिए निम्नलिखित बोली-प्रक्रिया समन्वयकों (बीपीसी) की नियुक्ति करती है, जैसा कि पारेषण स्कीम के नाम के आगे दर्शाया गयाहै:

क्रम सं		पारेषण स्कीम के नाम तथा	कार्यक्षेत्र	बोली-प्रक्रिया समन्वयक
	नीमच एसईजे कार्यक्षेत्र:	तेड से विद्युत की निकासी के लिए पारेषण प्र ण	ाली :	
	1	नीमच में 1x125 एमवीएआर बस रिएक्टर के साथ 2x500 एमवीए, 400/220 केवी पूलिंग स्टेशन (एआईएस)की स्थापना	400/220 केवी, 500 एमवीए आईसीटी -2 400 केवी आईसीटी बे - 2 220 केवी आईसीटी बे - 2 400 केवी लाइन बे -4	आरईसीपीडीसीएल

7076 GI/2021



[PART II—SEC. 3(ii)]

2 नीमच पीएस - चित्तौड़गढ़ (पीजी) एस/एस 400 केवी डी/सी लाइन (न्यूनतम क्षमता 2100 एमबीए/सीकेटी नाममात्र वोल्टेज पर कंडक्टर) लंबाई ~ 130 किमी 3 नीमच पीएस - चित्तौड़गढ़ (पीजी) एस/एस 400 केवी डी/सी लाइन के लिए चित्तौड़गढ़ (पीजी) 400 केवी एस/एस में 400 केवी लाइन बे-2 (नाममात्र वोल्टेज पर 2100 एमवीए/सीकेटी की न्यूनतम क्षमता वाला कंडक्टर) 400 केवी लाइन बे -चित्तौड़गढ़ 4 नीमच पीएस- मंदसौर सब-स्टेशन400 केवी डी/सी लाइन (नाममात्र वोल्टेज पर 2100 एमवीए/सीकेटी की न्यूनतम क्षमता थाला कंडक्टर) लंबाई ~ 120 किमी 5 नीमच पीएस-मंदसौर एस/एसटीएन 400 केवी डी/सी लाइन के लिए मंदसौर मंदसौर में 400 केवी लाइन बे - 2		भावी प्रावधान : बे सहित 400/220 केवी आईसीटी: 2 400 केवी लाइन बे: 6 220 केवी लाइन बे: 5 बे के साथ 420 केवी बस रिएक्टर:1 के लिए स्थान	(चित्तौडगढ़ और मंदसौर लाइनों के लिए प्रत्येक 2) 220 केवी लाइन बे - आरई डेवलपर्स को दी गई कनेक्टिविटी के अनुसार (वर्तमान में 500 मेगावाट के अनुरूप 2 बे पर विचार किया जाता है) 125 एमवीएआर, 420 केवी रिएक्टर-1 420 केवी रिएक्टर बे - 1	
एस/एस 400 केवी डी/सी लाइन के बे -चित्तौड़गढ़ लिए चित्तौड़गढ़ (पीजी) 400 केवी (पीजी) में2 एस/एस में 400 केवी लाइन बे-2 (नाममात्र वोल्टेज पर 2100 एमवीए/सीकेटी की न्यूनतम क्षमता वाला कंडक्टर) 4 नीमच पीएस- मंदसौर सब-स्टेशन400 केवी डी/सी लाइन (नाममात्र वोल्टेज पर 2100 एमवीए/सीकेटी की न्यूनतम क्षमता वाला कंडक्टर) लंबाई ~ 120 किमी 5 नीमच पीएस-मंदसौर एस/एसटीएन 400 केवी डी/सी लाइन के लिए मंदसौर मंदसौर में 400 केवी लाइन बे - 2	2	एस/एस 400 केवी डी/सी लाइन (न्यूनतम क्षमता 2100 एमबीए/सीकेटी	· · · · · · · · · · · · · · · · · · ·	
 केवी डी/सी लाइन (नाममात्र वोल्टेज पर 2100 एमवीए/सीकेटी की न्यूनतम क्षमता वाला कंडक्टर) 5 नीमच पीएस-मंदसौर एस/एसटीएन 400 केवी डी/सी लाइन के लिए मंदसौर 	3	एस/एस 400 केवी डी/सी लाइन के लिए चित्तौड़गढ़ (पीजी) 400 केवी एस/एस में 400 केवी लाइन बे-2 (नाममात्र वोल्टेज पर 2100 एमवीए/सीकेटी की न्यूनतम क्षमता	बे -चित्तौड़गढ़	
400 केवी डी/सी लाइन के लिए मंदसौर	4	केवी डी/सी लाइन (नाममात्र वोल्टेज पर 2100 एमवीए/सीकेटी की न्यूनतम	लंबाई ~ 120 किमी	
400 केवी एस/एस में 400 केवी लाइन बे- 2 (नाममात्र वोल्टेज पर 2100 एमवीए/सीकेटी की न्यूनतम क्षमता वाला कंडक्टर)	5	400 केवी डी/सी लाइन के लिए मंदसौर 400 केवी एस/एस में 400 केवी लाइन बे- 2 (नाममात्र वोल्टेज पर 2100 एमवीए/सीकेटी की न्यूनतम क्षमता	मंदसौर में 400 केवी लाइन बे - 2	2

	करन	Ĩ I		1		
(iii) एसईसीआई /आरईआईए द्वारा आरई परियोजना की पहली बोली के बाद प्रदान की जाने वाली योजना।						
कार्यान्व	वयन वै	ो समयावधि: एसपीवी अधिग्रहण की तारी	ख से 18महीने			
खावड़ ा	आरई	पार्क में खावड़ा पूलिंग स्टेशन -2 (केपीएस	2) की स्थापना:			
कार्यक्षेत्र	त्र					
क्र	इ.सं.	पारेषण स्कीम के कार्यक्षेत्र	क्षमता/कि मी			
		2x330 एमवीएआर 765 केवी बस	1500 एमबीए, 765/400			
	1	रिएक्टर और 2x125 एमवीएआर	केवी आईसीटी- 4 (13x500			
		400 केवी बस रिएक्टर के साथ	एमवीए, जिसमें एक अतिरिक्त			
		765/400 केवी, 4x1500 एमवीए,	इकाई शामिल है)			
		केपीएस2 (जीआईएस) की स्थापना।				
		5x1500 एमवीए 765/400 केवी	765 केवी आईसीटी बे - 4			
		आईसीटी के भावी विस्तार के लिए सर्जन	400 केवी आईसीटी बे - 4			
		पर्याप्त स्थान -	400 कथा आइसाटा थे ने म	आरईसीपीडीर्स		
		765 केवी और 400 केवी पर बस सेक्शनलाइज़र	765 केबी लाइन बे - 2			
		तपरागणा २११	400 केवी लाइन बे – 3			
			(वर्तमान में एनटीपीसी,			
		प्रत्येक बस सेक्शन पर, 2x1500	जीएसईसीएल और			
		एमवीए 765/400केवी आईसीटी,	जीआईपीसीएल के लिए 3 में से एक-एक बे पर विचार किया			
		1x330 एमवीएआर, 765 केवीऔर 1x125 एमवीएआर, 420 केवीबस	जाता है)। बे की वास्तविक			
		1X125 एमवाएआर, 420 कवाबस रिएक्टर, भविष्य के विस्तार के लिए	संख्या आरई डेवलपर्स को दी			
		ारएक्टर, मावर्थ्य के विस्तार के लिए पर्याप्त स्थाना	गई कनेक्टिविटी के अनुसार होगी।			
			Ci.itt			
		765 केवी स्तर पर अस सेक्शनलाइज़र	1x330 एमवीएआर, 765			
		सामान्य रूप से बंद रहेगा और 400	केबी बस रिएक्टर-2			
		केवी स्तर पर बस सेक्शनलाइज़र	(7x110 एमवीएआर, एक			
		सामान्य रूप से खुला रहेगा	(/X110 एमयाएआर, एक अतिरिक्त इकाई सहित)			
		भावी प्रावधान:	765केवी रिएक्टर बे - 2			
		बे के साथ 765/400 केवी आईसीटी:5				
		765केवीलाइन बे: 8	1x125 एमवीएआर 400 केवी			
		400केवीलाइन बे: 10	1X125 एमवाएआर 400 कवा बस रिएक्टर-2			

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	भावी में क्षेत्र की किसी भी निकासी की जरूरत को पूरा करने के लिए: 400/220 केवी आईसीटी: 2	400 केवी रिएक्टर बे - 2	
		765केवी बस सेक्शनलाइज़र वे - 2	
	220 केवी लाइन बे: 4 के लिए स्थान	- z 400 केवी बस सेक्शनलाइज़र बे - 2	-
2.	केपीएस1 के एक सीकेटी का एलआईएलओ- भुज पीएस 765 केवी डी/सी लाइन केपीएस2	लाइन की लंबाई - 1 किमी	
कार्यान्वयन र्व	ने वाली योजना। के समयावधि: एसपीवी अधिग्रहण की तारीख 		
क्रम सं	पारेषण स्कीम के कार्यक्षेत्र	क्षमता/कि मी	
1	1x330 एमवीएआर 765 केवी बस	1500 एमवीए, 765/400	
	रिएक्टर और 1x125 एमवीएआर	केवी आईसीटी- 3	
	400 केवी बस रिएक्टर के साथ 765/400 केवी, 3x1500 एमवीए, केपीएस3 (जीआईएस) की स्थापना।	(एक अतिरिक्त इकाई सहित	
	कथाएतउ (जालाइएत) का त्यावनात	10x500 एमवीए)	
	5x1500 एमबीए 765/400 केबी	, 765 केवी आईसीटी बे - 3	
	आईसीटी के भावी विस्तार के लिए पर्याप्त स्थान	400 केवी आईसीटी बे - 3	आरईसीपीडीसीएर
		765 केवी लाइन बे - 2	
	भावी प्रावधान: बे सहित 765/400 केवी आईसीटी:	765 केवी लाइन बे - 2 400 केवी लाइन बे - 3	
	भावी प्रावधान:	400 केवी लाइन बे - 3	
	भावी प्रावधान: बे सहित 765/400 केवी आईसीटी:	400 केवी लाइन बे - 3 वर्तमान में विचार किया गया है (आरई डेवलपर को दी गई कनेक्टिविटी के अनुसार बे की	
	भावी प्रावधान: बे सहित 765/400 केवी आईसीटी: 5765केवीलाइन बे: 4	400 केवी लाइन बे - 3 वर्तमान में विचार किया गया है (आरई डेवलपर को दी गई	
	भावी प्रावधान: बे सहित 765/400 केवी आईसीटी: 5765केवीलाइन बे: 4 400केवीलाइन बे: 10 765 केवी बस सेक्शनलाइज़र ब्रेकर:2400 केवी बस सेक्शनलाइज़र	400 केवी लाइन बे - 3 वर्तमान में विचार किया गया है (आरई डेवलपर को दी गई कनेक्टिविटी के अनुसार बे की वास्तविक संख्या)	
	भावी प्रावधान: बे सहित 765/400 केवी आईसीटी: 5765केवीलाइन बे: 4 400केवीलाइन बे: 10 765 केवी बस सेक्शनलाइज़र	400 केवी लाइन बे - 3 वर्तमान में विचार किया गया है (आरई डेवलपर को दी गई कनेक्टिविटी के अनुसार बे की	

[भाग][—खण्ड 3(ii)]

भविष्य में क्षेत्र की किसी भी निकासी की जरूरत को पूरा करने के लिए:	एमवीएआर, एक अतिरिक्त जन्मर् द प्रक िभ
400/220 केवी आईसीटी: 2 220 केवी लाइन बे: 4 के लिए स्थान	इकाई सहित) 765 केवीरिएक्टर वे - 1
	1x125 एमवीएआर 400 केवी बस रिएक्टर-1 400 केवी रिएक्टर बे - 1
केपीएस3- केपीएस2 765 केवी डी/सी लाइन	20 किमी
केपीएस2 पर 765 केवी लाइन बे - 2 केपीएस3-केपीएस2 के लिए 765 केवी एस/एस के लिए765 केवी डी/सी लाइन	केपीएस2 छोर पर 765 केवी लाइन बे: 2
	के लिए स्थान केपीएस3- केपीएस2 765 केवी डी/सी लाइन केपीएस2 पर 765 केवी लाइन बे - 2 केपीएस3-केपीएस2 के लिए 765 केवी एस/एस के लिए765 केवी डी/सी

टिप्पणी :

- (i) पूलिंग स्टेशन 765/400 केवी, 3x1500 एमवीए आईसीटी और 1x330 एमवीएआर 765 केवी और 1x125 एमवीएआर 400 केवी बस रिएक्टर के साथ बस सेक्शन- । के साथ बनाया जाएगा।
- (ii) बस सेक्शनII (भविष्य) 765/400 केवी, 4x1500 एमवीए आईसीटी और 1x330 एमवीएआर 765 केवी और 1x125 एमवीएआर 400 केवी बस रिएक्टरों के साथ बनाया जाएगा।
- (iii) 765केवी स्तर पर बस सेक्शनलाइज़र सामान्य रूप से बंद रहेगा और 400 केवीस्तर पर बस सेक्शनलाइज़र सामान्य रूप से खुला रहेगा
- (iv) केपीएस2 765 केवी उपलब्ध कराने के लिएएस/एस के विकासकर्ता 2 के लिए स्थान। केपीएस3-केपीएस2 765 केवी डी/सी लाइन की समाप्ति के लिए केपीएस2 765 केवी एस/एस पर 765 केवी लाइन बे।
- (v) एसईसीआई//आरईआईए प्रदान करने के बाद केपीएस3 में आरई परियोजना की पहली बोली के बाद प्रदान की जाने वाली योजना

कार्यान्वयन की समयावधि: एसपीवी अधिग्रहण की तारीख से 24 महीने

312.

4. बाइडा पीएस1 (केपीएस1) में अभीगवाट आरई पावर से अविरिक्त इंजेक्शन के लिए पारेषण योजना: कार्यक्षेत्र :	6			THE GAZETTE OF	INDIA : EXTRAORDINARY	[PART II—SEC. 3(ii)]
1. 1×330 एमबीएआर 765 765/400 केवी, 1500 एमबीए- 4 केवी बस रिएकटर और (13×500 एमबीए, एक अतिरिक्त इकाई) आरईसीपीडीसीएल केवी बस रिएकटर काथ (विकासी की आवश्यकता के आधार पर आरईसीपीडीसीएल केवी बस सेक्शन के (विकासी की आवश्यकता के आधार पर आरईसीपीडीसीएल सहत (विकासी की आवश्यकता के आधार पर आरईसीपीडीसीएल अता खावडा पीएस1 का 765 केवी आईसीटी के - 4 765 केवी आईसीटी के - 4 765/400 केवी परिवर्तन 765 केवी आधार गर 100 केती लिए न के ना बिस्तारा (विवार किया गया (आरई डेवलपर्स को जी गाई कतेक्या नया (आरई डेवलपर्स को दी गई कतेक्यि सख्या) 1x330 एमबीएआर, 765 केवी बस 1x330 एमबीएआर, 765 केवी बस रिएकटर - 1 (4x110 एमबीएआर, एक अतिरिक्त इकाई महित) 765 केवीरिएकटर वे - 1 765 केवी रिएकटर के -1 125 एमबीएआर, 420 केवी रिएकटर - 1 400 केवी दिएकटर - 1 400 केवी दिखर दे -1 765 केवी बस सेक्शनलाइज़र- 2 400 केवी बस सेक्शनलाइज़र- 2 2 केपीएस1-खावडा पीएस लंबाई ~ 20 किमी	4.	योजना	Γ:	प्त1 (केपीएस1) में 3गीगावाट आ	रई पावर से अतिरिक्त इंजेक्शन के लिए पारे	षण
केती बस रिएकटर और 1x125 एमयीएआर 420 केवी बस रिएकटर के माथ ज्ञमश दूसरे 765 केवी और 400 केवी बस संकशन के साथ खावड़ा पीएस1 का 765/400 केवी परिवर्तन अपता '(अधिकतम 4x1500 एमवीए तक) का बिस्तार। (तिकासी की आवश्यकता के आधार पर आईसीटी की वास्तविक संख्या तय की जा सकती है) आरईसीटी वे - 4 765/400 केवी परिवर्तन अपता '(अधिकतम 4x1500 एमवीए तक) का बिस्तार। 765 केवी आईसीटी वे - 4 765 केवी आईसीटी वे - 4 1x330 एमवीएआर, 765 केवी आ यास्तविक संख्या) 400 केवी लाइन वे - 2 400 केवी लाइन वे - 2 1x330 एमवीएआर, 765 केवी बस रिएकटर - 1 (4x110 एमवीएआर, 765 केवी बस रिएकटर - 1 (4x110 एमवीएआर, एक अतिरिक्त इकाई महित) की वा रार330 एमवीएआर, एक अतिरिक्त इकाई महित) 765 केवी वस सेख्यानलाइज़र- 2 400 केवी तिएक्टर दे - 1 125 एमवीएआर, 420 केवी रिएक्टर - 1 400 केवी रिएक्टर दे - 1 765 केवी बस सेक्थानलाइज़र- 2 400 केवी बस सेक्थानलाइज़र- 2 2 केतीएएस (केपीएस2) 765 लंबाई ~ 20 किमी			क्र.स.	पारेषण स् <mark>कीम</mark> का कार्यक्षेत्र	क्षमता/किमी	
जीआईएस (केपीएस2) 765			1.	केवी बस रिएक्टर और 1x125 एमवीएआर 420 केवी बस रिएक्टर के साथ क्रमश दूसरे 765 केवी और 400 केवी बस सेक्शन के साथ खावड़ा पीएस1 का 765/400 केवी परिवर्तन क्षमता *(अधिकतम्र 4x1500 एमवीए तक) का	(13x500 एमबीए, एक अतिरिक्त इकाई सहित) (निकासी की आवश्यकता के आधार पर आईसीटी की वास्तविक संख्या तय की जा सकती है) 765 केवी जाइन बे - 4 765 केवी लाइन बे - 2 400 केवी जाइन बे - वर्तमान में 3 पर विचार किया गया (आरई डेवलपर्स को दी गई कनेक्टिविटी के अनुसार बे की वास्तविक संख्या) 1x330 एमबीएआर, 765 केवी बस रिएक्टर- 1 (4x110 एमबीएआर, एक अतिरिक्त इकाई सहित) 765 केवीरिएक्टर बे - 1 125 एमवीएआर, 420 केवी रिएक्टर- 1 400 केवी रिएक्टर बे-1	आरईसीपीडीसीएल -
			2.	जीआईएस (केपीएस2) 765	लंबाई ~ 20 किमी	

भाग ।	দ্বদ্র 3(ii)] भारत का राजपत्र : अस	ाधारण 	7
		में केपीएस1-भुज के एक सीकेटी के एलआईएलओ को दरकिनार कर और एलआईएलओ सेक्शन के उपयोग के साथ स्थापित किया जाना है)		
*	े निकासी आ	। वश्यकता के आधार पर आईसीटी की वास्तविक सं	ख्या तय की जा सकती है	
	प्पणी: केर्प ाएगा।	ोएस1 में 3 गीगावॉट से अधिक निकासी की आव	श्यकता के लिए कार्यान्वयन किय	T
क	ार्यान्वयन ब	ही समयावधि: एसपीवी अधिग्रहण की तारीख से 2	24 महीने	
पा	रण III-भा रेषण प्रणा गर्यक्षेत्रः	ग क1 के तहत राजस्थान (20गीगावाट) में आरई ली		Ĺ
	क्रम सं	पारेषण योजना का कार्यक्षेत्र	क्षमता/कि मी	
	1.	2x125 एमवीएआर बस रिएक्ट्र के साथ	400/220 केवी, 500	
		फतेहगढ़-4 में 2x500 एमवीए, 400/220	एमवीए आईसीटी - 2	
		केवी पूलिंग स्टेशन की स्थापना	400 केवी आईसीटी बे - 2	
			220 केवी आईसीटी बे - 2	पीएफसीसीएल
		भावी प्रावधान: बे के साथ 400/220 केवी	400 केवी लाइन बे - 2	
		आईसीटी: 5 स्विच करने योग्य लाइन रिएक्टर के साथ 400 केवी लाइन बे: 6 बे के साथ 400 केवी बस रिएक्टर: 2 400 केवी सेक्शनलाइज़ेशन बे: 1 220 केवी लाइन बे: 10 220 केवी सेक्शनलाइज़ेशन बे: 2 के लिए स्थान	400 केवी लाइन बे - 2 220 केवी लाइन बे - आरई डेवलपर्स को दी गई कनेक्टिविटी के अनुसार (वर्तमान में 4 बे पर विचार किया है)। 125 एमवीएआर, 420 केवी बस रिएक्टर - 2 420 केवी रिएक्टर बे - 2	
	2.	फतेहगढ़-4- फतेहगढ़-3 400 केवी डी/सी	लंबाई - 50 किमी	
	3.	ट्विन एचएलटीएस* लाइन (50 किमी) फतेहगढ़-3 . में 400 केवी लाइन बे में से 2	400 केवी लाइन बे - 2	
		ात्र वोल्टेज पर प्रत्येक सर्किट पर 2100 एमवीए व	<i>जी न्यूनतम क्षमता के साथ</i>	
	टिप्पर्ण	ì:		
	(i) शॉर्ट	सर्किंट स्तर को सीमित करने के लिए उपयुत्त	क सेक्शनलाइजेशन का प्रावधान	

8		THE GAZETTE OF INDI	A : EXTRAORDINARY	[PART II-SEC. 3(ii)]
	দ	तेहगढ़ -4 में 400केवीऔर 220केवी स्तर	पर रखा जाएगा।	
	र्लि के (iii) ऊ लं (iv) फ आ	तेहगढ़-4-फतेहगढ़-3 400 केवी डी/सी 1 ाए फतेहगढ़-3 एस/एस में 400 केवी लाइ विकासकर्ता स्थान उपलब्ध कराना। पर उल्लिखित लाइन की लंबाई अनुमानि बाई प्राप्त की जाएगी तेहगढ़ -4 पूलिंग स्टेशन पर आरई पी ारईआईए प्रदान करने के बाद प्रदान की ज	इन बे को फतेहगढ़ -3 एस/एस (न त है क्योंकि विस्तृत सर्वेक्षण के बार रेयोजना की पहली बोली एसईर ाने वाली योजना।	या खंड) द सटीक
6	फेज-III प पारेषण ऽ			के लिए
	कार्यक्षेत्र क्रम सं	: पारेषण योजना का कार्यक्षेत्र	क्षमता/कि मी	
	1.	फतेहगढ़ 3- भादला -3 400 केवी डी/ सी लाइन (क्वाड) के साथ-साथ फतेहगढ़-3 भादला -3 400 केवी डी/ सी लाइन के दोनों छोर पर प्रत्येक सर्किट के लिए 50 एमवीएआर स्विचेबल लाइन रिएक्टर 3-	लंबाई - 200 किमी 400 केवी 50 एमवीएआर सि लाइन रिएक्टर - 4 400 केवी 50 एमवीएआर सि लाइन रिएक्टर के लिए 1 उपकरण - 4 400 केवी लाइन बे भादला-3 और फतेहगढ़-3 एस/एस-4 (2+2	स्वेचबल स्विचिंग एस /एस
	अ (ii) फर ला (iii) भा	तेहगढ़ 3- भादला-3 400केवीडी/सी ल धिक निकासी की आवश्यकता के लिए लिय तेहगढ़ -3 एस/एस (नया खंड) के विकास इन रिएक्टरों प्रदान करने के लिए 400 वे दला -3 सबस्टेशन के विकासकर्ता भादला	गा जा सकता है। कर्ताको फतेहगढ़ -3 में स्विच क केवी लाइन बे के लिए 2स्थान प्रदान -3 में स्विच करने योग्य लाइन रिा	रने योग्य पीएफसीसीएल न करना।
7	कार्यान्व	ए स्थान के साथ 400 केवी लाइन बे में से ग्यन की समयावधि:एसपीवी अधिग्रहण र्व गर्ट ख1 के तहत राजस्थान (20गीगावाट) णाली	गे तारीख से 18महीने	े के लिए
	कार्यक्षेत्र क्र.स.		क्षमता/कि मी	

[भाग]]—खण्ड 3(ii)]

भारत का राजपत्र : असाधारण

1 11-	_~g\v 5	(1)) मारत का राजपत्र , ज		
	1.	2x330 एमवीएआर (765 केवी) बस रिएक्टर		
		और 2x125 एमवीएआर (420 केवी) बस		
		रिएक्टर के साथ भादला-3 में 2x1500	(1.000 (1.1.5) ()	
		एमवीए, 765/400 केवी और 3x500		
		एमवीए, 400/220 केवी पूलिंग स्टेशन की	765केवीआईसीटी बे - 2	
		स्थापना	400/220 केवी, 500	
			एमवीए आईसीटी - 3	
		<u>भावी प्रावधान</u> :	765kV लाइन बे - 2	
		बे के साथ 765/400केवीआईसीटी: 2	400 केवी आईसीटी वे - 5	0.00-
		स्विच करने योग्य लाइन रिएक्टर के साथ 765केवी लाइन बे: 4	220 केवी आईसीटी बे - 3	पीएफ सीसीएल
		765केवीलाइन बे: 4	400 केवी लाइन बे - 2	
		बे सहित 765केवी बस रिएक्टर: 2	220 केवी लाइन बे: आरई	
		बे के साथ 400/220 केवी आईसीटी: 10	डेवलपर्स को दी गई कनेक्टिविटी के अनुसार	
		400 केवी लाइन बे: 8	(वर्तमान में 5 बे पर विचार	
	× 1	स्विच करने योग्य लाइन रिएक्टर के साथ 400	किया जा रहा है)	
		केवी लाइन बे: 4	330 एमवीएआर बस	
		बे के साथ 400 केवी बस रिएक्टर: 2	रिएक्टर-2	
		400 केवी सेक्शनलाइज़ेशन बे: 2	(7x110 एमवीएआर, एक अतिरिक्त इकाई सहित)	
		220 केवी लाइन बे: 12	765केवीरिएक्टर बे- 2	
		220 केवी सेक्शनलाइज़ेशन बे: 2	125 एमवीएआर, 420 केवी	
		के लिए स्थान	बस रिएक्टर - 2	
			420 केवी रिएक्टर बे - 2	
	2.	फतेहगढ़-2 - भादला-3 400 केवी डी/सी	लंबाई - 200 किमी	
		लाइन दोनों छोर पर प्रत्येक सर्किट के लिए	400 केवी 50 एमवीएआर	
		50 एमवीएआर स्विचेबल लाइन रिएक्टर के	स्विचेबल लाइन रिएक्टर -4	
	- 1	साथ फतेहगढ़-2-भादला-3 400 केवी डी/सी	स्विचिंग उपकरण के लिए 400	
		लाइन(क्वाड मूस)	केवी 50 एमवीएआर स्विचेबल	
			लाइन रिएक्टर -4	
	3.	फतेहगढ़-2 के लिए फतेहगढ़-2 में 400 केवी	400 केवी लाइन बे - 2	
		लाइन बे में से 2 - भादला-3 400 केवी		
		डी/सी लाइन		
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e 10.

10	2		THE GAZETTE OF INDIA :	EXTRAORDINARY [Part 11—Sec. 3(ii)]
			भादला-3-सीकर-II 765 केवी डी/सी लाइन साथ-साथ भादला-3-सीकर-II 765 के डी/सी लाइन के प्रत्येक छोर पर प्रत्येक सवि के लिए 330 एमवीएआर स्विचेबल लाग रिएक्टर	वी 765 केवी 330 एमवीएआर कें ^{क्रिंट} लिए स्विचिंग उपकरण	
		5	सीकर-II में 765 केवीलाइन बे-2	765 केवी लाइन बे - 2	
	(i) (ii) (iii) (iv)	एसईर शॉर्ट : उपयुत्त) फतेहर लाइन) ऊपर लंबाई) सीकर षिए प्रदान	ढ़ पीएस/भादला-3 पीएस में आर सीआई//आरईआईए प्रदान करने के बाद प्रदान सर्किट स्तर को सीमित करने के लिए भादल क सेक्शनलाइज़ेशन का प्रावधान रखा जाएग गढ़-2 एस/एस में स्विच करने योग्य लाइन रि बे-2 के लिए पावर ग्रिड द्वारा स्थान उपलब उल्लिखित लाइन की लंबाई अनुमानित है प्राप्त की जाएगी। -II एस/एस के विकासकर्ता को सीकर-II एर स्थान प्रदान करने के साथ-साथ स्विच कर करना। वयन की समय सीमा: एसपीवी अधिग्रहण की	ा की जाने वाली योजना n -3 में 400केवीऔर 220केवी स्तर पर ता एक्टरों के लिए स्थान के साथ 400 केव ध कराना । , क्योंकि विस्तृत सर्वेक्षण के बाद सटीव त/एस में 765 केवी लाइन बे में से 2 वे ने योग्य लाइन रिएक्टरों के लिए स्थान	र 1 5
8		वरण- ॥ गरेषण प्र	l भाग ग1के तहत राजस्थान (20गीगावाट) प्रणाली	में आरईजेडसे <mark>विद्युत की नि</mark> कासी के लिए	Ţ.
		कार्यक्षेत्रः क्रम सं	पारेषण योजना का कार्यक्षेत्र	क्षमता/कि मी	
		1.	2x1500 एमवीए, 765/400 केवी और 2x500 एमवीए की स्थापना,2x240 एमवीएआर (765 केवी) बस रिएक्टर और 2x125 एमवीएआर (420 केवी) बस रिएक्टर के साथ रामगढ़ में 400/220 केवी पूलिंग स्टेशन <u>भावी प्रावधान</u> : 765/400केवी आईसीटी बे सहित: 3 स्विच करने योग्य लाइन रिएक्टर के साथ	765/400केवी 1500 एमवीए आईसीटी: 2 (एक अतिरिक्त इकाई सहित 7x500 एमवीए) 765 केवी आईसीटी बे -2 400/220 केवी, 500 एमवीए आईसीटी - 2 400 केवी आईसीटी बे - 4 220 केवी आईसीटी बे - 2 400 केवी लाइन बे - आरई डेवलपर्स	आरईसीपीडीसीएल

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[भाग [[—खण्ड 3(ii)]

765केबीलाइन बे: 2

400 केवी लाइन बे: 4

400 केवी लाइन बे: 4

220 केवी लाइन बे: 8

बे सहित 765केवीबस रिएक्टर: 2

बे सहित 400केवीबस रिएक्टर: 2

400केवीसेक्शनलाइजेशन बे: 3

220केवी सेक्शनलाइज़ेशन बे: 2

बे सहित 400/220 केवी आईसीटी: 6 स्विच करने योग्य लाइन रिएक्टर के साथ

भारत का राजपत्र : असाध

को दी गई कनेक्टिविटी के अनुसार	
का दा गई कनाकटावटा के अनुनार (वर्तमान में 2 बे विचार-विमर्श किया	
(वतमान म 2 ब वियोर-विमेश किया गया)	
220 केवी लाइन बे - आरई डेवलपर्म	
को दी गई कनेक्टिविटी के अनुसार	

को दी गई व कनाक्टावटा (वर्तमान में 4 बे पर विचार किया गया)

765 केवी लाइन बे - 2

240 एमवीएआर बस रिएक्टर-2

(एक अतिरिक्त इकाई पर विचार

करते हुए 7x80 एमवीएआर)

765kV रिएक्टर बे- 2

125 एमवीएआर, 420 केवी बस रिएक्टर - 2

420 केवी रिएक्टर बे - 2

2.	रामगढ़ - भादला -3 765 केवी डी / सी	लंबाई - 180 किमी
	लाइन (180 किमी) के साथ 240	765 केवी, 240 एमवीएआर
	एमवीएआर स्विचेबल लाइन रिएक्टर के साथ रामगढ़ के रामगढ़ छोर पर प्रत्येक	स्विचेबल लाइन रिएक्टर- 2
	सर्किट पर - भादला -3 765 केवी डी / सी	
	लाइन	240 एमवीएआर स्विचेबल लाइन
		रिएक्टर -2
3.	भादला-3 पर 765केवीदो लाइन बे	765 केवी लाइन बे - 2

टिप्पणी :

- चरण |||-भाग ग 1 पैकेज का कार्यान्वयन सूची चरण |||-भाग ख 1 (भादला-3 (i) पीएस की स्थापना, 765केवी भादला-3 पीएस-सीकर-2 डी/सी लाइन, 400केवी भादला-3 पीएस- फतेहगढ़-2 डी/सी लाइन)
- भादला-3 एस/एस के विकासकर्ता को 2 के लिए स्थान उपलब्ध कराने के लिए (ii) रामगढ़-भादला-3 765केवीडी/सी लाइन को समाप्त करने के लिए भादला-3 एस/एस में 765 केवी लाइन बे।
- ऊपर उल्लिखित लाइन की लंबाई अनुमानित है क्योंकि विस्तृत सर्वेक्षण के बाद (iii) सटीक लंबाई प्राप्त की जाएगी।

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	(iv)	शॉर्ट सर्किट स्तर को मीमित करने के लिए र पर उपयुक्त सेक्शनलाइज़ेशन का प्रावधान र		र
	(v)	एसईसीआई//आरईआईए प्रदान करने के बा पीएस/भादला-3 पीएस में आरई परियोजन		
का	र्यान्वयन	की समय सीमा: एसपीवी अधिग्रहण की तार्र	ोख से 18 महीने।	A.
	एग-॥। भा रेषण प्रणा	ग डी के तहत राजस्थान (20 गीगावाट)में ली	आरईजेडसे विद्युत की निकासी के f	लेए
 				
का	र्यक्षेत्र:			
	क्रम सं	पारेषण योजना का कार्यक्षेत्र	क्षमता/कि मी	
	1.	सीकर-II- खेतड़ी 765 केवी डी/सी लाइन	लंबाई – 90 किमी	
	2	सीकर-॥- नरेला 765 केवी डी/सी	लंबाई - 260 किमी	
		लाइन के साथ-साथ सीकर-॥ - नरेला	स्विचिंग उपकरणके लिए 765	
		765 केवी डी/सी लाइन के प्रत्येक छोर	केवी 240 एमवीएआर स्विचेबल	
		पर प्रत्येक सर्किट के लिए 240 एमवीएआर स्विचेवल लाइन रिएक्टर	लाइन रिएक्टर -4	
			240 एमवीएआर, 765 केवी	आरईसीपीडीसीए
			स्विचेबल लाइन रिएक्टर- 4	
	3	झटिकारा - द्वारका 400केबीडी/सी लाइन (क्वाड) (20किमी)	लंबाई – 20 किमी	
	4	सीकर-II - खेतड़ी के लिए सीकर-II में	765 केवी लाइन बे - 4	
		765 केवी लाइन बे 765 केवी डी/सी लाइन और सीकर-II -नरेला 765 केवी डी/सी लाइन		
	5	2 खेतड़ी और नरेला दोनों में 765केवीलाइन बे	765 केवी लाइन बे - 4	
	6	2 झटीकारा और द्वारका दोनों में 400 केवी लाइन बे	400केवी लाइन बे - 4	
	टिप्पण	गि :		
	• /	स्विचबिल लाइन रिएक्टरों के लिए स्थान र		65
	<u> </u>	<mark>ती बे</mark> लाइन के लिए सीकर-//विकासकर्ता द्वा	रा स्थान उपलब्ध कराना।	

	(ii	ii) पावरग्रि कराना।	ोड द्वारा खेतड़ी सबस्टेशन पर दो <i>765</i> केवी ला	इन बे के लिए स्थान उपलब्ध		
	(iv	∨) क्रमशः	झटिकारा और द्वारका सब-स्टेशन दोनों में प	गवरग्रिड और डीटीएल दो		
	(v	400केवीलाइन वे के लिए स्थान उपलब्ध कराना। (v) ऊपर उल्लिखित लाइन की लंबाई अनुमानित है क्योंकि विस्तृत सर्वेक्षण के बाद सटीक लंबाई प्राप्त की जाएगी।				
	(v		// भाग सी / के तहत राजस्थान में आरईजेड (. ं के लिए पारेषण प्रणाली के मिलान समय सी			
	कार्यान		म य सीमा: एसपीवी अधिग्रहण की तारीख से 18	3 महीने		
10	फेज	-।।। पार्ट एप	ह के तहत राजस्थान (20 गीगावाट) में आरईजेड	से विद्युत की निकासी के लिए		
	े पारेग	षण प्रणाली				
	कार्य	क्षेत्र :				
		क्रम सं	पारेषण योजना का कार्यक्षेत्र	क्षमता / किमी		
		1	ब्याबर के निकट उपयुक्त स्थान पर	765/400 केवी 1500		
			2x1500 एमवीए, 765/400 केवी	एमबीए आईसीटी: 2		
			सबस्टेशन की स्थापना 2x330	(7x500 एमवीए, एक		
			एमवीएआर 765 केवी बस रिएक्टर और	अतिरिक्त इकाई सहित)		
			420 केवी बस रिएक्टर के साथ 2x125	330 एमवीएआर, 765		
			एमवीएआर'	केवी बस रिएक्टर-2		
				(7x110 एमवीएआर,		
			भावी प्रावधान:	एक अतिरिक्त इकाई		
			बे के साथ 765/400 केवी आईसीटी:2	सहित)		
			स्विच करने योग्य लाइन रिएक्टर के साथ	765 केवी आईसीटी बे- 2		
			765 केवीलाइन बे: 6	400 केवी आईसीटी बे- 2		
			बे के साथ 765 केवीबस रिएक्टर: 2	765 केवी लाइन बे - 6	आरईसीपीडीसीएल	
			बे के साथ 400/220 केवी आईसीटी: 2	400 केवी लाइन बे- 2		
			स्विच करने योग्य लाइन रिएक्टर के साथ 400 केवी लाइन बे: 4	765 केवीरिएक्टर बे- 2		
			बे के साथ 400 केवीबस रिएक्टर: 1	125 एमवीएआर,		
				420 केवी बस रिएक्टर-		
		d	220 केवी लाइन बे: 4 के लिए स्थान	2420 केवी रिएक्टर बे- 2		
		2	ब्यावर में अजमेर-चित्तौड़गढ़ के दोनों सर्किटों का एलआईएलओ 765 केवी डी/सी	लंबाई - 45 किमी		
		3	ब्यावर में 400 केवी कोटा-मेर्टा लाइन का	लंबाई - 20 किमी		
			एलआईएलओ			

14		THE GAZETTE OF INDIA : EXTR	AORDINARY [i	Part II—Sec. 3(ii)
		4 फतेहगढ़-3- ब्यावर 765 केवी डी/सी के साथ-साथ 330 एमवीएआर स्विचेबल लाग रिएक्टर प्रत्येक सर्किट के लिए के प्रत्येक छे पर फतेहगढ़-3-ब्यावर 765 केवी डी/सी लाइन		
	 ऽरि	प्पणी :		1
	1	765 केवी स्विचेबल लाइन रिएक्टरों के लिए स्थान फतेहगढ़ -3 के विकासकर्ता द्वारा दो 765 केवी लाइन		
		ऊपर उल्लिखित लाइन की लंबाई अनुमानित है क्यों लंबाई प्राप्त की जाएगी.	के विस्तृत सर्वेक्षण के बाद सटीक	
	l	फतेहगढ़-3 (नया खंड और/या फतेहगढ़-4) में आर एसईसीआई//आरईआईए प्रदान करने के बाद प्रदान की		
	कार्यान्वय	<mark>यन समय सीमा:</mark> एसपीवी अधिग्रहण की तारीख से 18	महीने	
11	फेज-II पारेषण	l पार्ट जी के तहत राजस्थान (20 गीगावाट) में आरई ग प्रणाली		Γ.
	फेज-।।	l पार्ट जी के तहत राजस्थान (20 गीगावाट) में आरई ग प्रणाली त्र :		Ţ.
	फेज-॥ पारेषण् कार्यक्षे	l पार्ट जी के तहत राजस्थान (20 गीगावाट) में आरई ग प्रणाली त्र :	जेड से विद्युत की निकासी के लिए क्षमता / किमी	पीएफसीसीएल
	फेज-॥ पारेषण् कार्यक्षे क्रम सं	I पार्ट जी के तहत राजस्थान (20 गीगावाट) में आरई प्रणाली त्र : पारेषण योजना का कार्यक्षेत्र फतेहगढ़-3- ब्यावर 765 केवी डी/सी (दूसरा) के साथ-साथ 330 एमबीएआर स्विचेबल लाइन रिएक्टर के साथ प्रत्येक सर्किट के लिए प्रत्येक छोर	जेड से विद्युत की निकासी के लिए क्षमता / किमी लंबाई - 350 किमी स्विचिंग उपकरण के लिए 765 केवी 330 एमवीएआर स्विचकरने योग्य लाइन रिएक्टर -4	
	फेज-॥ पारेषण् कार्यक्षे क्रम सं	I पार्ट जी के तहत राजस्थान (20 गीगावाट) में आरई प्रणाली त्र : पारेषण योजना का कार्यक्षेत्र फतेहगढ़-3- ब्यावर 765 केवी डी/सी (दूसरा) के साथ-साथ 330 एमबीएआर स्विचेबल लाइन रिएक्टर के साथ प्रत्येक सर्किट के लिए प्रत्येक छोर	<mark>क्षेड से विद्युत की निकासी के लिए</mark> क्षमता / किमी लंबाई - 350 किमी स्विचिंग उपकरण के लिए 765 केवी 330 एमवीएआर स्विचकरने योग्य लाइन रिएक्टर -4 765 केवी, 330 एमवीएआर स्विचेबल लाइन रिएक्टर-4	
	फेज-॥ पारेषण् कार्यक्षे क्रम सं 1.	I पार्ट जी के तहत राजस्थान (20 गीगावाट) में आरई प्रणाली त्र : पारेषण योजना का कार्यक्षेत्र फतेहगढ़-3- ब्यावर 765 केवी डी/सी (दूसरा) के साथ-साथ 330 एमवीएआर स्विचेबल लाइन रिएक्टर के साथ प्रत्येक सर्किट के लिए प्रत्येक छोर पर फतेहगढ़-3-ब्यावर 765 केवी डी/सी लाइन ब्यावर और फतेहगढ़ दोनों में 765 केवी 2 लाइन बे	<mark>क्षेड से विद्युत की निकासी के लिए</mark> क्षमता / किमी लंबाई - 350 किमी स्विचिंग उपकरण के लिए 765 केवी 330 एमवीएआर स्विचकरने योग्य लाइन रिएक्टर -4 765 केवी, 330 एमवीएआर स्विचेबल लाइन रिएक्टर-4	
	फेज-॥ पारेषण् कार्यक्षे क्रम सं 1. 2 (i)	I पार्ट जी के तहत राजस्थान (20 गीगावाट) में आरई प्र प्रणाली त्र : पारेषण योजना का कार्यक्षेत्र फतेहगढ़-3- ब्यावर 765 केवी डी/सी (दूसरा) के साथ-साथ 330 एमवीएआर स्विचेबल लाइन रिएक्टर के साथ प्रत्येक सर्किट के लिए प्रत्येक छोर पर फतेहगढ़-3-ब्यावर 765 केवी डी/सी लाइन ब्यावर और फतेहगढ़ दोनों में 765 केवी 2 लाइन बे - 3	क्षेड से विद्युत की निकासी के लिए क्षमता / किमी लंबाई - 350 किमी स्विचिंग उपकरण के लिए 765 केवी 330 एमवीएआर स्विचकरने योग्य लाइन रिएक्टर -4 765 केवी, 330 एमवीएआर स्विचेबल लाइन रिएक्टर-4 765 केवी लाइन बे - 4	पीएफसीसीएल

लिए स्थान प्रदान करने के साथ-साथ 765 केवी स्विचेबल लाइन रिएक्टरों के लिए

		स् थान प्रदान करेंगे।		1
	(111)	्यावर एस/एस के विकासकर्ता ब्यावर एस/ए	म में 765 केवी लाइन बे में से 2 के लिए	r
	(m)	, ज्यापर एक एक प्रकार के विचित्र रहे के बी स्विचेबल लाइन		•
	11.1) ऊपर उल्लिखित लाइन की लंबाई अनुमानित		
	(IV			
		कार्यान्वयन समय सीमा: एसपीवी अधिग्रहण व	की तारीख से 18 महीने	
12	चरण-।	में आरईजेड से विद्युत की निकासी के लिए		
	and the second	। प्रणाली	,	
	कार्यक्षेत्र			
	क,	पारेषण योजना का कार्यक्षेत्र	क्षमता / किमी	
	सं.			·
	1.	2x330 एमवीएआर, 765 केवी बस	765/400 केवी 1500 एमवीए	
		रिएक्टर और 2x125 एमवीएआर, 420	आईसीटी: 2 (7x500 एमवीए,	
		केवी बस रिएक्टर के साथ दौसा के निकट	एक अतिरिक्त इकाई सहित)	
		उपयुक्त स्थान पर 2x1500 एमवीए	330 एमवीएआर, 765 केवी बस	
		765/400 केवी सबस्टेशन की स्थापना	रिएक्टर- 2 (7x110 एमवीएआर,	पीएफसीसीएल
		भावी प्रावधान: बे के साथ 765/400 केवी	एक अतिरिक्त इंकाई सहित)	in Sponsing of
		आईसीटी: 2		
		स्विच करने योग्य लाइन रिएक्टर के साथ	765 केवी आईसीटी बे - 2	
		765 केवी लाइन बे: 4		
		765 केवी बस रिएक्टर बे सहित: 2	400 केवी आईसीटी बे - 2	
		बे के साथ 400/220 केवी आईसीटी: 2	765 केवी लाइन बे - 6	
		स्विच करने योग्य लाइन रिएक्टर के साथ	400 केवी लाइन बे- 4	
		400 केवी लाइन बे: 4	1 ¹	
		बे के साथ 400 केवी बस रिएक्टर: 1	765 केवीरिएक्टर बे- 2	
		220 केवी लाइन बे: 4	125 एमवीएआर, 420 केवी बस	
		के लिए स्थान	रिएक्टर - 2	
	क लिए स्थान		420 केवी रिएक्टर बे - 2	
	2.	दौसा के दौसा छोर पर प्रत्येक सर्किट के लिए	लंबाई - 40 किमी	
		240 एमवीएआर स्विचेबल लाइन रिएक्टर	स्विचिंग उपकरण के लिए 765 केवी	
		सहित दौसा में जयपुर (फागी)-ग्वालियर	240 एमबीएआर स्विचेबल लाइन	
		765 केवी डी/सी के दोनों सर्किटों का	रिएक्टर-2	
		एलआईएलओ 765 केवी डी/सी लाइन	240 एमवीएआर 765 केवी	
			स्विचेबल लाइन रिएक्टर- 2	
			।त्य प्रथल लाहग ।रष्ट्रपटऱ्-∠	

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				(एक अतिरिक्त इकाई पर विचार	
				करते हुए 7x80 एमवीएआर)	
				(765 केवी ब्यावर-दौसा डी/सी लाइन के लिए दौसा छोर पर स्पेयर रिएक्टर के रूप में भी इस्तेमाल किया जाएगा)	
		3	दौसा के दौसा छोर पर प्रत्येक सर्किट वे लिए 50 एमवीएआर स्विचेबल लाइन रिएक्टर के साथ दौसा में आगरा-जयपुर (दक्षिण) 400 केवी डी/सी के दोने सर्किटों का एलआईएलओ 400 केव डी/सी लाइन	स्वाइ - उठा कवा त स्वचिंग उपकरण के लिए 420 त केवी, 50 एमवीएआर स्विचेबल	
			ब्यावर-दौसा 765 केवी डी/सी लाइ (240 किमी) प्रत्येक सर्किट के लिए प्रत्येव छोर पर 240 एमवीएआर स्विचेबर लाइन रिएक्टर	क स्विचिंग उपकरण के लिए 765 केवी	
			यावर - दौसा 765 केवी डी/सी लाइन	के 765 केवी लाइन बे - 2	
		10	नेए ब्यावर में दो 765 केवीलाइन बे		
		(i) प (i) जि नि	लगभग) से अधिक निकासी की आवश्यकता यावर एस/एस के विकासकर्ता अपने सब रेएक्टरों के साथ-साथ दो 765 केवी लाइन	बस्टेशनों पर 765 केवी स्विचेबल लाइन	
			ंबाई प्राप्त की जाएगी।		
	-		। की समय सीमा: एसपीवी अधिग्रहण की र		
13			जम्मू और कश्मीर में 400/220 केवी, 2x3	15 एमवीए एस/एस का निर्माण	
	-	कार्यक्षेत्र	02		1. 1.
		क्रम सं	पारेषण योजना का कार्यक्षेत्र	क्षमता / किमी	
		1.	1x80 एमवीएआर (420 केवी) 3	15 एमवीए, 400/220 केवी आईसीटी	

भारत का राजपत्र : असाधारण

	बस रिएक्टरों के साथ 7x105	(7x105 एमबीए, एक अतिरिक्त संहित)	
	एमवीए, 400/220 केवी सियोट एम/एस की स्थापना	400 केवी आईसीटी बे - 2	
	भावी प्रावधानः	220 केवी आईसीटी बे - 2	
	बेके साथ 400/220 केवी आईसीटी:	400 केवी लाइन बे - 4	पीएफसीसीएल
	2	220 केवी लाइन बे - 6	
	स्विच करने योग्य लाइन रिएक्टर के	80 एमबीएआर, 420 केवी बस रिएक्टर -	1. S
	साथ 400 केवी लाइन बे: 4	1	
	220 केवी लाइन बे: 4 के लिए स्थान	420 केवी रिएक्टर बे - 1	
2.	400 केवी डी/सी अमरगढ़ (कुंजर)	लंबाई - 15 किमी	
	का एलआईएलओ- 400/220 केवी		
	सिओट एस/एस पर सांबा लाइन		
र्यान्वयन	न समय सीमा: मार्च , 2024		

2. बोली-प्रक्रिया समन्वयकों की नियुक्ति दिशानिर्देशों में निर्धारित शर्तों के अधीन है।

[फा.सं. 15/3/2018- पारेषण-भाग (1)]

मृत्युंजय कुमार नारायण, संयुक्त सचिव (पारेषण)

MINISTRY OF POWER

NOTIFICATION

New Delhi, the 3rd December, 2021

S.O. 5032(E).—In exercise of the powers conferred by sub- para 3.2 of Para 3 of the Guidelines circulated under Section 63 of the Electricity Act, 2003 (no. 36 of 2003), the Central Government hereby appoints the following Bid-Process Coordinators (BPCs) for the Transmission Schemes, as shown against the name of the Transmission Schemes:

SI. No.			Name & Scope of the Transn	nission Scheme	Bid Process Coordinator
1.	Trans Scope:		on system for evacuation of power fron	1 Neemuch SEZ:	
		SI. No	Scope of the Transmission Scheme	Capacity /km	
		1	Establishment of 2x500 MVA, 400/220 kV Pooling Station (AIS) at Neemuch with 1x125 MVAr Bus	400/220 kV, 500 MVA ICT -2 nos.	
			Reactor	400 kV ICT bays – 2 nos.	
			Future provisions:	220 kV ICT bays - 2 nos.	
			Space for 400/220 kV ICTs along with bays: 2	400 kV line bays –4 (2 each for Chittorgarh & Mandsaur	

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		nos. 400 kV line bays: 6 nos. 220 kV line bays: 5 nos. 420kV bus reactor along with bays:1	lines) 220 kV line bays – As per connectivity granted to RE developers (2 no. of bays considered at present corresponding to 500 MW) 125 MVAr, 420 kV reactor- l no. 420 kV reactor bay – 1 no.		RECPDCL
	2	Neemuch PS – Chhittorgarh (PG) S/s 400 kV D/C line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage)	Length ~ 130 km		
	3.	2 nos. of 400 kV line bays at Chhittorgarh (PG) 400 kV S/s for Neemuch PS – Chhittorgarh (PG) S/s 400 kV D/C line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage)	400 kV line bays – 2 nos. at Chhittorgarh (PG)		
	4	Neemuch PS- Mandsaur S/stn 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage)	Length ~120 km		
	5	2 no. of 400 kV line bays at Mandsaur 400 kV S/s for Neemuch PS- Mandsaur S/stn 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage)	400 kV fine bays – 2 nos. at Mandsaur		
 Note: Powergrid to provide space for 2 no. of 400 kV line bays at Chhittorgarh (PG) 400 kV S/s for termination of Neemuch PS – Chhittorgarh (PG) 400 kV D/c line. MPPTCL to provide space for 2 no. of 400 kV line bays at Mandsaur 400 kV S/s for termination of Neemuch PS – Mandsaur 400 kV D/c line. Scheme to be awarded after SECI//REIA awards first bid of RE project. Implementation Time-frame: 18 months from date of SPV acquisition 					
Establishment of Khavda Pooling Station-2 (KPS2) in Khavda RE Park: Scope					
	SI. No.	Scope of the Transmission Scheme	Capacity /km		
	1	Establishment of 765/400 kV, 4x1500MVA, KPS2 (GIS) with 2x330 MVAR 765 kV bus reactor and 2x125 MVAR 400 kV bus reactor.	1500MVA, 765/400kV ICT- 4 nos. (13x500 MVA, including one spare unit) 765 kV ICT bays – 4 nos. 400 kV ICT bays – 4 nos.	F	RECPDCL
		Adequate space for future expansion of 5x1500 MVA	765 kV line bays – 2 nos.		

	1 1	765/400 kV ICT's	400 kV line bays - 3 nos.	
		700/HOU KY ICT 3	(3 no. of bays considered at	
		Description of 766131 P	present, one each for	
		Bus sectionalizer at 765kV & 400kV.	NTPC, GSECL & GIPCL).	
			Actual nos. of bays would	
		On each bus section, there shall be	be as per connectivity	
		2x1500MVA 765/400kV ICTs, 1x330MVAr, 765 kV &	granted to RE developers.	
		$1 \times 125 \text{ MVAr}$, $700 \times 10^{-1} \text{ kV}$ at $1 \times 125 \text{ MVAr}$ 420kV bus reactor,		
		space for future expansion.		
			1x330 MVAr, 765 kV bus	
		Bus sectionalizer at 765 kV level	reactor-2	
		shall normally be closed and bus	(7x110 MVAr, including	
		sectionalizer at 400 kV level shall .	one spare unit)	
		normally be open		
			765 kV reactor bay – 2	
		Future provisions:	1x125 MVAr 400 kV bus	
		Space for	reactor-2	
		•	400 kV reactor bay – 2	
		765/400 kV ICTs along with bays: 5 nos.		
		765kV line bays: 8 nos.	765 by hus sectionalizer have	
		400kV line bays: 10 nos.	765 kV bus sectionalizer bay -2	
		To take care of any drawal needs of area in future:	400 kV bus sectionalizer bay	
			-2	
		400/220 kV ICT: 2 nos.	-2	
		220 kV line bays: 4 nos.		
	2.	LILO of one ckt. of KPS1- Bhuj PS 765 kV D/c line at KPS2	Line length – 1 km	
		te to be awarded after SECI//REIA awa	urds first bid of RE projectat KPS2	
Imp	lementat	ion Time-frame: 24 months from date nt of Khavda Pooling Station-3 (KPS3		
Imp Est:	olementat ablishmer ope:	nt of Khavda Pooling Station-3 (KPS3	i) in Khavda RE Park:	
Imp Est:	olementat ablishmer ope: Sl. No.	nt of Khavda Pooling Station-3 (KPS3 Scope of the Transmission Scher	i) in Khavda RE Park: me Capacity /km	
Imp Est:	olementat ablishmer ope:	nt of Khavda Pooling Station-3 (KPS3 Scope of the Transmission Scher Establishment of 765/400 kV	i) in Khavda RE Park: me Capacity /km V, 1500 MVA, 765/400	
Imp Est:	olementat ablishmer ope: Sl. No.	Scope of the Transmission Scher Establishment of 765/400 kV 3x1500 MVA, KPS3	B) in Khavda RE Park: me Capacity /km V, 1500 MVA, 765/400 th kV ICT- 3	
Imp Est:	olementat ablishmer ope: Sl. No.	nt of Khavda Pooling Station-3 (KPS3 Scope of the Transmission Scher Establishment of 765/400 kV	B) in Khavda RE Park: me Capacity /km V, 1500 MVA, 765/400 th kV ICT- 3 or (10x500 MVA,	
Imp Est:	olementat ablishmer ope: Sl. No.	Scope of the Transmission Scher Establishment of 765/400 kV 3x1500 MVA, KPS3 (GIS) wit 1x330 MVAR 765 kV bus reactor	B) in Khavda RE Park: me Capacity /km V, 1500 MVA, 765/400 th kV ICT- 3 or (10x500 MVA,	RECPDCI
Imp Est:	olementat ablishmer ope: Sl. No.	station-3 (KPS3Scope of the Transmission ScherEstablishment of 765/400 kV3x1500 MVA, KPS3 (GIS) wit1x330 MVAR 765 kV bus reactorand 1x125 MVAR 400 kV bureactor.AdequateAdequatespaceforfuture	me Capacity /km V, 1500 MVA, 765/400 th kV ICT- 3 or (10x500 MVA, us including one spare unit) re 765 kV ICT bays - 3	RECPDCL
Imp Est:	olementat ablishmer ope: Sl. No.	Scope of the Transmission Scher Establishment of 765/400 kV 3x1500 MVA, KPS3 (GIS) wit 1x330 MVAR 765 kV bus reactor and 1x125 MVAR 400 kV bu reactor.	B) in Khavda RE Park: me Capacity /km V, 1500 MVA, 765/400 th kV ICT- 3 or (10x500 MVA, us including one spare unit) re 765 kV ICT bays – 3	RECPDCL

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	Space for 765/400 kV ICTs along with bays: 5 nos. 765kV line bays: 4 nos. 400kV line bays: 10 nos. 765 kV Bus sectionalizer breaker: 2 nos. 400 kV Bus sectionalizer breaker: 2 nos. To take care of any drawal needs of area in future: 400/220 kV ICT: 2 nos. 220 kV line bays: 4 nos.	nos. 400 kV line bays – 3 nos, considered at present (Actual nos. of bays as per connectivity granted to RE developer) 1x330 MVAr, 765 kV bus reactor-1 (4x110 MVAr, including one spare unit) 765 kV reactor bay – 1 1x125 MVAr 400 kV bus reactor-1 400 kV reactor bay – 1	
2.	KPS3- KPS2 765 kV D/c line	20 km	
3.	2 no. of 765 kV line bays at KPS2 765 kV S/s for KPS3-KPS2 765 kV D/c line	765 kV line bays: 2 nos. at KPS2 end	
ICTs at ii. Bus sec 1x330 l iii. Bus sec 400kV iv. Develo KPS2 7 v. Scheme	station shall be created with bus section- nd 1x330 MVAR 765 kV & 1x125 MVAR ction II (future) shall be created with 765/4 MVAR 765 kV & 1x125 MVAR 400 kV b ctionalizer at 765kV level shall normally be level shall normally be open per of KPS2 765 kV S/s to provide space f 65 kV S/s for termination of KPS3-KPS2 to be awarded after SECI//REIA awards in Time-frame: 24 months from date of SE	400 kV bus reactors. 00 kV, 4x1500MVA ICTs and bus reactors. e closed and bus sectionalizer at for 2 no. of 765 kV line bays at 765 kV D/c line. <i>first bid of RE project</i> at KPS3	
	cheme for injection beyond 3 GW RE p	ower at Khavda PS1 (KPS1)	
Scope:	Same of the Tronomission Cohome	Capacity /km	
SL No.	Scope of the Transmission Scheme Augmentation of Khavda PS1 by 765/400 kV transformation capacity *(max. upto 4x1500 MVA) with 1x330 MVAR 765 kV bus reactor and 1x125 MVAR 420 kV bus reactor on 2 nd 765 kV and 400 kV bus section respectively.	MVA-4 (13x500 MVA, including one spare unit) (Actual no. of ICTs may be decided based on evacuation requirement)	RECPDCL
		765 kV ICT bays - 4	

Lana		-342 2(11)			
				765 kV line bays - 2 400 kV ICT bays – 4 400 kV line bays – 3 nos. considered at present (Actual no. of bays as per connectivity granted to RE developers)	
				1x330 MVAr, 765 kV bus reactor- 1 (4x110 MVAr, including one spare unit)	
				765 kV reactor bay 1	
				125 MVAr, 420 kV reactor- 1 400 kV Reactor bay- 1	
		ł		765 kV bus sectionalizer- 2 400 kV bus sectionalizer- 2	
		2	KPS1-Khavda PS GIS (KPS2) 765 kV D/C line (to be established with bypassing of LILO of one ckt. of KPS1- Bhuj at KPS2 and utilisation of LILO section)		
	Note	: Impleme	f ICTs may be decided based on evacuation r <i>intation to be taken up for evacuation require</i> on Timeframe : 24 months from date of SPV	ement beyond 3 GW at KPS1	
		er phase I	system for evacuation of power from II –Part A1	REZ in Rajasthan (20 GV	V)
	ocoh	SI. No.	Scope of the Transmission Scheme	Capacity /km	
		1.	Establishment of 2x500 MVA, 400/220 kV pooling station at Fatehgarh-4 along with 2x125 MVAr	400/220 kV, 500 MVA ICT - 2nos. 400 kV ICT bays - 2	
			Bus Reactor Future provisions: Space for	nos. 220 kV ICT bays - 2	
			400/220 kV ICTs along with bays: 5 nos. 400 kV line bays along with switchable line reactor: 6 nos.	nos. 400 kV line bays - 2 nos.	PFĊCL
			400 kV Bus Reactor along with bays: 2	220 kV line bays - As per connectivity	

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			nos. 400 kV Sectionalization bay: 1 no 220 kV line bays: 10 nos. 220 kV sectionalization bay: 2 no	bays cor present). 125 MVA reactor - 2 420 kV rea nos.	r, 420 kV bus nos. actor bay - 2	
		2.	Fatehgarh-4- Fatehgarh-3 400 kV twin HLTS* line (50 km) 2 no. of 400 kV line bays at Fateh		e bays - 2 nos.	
			3 inimum capacity of 2100 MVA on ec			
	i.	220k	sion of suitable sectionalization shal V level to limit short circuit level	-		
	ii.	line b	loper of Fatehgarh-3 S/s(new section ays at Fatehgarh-3 S/s for termination win HLTS line) to provide space for n of Fatehgarh-4- Fa	r 2 nos. of 400 kV utehgarh-3 400 kV	
	iii.	obtair	ine lengths mentioned above are app ned after the detailed survey			
	iv.	Fateh	ne to be awarded after SECI//REIA garh-4 pooling station.		-	
		Ŷ.	ntation Timeframe: 18 months from	_		
6	Phas	se-III Par	system for evacuation of power first A3	om REZ in Rajasth	an (20GW) under	
	Scop	SI. No.	Scope of the Transmission Scheme	Capacity	/km	
		1.	Fatehgarh 3- Bhadla-3 400kV D/c line(Quad) along with 50 MVAr Switchable line reactor for each circuit at both ends of Fatehgarh 3- Bhadla-3 400kV D/c line	Length – 200 km 400 kV 50 MVAr 5 line reactor – 4 nos Switching equipme 50 MVAR switchal reactor – 4 nos.	ent for 400 kV ble line	
				400 kV line bays B Fatehgarh-3 S/s - 4		
	Note	Fateh requir	garh 3- Bhadla-3 400 kV D/c line m ement beyond 2000 MW at Fatehga	h-4.		
4	ii. iii.	bays a	oper of Fatehgarh-3 S/s(new section along with space for switchable line oper of Bhadla –3 substation to prov	eactors at Fatehgarh-	-3	PFCCL
		along	with space for switchable line reactor ntation Timeframe: 18 months from	rs at Bhadla -3		
7		nsmission se-III Pa	system for evacuation of power f	om REZ in Rajasth	an (20GW) under	
	Scop					

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भारत का राजपत्र : असाधारण

SI. No.	Scope of the Transmission Scheme	Capacity /km		
1.	Establishment of 2x1500 MVA, 765/400kV & 3x500 MVA, 400/220	765/400kV 1500 MVA ICTs: 2 nos		
	kV pooling station at Bhadla-3 along with 2x330 MVAr (765kV) Bus Reactor	(7x500 MVA, including one spare unit)		
	& 2x125 MVAr (420kV) Bus Reactor	765kV ICT bays - 2 nos.		
	Future provisions: Space for	400/220 kV, 500 MVA ICT -		
	765/400kV ICTs along with bays: 2nos.	3 nos.		PFCC
	765kV line bay along with switchable	765kV line bays - 2 nos.		nee
	line reactor: 4nos.	400 kV ICT bays - 5 nos.		
	765kV line bay: 4nos.	220 kV ICT bays - 3 nos.		
	765kV Bus Reactor along with bays: 2	400 kV line bays - 2 nos		
	nos.	220 kV line bays: As per		
	400/220 kV ICTs along with bays: 10nos.	connectivity granted to RE developers (5 no. of bays		
	400 kV line bays: 8 nos.	considered at present) 330 MVAr Bus Reactor-2		
	400 kV line bays along with switchable line reactor:4	nos.		
	400 kV Bus Reactor along with bays: 2 nos.	(7x110 MVAr, including one spare unit)		
	400 kV Sectionalization bay: 2 nos.	765kV reactor bay- 2 nos.		
	220 kV line bays: 12 nos.	125 MVAr, 420kV bus		
	220 kV sectionalization bay: 2nos.	reactor - 2 nos. 420 kV reactor bay - 2 nos.		
	Della DI II 2400 IV Di Pas			
2. 🐨	Fatehgarh-2 – Bhadla-3 400 kV D/c line (Quad moose) along with 50 MVAr	Length – 200 km 400 kV 50 MVAR switchable		
	Switchable line reactor for each circuit	line reactor -4		
	at both ends of Fatehgarh 2- Bhadla-3	Switching equipment for 400		
	400 kV D/c line	kV 50 MVAR switchable line		
		reactor4		
3.	2 nos. of 400 kV line bays at Fatehgarh-2 for Fatehgarh-2 – Bhadla- 3 400kV D/c line	400 kV line bays - 2 nos.		
4.	Bhadla-3 – Sikar-II 765 kV D/c line	Length – 380km		
	along with 330 MVAr Switchable line reactor for each circuit at each end of	Switching equipment for 765 kV 330 MVAR switchable		
	Bhadla-3 – Sikar-II 765 kV D/c line	line reactor -4		
		765 kV, 330 MVAr		
		Switchable line reactor- 4		
5	2 nos. of 765 kV line bays at Sikar-II	765 kV line bays - 2nos		
Ra	heme to be awarded after SECI//REIA awa mgarh PS/Bhadla-3 PS		1637	
lev	ovision of suitable sectionalization shall be rel to limit short circuit level			
SW	wergrid to provide space for 2 nos. of 400 l itchable line reactors at Fatehgarh-2 S/s	•		
obt	e line lengths mentioned above are approxi- tained after detailed survey.	· · ·		
De	eveloper of Sikar-II S/s to provide space for	2 nos. of 765 kV line bays at Sik	ar-	

		S/s along with space for switchable line mentation Timeframe: 18 months from		
	nsmiss se-III l	ion system for evacuation of power fro Part C1		r
[SI.	Scope of the Transmission Scheme	Capacity /km	
	No.			
	1.	Establishment of 2x1500 MVA, 765/400kV & 2x500 MVA, 400/220 kV pooling station at Ramgarh along with 2x240 MVAr (765kV) Bus	spare unit)	
		Reactor & 2x125 MVAr (420kV) Bus reactor	400/220 kV, 500 MVA ICT – 2nos.	RECPDCI
		Future provisions: Space for	400 kV ICT bays – 4 nos.	
		765/400kV ICTs along with bays:	220 kV ICT bays – 2 nos.	
		 3nos. 765kV line bay along with switchable line reactor: 2nos. 765kV Bus Reactor along with bays: 	400 kV line bays - As per connectivity granted to RE developers (2 no. of bays considered at present)	
		 2 nos. 400/220 kV ICTs along with bays: 6 nos. 400 kV line bays along with switchable fine reactor: 4nos. 	220 kV line bays -As per connectivity granted to RE developers (4 no. of bays considered at present)	
		400 kV line bays: 4 nos.	765 kV line bays – 2 nos.	
		400kV Bus Reactor along with bays:2 nos.400kV Sectionalization bay: 3 nos.	240 MVAr Bus Reactor-2 nos. (7x80 MVAr considering one spare unit)	
		220 kV line bays: 8 nos.	765kV reactor bay- 2 nos.	
		220kV sectionalisation bay: 2 nos.	125 MVAr, 420kV bus reactor – 2 nos.	
			420 kV reactor bay – 2 nos.	
	2.	Ramgarh – Bhadla-3 765 kV D/c line (180 km) along with 240 MVAr switchable line reactor at each circuit	765 kV, 240 MVAr switchable	
		at Ramgarh end of Ramgarh – Bhadla- 3 765kV D/c line	Switching equipment for 765 kV 240 MVAR switchable line reactor -2 nos.	27
F	3.	2 nos. of 765kV line bays at Bhadla-3	765 kV line bays - 2nos	
L	Note	•		
i,	Imj Pha	• plementation schedule of Phase III –Part ase III –Part B1 (establishment of Bhadla c line, 400kV Bhadla-3 PS-Fatehgarh-2 L	-3 PS, 765kV Bhadla-3 PS-Sikar-2	
ii.	De	veloper of Bhadla-3 S/s to provide space adla-3 S/s for termination of Ramgarh -	for 2 nos. of 765 kV line bays at	
iii.	obt	e line lengths mentioned above are appro ained after the detailed survey	· · · ·	
iv.	lev	vision of suitable sectionalization shall be el to limit short circuit level neme to be awarded after SECI//REIA av	17	<i>′</i>

[भाग]]—खण्ड 3(ii)]

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	nsmissio	ntation Timeframe: 18 months from d n system for evacuation of power -III Part D	-	W)
Sco	pe:			
	Sl.No.	Scope of the Transmission Scheme	Capacity /km	
	1.	Sikar-II – Khetri 765 kV D/c line	Length – 90 km	
	2	Sikar-II – Narela 765 kV D/c line along with 240 MVAr Switchable line reactor for each circuit at each end of Sikar-II – Narela 765 kV D/c line	Length – 260 km Switching equipment for 765 kV 240 MVAR switchable line reactor –4 nos. 240 MVAr, 765kV Switchable line reactor-4 nos.	RECPDC
	3	Jhatikara – Dwarka 400kV D/c line (Quad) (20km)	Length – 20 km	
	4	765kV line bays at Sikar -II for Sikar-II – Khetri 765 kV D/c line and Sikar-II – Narela 765 kV D/c line	765 kV line bays - 4nos	
	5	2 nos. of 765kV line bays at both Khetri and Narela S/s	765 kV line bays - 4nos	
	6	2 nos. of 400kV line bays at both Jhatikara and Dwaraka S/s	400 kV line bays - 4nos	
i. ii. iii.	II S/s Deve with s	loper of Sikar-II S/s to provide space for s along with space for two nos. of switc loper of Narela S/s to provide space for space for switchable line reactors at Nar argrid to provide space for two nos. of 76	chable line reactors 2 nos. of 765 kV line bays along rela S/s 65 kV line bays at Khetri substation	
		rgrid and DTL to provide space for two cara and Dwarka S/s respectively	nos. of 400k v line bays both at	
iv.		ing langths montioned above are approv	imate as the exact length shall be	
	The l	ine lengths mentioned above are approx ned after the detailed survey.	imate as the exact length shall be	
iv.	The l obtain Scher		frame of Transmission system for	2 2
iv. v. vi.	The l obtain Scher evacu	ned after the detailed survey. me to be implemented in matching time	frame of Transmission system for (20GW) under Phase-III Part C1	С. ₂ .
iv. v. vi. Imp Trai Pha	The l obtain Scher evacu elementati nsmission se-III Par	ned after the detailed survey. me to be implemented in matching time nation of power from REZ in Rajasthan ion Timeframe: 18 months from date o system for evacuation of power from	frame of Transmission system for (20GW) under Phase-III Part C1 f SPV acquisition	er
iv. v. vi. Imp Tra	The 1 obtain Scher evacu ilementati nsmission se-III Par pe :	ned after the detailed survey. me to be implemented in matching time nation of power from REZ in Rajasthan ion Timeframe: 18 months from date o system for evacuation of power from rt F	frame of Transmission system for (20GW) under Phase-III Part C1 f SPV acquisition REZ in Rajasthan (20GW) und	er
iv. v. vi. Imp Trai Pha	The 1 obtain Scher evacu ilementati nsmission se-III Par pe :	ned after the detailed survey. me to be implemented in matching time nation of power from REZ in Rajasthan ion Timeframe: 18 months from date o system for evacuation of power from	frame of Transmission system for (20GW) under Phase-III Part C1 f SPV acquisition REZ in Rajasthan (20GW) und Capacity /km A, 765/400kV 1500 MVA ICTs: 2 nos (7x500 MVA, including one	er

THE GAZETTE OF INDIA : EXTRAORDINARY

[PART II-SEC. 3(ii)]

		THE GAZETTE OF INDIA . EATH		[I AKI II—BEC. 5(
		765kV line bay along with switchable line reactor: 6nos.765kV Bus Reactor along with bays: 2	spare unit) 765kV ICT bays – 2 nos.	
		nos. 400/220 kV ICTs along with bays:2nos. 400 kV line bays along with switchable	400 kV ICT bays – 2 nos. 765 kV fine bays – 6	RECPDC
-		line reactor: 4 nos. 400kV Bus Reactor along with bays: 1nos. 220 kV line bays: 4nos.	nos 400kV line bay- 2nos. 765kV reactor bay- 2 nos. 125 MVAr, 420kV bus	
			reactor – 2 nos. 420 kV reactor bay – 2 nos.	
	2	LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar	Length – 45km	
	3	Beawar	Length – 20km	
	4		Switching equipment for	
1	S/s a i. The obta i. Sche Fate	eloper of Fategarh-3 S/s to provide 2 nos. of along with space for 765kV switchable line re- line lengths mentioned above are approxima- ined after the detailed survey <i>to be awarded after SECI//RELA awards</i> hgarh-3 (new section and/or Fatehgarh-4). mplementation Timeframe : 18 months from	eactors te as the exact length shall be <i>first bid of RE project</i> at	
Pha	ase-III Pa	n system for evacuation of power from RE art G	CZ in Rajasthan (20GW) und	ler
Sco	pe : SLNo.	Scope of the Transmission Scheme	Capacity /km	
	J .	Fatehgarh-3– Beawar 765 kV D/c(2 nd) alon with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3 Beawar 765 kV D/c line	ng Length – 350km or Switching equipment	PFCCL
			765 kV, 330 MVAr Switchable line reactor- 4	
	2	2 nos. of 765kV line bays at both at Beawar Fatehgarh-3	& 765 kV line bays - 4nos	
	Note:		12000 1 000	
<u>i</u>	. Impl	ementation to be taken up for evacuation req	unement beyond 5000 MW	

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[भाग	ń—	-खुण्ड	3(ii)] भारत का राजपत्र	: असाधारण	2.
ľ I		(cumulative at Fatehgarh-3 PS (new section)	& Fatehgarh-4 PS).	1
	ii.		Developer of Fategarh-3 S/s to provide spac Fatehgarh-3 S/s along with space for 765 kV		
	iii.		Developer of Beawar S/s to provide space for Beawar S/s along with space for 765kV.swi		
	iv.		The line lengths mentioned above are appro obtained after the detailed survey	ximate as the exact length shall be	
·			Implementation Timeframe: 18 month		
12			ission system for evacuation of power Phase-III Part H	from REZ in Rajasthan (20G	W)
		ope :			
	Ĩ	SI.	Scope of the Transmission Scheme	Capacity /km	
		No.	-		
		1.	Establishment of 2x1500 MVA 765/400kV substation at suitable location near Dausa along with 2x330 MVAr, 765 kV Bus Reactor & 2x125 MVAr, 420 kV bus Reactor Future provisions: Space for	765/400kV 1500 MVA ICTs: 2 nos. (7x500 MVA, including one spare unit) 330 MVAr, 765 kV bus reactor- 2nos. (7x110 MVAr, including one spare unit)	PFCCL
			765/400kV ICTs along with bays: 2 nos. 765kV line bay along with switchable line reactor: 4nos.	765kV ICT bays - 2 nos	
			765kV Bus Reactor along with bays: 2 nos.	400 kV ICT bays – 2 nos. 765 kV line bays – 6 nos.	
			400/220 kV ICTs along with bays: 2 nos	400kV line bay- 4 nos.	
			400 kV line bays along with switchable line reactor: 4 nos.	765kV reactor bay- 2 nos. 125 MVAr, 420kV bus reactor – 2 nos.	
			400kV Bus Reactor along with bays: 1 nos.	420 kV reactor bay -2 nos.	
		2.	220 kV line bays: 4nos. LILO of both circuits of Jaipur(Phagi)-	Length – 40km	
		2.	Gwalior 765 kV D/c at Dausa along with 240 MVAr Switchable line reactor for each circuit at Dausa end of Dausa – Gwalior 765 kV D/c line	Switching equipment for 765 kV 240 MVAR switchable line reactor -2 240 MVAr 765 kV Switchable	
				line reactor- 2 (7x80 MVAr considering one spare unit)	
				(also to be used as spare reactor at Dausa end for 765kV Beawar – Dausa D/c line)	
		3	LILO of both circuits of Agra – Jaipur(south) 400kV D/c at Dausa along with 50 MVAr Switchable line reactor for each circuit at Dausa end of Dausa –	Length – 30km Switching equipment for 420 kV, 50 MVAR switchable line reactor –2	
			Agra 400kV D/c line	420 kV, 50 MVAr Switchable line reactor-2 nos.	

	Beawar – Dausa 765 kV D/c line (2 km) along with 240 MVAr Switchal ine reactor for each circuit at each end	ble Switching equipment for 765	
	2 nos. of 765kV line bays at Beawa Beawar – Dausa 765 kV D/c line	r for 765 kV line bays – 2 nos	
W1	th space for 765kV switchable line rea	actors at their substations	
i. Th ob Ir	L	pproximate as the exact length shall be hs from date of SPV acquisition.	
i. Th ob Ir reation	e line lengths mentioned above are ap tained after the detailed survey nplementation Timeframe : 18 month of 400/220 kV, 2x315 MVA S/S at Si	pproximate as the exact length shall be hs from date of SPV acquisition.	
i. Th ob Ir reation o ope :	e line lengths mentioned above are ap tained after the detailed survey nplementation Timeframe: 18 month of 400/220 kV, 2x315 MVA S/S at Si Scope of the Transmission	oproximate as the exact length shall be hs from date of SPV acquisition. iot, Jammu & Kashmir	PFCCL

2. The appointment of the Bid-Process Coordinators is subject to the conditions laid down in the Guidelines.

[F. No. 15/3/2018-Trans-Pt(1)] MRITUNJAY KUMAR NARAYAN, Jt. Secy. (Trans)

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Annexure-3 (Colly.) BEAWAR TRANSMISSION LIMITED

(A wholly owned subsidiary of REC Power Development and Consultancy Limited) Registered Office: Core-4, SCOPE Complex, 7, Lodhi Road, New Delhi-110003 Corporate Office: D-Block, REC World Headquarter, Plot No. I-4, Sector-29, Gurugram ,Haryana-122001 (CIN No: U40106DL2022GOI397400)

Ref No.: BTL/ ISTS/approval/Section -68/2023-24/316

Date: 10.05.2023

The Secretary, Central Electricity Authority, Sewa Bhawan, R. K. Puram, New Delhi - 110 066

Kind Attention: Sh. Rakesh Goyal.

Sub: Approval for laying of overhead transmission line, under Sec. 68 of the Electricity Act, 2003 for "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" to be implemented through tariff based competitive bidding process.

Ref.:

- 1. BTL/ ISTS/approval/Section- 68/2022-23/1281 dated 04.08.2022.
- 2. File No.CEA-PS-11-21 (25)/1/2018-PSPA-I Division-Part(1) dated 28.09.2022.

Dear Sir,

This has reference to this approval received vide letter dated 28.09.2023 for subjected transmission scheme.

Further, as per the 11th NCT meeting held on 28th December 2022 & 17th January 2023, the scope of the subjected scheme was modified/amended.

The revised scope of work is as follows:

Si No	Scope of the Project
1	Establishment of 2x1500 MVA 765/400 kV Substation at suitable location near Beawar
	along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus Reactor
	765/400kV, 1500 MVA ICTs – 2 nos. (7x500 MVA, including one spare unit)
	330MVAr, 765kV bus reactor-2 nos (7x110 MVAr, including one spare unit)
	765 kV ICT bays – 2 nos.
	400 kV ICT bays – 2 nos.
	765 kV line bays – 6 nos.
	400 kV line bays – 2 nos.
	765kV reactor bay-2 nos.
3	125 MVAr, 420 kV bus reactor-2 nos.
02 L	420 kV reactor bay – 2 nos.
2	Future provisions: Space for
	765/400kV ICTs along with bays: 2 nos.
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	765kV line bay along with switchable line reactor: 8 nos.
10000	765kV Bus Reactor along with bays : 2nos.
	400/220kV ICTs along with bays: 2 nos.
	400kV line bays along with switchable line reactor : 4 nos
	Page 1 of 2

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	400kV Bus Reactor along with bays: 1 no. 220kV line bays: 4 nos.
2	LILO of both citcuit of Ajmer-Chittorgarh 765kV D/c at Beawar
3	LILO of 400kV Kota- Merta line at Beawar
4	Fatehgarh-3- Beawar 765kV D/c along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3- Beawar 765kV D/c line Switching equipment for 765kV 330 MVAr switchable line reactor-4 nos. 765kV, 330 MVAr Switchable line reactor-4 nos.
5	± 2x300MVAr STATCOM, 4x125 MVAr MSC, 2x125 MVAr MSR along with 2 nos. of 400 kV bays at Fatehgarh-3 PS
Notes:	
(1)	POWERGRID shall provide space for 2 nos. of 765 kV line bays at Fatehgarh-3 S/s for Fatehgarh-3– Beawar 765 kV D/c line along with 765kV switchable line reactors.
(11)	±300 MVAr STATCOM should be placed in each 400 kV bus section of Fatehgarh-3 PS (Phase-III Part E1).
(iii)	POWERGRID shall provide space at Fatehgarh-3 S/s STATCOM along with MSC & MSR and associated 400kV bays.

It is therefore requested that revised approval for laying of overhead transmission line under Section 68 of Electricity Act,2003 may kindly be accorded for the above Transmission System in favour of the SPV i.e. "BEAWAR TRANSMISSION LIMITED".

Thanking you,

Your faithfully,

(Jatin Kumar Hayak) Director

Encl.: As above

REC Power Development and Consultancy Limited (Formerly known as REC Power Distribution Company Limited, A wholly owned subsidiary of REC Limited, a 'Maharatna CPSE' under Ministry of Power, Govt. of India)



Date: 28.06.2023

Ref No: RECPDCL/TBCB/Rajasthan Part F/2023-24/779

The Secretary, Central Electricity Authority, Sewa Bhawan, R. K. Puram, New Delhi - 110066

#### Kind Attention: Sh. Rakesh Goyal

Sub: Approval for laying of overhead transmission line, under Sec. 68 of the Electricity Act, 2003 for "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" to be implemented through tariff based competitive bidding process-regarding.

#### Ref No.:

- 1. BTL/ ISTS/approval/Section -68/2023-24/316 dated _10.05.2023.
- 2. RECPDCL_Amendment dated_15.05.2023

Dear Sir,

This has reference to our letter dated 10.05.2023 regarding approval for laying of overhead transmission line, under Sec. 68 of the Electricity Act, 2003 for "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F".

The approval of sec 68 for the subjected project was obtained on 28.09.2022.

However, as per the 11th NCT meeting held on 28th December & 17th January 2023, the scope of the subjected scheme was modified/revised.

It is therefore requested that revised approval for laying of overhead transmission line under Section 68 of Electricity Act,2003 may kindly be accorded for the revised scope of work in favour of the SPV i.e. "BEAWAR TRANSMISSION LIMITED".

It may be noted that, resubmission of application on NSWS portal is showing restricted and hence the details are enclosed herewith for kind consideration.

Thanking you,

Yours faithfully,

(PS Hariharan) AChief General Manager (Tech)

Encl.: As above

Copy to:

1. Sh. Ashok Kumar Rajput, Member (Power System), Central Electricity Authority, Sewa Bhawan, R. K. Puram, New Delhi - 110066

P.D. Block, REC Headquarter, Plot No. 1-4, Sector-29, Gurugram, (Haryana) -122001.
E-mail: co@recpdcl.in 1 @Tel::01224-4441300 i @www.recpdcl.in 1 Clil No. RECPDCL-U40101DL2007GOI165779 1 GST No. 06AADCR7399K12P

#### No. 25-17/9/2023-PG Government of India Ministry of Power

#### Shram Shakti Bhawan, Rafi Marg New Delhi -01, Dated 12th July 2023

To,

The Director, Beawar Transmission Limited, Core-4, Scope Complex, 7 Lodhi Road, New Delhi - 110003

Subject: Prior approval / revision of the Government of India under Section 68 (1) of the Electricity Act, 2003, for installation of overhead transmission line under the transmission scheme "Transmission scheme for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part F" to M/s Beawar Transmission Limited, a wholly owned subsidiary of REC Power Development and Consulting Limited (RECPDCL)- regarding.

Sir,

I am directed to refer to M/s RECPDCL's application dated 28.06.2023, seeking revision in prior approval dated 28.09.2022 issued vide letter No. CEA-PS-11-21(25)/1/2018-PSPA-I-Part(1) I/23911/2022 of the Government of India under section 68 (1) of the Electricity Act, 2003 to M/s RECPDCL for installation of the subject cited overhead transmission line. Revision is sought due to change in scope of the subjected scheme decided in the 11th NCT meeting held on 28th December & 17th January 2023.

2. CEA vide letter no. CEA-PS-11-21(25)/1/2018-PSPA-I-Part(1) I/23911/2022 dated 28.09.2022 (copy enclosed) had granted prior approval of Government under section 68(1) of the Electricity Act, 2003 to for installation of overhead transmission line under the transmission scheme "Transmission scheme for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part F" for installation of the following overhead transmission lines:

i. LILO of both circuit of Ajmer - Chittorgarh 765 kV D/c line at Beawar

ii. LILO of 400 kV Kota - Merta line at Beawar

iii. Fatehgarh-3 – Beawar 765 kV D/c line

3. The scope of works of above transmission scheme was modified in 10th meeting of NCT and the revised scheme was notified by MoP vide its Gazette Notification no. 822 dated 22.02.2023. Subsequently, the scope of works was again modified in the 11th meeting of NCT (addition of STATCOM) and the revised scheme was notified by MoP vide its Gazette Notification no. 1644 dated 13.04.2023 with the following scope of works:



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Note:

- i. POWERGRID shall provide space for 2 Nos. of 765 kV line bays at Fatehgarh-3 S/s for Fatehgarh-3 - Beawar 765 kV D/c line alongwith 765 kV switchable line reactors
- ii. The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey
- iii. Scheme to be awarded after SECI/REIA awards first bid of RE project at Fatehgarh-3 (new section and/or Fatehgarh-4).
- iv. ±300 MVAr STACOM should be placed in each 400 kV section of Fatehgarh-3 PS (Phase-III Part E1)
- POWERGRID shall provide space at Fatehgarh-3 PS for STATCOM alongwith MSC & MSR and associated 400 kV bays.

4. Based on the recommendation of Central Electricity Authority (CEA), Ministry of Power conveys the approval under Section 68 (1) of the Electricity Act, 2003, to the SPV, M/s Beawar Transmission Limited, incorporating the revised scope of works, for installation of the following dedicated overhead transmission line under the transmission scheme "Transmission scheme for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part F":

- (i) LILO of both circuit of Ajmer Chittorgarh 765 kV D/c line at Beawar
- (ii) LILO of 400 kV Kota Merta line at Beawar
- (iii) Fatehgarh-3 Beawar 765 kV D/c line.

#### D/c towers)

5. The approval would be subject to compliance of:

- i. The relevant provisions of the Electricity Act, 2003, as amended from time to time and the rules and regulations made there under, and
- ii. CEA (Measures relating to Safety and Electrical Supply) Regulations, 2010, and any subsequent amendments made thereto.
- The decision of Hon'ble Supreme Court of India in its order in I.A No. 85618 of 2020 dated 19.04.2021 in Writ Petition No. 838 of 2019 for laying of overhead transmission lines.
- 6. The approval would also be subject to the following conditions:
  - i. The implementing agency will commence construction of the project within three years of grant of approval, unless this term is extended by Ministry of Power.
  - ii. Ministry of Power may withdraw the approval before the expiry of the period of three years after giving a one-month notice.
  - iii. The implementing agencies shall abide by the provisions of Works of Licensee Rules, 2006 notified by the Govt. of India, Ministry of Power in the Gazette of India, extraordinary Part-II, Section 3(i) dated 18-04-2006 (vide GSR 217 (E) dated 18-04-2006).

Your faithfully

(Sanjeev Jain) Under Secretary to the Government of India Tele: 011-23730264

Copy to The Chairperson CEA Seva Bhawan, R.K. Puram Delhi





#### GOVERNMENT OF INDIA MINISTRY OF CORPORATE AFFAIRS

Central Registration Centre

### **Certificate of Incorporation**

[Pursuant to sub-section (2) of section 7 and sub-section (1) of section 8 of the Companies Act, 2013 (18 of 2013) and rule 18 of the Companies (Incorporation) Rules, 2014]

I hereby certify that BEAWAR TRANSMISSION LIMITED is incorporated on this Twenty seventh day of April Two thousand twenty-two under the Companies Act, 2013 (18 of 2013) and that the company is limited by shares.

The Corporate Identity Number of the company is U40106DL2022GOI397400.

The Permanent Account Number (PAN) of the company is AAKCB7111Q

The Tax Deduction and Collection Account Number (TAN) of the company is DELB25063D

Given under my hand at Manesar this Twenty seventh day of April Two thousand twenty-two .

DS MINIGTRY OF CONFORMTE AFFAIRS 10

Digital Signature Certificate Mr. N.VAIRAMUTHU

For and on behalf of the Jurisdictional Registrar of Companies

Registrar of Companies

Central Registration Centre

Disclaimer: This certificate only evidences incorporation of the company on the basis of documents and declarations of the applicant(s). This certificate is neither a license nor permission to conduct business or solicit deposits or funds from public. Permission of sector regulator is necessary wherever required. Registration status and other details of the company can be verified on <u>www.mca.gov.in</u>

Mailing Address as per record available in Registrar of Companies office:

BEAWAR TRANSMISSION LIMITED CORE-4, SCOPE COMPLEX, 7, LODHI ROAD, DELHI, South Delhi, Delhi, India, 110003



* as issued by the Income Tax Department



### **Annexure-5 (Colly)**

[Pursuant to Schedule I (see sections 4 and 5) to the Companies Act, 2013] FORM NO. INC-33

* Table applicable to company as notified under schedule I of the companies Act, 2013

Table A- MEMORANDUM OF ASSOCIATION OF A COMPANY LIMITED BY SHARES

1. The Name of the Company is

BEAWAR TRANSMISSION LIMITED

2. The Registered office of the company will be situated in the state of

Delhi-DL

3.(a)The objects to be pursued by the company on its incorporation are

1. To plan, promote and develop an integrated and efficient power transmission system network in all its aspects including planning, investigation, research, design and engineering, preparation of preliminary, feasibility and definite project reports, construction, operation and maintenance of transmission lines, sub-stations, load dispatch stations and communication facilities and appurtenant works, coordination of integrated operation of regional and national grid system, execution of turn-key jobs for other utilities/organizations and wheeling of power in accordance with the policies, guidelines and objectives laid down by the Central Government from time to time.

2. To study, investigate, collect information and data, review operation, plan, research, design and prepare Report, diagnose operational difficulties and weaknesses and advise on the remedial measures to improve, undertake development of new and innovative product connected with business of the Company as well as modernize existing EHV, HV lines and Sub-Stations.

3.To act as consultants, technical advisors, surveyors and providers of technical and other services to Public or Private Sector enterprises engaged in the planning, investigation, research, design and preparations of preliminary, feasibility and definite project reports, manufacture of power plant and equipment, construction, generation, operation and maintenance of power transmission system from power generating stations and projects, transmission and distribution of power.

4.To plan, promote, develop, erect and maintain, operate and otherwise deal in Telecommunication networks and services in all its aspects including planning, investigation, research, design and engineering, preparation of preliminary, feasibility and definite project reports: to purchase, sell, import, export, assemble, manufacture, install, commission, maintain, operate commercially whether on own or along with other, on lease or otherwise. These networks and for such purposes to set up and/or install all requisite communications facilities and other facilities including fibre optic links, digital microwave links, communication cables, other telecommunication means, telephone and other exchanges, co-axial stations, microwave stations, repeater stations, security system databases, billing systems, subscriber management systems and other communication systems whether consisting of sound, visual impulse, or otherwise, existing or that may be developed or invented in the future and to manufacture, purchase, sell, import, export, assemble, take or give on lease/rental/subscription basis or by similar means or otherwise deal in all components and other support and ancillary hardware and software systems, accessories, parts and equipments etc. used in or in connection with the operation of the above communication systems and networks including to deal with telecommunication operations or directly with the general public, commercial companies or otherwise.

3.(b)Matters which are necessary for furtherance of the objects specified in clause 3(a) are

1. To obtain license, approvals and authorization from Governmental Statutory and Regulatory Authorities, as may be necessary to carry out and achieve the Objects of the Company and connected matters which may seem expedient to develop the business interests of the Company in India and abroad.

2. To enter into any arrangement with the Government of India or with any State Government or with other authorities/ commissions, local bodies or public sector or private sector undertakings, Power Utilities, Financial Institutions, Banks, International Funding Agencies and



SPICC +MOA (e-Memorandum of Association)

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obtain such charters, subsidies, loans, advances or other money, grants, contracts, rights, sanctions, privileges, licenses or concessions whatsoever (whether statutory or otherwise) which the Company may think it desirable to obtain for carrying its activities in furthering the interests of the Company or its members.

3.To enter into any agreement, contract or any arrangement for the implementation of the power generation, evacuation, transmission and distribution system and network with Power/Transmission Utilities, State Electricity Boards, Vidyut Boards, Transmission Companies, Generation Companies, Licensees, Statutory bodies, other organizations (whether in Private, Public or Joint Sector Undertaking) and bulk consumers of power etc.

4.To secure the payments of money, receivables on transmission and distribution of electricity and sate of fuel, as the case may be, to the State Electricity Boards, Vidyut Boards, Transmission Utilities, Generating Companies, Transmission Companies, Distribution Companies, State Governments, Licensees, statutory bodies, other organizations (whether in Private, Public or Joint Sector Undertaking) and bulk consumers of power etc. through Letter of Credits/ESCROW and other security documents.

5. To coordinate with the Central Transmission Utility of electricity generated by it under the relevant provisions of Electricity Act 2003 and any amendments thereto.

6.Subject to provisions of Sections 73, 74, 179, 180 & 186 and other applicable provisions of the Companies Act, 2013 and rules made thereunder and subject to other laws or directives, if any, of SEBI/RBI, to borrow money in Indian rupees or foreign currencies and obtain foreign lines of credits/ grants/aids etc. or to receive money or deposits from public for the purpose of the Company's business in such manner and on such terms and with such rights, privileges and obligations as the Company may think fit. The Company may issue bonds/ debentures whether secured or unsecured; bills of exchange, promissory notes or other securities, mortgage or charge on all or any of the immovable and movable properties, present or future and all or any of the uncalled capital for the time being of the Company as the Company may deem fit and to repay, redeem or pay off any such securities or charges.

7. To lend money on property or on mortgage of immovable properties or against Bank guarantee and to make advances of money against future supply of goods and services on such terms as the Directors may consider necessary and to invest money of the Company in such manner as the Directors may think fit and to sell, transfer or to deal with the same.

8. To own, possess, acquire by purchase, lease or otherwise rights, title and interests in and to, exchange or hire real estate, equipment, Transmission lines, lands, buildings, apartments, plants, equipment, machinery, fuel blocks and hereditaments of any tenure or descriptions situated in India or abroad or any estate or interest therein and any right over or connected with land so situated and turn the same to account in any manner as may seem necessary or convenient for the purpose of business of the Company and to hold, improve, exploit, re-organize, manage, lease, sell, exchange or otherwise dispose of the whole or any part thereof.

9.Subject to applicable provisions of Companies Act, 2013, to subscribe for, underwrite, or otherwise acquire, hold, dispose of and deal with the shares, stocks, debentures or other securities and titles of indebtedness or the right to participate in profits or other similar documents issued by any Government authority, Corporation or body or by any company or body of persons and any option or right in respect thereof.

10. To create any depreciation fund, reserve fund, sinking fund, insurance fund, gratuity, provident fund or any other fund, for depreciation or for repairing, improving extending or maintaining any of the properties of the Company or for any other purposes whatsoever conducive to the interests of the Company.

11. To acquire shares, stocks, debentures or securities of any company carrying on any business which this Company is entitled to carry on or acquisition of undertaking itself which may seem likely or calculated to promote or advance the interests of the Company and to sell or dispose of or transfer any such shares, stocks or securities and the acquired undertaking.

12. To enter into partnership or into any agreement for joint working, sharing or pooling profits, joint venture, amalgamation, union of interests, co-operation, reciprocal concessions or otherwise or amalgamate with any person or company carrying on or engaged in or about to carry on or engaged in any business or transaction in India or abroad which the Company is authorized to carry on or engage in any business undertaking having objects identical or similar to, as are being carried on by this Company.

13. To establish and maintain agencies, branch offices and local agencies, to procure business in any part of India and world and to take such steps as may be necessary to give the Company such rights and privileges in any part of the world as deemed proper in the interest of the Company.

14. To promote and undertake the formation of any institution or Company or subsidiary company or for any aforesaid objects intended to benefit the Company directly or indirectly and to coordinate, control and guide their activities.

15(a). To negotiate and enter into agreements and contracts with domestic and foreign companies, persons or other organizations, banks and financial institutions, in relation to the business of the Company including that of technical know-how, import, export, purchase or sale of plant, machinery, equipment, tools, accessories and consumables, financial assistance and for carrying out all or any of the objects of the Company.

15(b).To negotiate and enter into agreements and contracts for execution of turnkey jobs, works, supplies and export of plant, machinery, tools and accessories etc.

16.Upon and for the purpose of any issue of shares, debentures or any other securities of the Company, to enter into agreement with intermediaries including brokers, managers of issue/commission agents and underwriters and to provide for the remuneration of such

persons for their services by way of payment in cash or issue of shares, debentures or other securities of the Company or by granting options to take the same or in any other manner as permissible under the law.

17.To enter into contracts of indemnity and get guarantee and allocations for the business of the Company.

18.To make arrangements for training of all categories of employees and to employ or otherwise engage experts, advisors, consultants etc. in the interest of achieving the Company's objects.

19. To promote conservation and protection of electricity from theft, safety of life and to protect environments including air, land and water etc.

20. To pay and provide for the remuneration, amelioration and welfare of persons employed or formerly employed by the Company and their families providing for pension, allowances, bonuses, other payments or by creating for the purpose from time to time the Provident Fund, Gratuity and other Funds or Trusts. Further to undertake building or contributing to the building or houses, dwellings or chawls by grants of money, or by helping persons employed by the Company to effect or maintain insurance on their lives by contributing to the payment of premium or otherwise and by providing or subscribing or contributing towards educational institutions, recreation, hospitals and dispensaries, medical and other assistance as the Company may deem fit.

21.To ensure any rights, properties, undertakings, contracts, guarantees or obligations or profits of the Company of every nature and kind in any manner with any person, firm, association, institution or company.

22. To distribute among members of the Company dividend including bonus shares out of profits, accumulated profits or funds and resources of the Company in any manner permissible under law.

23. To institute, conduct, defend, compound or abandon any legal proceedings by or against the Company or its officers or otherwise concerning the affairs of the Company and also to compound and to allow time for payment or satisfaction of any debts or recovery due, claims or demands by or against the Company and to refer any claims or demands by or against the Company or any differences arising in execution of contracts to conciliation and arbitration and to observe, comply with and/or challenge any awards preliminary, interim or final made in any such arbitration.

24. To pay out of the funds of the Company all costs, charges, expenses and preliminary and incidental to the promotion, formation, establishment and registration of the Company or other expenses incurred in this regard.

25. Subject to provisions of Sections 181, 182 & 183 of Companies Act, 2013 to contribute money or otherwise assist to charitable, benevolent, religious, scientific national, defense, public or other institutions or objects or purposes.

26. To open an account or accounts with any individual, firm or company or with any bank bankers or shroofs and to pay into and withdraw money from such account or accounts.

27. To accept gifts, bequests, devises and donations from members and others and to make gifts to members and others of money, assets and properties of any kind.

28. To carry out all or any of the objects of the company and do all or any of the above things in any part of the world and either as principal, agent, contractor or trustee or otherwise and either alone or in conjunction with others.

29. To negotiate and/or enter into agreement and contract with individuals, companies, corporations, foreign or Indian, for obtaining or providing technical, financial or any other assistance for carrying on all or any of the objects of the Company and also for the purpose of activating, research, development of projects on the basis of know-how and/or financial participation and for technical collaboration, and to acquire or provide necessary formulate and patent rights for furthering the objects of the company.

30. To aid peculiarly or otherwise, any association, body or movement having for its object the solution, settlement or surmounting of industrial or labour problems or trouble or the promotion of industry or trade.

31.Subject to the provisions of Companies Act, 2013 or any amendment or re-enactment thereof in the event of winding up to distribute among the members in specie any property of the Company or any proceeds of sale on disposal of any property in accordance with the provisions of the Act.

32. To do all such other things as may be deemed incidental or conducive to the attainment of the above Objects or any of them and to carry on any business which may seem to the Company capable of being conveniently carried in connection with any of the Company's Objects or calculated directly or indirectly to enhance the value of or render profitable any of the Company's property or rights.

33. To establish, provide, maintain and conduct or otherwise subsidies research laboratories and experimental workshops for scientific, technical or researches, experiments and to undertake and carry on directly or in collaboration with other agencies scientific and technical research experiments and tests of all kinds and to process, improve and invent new products and their techniques of manufacture and to promote, encourage, reward in every manner studies and research, scientific and technical investigations and inventions of any kind that may be considered likely to assist, encourage and promote rapid advances in technology, economies, import substitution or any business which the Company is authorized to carry on.

34.Subject to provisions of the Companies Act, 2013, to evolve scheme for restructuring or arrangement, to amalgamate or merge or to enter into partnership or into any consortium or arrangement for sharing of profits, union of interests, co-operation, joint venture with any Person or Persons, partnership firm/firms, or company or companies carrying on or engaged in any operation capable of being conducted so conveniently in co-operation with the business of the Company or to benefit the Company or to the activities for which the Company has been established.

35.To apply for purchase, or otherwise acquire any trade marks, patents, brevets, inventions, licenses, concessions and the like, conferring any exclusive or nonexclusive or limited rights to use, or any secret or other information as to any invention which may be capable of being used for any of the purposes of the Company, or the acquisition of which may benefit the Company and to use, exercise, develop or grant licenses in respect of or otherwise turn to account the property, rights or information so acquired.

36. To sell, dispose or hive off an undertaking of the Company or any part thereof for such consideration as the Company may think fit and in particular for shares, debentures or securities of any other association, corporation or company.

37.To sell, improve, manage, develop, exchange, loan, lease or let, under-lease, sub - let, mortgage, dispose of, deal with in any manner, turn to account or otherwise deal with any rights or property of the Company.

4. The liability of the member(s) is limited and this liability is limited to the amount unpaid, if any, on the shares held by them.

5.The share capital of the company is

500,000.00

rupees, divided into,

50,000.00	Equity	shares of	10.00	rupees each	,and	
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6 X We, the several persons, whose names and addresses are subscribed, are desirous of being formed into a company in pursuance of this memorandum of association, and we respectively agree to take the number of shares in the capital of the company set against our respective names:

 I, whose name and address is given below, am desirous of forming a company in pursuance of this memorandum of association and agree to take all the shares in the capital of the company (Applicable in case of one person company):

S.No.	Subscriber Details									
	Name, Address, Description and O	cclination	DIN/PAN/Passport Number	No. of sł taken	nares	DSC	Dated			
1	REC POWER DEVELOPMENT AND CON LIMITED, CORE-4, SCOPE COMPLEX, 7 NEW DELHI- 110003, TROUGH ITS CEI LAKSHMANAN S/O SHRI KANNAPPAN 1ST FLOOR (BACK PORTION), GREEN F NEW DELHI-110016, OCCUPATION-SE	, LODHI ROAD, O RAJU I RAJU R/O C-4, PARK EXTENSION,	AAZPL2257P		Equity Preferenc	R Hondraw Laksh Date: manan 17.44.03 +05/30*	25/04/22			
2	THANGARAJAN SUBASH CHANDIRA E SITHAN THANGARAJAN NOMINEE OF DEVELOPMENT AND CONSULTANCY APARTMENT NO S-2, MIDDLE PORTIO NEW DELHI-110014, OCCUPATION-SE	305h s/o shri Frec Power Limited R/O NN 2-b, Jangpura,	02772316		Equity Preferenc	Thangar Dykar upnot ajan subash Subash Chandina Subash Chandira 302.04.25 Bosh -0530	25/04/22			
3	SAHAB NARAIN S/O HARI NARAIN NC POWER DEVELOPMENT AND CONSUL R/O A-1, FLAT NO 103, SOAMI NAGAF NAGAR, DELHI-110017 OCCUPATION	TANCY LIMITED R. MALVIYA	03641879		Equity Preferenc	SAHA Digitaliy expect by B bhafaabi NARAI 2002 06 25 N 17-47-26 N 109/307	25/04/22			
4	PUTHIYARKATTU SHIVARAMAN HARI PUTHIYARAKAT VELAYUDHAN SIVAR OF REC POWER DEVELOPMENT AND LIMITED FLAT NO.104, SADAR APART VIHAR EXTENTION, PHASE-1, PLOT NO	AMAN NOMINEE CONSULTANCY MENT, MAYUR 0.9, NEW	08657652	1	Equity Preferenc	P S Martine b P S HARIH Date ARAN 175/33 40530	25/04/22			
5	DELHI-110091, OCCUPATION-SERVIC RAJENDRA KUMAR GUPTA S/O LALLU NOMINEE OF REC POWER DEVELOPM CONSULTANCY LIMITED, R/O 204,MIL RAMPRASHTA GREENS, SECTOR-7,VAISHALI ,I.E.SAHIBABAD, GHAZIABAD-201010, UTTAR PRADES SERVICE	J RAM GUPTA IENT AND LENIA HEIGHTS,	06949686	1	Equity Preferenc	Rajend Digitaty tepnod try ra Retender Kumar Capita Kumar 2020 Gupta +00/30	25704/22			
6	MOHAN LAL KUMAWAT S/O SHRI RA KUMAWAT NOMINEE OF REC POWEF AND CONSULTANCY LIMITED FLAT N GC EMERALD, RAMPRASTHA GREENS SECTOR-7, GHAZIABAD-201010, UTT, OCCUPATION-SERVICE	r Development 10 142 Tower - 1 5 Vaishali	07682898	1	Equity Preferenc	Mohan Orgitality separat by Lat Materian Lat KurmaW2002 04 25 at 17:57:11 -05:30*	25/04/22			
7	SWATI GUPTA, D/O SHRI ROSHAN LA OF REC POWER DEVELOPMENT AND LIMITED, 337, TOWER NO. 1, MOUNT APARTMENTS, EAST OF KAILASH, DEI OCCUPATION-SERVICE	CONSULTANCY KAILASH	09569470	1	Equity Preferenc	Swati ^{Digitally} sgned by Gupt Date 2022.04.25 a 175353	25/04/22			
	Total Share	es taken		50,000.0	Equity Preferenc					
		S	igned before Me	1	I					
Nam	e A	Address, Descript	ion and Occupation	Numb	ership	rt DSC	Dated			

FCA	VINAY KUMAR	1803, TOWER-9, LA RESIDENTIA, TECH ZONE-4, GREATER NOIDA WEST-201306	402996	VINA Digitatiy tigned by Y ViNAY KUMAR KUM 2022.01 25 AR 409301
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#### [Pursuant to Schedule I (see Sections 4 and 5) to the Companies Act, 2013)] FORM NO. INC-34

### SPIC**C** +AOA (e-Articles of Association)

*Table **F** as notified under schedule I of the companies Act, 2013 is applicable to the company

#### BEAWAR TRANSMISSION LIMITED

#### A COMPANY LIMITED BY SHARES

Che ck if not appl icab le	ck if alter	Articl e No	Description
			Interpretation
	X	1	<ul> <li>(1) In these regulations- <ul> <li>(a) "the Act" means the Companies Act, 2013,</li> <li>(b) "the seal" means the common seal of the company.</li> </ul> </li> <li>(2) Unless the context otherwise requires, words or expressions contained in these regulations shall bear the same meaning as in the Act or any statutory modification thereof in force at the date at which these regulations become binding on the company.</li> <li>(3) "Public company means a company which- <ul> <li>(a) is not a private company;</li> <li>(b) has a minimum paid-up share capital as may be prescribed:</li> </ul> </li> <li>Provided that a company which is a subsidiary of a company, not being a private company, shall be deemed to be public company for the purposes of this Act even where such subsidiary company continues to be a private company in its articles.</li> </ul>
			Share capital and variation of rights
		 1	Subject to the provisions of the Act and these Articles, the shares in the capital of the company shall be under the control of the Directors who may issue, allot or otherwise dispose of the same or any of them to such persons, in such proportion and on such terms and conditions and either at a premium or at par and at such time as they may from time to time think fit.
	×	2	<ul> <li>(i) Every person whose name is entered as a member in the register of members shall be entitled to receive within two months after incorporation, in case of subscribers to the memorandum or after allotment or within one month after the application for the registration of transfer or transmission or within such other period as the conditions of issue shall be provided,- <ul> <li>(a) one certificate for all his shares without payment of any charges; or</li> <li>(b) several certificates, each for one or more of his shares, upon payment of twenty rupees for each certificate after the first.</li> </ul> </li> <li>(ii) Every certificate shall specify the shares to which it relates and the amount paid-up thereon and shall be signed by two Directors or by a director and the company secretary, wherever the company has appointed a company secretary:</li> </ul>
			Provided that in case the company has a common seal it shall be affixed in the presence of the persons required to sign the certificate. (iii) In respect of any share or shares held jointly by several persons, the company shall not be bound to issue more than one certificate, and delivery of a certificate for a share to one of several joint holders shall be sufficient delivery to all such holders.
		3	(i) If any share certificate be worn out, defaced, mutilated or torn or if there be no further space on the back for endorsement of transfer, then upon production and surrender thereof to the company, a new certificate may be issued in lieu thereof, and if any certificate is lost or destroyed then upon proof thereof to the satisfaction of the company and on execution of such indemnity as the company deem adequate, a new certificate in lieu thereof shall be given. Every certificate under this Article shall be issued on payment of twenty rupees for each certificate.

			(ii) The provisions of Articles (2) and (3) shall mutatis mutandis apply to debentures of the company.
			Except as required by law, no person shall be recognised by the company as holding any share upon any trust,
	-		and the company shall not be bound by, or be compelled in any way to recognise (even when having notice
		4	thereof) any equitable, contingent, future or partial interest in any share, or any interest in any fractional part of
			a share, or (except only as by these regulations or by law otherwise provided) any other rights in respect of any
			share except an absolute right to the entirety thereof in the registered holder.
-			(i) The company may exercise the powers of paying commissions conferred by sub-section (6) of section 40,
			provided that the rate per cent or the amount of the commission paid or agreed to be paid shall be disclosed in
		-	the manner required by that section and rules made thereunder.
		5	(ii) The rate or amount of the commission shall not exceed the rate or amount prescribed in rules made under
1			sub-section (6) of section 40.
			(iii) The commission may be satisfied by the payment of cash or the allotment of fully or partly paid shares or
			partly in the one way and partly in the other.
			(i) If at any time the share capital is divided into different classes of shares, the rights attached to any class
limet			(unless otherwise provided by the terms of issue of the shares of that class) may, subject to the provisions of
			section 48, and whether or not the company is being wound up, be varied with the consent in writing of the
		6	holders of three-fourths of the issued shares of that class, or with the sanction of a special resolution passed at
			a separate meeting of the holders of the shares of that class.
			(ii) To every such separate meeting, the provisions of these regulations relating to general meetings shall
			mutatis mutandis apply, but so that the necessary quorum shall be at least two persons holding at least one-
			third of the issued shares of the class in question. The rights conferred upon the holders of the shares of any class issued with preferred or other rights shall not,
		7	unless otherwise expressly provided by the terms of issue of the shares of that class, be deemed to be varied
		'	by the creation or issue of further shares ranking pari passu therewith.
			Subject to the provisions of section 55, any preference shares may, with the sanction of an ordinary resolution,
		8	be issued on the terms that they are to be redeemed on such terms and in such manner as the company
		Ũ	before the issue of the shares may, by special resolution, determine.
	-		
			Lien
			(i) The company shall have a first and paramount lien-
			(a) on every share (not being a fully paid share), for all monies (whether presently payable or not)
			called, or payable at a fixed time, in respect of that share; and
			(b) on all shares (not being fully paid shares) standing registered in the name of a single person, for all
		9	monies presently payable by him or his estate to the company:
			Provided that the Board of directors may at any time declare any share to be wholly or in part exempt from the
			provisions of this clause.
			(ii) The company?s lien, if any, on a share shall extend to all dividends payable and bonuses declared from
			time to time in respect of such shares.
	-		The company may sell, in such manner as the Board thinks fit, any shares on which the company has a lien:
			Provided that no sale shall be made-
		10	(a) unless a sum in respect of which the lien exists is presently payable; or
			(b) until the expiration of fourteen days after a notice in writing stating and demanding payment of such
			part of the amount in respect of which the lien exists as is presently payable, has been given to the registered
			holder for the time being of the share or the person entitled thereto by reason of his death or insolvency.
			(i) To give effect to any such sale, the Board may authorise some person to transfer the shares sold to the
		44	purchaser thereof. (ii) The purchaser shall be registered as the holder of the observe comprised in grup such transfer.
		11	(ii) The purchaser shall be registered as the holder of the shares comprised in any such transfer.
			(iii) The purchaser shall not be bound to see to the application of the purchase money, nor shall his title to the
-			shares be affected by any irregularity or invalidity in the proceedings in reference to the sale.
			(i) The proceeds of the sale shall be received by the company and applied in payment of such part of the
		-12	amount in respect of which the lien exists as is presently payable. (ii) The residue, if any, shall, subject to a like lien for sums not presently payable as existed upon the shares
			before the sale, be paid to the person entitled to the shares at the date of the sale.
			berere me sale, ve paid to the person entitled to the shares at the date of the sale.
			Calis on shares
			(i) The Board may, from time to time, make calls upon the members in respect of any monies unpaid on their
			shares (whether on account of the nominal value of the shares or by way of premium) and not by the
1		13	conditions of allotment thereof made payable at fixed times:
		10	Provided that no call shall exceed one-fourth of the nominal value of the share or be payable at less than one
			month from the date fixed for the payment of the last preceding call.
			(ii) Each member shall, subject to receiving at least fourteen days? notice specifying the time or times and

		place of payment, pay to the company, at the time or times and place so specified, the amount called on his shares. (iii) A call may be revoked or postponed at the discretion of the Board.
	14	A call shall be deemed to have been made at the time when the resolution of the Board authorizing the call was passed and may be required to be paid by instalments.
	15	The joint holders of a share shall be jointly and severally liable to pay all calls in respect thereof.
	16	<ul> <li>(i) If a sum called in respect of a share is not paid before or on the day appointed for payment thereof, the person from whom the sum is due shall pay interest thereon from the day appointed for payment thereof to the time of actual payment at ten per cent per annum or at such lower rate, if any, as the Board may determine.</li> <li>(ii) The Board shall be at liberty to waive payment of any such interest wholly or in part.</li> </ul>
	17	<ul> <li>(i) Any sum which by the terms of issue of a share becomes payable on allotment or at any fixed date, whether on account of the nominal value of the share or by way of premium, shall, for the purposes of these regulations, be deemed to be a call duly made and payable on the date on which by the terms of issue such sum becomes payable.</li> <li>(ii) In case of non-payment of such sum, all the relevant provisions of these regulations as to payment of interest and expenses, forfeiture or otherwise shall apply as if such sum had become payable by virtue of a call duly made and notified.</li> </ul>
	18	The Board- (a) may, if it thinks fit, receive from any member willing to advance the same, all or any part of the monies uncalled and unpaid upon any shares held by him; and (b) upon all or any of the monies so advanced, may (until the same would, but for such advance, become presently payable) pay interest at such rate not exceeding, unless the company in general meeting shall otherwise direct, twelve per cent per annum, as may be agreed upon between the Board and the member paying the sum in advance.
		Transfer of shares
	19	<ul> <li>(i) The instrument of transfer of any share in the company shall be executed by or on behalf of both the transferor and transferee.</li> <li>(ii) The transferor shall be deemed to remain a holder of the share until the name of the transferee is entered in the register of members in respect thereof.</li> </ul>
	20	The Board may, subject to the right of appeal conferred by section 58 decline to register- (a) the transfer of a share, not being a fully paid share, to a person of whom they do not approve; or (b) any transfer of shares on which the company has a lien.
	21	The Board may decline to recognise any instrument of transfer unless- (a) the instrument of transfer is in the form as prescribed in rules made under sub-section (1) of section 56; (b) the instrument of transfer is accompanied by the certificate of the shares to which it relates, and such other evidence as the Board may reasonably require to show the right of the transferor to make the transfer; and (c) the instrument of transfer is in respect of only one class of shares.
	22	On giving not less than seven days? previous notice in accordance with section 91 and rules made thereunder, the registration of transfers may be suspended at such times and for such periods as the Board may from time to time determine: Provided that such registration shall not be suspended for more than thirty days at any one time or for more than forty-five days in the aggregate in any year.
		Transmission of shares
	23	<ul> <li>(i) On the death of a member, the survivor or survivors where the member was a joint holder, and his nominee or nominees or legal representatives where he was a sole holder, shall be the only persons recognised by the company as having any title to his interest in the shares</li> <li>(ii) Nothing in clause (i) shall release the estate of a deceased joint holder from any liability in respect of any share which had been jointly held by him with other persons.</li> </ul>
	24	<ul> <li>(i) Any person becoming entitled to a share in consequence of the death or insolvency of a member may, upon such evidence being produced as may from time to time properly be required by the Board and subject as hereinafter provided, elect, either-</li> <li>(a) to be registered himself as holder of the share; or</li> <li>(b) to make such transfer of the share as the deceased or insolvent member could have made.</li> <li>(ii) The Board shall, in either case, have the same right to decline or suspend registration as it would have had, if the deceased or insolvent member had transferred the share before his death or insolvency.</li> </ul>

	25	<ul> <li>(i) If the person so becoming entitled shall elect to be registered as holder of the share himself, he shall deliver or send to the company a notice in writing signed by him stating that he so elects.</li> <li>(ii) If the person aforesaid shall elect to transfer the share, he shall testify his election by executing a transfer of the share.</li> <li>(iii) All the limitations, restrictions and provisions of these regulations relating to the right to transfer and the registration of transfers of shares shall be applicable to any such notice or transfer as aforesaid as if the death or insolvency of the member had not occurred and the notice or transfer were a transfer signed by that member.</li> </ul>
	26	A person becoming entitled to a share by reason of the death or insolvency of the holder shall be entitled to the same dividends and other advantages to which he would be entitled if he were the registered holder of the share, except that he shall not, before being registered as a member in respect of the share, be entitled in respect of it to exercise any right conferred by membership in relation to meetings of the company: Provided that the Board may, at any time, give notice requiring any such person to elect either to be registered himself or to transfer the share, and if the notice is not complied with within ninety days, the Board may thereafter withhold payment of all dividends, bonuses or other monies payable in respect of the share, until the requirements of the notice have been complied with.
		Forfeiture of shares
	27	If a member fails to pay any call, or instalment of a call, on the day appointed for payment thereof, the Board may, at any time thereafter during such time as any part of the call or instalment remains unpaid, serve a notice on him requiring payment of so much of the call or instalment as is unpaid, together with any interest which may have accrued.
	28	The notice aforesaid shall- (a) name a further day (not being earlier than the expiry of fourteen days from the date of service of the notice) on or before which the payment required by the notice is to be made; and (b) state that, in the event of non-payment on or before the day so named, the shares in respect of which the call was made shall be liable to be forfeited.
	29	If the requirements of any such notice as aforesaid are not complied with, any share in respect of which the notice has been given may, at any time thereafter, before the payment required by the notice has been made, be forfeited by a resolution of the Board to that effect.
	30	<ul> <li>(i) A forfeited share may be sold or otherwise disposed of on such terms and in such manner as the Board thinks fit.</li> <li>(ii) At any time before a sale or disposal as aforesaid, the Board may cancel the forfeiture on such terms as it thinks fit.</li> </ul>
	31	<ul> <li>(i) A person whose shares have been forfeited shall cease to be a member in respect of the forfeited shares, but shall, notwithstanding the forfeiture, remain liable to pay to the company all monies which, at the date of forfeiture, were presently payable by him to the company in respect of the shares.</li> <li>(ii) The liability of such person shall cease if and when the company shall have received payment in full of all such monies in respect of the shares.</li> </ul>
	32	<ul> <li>(i) A duly verified declaration in writing that the declarant is a director, the manager or the secretary, of the company, and that a share in the company has been duly forfeited on a date stated in the declaration, shall be conclusive evidence of the facts therein stated as against all persons claiming to be entitled to the share;</li> <li>(ii) The company may receive the consideration, if any, given for the share on any sale or disposal thereof and may execute a transfer of the share in favour of the person to whom the share is sold or disposed of;</li> <li>(iii) The transferee shall thereupon be registered as the holder of the share; and</li> <li>(iv) The transferee shall not be bound to see to the application of the purchase money, if any, nor shall his title to the share be affected by any irregularity or invalidity in the proceedings in reference to the forfeiture, sale or disposal of the share.</li> </ul>
	33	The provisions of these regulations as to forfeiture shall apply in the case of nonpayment of any sum which, by the terms of issue of a share, becomes payable at a fixed time, whether on account of the nominal value of the share or by way of premium, as if the same had been payable by virtue of a call duly made and notified.
		Alteration of capital
	34	The company may, from time to time, by ordinary resolution increase the share capital by such sum, to be divided into shares of such amount, as may be specified in the resolution.
	35	Subject to the provisions of section 61, the company may, by ordinary resolution,- (a) consolidate and divide all or any of its share capital into shares of larger amount than its existing shares; (b) convert all or any of its fully paid-up shares into stock, and reconvert that stock into fully paid-up shares of any denomination; (c) sub-divide its existing shares or any of them into shares of smaller amount than is fixed by the memorandum;

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		(d) cancel any shares which, at the date of the passing of the resolution, have not been taken or agreed to be
 		taken by any person.
		Where shares are converted into stock,- (a) the holders of stock may transfer the same or any part thereof in the same manner as, and subject to the same regulations under which, the shares from which the stock arose might before the conversion have been transferred, or as near thereto as circumstances admit: Provided that the Board may, from time to time, fix the minimum amount of stock transferable, so, however, that such minimum shall not exceed the nominal amount of the shares from which the stock arose. (b) the holders of stock shall, according to the amount of stock held by them, have the same rights, privileges and advantages as regards dividends, voting at meetings of the company, and other matters, as if they held the shares from which the stock arose; but no such privilege or advantage (except participation in the dividends and profits of the company and in the assets on winding up) shall be conferred by an amount of stock which would not, if existing in shares, have conferred that privilege or advantage. (c) such of the regulations of the company as are applicable to paid-up shares shall apply to stock and the words "share" and "shareholder" in those regulations shall include "stock" and "stock-holder" respectively. The company may, by special resolution, reduce in any manner and with, and subject to, any incident
	37	authorised and consent required by law,- (a) its share capital;
	51	(b) any capital redemption reserve account; or
		(c) any share premium account.
		Capitalisation of profits
		<ul> <li>(i) The company in general meeting may, upon the recommendation of the Board, resolve-</li> <li>(a) that it is desirable to capitalise any part of the amount for the time being standing to the credit of any of the company?s reserve accounts, or to the credit of the, profit and loss account, or otherwise available for distribution; and</li> <li>(b) that such such such such such such such such</li></ul>
	38	<ul> <li>(b) that such sum be accordingly set free for distribution in the manner specified in clause (ii) amongst the members who would have been entitled thereto, if distributed by way of dividend and in the same proportions.</li> <li>(ii) The sum aforesaid shall not be paid in cash but shall be applied, subject to the provision contained in clause (iii), either in or towards-</li> <li>(A) paying up any amounts for the time being unpaid on any shares held by such members respectively;</li> <li>(B) paying up in full, unissued shares of the company to be allotted and distributed, credited as fully paid-up, to and amongst such members in the proportions aforesaid;</li> <li>(C) partly in the way specified in sub-clause (A) and partly in that specified in sub-clause (B);</li> <li>(D) A securities premium account and a capital redemption reserve account may, for the purposes of this regulation, be applied in the paying up of unissued shares to be issued to members of the company as fully paid bonus shares;</li> <li>(E) The Board shall give effect to the resolution passed by the company in pursuance of this regulation.</li> </ul>
	39	<ul> <li>(i) Whenever such a resolution as aforesaid shall have been passed, the Board shall-</li> <li>(a) make all appropriations and applications of the undivided profits resolved to be capitalised thereby, and all allotments and issues of fully paid shares if any; and</li> <li>(b) generally do all acts and things required to give effect thereto.</li> <li>(ii) The Board shall have power-</li> <li>(a) to make such provisions, by the issue of fractional certificates or by payment in cash or otherwise as it thinks fit, for the case of shares becoming distributable in fractions; and</li> <li>(b) to authorise any person to enter, on behalf of all the members entitled thereto, into an agreement with the company providing for the allotment to them respectively, credited as fully paid-up, of any further shares to which they may be entitled upon such capitalisation, or as the case may require, for the payment by the company on their behalf, by the application thereto of their respective proportions of profits resolved to be capitalised, of the amount or any part of the amounts remaining unpaid on their existing shares;</li> <li>(iii) Any agreement made under such authority shall be effective and binding on such members.</li> </ul>
		Buy-back of shares
	40	Notwithstanding anything contained in these articles but subject to the provisions of sections 68 to 70 and any other applicable provision of the Act or any other law for the time being in force, the company may purchase its own shares or other specified securities.
		General meetings
	<b>4</b> 1	All general meetings other than annual general meeting shall be called extraordinary general meeting.

	i-i		(i) The Board may, whenever it thinks fit, call an extraordinary general meeting.
		42	(ii) If at any time directors capable of acting who are sufficient in number to form a quorum are not within India,
			any director or any two members of the company may call an extraordinary general meeting in the same
-			manner, as nearly as possible, as that in which such a meeting may be called by the Board.
			Proceedings at general meetings
			(i) No business shall be transacted at any general meeting unless a quorum of members is present at the time
	$\cup$	43	when the meeting proceeds to business.
		77	(ii) Save as otherwise provided herein, the quorum for the general meetings shall be as provided in section
			103.
		44	The chairperson, if any, of the Board shall preside as Chairperson at every general meeting of the company,
		45	If there is no such Chairperson, or if he is not present within fifteen minutes after the time appointed for holding the meeting, or is unwilling to act as chairperson of the meeting, the directors present shall elect one of their
		40	members to be Chairperson of the meeting.
-			If at any meeting no director is willing to act as Chairperson or if no director is present within fifteen minutes
		46	after the time appointed for holding the meeting, the members present shall choose one of their members to be
			Chairperson of the meeting.
			Adjournment of meeting
			(i) The Chairperson may, with the consent of any meeting at which a quorum is present, and shall, if so
la <del>r i</del>	لسا		directed by the meeting, adjourn the meeting from time to time and from place to place. (ii) No business shall be transacted at any adjourned meeting other than the business left unfinished at the
			meeting from which the adjournment took place.
		47	(iii) When a meeting is adjourned for thirty days or more, notice of the adjourned meeting shall be given as in
			the case of an original meeting.
			(iv) Save as aforesaid, and as provided in section 103 of the Act, it shall not be necessary to give any notice of
			an adjournment or of the business to be transacted at an adjourned meeting.
			Voting rights
			Subject to any rights or restrictions for the time being attached to any class or classes of shares,-
			(a) on a show of hands, every member present in person shall have one vote; and
	11	48	(b) on a poll, the voting rights of members shall be in proportion to his share in the paid-up equity share capital
			of the company.
	-	49	A member may exercise his vote at a meeting by electronic means in accordance with section 108 and shall
		49	vote only once.
			(i) In the case of joint holders, the vote of the senior who tenders a vote, whether in person or by proxy, shall
	ļĻ	50	be accepted to the exclusion of the votes of the other joint holders.
			(ii) For this purpose, seniority shall be determined by the order in which the names stand in the register of
			members. A member of unsound mind, or in respect of whom an order has been made by any court having jurisdiction in
		51	lunacy, may vote, whether on a show of hands or on a poll, by his committee or other legal guardian, and any
			such committee or guardian may, on a poll, vote by proxy.
-			Any business other than that upon which a poll has been demanded may be proceeded with, pending the
		52	taking of the poll.
			No member shall be entitled to vote at any general meeting unless all calls or other sums presently payable by
		53	him in respect of shares in the company have been paid
			(i) No objection shall be raised to the qualification of any voter except at the meeting or adjourned meeting at
			which the vote objected to is given or tendered, and every vote not disallowed at such meeting shall be valid
		54	for all purposes.
			(ii) Any such objection made in due time shall be referred to the Chairperson of the meeting, whose decision
			shall be final and conclusive.
			Ргоху
1-1			The instrument appointing a proxy and the power-of-attorney or other authority, if any, under which it is signed
	111	1	or a notarised copy of that power or authority, shall be deposited at the registered office of the company not
		55	less than 48 hours before the time for holding the meeting or adjourned meeting at which the person named in
		55	

	56	An instrument appointing a proxy shall be in the form as prescribed in the rules made under section 105.
	57	A vote given in accordance with the terms of an instrument of proxy shall be valid, notwithstanding the previous death or insanity of the principal or the revocation of the proxy or of the authority under which the proxy was executed, or the transfer of the shares in respect of which the proxy is given:Provided that no intimation in writing of such death, insanity, revocation or transfer shall have been received by the company at its office before the commencement of the meeting or adjourned meeting at which the proxy is used.
		Board of Directors
X		The day to day management of the business of the Company shall be vested with the Board of Directors of the Company or such person(s), as may be authorized by the Board from time to time. The Board may exercise all such powers of the Company and do all such acts, deeds and things as are not prohibited by the Act or any other law for the time being in force or by the Memorandum of Association of the Company and without prejudice to the foregoing, shall be responsible for all policy matters and the supervision, direction and control of the conduct of the business affairs and operations of the Company. (i) The first Directors of the Company shall be:- 1. SAURABH RASTOGI 2. SOMYA KANT 3. MOHAN LAL KUMAWAT (ii) At every annual general meeting, one-third of such of the directors for the time being as are liable to retire by rotation, or if their number is neither three nor a multiple of three then, the number nearest to one-third, shall retire from office.
	58	<ul> <li>(iii) The directors to retire by rotation at every annual general meeting shall be those who have been longest in office since their last appointment, but as between persons who bécame directors on the same day, those who are to retire shall, in default of and subject to any subject to any agreement among themselves, be determined by lot.</li> <li>(iv) At annual general meeting at which a director retires as aforesaid, the company may fill up the vacancy by appointing the retiring director or some other person thereto.</li> <li>The Board of Directors of the Company shall consist of not less than 3 but not more than 15 Directors. The appointment of Directors including the Chairman, Managing Director, Whole time Director, Part-time Director shall be done in the General Meetings in accordance with the provisions of the Companies Act, 2013 and Rules made thereunder and shall be eligible for reappointment.</li> <li>However, till the Company shall company, REC Power Development and Consultancy Limited (RECPDCL)- the holding company shall have the full powers to recommend / nominate the name of any Directors to be appointed on the Board of the Company.</li> <li>Further, RECPDCL shall also have the ower to remove any director from office at any time in its absolute discretion. RECPDCL shall also have the right to fill any vacancies in the office of director caused by removal, resignation, death or otherwise.</li> <li>Subject to provisions of the Act, the Company may by passing the resolution in General Meeting increase/ decrease the maximum number of Directors, and may alter their qualification.</li> <li>Further Read and point another person in place of him.</li> <li>The Board may appoint another person in place of him.</li> <li>The Board may appoint any person to act as alternate director for a Director during the later's absence for a period of not less than three months from India and such appointment shall have effect and such appointee, whils the holds office as an alternate director, shall be entitled to</li></ul>
		Director so appointed shall retire from Office at next annual General Meeting but shall be eligible for election by the company at that meeting as a Director.
	59	<ul> <li>(i) The remuneration of the directors shall, in so far as it consists of a monthly payment, be deemed to accrue from day-to-day.</li> <li>(ii) In addition to the remuneration payable to them in pursuance of the Act, the directors may be paid all travelling, hotel and other expenses properly incurred by them-</li> <li>(a) in attending and returning from meetings of the Board of Directors or any committee thereof or general meetings of the company; or</li> <li>(b) in connection with the business of the company.</li> </ul>

	60	The Board may pay all expenses incurred in getting up and registering the company.
	61	The company may exercise the powers conferred on it by section 88 with regard to the keeping of a foreign register; and the Board may (subject to the provisions of that section) make and vary such regulations as it may thinks fit respecting the keeping of any such register.
	62	All cheques, promissory notes, drafts, hundis, bills of exchange and other negotiable instruments, and all receipts for monies paid to the company, shall be signed, drawn, accepted, endorsed, or otherwise executed, as the case may be, by such person and in such manner as the Board shall from time to time by resolution determine.
	63	Every director present at any meeting of the Board or of a committee thereof shall sign his name in a book to be kept for that purpose.
	64	<ul> <li>(i) Subject to the provisions of section 149, the Board shall have power at any time, and from time to time, to appoint a person as an additional director, provided the number of the directors and additional directors together shall not at any time exceed the maximum strength fixed for the Board by the articles.</li> <li>(ii) Such person shall hold office only up to the date of the next annual general meeting of the company but shall be eligible for appointment by the company as a director at that meeting subject to the provisions of the Act.</li> </ul>
		Proceedings of the Board
	65	<ul> <li>(i) The Board of Directors may meet for the conduct of business, adjourn and otherwise regulate its meetings, as it thinks fit.</li> <li>(ii) A director may, and the manager or secretary on the requisition of a director shall, at any time, summon a meeting of the Board.</li> </ul>
	66	<ul> <li>(i) Save as otherwise expressly provided in the Act, questions arising at any meeting of the Board shall be decided by a majority of votes.</li> <li>(ii) In case of an equality of votes, the Chairperson of the Board, if any, shall have a second or casting vote.</li> </ul>
	67	The continuing directors may act notwithstanding any vacancy in the Board; but, if and so long as their number is reduced below the quorum fixed by the Act for a meeting of the Board, the continuing directors or director may act for the purpose of increasing the number of directors to that fixed for the quorum, or of summoning a general meeting of the company, but for no other purpose.
	68	<ul> <li>(i) The Board may elect a Chairperson of its meetings and determine the period for which he is to hold office.</li> <li>(ii) If no such Chairperson is elected, or if at any meeting the Chairperson is not present within five minutes after the time appointed for holding the meeting, the directors present may choose one of their number to be Chairperson of the meeting.</li> </ul>
	69	<ul> <li>(i) The Board may, subject to the provisions of the Act, delegate any of its powers to committees consisting of such member or members of its body as it thinks fit.</li> <li>(ii) Any committee so formed shall, in the exercise of the powers so delegated, conform to any regulations that may be imposed on it by the Board.</li> </ul>
	70	<ul> <li>(i) A committee may elect a Chairperson of its meetings.</li> <li>(ii) If no such Chairperson is elected, or if at any meeting the Chairperson is not present within five minutes after the time appointed for holding the meeting, the members present may choose one of their members to be Chairperson of the meeting.</li> </ul>
	71	<ul> <li>(i) A committee may meet and adjourn as it thinks fit.</li> <li>(ii) Questions arising at any meeting of a committee shall be determined by a majority of votes of the members present, and in case of an equality of votes, the Chairperson shall have a second or casting vote.</li> </ul>
	72	All acts done in any meeting of the Board or of a committee thereof or by any person acting as a director, shall, notwithstanding that it may be afterwards discovered that there was some defect in the appointment of any one or more of such directors or of any person acting as aforesaid, or that they or any of them were disqualified, be as valid as if every such director or such person had been duly appointed and was qualified to be a director.
	73	Save as otherwise expressly provided in the Act, a resolution in writing, signed by all the members of the Board or of a committee thereof, for the time being entitled to receive notice of a meeting of the Board or committee, shall be valid and effective as if it had been passed at a meeting of the Board or committee, duly convened and held.
		Chief Executive Officer, Manager, Company Secretary or Chief Financial Officer
	74	Subject to the provisions of the Act,- (i) A chief executive officer, manager, company secretary or chief financial officer may be appointed by the Board for such term, at such remuneration and upon such conditions as it may thinks fit; and any chief executive officer, manager, company secretary or chief financial officer so appointed may be removed by means of a resolution of the Board;

		<ul> <li>(ii) A director may be appointed as chief executive officer, manager, company secretary or chief financial officer</li> </ul>
	75	A provision of the Act or these regulations requiring or authorising a thing to be done by or to a director and chief executive officer, manager, company secretary or chief financial officer shall not be satisfied by its being done by or to the same person acting both as director and as, or in place of, chief executive officer, manager, company secretary or chief financial officer.
		The Seal
	76	i) The Board shall provide for the safe custody of the seal. (ii) The seal of the company shall not be affixed to any instrument except by the authority of a resolution of the Board or of a committee of the Board authorised by it in that behalf, and except in the presence of at least two directors and of the secretary or such other person as the Board may appoint for the purpose; and those two directors and the secretary or other person aforesaid shall sign every instrument to which the seal of the company is so affixed in their presence.
		Dividends and Reserve
	77	The company in general meeting may declare dividends, but no dividend shall exceed the amount recommended by the Board.
	78	Subject to the provisions of section 123, the Board may from time to time pay to the members such interim dividends as appear to it to be justified by the profits of the company.
	79	<ul> <li>(i) The Board may, before recommending any dividend, set aside out of the profits of the company such sums as it thinks fit as a reserve or reserves which shall, at the discretion of the Board, be applicable for any purpose to which the profits of the company may be properly applied, including provision for meeting contingencies or for equalizing dividends; and pending such application, may, at the like discretion, either be employed in the business of the company or be invested in such investments (other than shares of the company) as the Board may, from time to time, thinks fit.</li> <li>(ii) The Board may also carry forward any profits which it may consider necessary not to divide, without setting them aside as a reserve.</li> </ul>
	80	<ul> <li>(i) Subject to the rights of persons, if any, entitled to shares with special rights as to dividends, all dividends shall be declared and paid according to the amounts paid or credited as paid on the shares in respect whereof the dividend is paid, but if and so long as nothing is paid upon any of the shares in the company, dividends may be declared and paid according to the amounts of the shares.</li> <li>(ii) No amount paid or credited as paid on a share in advance of calls shall be treated for the purposes of this regulation as paid on the share.</li> <li>(iii) All dividends shall be apportioned and paid proportionately to the amounts paid or credited as paid on the shares.</li> <li>(iii) All dividends shall be apportioned and paid proportionately to the amounts paid or credited as paid on the shares during any portion or portions of the period in respect of which the dividend is paid; but if any share is issued on terms providing that it shall rank for dividend as from a particular date such share shall rank for dividend accordingly.</li> </ul>
	81	The Board may deduct from any dividend payable to any member all sums of money, if any, presently payable by him to the company on account of calls or otherwise in relation to the shares of the company.
	82	<ul> <li>(i) Any dividend, interest or other monies payable in cash in respect of shares may be paid by cheque or warrant sent through the post directed to the registered address of the holder or, in the case of joint holders, to the registered address of that one of the joint holders who is first named on the register of members, or to such person and to such address as the holder or joint holders may in writing direct.</li> <li>(ii) Every such cheque or warrant shall be made payable to the order of the person to whom it is sent.</li> </ul>
	83	Any one of two or more joint holders of a share may give effective receipts for any dividends, bonuses or other monies payable in respect of such share.
	84	Notice of any dividend that may have been declared shall be given to the persons entitled to share therein in the manner mentioned in the Act.
	85	No dividend shall bear interest against the company.
		Accounts
	86	<ul> <li>(i) The Board shall from time to time determine whether and to what extent and at what times and places and under what conditions or regulations, the accounts and books of the company, or any of them, shall be open to the inspection of members not being directors.</li> <li>(ii) No member (not being a director) shall have any right of inspecting any account or book or document of the company except as conferred by law or authorised by the Board or by the company in general meeting.</li> </ul>

		Winding up
	87	Subject to the provisions of Chapter XX of the Act and rules made thereunder- (i) If the company shall be wound up, the liquidator may, with the sanction of a special resolution of the company and any other sanction required by the Act, divide amongst the members, in specie or kind, the whole or any part of the assets of the company, whether they shall consist of property of the same kind or not. (ii) For the purpose aforesaid, the liquidator may set such value as he deems fair upon any property to be divided as aforesaid and may determine how such division shall be carried out as between the members or different classes of members. (iii) The liquidator may, with the like sanction, vest the whole or any part of such assets in trustees upon such trusts for the benefit of the contributories if he considers necessary, but so that no member shall be compelled to accept any shares or other securities whereon there is any liability.
		Indemnity
	88	Every officer of the company shall be indemnified out of the assets of the company against any liability incurred by him in defending any proceedings, whether civil or criminal, in which judgment is given in his favour or in which he is acquitted or in which relief is granted to him by the court or the Tribunal.

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### **Annexure-6 (Colly.)**

#### REC POWER DEVELOPMENT AND CONSULTANCY LIMITED (Formerly Known as REC Power Distribution Company Limited)

#### GLOBAL INVITATION (Through e-bidding Only) FOR SELECTION OF TRANSMISSION SERVICE PROVIDER THROUGH TARIFF BASED **COMPETITIVE** BIDDING (TBCB) PROCESS ON BUILD, OWN, OPERATE AND TRANSFER (BOOT) BASIS FOR TWO (2) INTER - STATE TRANSMISSION PROJECTS

REC Power Development and Consultancy Limited (formerly known as REC Power Distribution Company Limited), New Delhi, India (a wholly owned subsidiary of REC Limited, a Navratna Central Public Sector Undertaking) invites proposal for setting up of the below mentioned transmission projects through TBCB process on Build, Own, Operate and Transfer (BOOT) basis following single stage two envelope process of "Request for Proposal (RFP)". Interested bidder may refer to the Request for Proposal (RFP) notifications and RFP documents available on our website www.recpdcl.in & www.recindia.nic.in w.e.f. 10.02.2022.

The bidders may obtain the RFP documents on all working days between 1030 hours (IST) to 1600 hours (IST) from 10.02.2022 to one day prior of bid submission date for each project on payment of non-refundable fee of ₹ 5,00,000/-(Rupees Five Lakh Only) or US\$ 7000 (US Dollars Seven Thousand Only) + 18% GST for each transmission project as per details provided in the RFP document available on the website www.recpdcl.in & www.recindia.nic.in.

The Request for Proposal (RFP) Documents can also be downloaded from our website www.recpdcl.in & www.recindia.nic.in, however in such cases interested parties can submit Response to RFP only on submission of non-refundable fee of ₹5,00,000/-(Rupees Five Lakh Only) or US\$ 7000 (US Dollars Seven Thousand Only) + 18% GST for each transmission project as per details provided in the respective RFP document. The survey report & clarifications to RFP documents shall be issued to those bidders, who have obtained/purchased RFP document by paying requisite fee. The Important timelines in this regard are as follows:

Sr. No.	Name of Project	Last Date for seeking clarifications	Last Date for submission of Response to RFP	Details of Opening of Response to
(	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase – III Part F	02.03.2022	18.04.2022 upto 1100 Hrs (IST)	18.04.2022 at 1130 Hrs (IST)
1	Transmission Scheme for Solar Energy Zone in Gadag (1500 MW), Karnataka: PartA-Phase-II		18.04.2022 upto 1200 Hrs (IST)	18.04.2022 at 1230 Hrs (IST)

Note: RECPDCL reserves the right to cancel or modify the process without assigning any reason and without any liability. This is not an offer.

Chief Executive Officer

**REC Power Development and Consultancy Ltd.** (formerly known as REC Power Distribution Company Ltd.) Core-4, SCOPE Complex, 7, Lodhi Road, New Delhi-110003, India



Consultancy Ltd. (formerly known as **REC Power Distribution Company Ltd.)** 

उर्जा ही जीवन है, इसे बचाएं।

**Ministry of Power** Government of India

**Central Electricity** Authority

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### STANDARD SINGLE STAGE REQUEST FOR PROPOSAL DOCUMENT

### FOR

### SELECTION OF BIDDER AS TRANSMISSION SERVICE PROVIDER THROUGH TARIFF BASED COMPETITIVE BIDDING PROCESS

### TO

### **ESTABLISH INTER-STATE TRANSMISSION SYSTEM**

### FOR

### TRANSMISSION SYSTEM FOR EVACUATION OF POWER FROM REZ IN RAJASTHAN (20GW) UNDER PHASE-III PART F

### **ISSUED BY**

REC Power Development and Consultancy Limited (formerly REC Power Distribution Company Limited) (A wholly owned subsidiary of REC Limited)

Registered Office: Core-4, SCOPE Complex, 7, Lodhi Road, New Delhi – 110 003 Email: pshariharan@recl.in, pshariharan@recpdcl.in

10.02.2022

**REC Power Development and Consultancy Limited** 

#### REC Power Development and Consultancy Limited (formerly REC Power Distribution Company Limited) (A wholly owned subsidiary of REC Limited) Core-4, SCOPE Complex, 7, Lodhi Road, New Delhi – 110 003

Request for Proposal Document for selection of Bidder as Transmission Service Provider through tariff based competitive bidding process to establish Inter-State Transmission System for Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F is issued by REC Power Development and Consultancy Limited.

This RFP document is issued to -

M/s._____

Chief Executive Officer, REC Power Development and Consultancy Limited (formerly REC Power Distribution Company Limited) (A wholly owned subsidiary of REC Limited)

Email:	
Place:	
Date:	
Signature:	

#### **REQUEST FOR PROPOSAL NOTIFICATION**

### REC Power Development and Consultancy Limited (formerly REC Power Distribution Company Limited) (A wholly owned subsidiary of REC Limited) Core-4, SCOPE Complex, 7, Lodhi Road, New Delhi – 110 003

- The Government of India, Ministry of Power, vide its notification no. 15/3/2018-Trans-Pt(1) dated 6th December, 2021 has notified REC Power Development and Consultancy Limited to be the Bid Process Coordinator (BPC) for the purpose of selection of Bidder as Transmission Service Provider (TSP) to establish Inter-State transmission system for "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F " through tariff based competitive bidding process.
- 2. REC Power Development and Consultancy Limited (hereinafter referred to as BPC) hereby invites all prospective Bidders for issue of Request for Proposal (RFP) for selection of Bidder as Transmission Service Provider (TSP) on the basis of international competitive bidding in accordance with the "Tariff Based Competitive Bidding Guidelines for Transmission Service" and "Guidelines for Encouraging Competition in Development of Transmission Projects" issued by Government of India, Ministry of Power under section 63 of The Electricity Act, 2003 and as amended from time to time. The responsibility of the TSP would be to establish the following Inter-State Transmission System Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F (hereinafter referred to as 'Project') on build, own, operate & transfer basis and to provide transmission service:

SI.	Scope of the Transmission Scheme	Scheduled	
No.		in months	
		Effective D	ate
1	Establishment of 2x1500MVA 765/400kV Substation at		
	suitable location near Beawar along with 2x330 MVAr 765kV		
	Bus Reactor & 2x125 MVAr 420kV Bus Reactor		
	765/400kV 1500 MVA ICTs: 2 nos.		
	(7x500 MVA, including one spare unit)		
	330 MVAr, 765 kV bus reactor- 2 nos.		
	(7x110 MVAr, including one spare unit)	10	
	765kV ICT bays – 2 nos.	18	
	400 kV ICT bays – 2 nos.		
	765 kV line bays – 6 nos.		
	400kV line bay- 2 nos.		
	765kV reactor bay- 2 nos.		
	125 MVAr, 420kV bus reactor – 2 nos.		
	420  kV reactor bay $-2  nos$ .		

SI.	Scope of the Transmission Scheme	Scheduled	COL
No.		in months	from
		Effective Da	ate
	Future provisions: Space for		
	765/400kV ICTs along with bays: 2 nos.		
	765kV line bay along with switchable line reactor: 6nos.		
	765kV Bus Reactor along with bays:2 nos.		
	400/220 kV ICTs along with bays: 2nos.		
	400 kV line bays along with switchable line reactor: 4 nos.		
	400kV Bus Reactor along with bays: 1no.		
	220 kV line bays: 4nos.		
2	LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar		
3	LILO of 400kV Kota –Merta line at Beawar		
4	Fatehgarh-3– Beawar 765 kV D/c along with 330 MVAr		
	Switchable line reactor for each circuit at each end of		
	Fatehgarh-3– Beawar 765 kV D/c line		
	Switching equipment for 765 kV 330 MVAR switchable line reactor –4 nos.		
	765 kV, 330 MVAr Switchable line reactor- 4 nos.		

Note:

(i) Developer of Fategarh-3 S/s to provide 2 nos. of 765 kV line bays at Fatehgarh-3 S/s along with space for 765kV switchable line reactors

- 3. The TSP shall ensure that design, construction and testing of all equipment, facilities, components and systems of the Project shall be in accordance with the provisions of the Transmission Service Agreement and applicable Rules/ Regulations, Orders and Guidelines issued by the Central Government.
- 4. **Transmission License**: The TSP shall obtain the Transmission License from the Commission.
- 5. **Bidding Process:** The Transmission Service Provider shall be selected through tariff based competitive bidding process for the Project based on meeting stipulated Qualification Requirements prescribed in Clause 2.1 of Section 2 of RFP and the lowest Quoted Transmission Charges discovered from Final Offers quoted during the e-reverse bidding. The selection of the TSP shall be subject to it obtaining Transmission License from the Commission, which, after expiry, may be further extended by such period as deemed appropriate by the Commission under powers vested with it to amend the conditions of the Transmission License.

The entire bidding process shall be conducted on electronic platform created by MSTC Limited.

The Bid shall be a single stage two envelope bid comprising the Technical Bid and the Financial Bid. The Bidders shall submit the Bid online through the electronic bidding platform. In addition to the online submission, the Bidder with lowest Final Offer will be required to submit original hard copies of Annexure 3, Annexure 4 (if applicable), Annexure 6 (if applicable) and Annexure 14 before issuance of LoI. There shall be no physical submission of the Financial Bid.

The Technical Bid shall be opened first and the Financial Bid of only the bidder who have qualified in the Technical Bid shall be opened. The Financial Bid will comprise of two rounds. In the first round the Initial Offer of the responsive bids would be opened and Quoted Transmission Charges of Initial Offer shall be ranked on the basis of ascending order. The Bidders, in the first fifty per cent of the ranking (with any fraction rounded off to higher integer) or four Bidders, whichever is higher, shall qualify for participating in the electronic reverse auction stage and submit their Final Offer.

6. The objective of the bidding process is to select a Successful Bidder pursuant to this RFP, who shall acquire one hundred percent (100%) of the equity shares of ......[Insert the name of the SPV] along with all its related assets and liabilities as per the provisions of the Share Purchase Agreement, at the Acquisition Price to be intimated by the BPC, twenty (20) days prior to the Bid Deadline.

The ......[Insert the name of the SPV], of which one hundred percent (100%) equity shares will be acquired by the Selected Bidder, shall be responsible as the TSP, for ensuring that it undertakes ownership, financing, development, design, engineering, procurement, construction, commissioning, operation and maintenance of the Project, and to provide Transmission Service as per the terms of the RFP Project Documents.

The TSP shall ensure transfer of all project assets along with substation land, right of way and clearances to CTU or its successors or an agency as decided by the Central Government after 35 years from COD of project at zero cost and free from any encumbrance and liability. The transfer shall be completed within 90 days after 35 years from COD of project failing which CTU shall be entitled to take over the project assets Suo moto.

- 7. **Commencement of Transmission Service**: The Bidder shall have to commence Transmission Service in accordance with the provisions of the Transmission Service Agreement.
- 8. **Transmission Charges**: The Transmission Charges shall be payable by the Designated ISTS Customers in Indian Rupees through the CTU as per Central Electricity Regulatory Commission (Sharing of Inter-State Transmission Charges and Losses) Regulations as amended from time to time. Bidders shall quote the Transmission Charges as per the pre-specified structure, as mentioned in the RFP.
- 9. Issue of RFP document: The detailed terms and conditions for qualification and selection of the Transmission Service Provider for the Project and for submission of Bid are indicated in the RFP document. All those interested in purchasing the RFP document may respond in writing to Chief Executive Officer, <u>pshariharan@recl.in</u> & <u>pshariharan@recpdcl.in</u> at the address given in para 12 below with a non-refundable fee of Rs. 5,00,000/- (Rupees Fibve Lakh Only) or US\$ 7,000 (US Dollars Seven Thousand Only) plus GST @18%, to be paid via electronic transfer to the following Bank Account:

Bank Name, Address	IDFC First Bank Limited
& Branch	Wholesale Banking Outlet Express Building, 2nd Floor,
	9-10 Bahadur Shah Zafar Marg, New Delhi-110002
Bank Account Name	REC Power Development & Consultancy Limited (formerly REC
	Power Distribution Company Limited)
Bank Account No	10000697415
Bank IFSC Code No	IDFB0020101

latest by 13.04.2022. Immediately after issuance of RFP document, the Bidder shall submit the Pre-Award Integrity Pact in the format as prescribed in Annexure B, which shall be applicable for and during the bidding process, duly signed on each page by any whole-time Director / Authorized Signatory, duly witnessed by two persons, and shall be submitted by the Bidder in two (2) originals in a separate envelope, duly superscripted with Pre-Award Integrity Pact. The Bidder shall submit the Pre-Award Integrity Pact on non-judicial stamp paper of Rs. 100/- each duly purchased from the National Capital Territory of Delhi. In case the Bidder is in a consortium, the Pre-Award Integrity Pact shall be signed and submitted by each member of the Consortium separately.

The RFP document shall be issued to the Bidders on any working day from 10.02.2022 to 13.04.2022 between 1030 hours (IST) to 1600 hours (IST). The BPC, on written request and against payment of the above mentioned fee by any Bidder shall promptly dispatch the RFP document to such Bidder by registered mail/ air mail. BPC shall, under no circumstances, be held responsible for late delivery or loss of documents so mailed.

- 10. **Receipt and opening of Bid:** The Bid must be uploaded online through the electronic bidding platform on or before 1100 hours (IST) on 18.04.2022. Technical Bid will be opened by the Bid Opening Committee on the same day at 1130 hours (IST) in the office of Central Electricity Authority, in the online presence of Bidders' representatives who wish to attend. If the Bid Deadline is a public holiday at the place of submission of Bid, it shall be opened on the next working day at the same time and venue. In addition to the online submission, the Bidder with lowest Final Offer will be required to submit original hard copies of Annexure 3, Annexure 4 (if applicable), Annexure 6 (if applicable) and Annexure 14 before issuance of LoI. Bidders meeting the Qualification Requirements, subject to evaluation as specified in Clause **3.2** to **3.4** shall be declared as "Qualified Bidders" and eligible for opening of Initial Offer.
- 11. The RFP document is not transferable. BPC reserves the right to reject all Bid and/or annul the process of tariff based competitive bidding for selection of Bidder as TSP to execute the Project without assigning any reason. BPC shall not bear any liability, whatsoever, in this regard.
- 12. Nodal person for enquiries and clarifications

  All correspondence and clarification in respect of RFP document shall be addressed to:
  Chief Executive Officer,
  REC Power Development and Consultancy Limited
  (formerly REC Power Distribution Company Limited)
  (A wholly owned subsidiary of REC Limited)
  REC Corporate Head Quarter,

D Block, Plot No. I – 4, Sec – 29 Gurugram – 122 001 Email: pshariharan@recl.in, pshariharan@recpdcl.in

## **DISCLAIMER**

- 1. This Request for Proposal (RFP) document is not an agreement or offer by the BPC to the prospective Bidders or to any other party. The purpose of this RFP document is to provide interested parties with information to assist the formulation of their Bid. The RFP document is based on material and information available in public domain.
- 2. This RFP, along with its Annexures, is not transferable and the information contained therein are to be used only by the person to whom it is issued. It may not be copied or distributed by the recipient to third parties (other than in confidence to the recipient's professional advisors). In the event that the recipient does not continue with its involvement in the Project in accordance with this RFP, this RFP must be kept confidential.
- 3. While this RFP has been prepared in good faith, neither the BPC nor its employees or advisors/consultants make any representation or warranty expressed or implied as to the accuracy, reliability or completeness of the information contained in this RFP. The Bidders shall satisfy themselves, on receipt of the RFP document, that the RFP document is complete in all respects. Intimation of any discrepancy shall be given to this office immediately. If no intimation is received from any Bidder within ten (10) days from the date of issue of this RFP document on or before the date & time mentioned in this RFP, it shall be considered that the issued document, complete in all respects, has been received by the Bidders.

This bidding process is in accordance with the Bidding Guidelines issued by Ministry of Power, Government of India under Section 63 of the Electricity Act, 2003. Revisions or amendments in these Bidding Guidelines may cause the BPC to modify, amend or supplement this RFP document, including the RFP Project Documents to be in conformance with the Bidding Guidelines.

- 4. This RFP document includes statements, which reflect various assumptions arrived at by BPC in order to give a reflection of current status in the RFP. These assumptions should not be entirely relied upon by Bidders in making their own assessments. This RFP document does not purport to contain all the information each Bidder may require and may not be appropriate for all persons. It is not possible for BPC to consider the investment objectives, financial situation and particular needs of each party who reads or uses this RFP document. Certain Bidders may have a better knowledge of the Project than the others. Each Bidder should conduct its own investigations and analysis and should check the accuracy, reliability and completeness of the information in this RFP document and obtain independent advice from appropriate sources.
- 5. Neither BPC nor their employees or consultants make any representation or warranty as to the accuracy, reliability or completeness of the information in this RFP document.
- 6. Neither BPC, its employees nor its consultants will have any liability to any Bidder or any other person under the law of contract, tort, the principles of restitution or unjust enrichment or otherwise for any loss, expense or damage which may arise from or be incurred or suffered in connection with anything contained in this RFP document, any matter deemed to form part of this RFP document, the award of the Project, the information supplied by or on behalf of BPC or its employees, any consultants or otherwise arising in any way from the qualification process for the said Project.

- 7. By participating in the bidding process, each of the Bidder shall have acknowledged and accepted that it has not been induced to enter into such agreement by any representation or warranty, expressed or implied, or relied upon any such representation or warranty by or on behalf of BPC or any person working in the bidding process.
- 8. BPC may in its absolute discretion, but without being under any obligation to do so, update, amend or supplement this RFP document. Such updations, amendments or supplements, if any, will however be circulated to the Bidders not later than 15 days prior to the last date for submission of Bid.
- 9. Each Bidder unconditionally agrees, understands and accepts that the BPC reserves the rights to accept or reject any or all Bids without giving any reason. Neither the BPC nor its advisers shall entertain any claim of any nature, whatsoever, including without limitations, any claim seeking expenses in relation to the preparation of Bids.
- 10. This RFP may be withdrawn or cancelled by the BPC at any time without assigning any reasons thereof. BPC further reserves the right, at its complete discretion to reject any or all of the Bids without assigning any reasons whatsoever.

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## DEFINITIONS

Any capitalized term, used but not defined in this RFP, shall have the meaning ascribed to such term in the RFP Project Documents, or the Bidding Guidelines, in that order. In absence of availability of definitions in the foregoing references, the capitalized terms shall be interpreted in accordance with the Electricity Act 2003, Grid Code or any other relevant electricity law, rule or regulation prevalent in India, as amended or re-enacted from time to time, in that order.

## The following terms are defined for use in this RFP:

"Acquisition Price" shall have the same meaning as defined in the Share Purchase Agreement;

"Affiliate" shall mean a company that either directly or indirectly

- i. controls or
- ii. is controlled by or
- iii. is under common control with

a Bidding Company (in the case of a single company) or a Member (in the case of a Consortium) and "**control**" means ownership by one entity of at least twenty six percent (26%) of the voting rights of the entity. As an illustration a chart is annexed hereto as Annexure -12;

**"Bid"** shall mean Technical Bid and Financial Bid (Initial Offer and Final Offer) submitted by the Bidder, in response to this RFP, in accordance with the terms and conditions thereof;

**"Bidder"** shall mean either a single company (including its permitted successors and legal assigns) or a Consortium of companies (including its permitted successors and legal assigns) submitting a Bid in response to this RFP. Any reference to the Bidder includes Bidding Company, Bidding Consortium/ Consortium, Member in a Bidding Consortium and Lead Member of the Bidding Consortium jointly and severally, as the context may require;

**"Bidding Company"** shall refer to such single company (including its permitted successors and legal assigns) that has submitted a Bid for the Project;

**"Bidding Consortium/ Consortium"** shall refer to a group of companies (including their permitted successors and legal assigns) that has collectively submitted a Bid for the Project;

**"Bidding Guidelines"** shall mean the "Tariff Based Competitive-Bidding Guidelines for Transmission Service" and "Guidelines for Encouraging Competition in Development of Transmission Projects" issued by Government of India, Ministry of Power under Section -63 of Electricity Act as amended from time to time;

**"Bid Bond"** shall mean the unconditional and irrevocable bank guarantee for Rupees Thirty Eight Crore Forty Lakh Only (Rs. 38.40 Crore), to be submitted along with the Technical Bid by the Bidder under Clause 2.11 of this RFP, as per the format prescribed in Annexure 14;

**''Bid Deadline''** shall mean the last date and time for submission of online Bid in response to this RFP, specified in Clause 2.7.1;

"Bid Process Coordinator or BPC" shall mean a person or its authorized representative as

**REC Power Development and Consultancy Limited** 

notified by the Government of India, responsible for carrying out the process for selection of Bidder who will acquire Transmission Service Provider;

**"Bid Security Declaration"** shall mean the declaration to be submitted along with the Technical Bid by the Bidder in lieu of the Bid Bond, as per the format prescribed in Annexure 14A;

"CEA" shall mean the Central Electricity Authority constituted under Section - 70 of the Electricity Act;

"Commission" or "CERC" shall mean the Central Electricity Regulatory Commission of India constituted under Section-76 of The Electricity Act, 2003 and any successors and assigns;

**"Conflict of Interest"** A Bidder shall be considered to be in a Conflict of Interest with one or more Bidders in the same bidding process if they have a relationship with each other, directly or through a common company, that puts them in a position to have access to information about or influence the Bid of another Bidder.

Provided that if two or more bidders in the bidding process have formed a Joint Venture Company or Consortium to execute another project, the Bidders will not be considered to have Conflict of Interest;

"**Commercial Operation Date (COD)**" shall mean the date as per Article 6.2 of the Transmission Service Agreement;

"Consents, Clearances, Permits" shall mean all authorizations, licenses, approvals, registrations, permits, waivers, privileges, acknowledgements, agreements, or concessions required to be obtained from or provided by any concerned authority for the development, execution and performance of Project including without any limitation on the construction, ownership, operation and maintenance of the transmission lines and/or sub-stations;

"Contract Performance Guarantee" shall have the meaning as per Clause 2.12 of this RFP;

"**Contract Year**" shall mean the period beginning on the Scheduled COD, and ending on the immediately succeeding March 31 and thereafter each period of 12 months beginning on April 1 and ending on March 31 provided that:

(i) the last Contract Year shall end on the last day of the term of the Transmission Service Agreement;

**"Infrastructure sector"** shall mean such sectors notified by Department of Economic Affairs in its Gazette Notification no. 13/1/2017-INF dated 14th November, 2017 and as amended from time to time;

"CTU/Central Transmission Utility" shall have same meaning as defined in the Electricity Act, 2003;

**"Designated ISTS Customers"** or "DICs" shall have the meaning as ascribed in Regulation 2(1) of Central Electricity Regulatory Commission (Sharing of inter-State Transmission Charges and Losses) Regulation 2020 and as amended or modified from time to time;

"Effective Date" shall have the meaning as ascribed thereto in the Transmission Service Agreement;

"**Element**" shall mean-each Transmission Line or each circuit of the Transmission Lines (where there are more than one circuit) or each bay of the Sub-station or switching station or HVDC terminal or inverter station of the Project, including ICTs, Reactors, SVC, FSC, etc. forming part of the ISTS which will be owned, operated and maintained by the concerned ISTS Licensee, and which may have a separate scheduled COD as per Schedule 2 of the Transmission Service Agreement and may have a separate percentage for recovery of Transmission Charges on achieving COD as per Schedule 5 of the Transmission Service Agreement;

"**National Committee on Transmission**" shall mean the committee constituted by the Ministry of Power, Government of India in terms of the "Guidelines for Encouraging Competition in Development of Transmission Projects", as notified from time to time;

**"Final Offer"** shall mean the Quoted Transmission Charges, required to be submitted as part of the Financial Bid on the electronic bidding platform during the e-reverse bidding stage. In case, no Final Offer is received during the e-reverse bidding stage then the lowest "Initial Offer" shall be deemed to be the Final Offer;

"Financial Bid" shall mean the Initial Offer and Final Offer, containing the Bidder's Quoted Transmission Charges, as per the format at Annexure -21 of this RFP;

**"Financially Evaluated Entity"** shall mean the company which has been evaluated for the satisfaction of the financial requirement set forth in Clause **2.1.3** hereof;

"Government" shall mean the Central Government;

**"Grid Code" / "IEGC"** or **"State Grid Code"** shall mean the Grid Code specified by the Central Commission under clause (h) of sub-section (1) of Section 79 of the Electricity Act and/or the State Grid Code as specified by the concerned State Commission referred under clause (h) of sub-section (1) of Section 86 of the Electricity Act as applicable;

**"Transmission Service Agreement"** or **"TSA"** shall mean the agreement entered into between Nodal Agency and the TSP, pursuant to which the TSP shall build, own, operate and transfer the Project and make available the assets of the Project on a commercial basis;

**"Initial Offer"** shall mean the Quoted Transmission Charges, required to be submitted as part of the Financial Bid on the electronic bidding platform along with the Technical Bid;

"Inter State Generating Station" or "ISGS" shall mean a Central / other generating station in which two or more states have shares and whose scheduling is to be coordinated by the Regional Load Despatch Centre;

"Inter-State Transmission System" shall have same meaning as defined in the Electricity Act, 2003;

**"Lead Member of the Bidding Consortium" or "Lead Member"** shall mean a company who commits at least twenty six percent (26%) equity stake in the Project, meets the technical requirement as per Clause 2.1.2 and so designated by other Member(s) in Bidding Consortium;

"Letter of Intent" or "LoI" shall mean the letter to be issued by the BPC to the Bidder, who has been identified as the selected bidder, for award of the Project to such Bidder;

"Member in a Bidding Consortium/Member" shall mean each company in the Bidding Consortium;

"MOP" shall mean the Ministry of Power, Government of India;

"MOEF" shall mean the Ministry of the Environment and Forests, Government of India;

"Nodal Agency" shall mean CTU, which shall execute and implement the Transmission Service Agreement (TSA);

Provided that while taking major decisions, CTU shall consult CEA on technical matters and any other matter it feels necessary.

"**Technical Bid**" shall mean the bid submitted online through the electronic bidding platform, containing the documents as listed out in Clause 2.5.2 of this RFP;

**"Parent Company"** shall mean an entity that holds at least twenty six percent (26%) of the paid - up equity capital directly or indirectly in the Bidding Company or in the Member in a Bidding Consortium, as the case may be;

"Qualification Requirements" shall mean the qualification requirements as set forth in Section-2, Clause 2.1 of this RFP;

"Quoted Transmission Charges" shall mean the quoted single annual Transmission Charges submitted online through the electronic bidding platform by the Bidder as part of its Financial Bid as per the format in Annexure – 21 of this RFP;

**"RFP"** shall mean Request for Proposal document along with all schedules, formats, annexure and RFP Project Documents attached hereto, issued by BPC for tariff based competitive bidding process for selection of bidder who will acquire the TSP through e-reverse bidding to execute the Project, and shall include any modifications, amendments or alterations or clarifications thereto;

**"RFP Project Documents"** shall mean the following documents to be entered into in respect of the Project, by the parties to the respective agreements:

- a. Transmission Service Agreement (TSA),
- b. Share Purchase Agreement,
- c. Agreement(s) required, if any, under Central Electricity Regulatory Commission (Sharing of Inter-State Transmission Charges and Losses) Regulations as amended from time to time and
- d. Any other agreement, as may be required;

"Scheduled COD" shall have the meaning as ascribed hereto in Clause 2.6 of this RFP;

"Statutory Auditor" shall mean the auditor appointed under the provisions of the Companies Act, 1956 / Companies Act, 2013 (as the case may be) or under the provisions of any other

applicable governing law;

"Successful Bidder" or "Selected Bidder" shall mean the Bidder selected pursuant to this RFP to acquire one hundred percent (100%) equity shares of ......[Insert the name of the SPV], along with all its related assets and liabilities, which will be responsible as the TSP to establish the Project on build, own, operate and transfer basis as per the terms of the Transmission Service Agreement and other RFP Project Documents;

"Survey Report" shall mean the report containing initial information regarding the Project and other details provided as per the provisions of Clause 1.6.2.1.1 of this RFP;

**"Technically Evaluated Entity"** shall mean the company which has been evaluated for the satisfaction of the technical requirement set forth in Clause 2.1.2 hereof;

**"Transmission Charges"** shall mean the Final Offer quoted by Selected Bidder and adopted by the Commission, and as computed in terms of the provisions of Schedule 4 of the TSA, payable to the ISTS Licensee by the Designated ISTS Customers, and collected / disbursed by the CTU, as per Central Electricity Regulatory Commission (Sharing of Inter-State Transmission Charges and Losses) Regulations as amended from time to time;

**"Transmission License"** shall mean the license granted by the Commission in terms of the relevant regulations for grant of such license issued under the Electricity Act, 2003;

**"Transmission Service Provider" or "TSP"** shall mean ......[Insert the name of the SPV] which has executed the Transmission Service Agreement and which shall be acquired by the Selected Bidder;

"Ultimate Parent Company" shall mean an entity which owns at least twenty six percent (26%) equity in the Bidding Company or Member of a Consortium, (as the case may be) and in the Technically Evaluated Entity and/or Financially Evaluated Entity (as the case may be) and such Bidding Company or Member of a Consortium, (as the case may be) and the Technically Evaluated Entity and/or Financially Evaluated Entity (as the case may be) and the Technically Evaluated Entity and/or Financially Evaluated Entity (as the case may be) shall be under the direct control or indirectly under the common control of such entity.

**SECTION – 1** 

# **INTRODUCTION**

### **SECTION 1**

## 1. INTRODUCTION

1.1 The Government of India, Ministry of Power vide its notification no. 15/3/2018-Trans-Pt(1) dated 6th December, 2021 has notified REC Power Development and Consultancy Limited to be the Bid Process Coordinator (BPC) for the purpose of selection of Bidder as Transmission Service Provider (TSP) to establish Inter-State transmission system for "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process.

The BPC hereby invites Bids from all prospective Bidders in accordance with this Request for Proposal (RFP) to select prospective Transmission Service Provider (TSP) in accordance with the "Tariff Based Competitive-Bidding Guidelines for Transmission Service" and "Guidelines for Encouraging Competition in Development of Transmission Projects" issued by Government of India, Ministry of Power under Section – 63 of the Electricity Act. The BPC shall select the Bidder having the prescribed technical and financial capability to become TSP and be responsible for establishing the Project in the state(s) of Rajasthan. The TSP will make the Project available against payment of Transmission Charges, as adopted by the Commission, payable to the TSP, as per Central Electricity Regulatory Commission (Sharing of Inter-State Transmission Charges and Losses) Regulations as amended from time to time.

1.2 The TSP will be required to establish the following Inter State Transmission System for Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F (hereinafter referred to as 'Project') on build, own, operate and transfer basis, and to provide transmission service.

Sl. No.	Scope of the Transmission Scheme	Scheduled in months Effective Da	from
1	Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus Reactor 765/400kV 1500 MVA ICTs: 2 nos. (7x500 MVA, including one spare unit) 330 MVAr, 765 kV bus reactor- 2 nos. (7x110 MVAr, including one spare unit) 765kV ICT bays – 2 nos. 400 kV ICT bays – 2 nos. 765 kV line bays – 6 nos. 400kV line bays – 6 nos. 125 MVAr, 420kV bus reactor – 2 nos. 420 kV reactor bay – 2 nos.	18	

Sl. No.	Scope of the Transmission Scheme	Scheduled COD in months from Effective Date
	<ul> <li>765/400kV ICTs along with bays: 2 nos.</li> <li>765kV line bay along with switchable line reactor: 6nos.</li> <li>765kV Bus Reactor along with bays:2 nos.</li> <li>400/220 kV ICTs along with bays: 2nos.</li> <li>400 kV line bays along with switchable line reactor: 4 nos.</li> <li>400kV Bus Reactor along with bays: 1no.</li> <li>220 kV line bays: 4nos.</li> </ul>	
2	LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar	
3	LILO of 400kV Kota –Merta line at Beawar	
4	Fatehgarh-3– Beawar 765 kV D/c along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line	
	Switching equipment for 765 kV 330 MVAR switchable line reactor –4 nos. 765 kV, 330 MVAr Switchable line reactor- 4 nos.	

#### Note:

(i) Developer of Fategarh-3 S/s to provide 2 nos. of 765 kV line bays at Fatehgarh-3 S/s along with space for 765kV switchable line reactors

### 1.3 Project Description

In order to integrate and evacuate power from additional potential of renewable energy zones (20 GW) in Rajasthan (Fatehgarh: 9.1GW, Bhadla: 8GW, Ramgarh: 2.9GW) over and above 17 GW Solar Energy Zones (SEZ), various transmission alternatives were evolved & discussed with stakeholders and deliberated in the 3rd NRPC-TP meeting held on 19.02.21. Based on the discussions, hybrid (EHVAC & HVDC) transmission system was agreed in above meeting for evacuation of power from additional 20 GW REZ in Rajasthan (Phase-III).

As part of Phase-III system, Fatehgarh-4 & Bhadla-3 Pooling stations (new) are to be established which will be interconnected with Fatehgarh-3 & Fatehgarh-2 PS respectively. Further, renewable sources in Ramgarh complex are also proposed to be pooled at Ramgarh PS which shall be interconnected with Bhadla-3 PS. In view of integration & evacuation of additional 20 GW RE in Rajasthan with reliability as well as taking care of RE variability, under Phase-III System, Hybrid transmission system comprising EHV AC (765kV) & HVDC corridors are planned towards Delhi & Southern UP.

The subject transmission scheme involves establishment of 765/400kV Substation at suitable location near Beawar, implementation of Fatehgarh-3– Beawar 765 kV D/c line, LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar and LILO of 400kV Kota –Merta line at Beawar S/s which shall facilitate evacuation of RE power from Fatehgarh complex to Beawar and onward dispersal of power beyond Beawar to various beneficiaries.

Above transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III was also agreed in 49th Northern Region Power Committee (NRPC) meeting held on 27/09/2021 & 5th National Committee on Transmission (NCT) held on 25thAug, 2021 and 2nd Sep, 2021.

1.4 Transmission Grid Map

Transmission Grid Map indicating the location of the Project is enclosed as Annexure 18 of this RFP for information and reference of the Bidders.

1.5 The objective of the bidding process is to select a Successful Bidder pursuant to this RFP, who shall acquire one hundred percent (100%) of the equity shares of ......[Insert the name of the SPV] along with all its related assets and liabilities as per the provisions of the Share Purchase Agreement, at the Acquisition Price to be intimated by the BPC, twenty (20) days prior to the Bid Deadline.

The ......[Insert the name of the SPV], of which one hundred percent (100%) equity shares will be acquired by the Selected Bidder, shall be responsible as the TSP, for ensuring that it undertakes ownership, financing, development, design, engineering, procurement, construction, commissioning, operation and maintenance of the Project, and to provide Transmission Service as per the terms of the RFP Project Documents.

The TSP shall ensure transfer of all project assets along with substation land, right of way and clearances to CTU or its successors or an agency as decided by the Central Government after 35 years from COD of project at zero cost and free from any encumbrance and liability. The transfer shall be completed within 90 days after 35 years from COD of project failing which CTU shall be entitled to take over the project assets Suo moto.

## 1.6 **Brief Scope of Work**

## 1.6.1 Scope of Transmission Service Provider

The TSP's scope of work for the Project shall comprise, but not necessarily be limited to the following:

- 1.6.1.1 Establishment, operation and maintenance of the Project on build, own, operate and transfer basis and completion of all the activities for the Project, including survey, detailed project report formulation, arranging finance, project management, necessary Consents, Clearances and Permits (way leave, environment & forest, civil aviation, railway/ road/river/canal/power crossing/PTCC, etc.), land compensation, design, engineering, equipment, material, construction, erection, testing & commissioning. Further, the actual location of substations, switching stations or HVDC terminal or inverter stations in the scope of TSP shall not be beyond 1 Km radius of the location proposed by the BPC in the survey report.
- 1.6.1.2 The TSP shall ensure that design, construction and testing of all equipment, facilities, components and systems of the Project shall be in accordance with Transmission Service Agreement and applicable Rules/ Regulations, Orders and Guidelines issued by the

**REC Power Development and Consultancy Limited** 

Central Government.

- 1.6.1.3 The TSP shall ensure timely completion of entire scope of Project in all respects and its operation and maintenance, as shall be specified in the RFP documents.
- 1.6.1.4 The TSP shall seek Transmission License from the Commission, as per the provisions of the Electricity Act and regulations made thereunder.

## 1.6.2 Scope of Bid Process Coordinator (BPC)

BPC's scope of work is briefly outlined hereunder:

- 1.6.2.1 The BPC has initiated development of the Project and shall be responsible for the tasks in this regard as specified hereunder:
  - 1. Provide to the Bidders a Survey Report for the Project at least forty five (45) days prior to the Bid Deadline. The Survey Report shall include the suggested route with approximate route length, type of terrain likely to be encountered and its likely implication in terms of Right of Way (ROW), statutory clearances, location of substations or converter stations and land area to be acquired for the substation or converter station.
  - 2. To obtain approval for laying of overhead transmission lines under Section 68 of Electricity Act, from the Government at least twenty (20) days prior to Bid Deadline.
  - 3. To initiate acquisition of land for location specific substations, switching stations or HVDC terminal or inverter stations, if required.
  - 4. To initiate process of seeking forest clearance, if required
  - 5. The BPC shall intimate to the Bidders, the Acquisition Price payable by the Selected Bidder to the REC Power Development and Consultancy Limited for the acquisition of one hundred percent (100%) of the equity shareholding of ......[Insert the name of the SPV], along with all its related assets and liabilities at least twenty (20) days prior to the Bid Deadline.
  - 6. The BPC shall ensure issuance of all finalized RFP Project Documents, at least fifteen (15) days prior to the Bid Deadline.

Provided that for any delay in meeting the above obligations of the BPC within the specified time period above, the Bid Deadline as per Clause 2.7.1 shall be extended on a day for day basis.

1.6.2.2 The details and documents as may be obtained by the BPC/ project specific SPV in relation to the Project shall be handed over to the TSP on an as-is-where-is basis, so that it may take further actions to obtain Consents, Clearances and Permits.

- 1.7 All costs (including direct and indirect) incurred by the BPC/ project specific SPV in connection with the activities concerning the Project shall be recovered from the TSP, which shall be included in the Acquisition Price.
- 1.8 The Project is required to be completed progressively in accordance with the schedule prescribed in this RFP.
- 1.9 A company under the Companies Act, 2013 by the name .......[Insert the name of the SPV] has been incorporated to initiate the activities for execution of the Project. The said company shall be acquired by the successful Bidder as per terms and conditions as may be prescribed in RFP.
- 1.10 The Ministry of Power and the appropriate state government(s) shall provide their support to the TSP, on best endeavor basis, in enabling the TSP to develop the Project.
- 1.11 All Bidders are required to submit their Bid in accordance with the instructions set forth in this RFP.
- 1.12 Once the Successful Bidder is selected, the details and documents as may be obtained by the BPC/ project specific SPV in relation to the Project, shall be handed over to the Successful Bidder on as is where basis, so that it may take further actions to obtain all necessary Consents, Clearances and Permits and the TSP shall not be entitled for any extensions in the Scheduled COD of the Project except as provided for in the TSA.
- 1.13 The assets of the Project shall be made available on a commercial basis as per the terms and conditions of the Transmission Service Agreement and Central Electricity Regulatory Commission (Sharing of Inter-State Transmission Charges and Losses) Regulations as amended from time to time.

# **SECTION - 2**

# INFORMATION AND INSTRUCTIONS FOR BIDDERS

### SECTION - 2

## 2. INFORMATION AND INSTRUCTIONS FOR BIDDERS

### 2.1 Qualification Requirements

2.1.1 The Bidder should be a company duly incorporated under the relevant laws (Bidding Company) or a Consortium of companies (Bidding Consortium) with one of the companies acting as the Lead Member of the Bidding Consortium. The Bidder shall be selected on meeting the Qualification Requirements specified in Section 2 of this RFP, as demonstrated by the Bidder's Technical Bid and the lowest Quoted Transmission Charges discovered from Final Offers quoted during the e-reverse bidding. A Bidding Consortium can participate in the bidding process for the Project if any Member of the Consortium has purchased the RFP document for such Project. Bidder who agree and undertake to procure the products associated with the Transmission System as per provisions of Public Procurement (Preference to Make in India) orders issued by Ministry of Power vide orders No. 11/5/2018 - Coord. dated 28.07.2020 for transmission sector, as amended from time to time read with Department for Promotion of Industry and Internal Trade (DPIIT) orders in this regard, shall be eligible hereunder. Further, it is clarified that Procuring Entity as defined in orders shall deemed to have included Selected Bidder and/ or TSP.

Besides, Department of Expenditure, Ministry of Finance vide Order (Public Procurement No 1) bearing File No. 6/18/2019-PPD dated 23.07.2020, Order (Public Procurement No 2) bearing File No. 6/18/2019-PPD dated 23.07.2020 and Order (Public Procurement No. 3) bearing File No. 6/18/2019-PPD, dated 24.07.2020, as amended from time to time, have issued directions regarding public procurement from a bidder of a country, which shares land border with India are also applicable.

### 2.1.2 Technical requirement to be met by the Bidding Company or Lead Member of Bidding Consortium

The Bidder must fulfill any one of the following technical requirements:

 Experience of development of projects in the Infrastructure Sector in the last five
 (5) years with aggregate capital expenditure of not less than Rs. 1920 Crore or equivalent USD (calculated as per provisions in Clause 3.4.1). However, the capital expenditure of each project shall not be less than Rs. 384 Crore or equivalent USD (calculated as per provisions in Clause 3.4.1).

For this purpose, capital expenditure incurred on projects that have been commissioned/completed at least seven (7) days prior to Bid Deadline shall be considered. The capital expenditure discussed above shall be as capitalized and reflected in the audited books of accounts of the Technically Evaluated Entity. In case a clearly identifiable part of a project has been put into commercial operation, the capital expenditure on such part of the project shall be considered. The Technically Evaluated Entity must have either executed such projects itself or must have held directly or indirectly at least twenty six percent (26%) of the shareholding in the company that has executed the project(s) from the date of financial closure of the project(s) till the time of commissioning/completion of such project(s).

## OR

(ii) Experience in construction of project in infrastructure sector: The Technically Evaluated Entity should have received aggregate payments not less than Rs. 1920 Crore or equivalent USD (calculated as per provisions in Clause 3.4.1) from its client(s) for construction works fully completed during the last 5(five) financial years. However, the payment received from each project shall not be less than Rs. 384 Crore or equivalent USD (calculated as per provisions in Clause 3.4.1).

For this purpose, payments received on projects that have been commissioned/ completed at least seven (7) days prior to Bid Deadline shall be considered. Further only the payments (gross) actually received, during such 5 (five) financial years shall qualify for purposes of computing the technical capacity. For the avoidance of doubt, construction works shall not include cost of land, supply of goods or equipment except when such goods or equipment form part of a turn-key construction contract/ EPC contract for the project. Further, in cases where different individual contracts are signed between same entities for the same project, the cumulative payments received under such individual contracts shall be considered for meeting the qualification requirement.

The Technically Evaluated Entity may be the Bidding Company or the Lead Member of a Consortium or an Affiliate or Parent of such Bidding Company or the Lead Member, as the case may be.

Bidders shall furnish documentary evidence duly certified by authorized signatory of the Bidder who has been issued Power of Attorney in support of their technical capability as defined in Clause 2.1.2 of this RFP.

### 2.1.3 Financial requirement to be met by the Bidding Company/Bidding Consortium

2.1.3.1 The Bidder must fulfill following financial requirements:

#### A. Networth:

Networth should be not less than Rs. **768 Crore** or equivalent USD (calculated as per provisions in Clause 3.4.1) computed as the Networth based on unconsolidated audited annual accounts (refer to Note below) of any of the last three (3) financial years as provided in Clause 2.2.3, immediately preceding the Bid Deadline. Also, the Networth of any of the last three (3) financial years should not be negative.

Note: Audited consolidated annual accounts of the Bidder may be used for the purpose of financial criteria provided the Bidder has at least 26% equity in each company whose accounts are merged in the audited consolidated accounts and provided further that the financial capability of such companies (of which accounts are being merged in the consolidated accounts) shall not be considered again for the purpose of evaluation of the Technical Bid. Bidders shall furnish prescribed Annexure 7 (A) duly certified by authorized signatory of the Bidder who has been issued Power of Attorney and the Statutory Auditor and separate computation sheet for Networth duly certified by Statutory Auditor in support of their financial capability as defined in Clause 2.1.3 of this RFP.

2.1.3.2 The Networth shall be computed in the following manner by the Bidder:

## A. Networth

=	Equity share capital
Add:	Reserves
Subtract:	Revaluation Reserves
Subtract:	Intangible Assets
Subtract:	Miscellaneous expenditures to the extent not written off
	and carry forward losses

- 2.1.3.3 If the Technical Bid is submitted by a Bidding Consortium the financial requirement shall be met individually and collectively by all the Members in the Bidding Consortium. The financial requirement to be met by each Member of the Bidding Consortium shall be computed in proportion to the equity commitment made by each of them for investment in the Project.
- 2.1.4 The Bidder may seek qualification on the basis of technical and financial capability of its Parent and/ or its Affiliate(s) for the purpose of meeting the Qualification Requirements. However, in the case of the Bidder being a Consortium, the Lead Member has to meet the technical requirement on its own or by seeking the technical capability of its Parent and/or its Affiliate(s). Authorization for use of such technical or financial capability shall have to be provided from its Parent and/or Affiliate(s) as per Annexure 9. The technical and financial capability of a particular company/ particular project, including its Parents and/or Affiliates, shall not be used directly or indirectly by more than one Bidder/ Member of a Bidding Consortium/ Bidding Company. However, development and construction experience of a particular project may be used by more than one company.

The determination of the relationship of Parent or Affiliate with the Bidding Company or with the Member of the Bidding Consortium, including the Lead Member, shall be on the date at the most seven (7) days prior to the last date of submission of the Bid. Documentary evidence to establish such relationship shall be furnished by the Bidder along with the Technical Bid.

If the Technically Evaluated Entity and/or Financially Evaluated Entity is an entity other than the Bidding Company or a Member in a Bidding Consortium, the Bidding Company or Member relying on such Technically Evaluated Entity and/or Financially Evaluated Entity will have to submit a legally binding undertaking supported by a board resolution from the Technically Evaluated Entity and/or Financially Evaluated Entity or its Ultimate Parent Company, that all the equity investment obligations of the Bidding Company or the Member of the Consortium shall be deemed to be equity investment obligations of the Technically Evaluated Entity and/or Financially Evaluated Entity or its Ultimate Parent Company, and in the event of any default the same shall be met by such evaluated entity or by or the Ultimate Parent Company. The Bidding Company or the Consortium Member shall have to provide information and documents relating to its relationship with such Technically Evaluated Entity and/or Financially Evaluated Entity including details about the equity shareholding between them as per Annexure 7(C).

2.1.5 A Bidder shall submit only one Bid in the same bidding process, either individually as

Bidding Company or as a Member of a Bidding Consortium (including the Lead Member). It is further clarified that any of the Parent/ Affiliate/Ultimate Parent of the Bidder/ Member in a Bidding Consortium shall not separately participate directly or indirectly in the same bidding process. Further, if any Bidder is having a Conflict of Interest with other Bidders participating in the same bidding process, the Bids of all such Bidders shall be rejected.

- 2.1.6 Notwithstanding anything stated above, BPC reserves the right to verify the authenticity of the documents submitted for meeting the Qualification Requirements and request for any additional information and documents. BPC reserves the right at its sole discretion to contact the Bidder's bank and project references and verify the Bidder's information and documents for the purpose of bid evaluation.
- 2.1.7 The Qualified Bidder(s) will be required to continue to maintain compliance with the Qualification Requirements throughout the bidding process and till execution of the Transmission Service Agreement. Where the Technically Evaluated Entity and/or the Financially Evaluated Entity is not the Bidding Company or a Member in a Bidding Consortium, as the case may be, the Bidding Company or Member shall continue to be an Affiliate of the Technically Evaluated Entity and/or Financially Evaluated Entity till the execution of the Transmission Service Agreement. Failure to comply with the aforesaid provisions shall make the Bid liable for rejection at any stage.
- 2.1.8 The Selected Bidder will be required to continue to maintain compliance with the Qualification Requirements till the COD of the Project. Where the Technically Evaluated Entity and/or the Financially Evaluated Entity is not the Bidding Company or a Member in a Bidding Consortium, as the case may be, the Bidding Company or Member shall continue to be an Affiliate of the Technically Evaluated Entity and/or Financially Evaluated Entity is not the aforesaid provisions shall be dealt as per provisions of Transmission Service Agreement.
- 2.1.9 On the Bid Deadline, for the Bidder to be eligible to participate in the bidding process:
  - a. the Bidder & any of its Affiliate including any Consortium Member & any of its Affiliate, their directors or key personnel should not have been barred or included in the blacklist by any government agency or authority in India, the government of the jurisdiction of the Bidder or Members where they are incorporated or the jurisdiction of their principal place of business, any international financial institution such as the World Bank Group, Asian Development Bank, African Development Bank, Inter-American Development Bank, Asian Infrastructure Investment Bank etc or the United Nations or any of its agencies; or
  - b. the Bidder & any of its Affiliate including any Consortium Member & any of its Affiliate or their directors should not have been convicted of any offence in India or abroad.

In case any investigation is pending against the Bidder, including any Consortium Member or Affiliate, or CEO or any of the directors/ manager/key managerial personnel of the Bidder /Consortium /Member or their Affiliates, full details of such investigation including the name of the investigating agency, the charge/offence for which the investigation has been launched, name and designation of persons against whom the investigation has been launched and other relevant information should be disclosed while submitting the Bid.

The Bidders shall confirm the above though a notarized affidavit as per Annexure 22.

### 2.2 Submission of Bid by the Bidder

- 2.2.1 The information and documents in Technical Bid will be submitted by the Bidder as per the formats specified in Section -4 (Formats for RFP) of this document
- 2.2.2 Strict adherence to the formats wherever specified, is required. Wherever, information has been sought in specified formats, the Bidder shall refrain from referring to brochures/ pamphlets. Non-adherence to formats and/ or submission of incomplete information may be a ground for declaring the Technical Bid as non-responsive. Each format has to be duly signed and stamped by the authorized signatory of Bidder.
- 2.2.3 The Technical Bid shall contain unconsolidated/consolidated audited annual accounts (consisting of unabridged Balance Sheet, Profit and Loss Account, profit appropriation account, Auditors Report, etc.), as the case may be, of Bidding Company or each Member in Consortium including Lead Member or the Financially Evaluated Entity for the last three (3) financial years immediately preceding the last date for submission of Bid for the purpose of calculation of Networth.

In case the annual accounts for the financial year immediately preceding the Bid Deadline is not audited, the Bidder shall give declaration in this regard duly certified by its statutory auditor. In such a case, the Bidder shall provide the audited annual accounts for the three (3) financial years preceding the financial year as above for which the annual accounts have not been audited.

### 2.2.4 Bid submitted by a Bidding Consortium:

2.2.4.1 The Technical Bid shall contain a legally enforceable Consortium Agreement entered amongst the Members in the Bidding Consortium, designating one of the Members to be the Lead Member (as per Annexure 6). There shall be only one Lead Member which shall continue to hold twenty six percent (26%) equity in the TSP and cannot be changed upto one (1) year from the Commercial Operation Date (COD) of the Project. Each Member in Bidding Consortium shall duly sign the Consortium Agreement making it liable for raising the required funds for its respective equity investment commitment as specified in the Consortium Agreement. In absence of Consortium Agreement, the Technical Bid will not be considered for evaluation and will be rejected.

Provided that the Lead Member of the Bidding Consortium will be required to be liable to the extent of 100% of the total proposed commitment of equity investment of the Bidding Consortium i.e. for both its own equity contribution as well as the equity contribution of other Members.

Provided further that the Consortium Agreement shall not be amended without the explicit approval of the BPC.

The Lead Member of the Consortium will be the single point of contact for the purposes of

the bid process before the date of signing of Share Purchase Agreement. Settlement of any dispute amongst the Consortium Members shall not be the responsibility of the BPC and/or the CTU and the BPC and/or the CTU shall not bear any liability whatsoever on this account.

- 2.2.4.2 The Lead Member should designate at the most two persons to represent the Consortium in its dealings with the BPC. The person(s) designated by the Lead Member should be authorized through a Power of Attorney (as per Annexure 3) to perform all tasks including, but not limited to providing information, responding to enquiries, signing of Technical Bid on behalf of the Consortium, etc. The Bidding Consortium shall provide board resolutions from their respective Boards for committing their respective portion of equity requirement for the Project. Additionally, the Lead member shall provide a Board resolution committing to make good any shortfall in the equity for the project, in case of any member not meeting its equity commitment.
- 2.2.4.3 The Technical Bid should also contain signed Letter of Consent (as per Annexure 2) from each Member in Consortium confirming that the entire Technical and Financial Bids has been reviewed and each element of the Technical and Financial Bids is agreed to by them including investment commitment for the Project.

In addition, the Technical Bid should also contain Board Resolution from each Member of the Consortium other than the Lead Member in favour of their respective authorized representatives for executing the POA, Consortium Agreement and signing of the requisite formats.

- 2.2.5 Bid submitted by a Bidding Company
- 2.2.5.1 The Bidding Company should designate at the most two persons to represent the Bidding Company in its dealings with BPC. The person(s) should be authorized to perform all tasks including, but not limited to providing information, responding to enquiries, signing of Technical and Financial Bids etc. The Bidding Company should submit, along with Technical Bid, a Power of Attorney (as per Annexure 3), authorizing the signatory of the Technical and Financial Bids. The Bidding Company shall submit the board resolution committing 100% of equity requirement for the Project, in the Technical Bid.

# 2.3 Clarifications & Pre-Bid Meeting

- 2.3.1 The Bidders may seek clarifications or suggest amendments to the RFP by sending an email to the BPC at the email id indicated in Clause 2.14 within the date and time mentioned in Clause 2.7.2. For any such clarifications or amendments, the Bidders should adhere to the format as per Annexure -19.
- 2.3.2 Only those Bidders or their authorized representatives, who have purchased the RFP documents are invited to attend the pre-bid meeting(s), which will take place on date as specified in Clause 2.7.2, or any such other date as notified by the BPC. The time and address of this would be intimated later.
- 2.3.3 The purpose of the pre-bid meeting will be to clarify any issues regarding the RFP, including in particular, issues raised in writing by the Bidders as per the provisions of Clause 2.3.1.

- 2.3.4 Non-attendance at the pre-bid meeting will not be a cause for disqualification of a Bidder.
- 2.3.5 The BPC is not under any obligation to entertain / respond to suggestions made or to incorporate modifications sought for.
- 2.3.6 In case Bidders need any further clarifications not involving any amendments in respect of final RFP, they should ensure that request for such clarification is submitted through email to the BPC at least ten (10) days prior to the Bid Deadline as mentioned in Clause 2.7.1. The BPC may issue clarifications only, as per its sole discretion, which is considered reasonable by it. Any such clarification issued shall be sent to all the Bidders to whom the RFP has been issued. Clarifications sought after this date shall not be considered in any manner and shall be deemed not to have been received. There shall be no extension in Bid Deadline on account of clarifications sought as per this clause 2.3.6.

### 2.4 Amendment of RFP

- 2.4.1. At any time before the timeline mentioned in Clause 2.7.1, the BPC may, for any reason, whether at its own initiative or in response to clarifications requested by any Bidder modify or amend the RFP, including the timelines specified in Clause 2.7.2 by issuance of addendum/modification/errata and/or revised document. Such document shall be notified in writing through a letter or fax or e-mail to all the entities to whom the RFP has been issued and shall be binding on them. In order to ensure that Bidders have reasonable time to take the modification, extend the due date for submission of Bid. Late receipt of any addendum/modification/errata and/or revised document will not relieve the Bidder from being bound by that modification.
- 2.4.2. All modifications shall become part of the terms and conditions of this RFP. No interpretation, revision or communication regarding this RFP is valid, unless made in writing.
- 2.4.3. The amendment to the RFP shall be notified to all the Bidders through the electronic bidding platform and shall be binding on them.

### 2.5 The Bidding Process

The entire bidding process shall be conducted on electronic bidding platform created by MSTC Limited. The Bid shall comprise of the Technical Bid and the Financial Bid. The Bidders shall submit the Technical Bid & Financial Bid through the electronic bidding platform. In addition to the online submission, the Bidder with lowest Final Offer will be required to submit original hard copies of Annexure 3, Annexure 4 (if applicable), Annexure 6 (if applicable) and Annexure 14 before issuance of LoI. There shall be no physical submission of the Financial Bid.

Evaluation of Technical Bid will be carried out considering the information and documents furnished by the Bidders as required under this RFP. This step would involve responsiveness check, technical and financial evaluation of the details/ documents furnished by the Bidding Company / Bidding Consortium in support of meeting the Qualification Requirements. Bidders meeting the Qualification Requirements, subject to

evaluation as specified in Clause **3.2** to **3.4** shall be declared as "Qualified Bidders" and eligible for opening of Initial Offer. The BPC shall also upload the list of all Qualified Bidders and Non-Qualified Bidders on the bidding portal along with the reasons for non-qualification. Also, the Financial Bids of Qualified Bidders shall be opened after at least 24 hours from the date of declaration of the Technically Qualified Bidders.

The Financial Bid will comprise of two rounds. In the first round the Initial Offer (submitted online along with the Technical Bids) of the responsive bids would be opened and Quoted Transmission Charges of Initial Offer shall be ranked on the basis of ascending order for determination of the Qualified Bidders as provided in Section-III of RFP. The Qualified Bidders, in the first fifty per cent of the ranking (with any fraction rounded off to higher integer) or four Qualified Bidders, whichever is higher, shall qualify for participating in the electronic reverse auction stage and submit their Final Offer.

Provided however, in case only one Bidder remains after the evaluation of Technical Bid as per Clause 3.2, 3.3 and Clause 3.4, the Initial Offer of such Bidder shall not be opened and the matter shall be referred to the Government.

Provided that in the event the number of qualified Technical Bids is between two and four, then each of the qualified Bidder shall be considered as "Qualified Bidders".

Provided that in the event of identical Quoted Transmission Charges discovered from the Initial Offer having been submitted by one or more Bidders, all such Bidders shall be assigned the same rank for the purposes of determination of Qualified Bidders. In such cases, all the Qualified Bidders who share the same rank till 50% of the rank (with any fraction rounded off to higher integer) determined above, shall qualify to participate in the electronic e-reverse auction stage. In case 50% of the ranks (with any fraction rounded off to higher integer) Bidders and the rank of the fourth (4th) Bidder is shared by more than one (1) Bidder, then all such Bidders who share the rank of the fourth (4th) Bidder fourth (4th) Bidder shall qualify to participate in the electronic reverse auction.

The applicable ceiling for electronic reverse bidding shall be the lowest Quoted Transmission Charges discovered from the Initial Offer received from the Qualified Bidders. The Qualified Bidders shall be permitted to place their Final Offer on the electronic bidding platform, which is lower than zero point two five (0.25) % of the prevailing lowest Quoted Transmission Charges.

The initial period for conducting the e-reverse bidding should be 2 hours which will be extended by 30 minutes from the last received bid time, if the bid is received during the last 30 minutes of the scheduled or extended bid time. Subsequently, it will be extended again by 30 minutes from the latest received bid time.

The technical details with respect to access to such electronic platform are provided in Annexure-A (Technical Details with respect to electronic reverse auction).

In case of any technical clarification regarding access to the electronic reverse auction platform or conduct of the auction process, the Bidders may contact MSTC Limited directly at the address provided in Annexure-A.

#### 2.5.1 Bid Formats

The Bids in response to this RFP will be submitted online through the electronic bidding platform by the Bidders in the manner provided in Clause 2.9. The Bids shall comprise of the following:

### 2.5.2 Technical Bid comprising of:

- 1. Covering Letter (as per prescribed format enclosed as **Annexure 1**);
- 2. Letter of Consent from Consortium Members in Annexure 2;
- 3. Power of attorney issued by the Bidding Company or the Lead Member of the Consortium, as the case may be, in favour of the person signing the Bid, in the format attached hereto as **Annexure 3**.

Additionally, in case of a Bidding Consortium, the power of attorney in favour of the Lead Member issued by the other Members of the Consortium shall be provided in as per format attached hereto as **Annexure 4**. Further, the Lead Member shall furnish Board resolution(s) from each Member of the Consortium other than the Lead Member in favour of their respective authorized representatives for executing the POA and signing of the requisite formats.

Provided that in the event the Bidding Company or the Lead Member of the Consortium or any Member of the Bidding Consortium, as the case may be, is a foreign entity, it may issue Board resolutions in place of power of attorney for the purpose of fulfilling these requirements.

- 4. Bidder's composition and ownership structure in Annexure 5
- 5. Format for Authorization submitted in Non-Judicial stamp paper duly notarized as per **Annexure 5** from the Bidding Company / each Member of the Consortium authorizing the BPC to seek reference from their respective bankers & others.
- 6. In case of Bidding Consortium, the Consortium Agreement shall be provided in as per format attached hereto as **Annexure 6**
- 7. Format of Qualification Requirement (Annexures 7A, 7B, 7C and 7D)
- 8. Bidders Undertakings and details of equity investment in Project (as per prescribed formats 1 and 2 of **Annexure 8**);
- 9. Authorization from Parent / Affiliate of Bidding Company / Member of Bidding Consortium whose technical / financial capability has been used by the Bidding Company / Member of Bidding Consortium (Annexure 9).
- Undertaking from the Technically / Financially Evaluated Entity(ies) OR Undertaking from the Ultimate Parent Company, for total equity investment commitment, in the prescribed format in Annexure – 10, to meet any shortfall in the equity investment by the Selected Bidder in the ......[Insert the name of the SPV].

Provided further, in case the Bidding Company or Member of a Consortium, (as the case may be) holds at least twenty six percent (26%) equity in such Technically/ Financially Evaluated Entities, whose credentials have been considered for the purpose of meeting the Qualification Requirements as per the RFP, no such Undertaking shall be required from the Technically / Financially Evaluated Entities.

- 11. Board resolutions, as per prescribed formats enclosed as Annexure 11, duly certified by the Company Secretary or any Whole-time Director / Manager (supported by a specific Board Resolution), as applicable to the Bidder and mentioned hereunder,
  - (a) Board resolution from the Bidding Company (and any investing Affiliate / Parent Company / Ultimate Parent Company) committing one hundred percent (100%) in aggregate of the equity requirement for the Project Format-1 of **Annexure 11**;
  - (b) Board resolutions from each of the Consortium Member of the Bidding Consortium (and any investing Affiliate / Parent Company / Ultimate Parent Company) together committing to one hundred percent (100%) in aggregate of equity requirement for the Project, in case Bidder is a Bidding Consortium - Format-1 of Annexure 11;
  - (c) In either of the cases as in (a) or (b) above as applicable, Board resolutions as per Format 2 of Annexure 11 for total equity investment commitment from the Technically / Financially Evaluated Entity(ies) whose technical / financial credentials had been considered for the purpose of meeting Qualification Requirements as per the RFP

#### OR

Board resolutions as per Format 2 of **Annexure 11** from the Parent Company or the Ultimate Parent Company for total equity investment commitment.

Provided that such Board resolutions, as specified in (a) or (b) or (c) above, in case of a foreign entity, shall be supported by an unqualified opinion issued by an independent legal counsel practicing in the relevant country, stating that the Board resolutions are in compliance with the applicable laws of the respective jurisdictions of the issuing company and the authorizations granted therein are true and valid.

For clarity sake, illustrations identifying which Board Resolution shall be applicable in typical cases are provided in **Annexure 11A**.

12. Format for Illustration of Affiliates at the most seven (7) days prior to Bid Deadline, duly certified by Company Secretary and supported by documentary evidence (Annexure 12).

Certified copy of the Register of Members / Demat Account Statement, Share Certificate, Annual Return filed with ROC etc. submitted as documentary evidence along with **Annexure 12**.

- 13. Disclosure as per **Annexure 13** regarding participation of any related companies in this bidding process.
- 14. Bid Bond, as per the prescribed format at **Annexure 14 or** Bid Security Declaration as per prescribed format at **Annexure-14A (as applicable)**;
- 15. Checklist for Technical Bid submission requirements as per Annexure 16.
- Last three (3) financial years' unconsolidated / consolidated audited annual accounts
   / statements, as the case may be, of the Financially Evaluated Entity / Technical Evaluated Entity
- 17. Unconsolidated audited annual accounts of both the TEE and the Bidding Company/Lead member, as applicable, for the financial years in which financial closure was achieved and the financial year in which the said project was completed / commissioned.
- 18. Copy of the Memorandum and Articles of Association and certificate of incorporation or other organizational document (as applicable), including their amendments, certified by the Company Secretary of Bidding Company or each Member in case of a Consortium including Lead Member.
- 19. For each project listed in Annexure 7(D), certified true copy of the certificates of final acceptance and / or certificates of good operating performance duly issued by owners or clients for the project, duly signed by duly signed by authorized signatory.

In addition to the online submission of above formats through the electronic platform, the Bidder with lowest Final Offer will be required to submit original hard copies of Annexure 3, Annexure 4 (if applicable), Annexure 6 (if applicable) and Annexure 14 before issuance of LoI. In case, there is a discrepancy between the online submission and physical documents, the bid would be out rightly rejected and the bidder shall be construed to have engaged in the fraudulent practice as defined in Clause 2.19.3 with consequences as mentioned in Clause 2.19.2.

## 2.5.3 Financial Bid (as per prescribed format at Annexure-21)

Financial Bid shall comprise of: (i) the Initial Offer; and (ii) the Final Offer. The Initial Offer is required to be submitted along with the Technical Bid. It is hereby clarified that the Financial Bid will comprise of two rounds. In the first round the Initial Offer of the responsive bids would be opened and Quoted Transmission Charges of Initial Offer shall be ranked on the basis of ascending order for determination of the Qualified Bidders as provided in Section-III of RFP.

In accordance with clause 2.5 of this RFP, the qualified Bidders shall be eligible to participate in the electronic reverse auction and submit their Final Offer.

The applicable ceiling for electronic reverse bidding shall be the lowest Quoted Transmission Charges discovered from the Initial Offer received from the Qualified Bidders. The Qualified Bidders shall be permitted to place their Final Offer on the electronic bidding platform, which is lower than zero point two five (0.25) % of the prevailing lowest Quoted Transmission Charges.

The initial period for conducting the e-reverse bidding should be 2 hours which will be extended by 30 minutes from the last received bid time, if the bid is received during the last 30 minutes of the scheduled or extended bid time. Subsequently, it will be extended again by 30 minutes from the latest received bid time.

The Bidders shall inter-alia take into account the following while preparing and submitting the Initial Offer and Final Offer of Financial Bid :-

- a. The Bidders shall quote single annual Quoted Transmission Charges for a period of 35 years commencing from the Scheduled COD of the Project.
- b. The Quoted Transmission Charges as per the format at Annexure-21 shall be inclusive of all charges and no exclusions shall be allowed. The Bidders shall take into account all costs including capital and operating, statutory taxes, duties, levies. Availability of the inputs necessary for operation and maintenance of the Project should be ensured by the TSP at the Project site and all costs involved in procuring the inputs (including statutory taxes, duties, levies, levies thereof) at the Project site must be included in the Quoted Transmission Charges.
- c. Annexure 21 duly digitally signed by authorized signatory.
- 2.5.4 Wherever information has been sought in specified formats, the Bidders shall fill in the details as per the prescribed formats and shall refrain from referring to any other document for providing any information required in the prescribed format.

## 2.5.5 Transmission Charges

- 2.5.5.1. The Transmission Charges shall be specified in the Transmission Service Agreement and shall be payable to the TSP in Indian Rupees only. The Bidders shall quote single Transmission Charges as per the format at Annexure 21.
- 2.5.5.2. The Transmission Charges of the Selected Bidder shall be inserted in Schedule 5 of the Transmission Service Agreement.

### 2.5.6 Bidders may note that:

- a) All the information and documents in Bid shall be submitted in English language only.
- b) Bidders shall mention the name, designation, telephone number, fax number, email address of the authorized signatory and complete address of the Bidder in the covering letter.
- c) All pages of the Bid submitted shall be initialed and stamped by the authorized signatory on behalf of the Bidder.

- d) A Bidder shall submit only one Bid in the same bidding process, either individually as Bidding Company or as a Member of a Bidding Consortium.
- e) The technical and financial capability of a particular company / particular project (Parent and/ or Affiliate) shall not be used directly or indirectly by more than one Bidder/ Member of a Bidding Consortium including Lead Member / Bidding Company.
- f) This Request for Proposal (RFP) document is not transferable. The RFP document and the information contained therein is for the use only by the Bidder to whom it is issued. It may not be copied or distributed by the recipient to third parties (other than in confidence to the recipient's professional advisors). In the event that the recipient does not continue with its involvement in the Project, this RFP document must be kept confidential.
- g) Though adequate care has been taken while preparing this RFP document, the Bidder shall satisfy himself that the document is complete in all respects. Intimation of any discrepancy shall be given to the BPC immediately. If no intimation is received from any Bidder within ten (10) days from the date of issue of RFP document, it shall be considered that the RFP document is complete in all respects and has been received by the Bidder.
- h) Bids submitted by the Bidder and opened on scheduled date and time as stipulated in this RFP shall become the property of the BPC and BPC shall have no obligation to return the same to the Bidder.
- i) If any Bidder conceals any material information or makes a wrong statement or misrepresents facts or makes a misleading statement in its Bid, in any manner whatsoever, the BPC reserves the right to reject such Bid or cancel the Letter of Intent, if issued. If such event is discovered after the Effective Date, consequences specified in Transmission Service Agreement shall apply.
- j) If for any reason the Bid of the Bidder with the lowest Quoted Transmission Charges is not selected or Letter of Intent issued to such Selected Bidder is cancelled or such Bidder withdraws its Bids, the BPC may :
  - i. Invite all the remaining Bidders to revalidate or extend their respective Bid Security, as necessary, and match the Bid of the Bidder with the lowest Quoted Transmission Charges (the "second round of bidding") with following cases:
    - If in the second round of bidding, only one Bidder matches the Bid of the Bidder with lowest Quoted Transmission Charges, it shall be the Selected Bidder.
    - If two or more Bidders match the Bid of the Bidder with the lowest Quoted Transmission Charges in the second round of bidding, then the Bidder whose Quoted Transmission Charges was lower as compared to other Bidder(s) in the first round of bidding shall be the Selected Bidder. For example, if the third and fifth lowest Bidders in the first round of bidding offer to match the Bid of the

Bidder with lowest Quoted Transmission Charges in the second round of bidding, the said third lowest Bidder shall be the Successful Bidder.

- In the event that no Bidder offers to match the Bid of the Bidder with the lowest Quoted Transmission Charges in the second round of bidding, the BPC may, in its discretion, invite fresh Bids (the "third round of bidding") from all Bidders except the Bidder which quoted the lowest Quoted Transmission Charges in the first round of bidding. In case the Bidders are invited for the third round of bidding to revalidate or extend their Bid Security, as necessary, and offer fresh Bids, they shall be eligible for submission of fresh Bids provided, however, that in such third round of bidding only such Bids shall be eligible for consideration which are lower than the Quoted Transmission Charges of the second lowest Bidder in the first round of bidding; or;
- ii. Annul the bid process; or
- iii. Take any such measure as may be deemed fit in the sole discretion of the  $BPC^1$
- k) The BPC may, at its sole discretion, ask for additional information / document and/or seek clarifications from a Bidder after the Bid Deadline, inter alia, for the purposes of removal of inconsistencies or infirmities in its Bid. However, no change in the substance of the Quoted Transmission Charges shall be sought or permitted by the BPC.
- 1) Non submission and/or submission of incomplete data/ information required under the provisions of RFP shall not be construed as waiver on the part of BPC of the obligation of the Bidder to furnish the said data / information unless the waiver is in writing.
- m) Bidders shall familiarize itself with the procedures and time frames required to obtain all Consents, Clearances and Permits.
- n) All Bidders are required to ensure compliance with the standards and codes mentioned in Clause 1.6.1.2.
- o) BPC reserves the right to reject all Bids and/or annul the process of tariff based competitive bidding for selection of Bidder as TSP to execute the Project without assigning any reason. BPC shall not bear any liability, whatsoever, in this regard.
- p) Foreign companies submitting the Bid are required to follow the applicable law in their country for execution of POA, Consortium Agreement and affixation of Common Seal (wherever required) and in such cases, their Bid should be supported by an unqualified opinion issued by an independent legal counsel practicing in the relevant country, stating that execution of such POA, Consortium Agreement and the authorizations granted therein are true and valid. Foreign companies executing POA outside India shall necessarily pay the adequate stamp charges in India as per the provisions of Stamp Act.

¹ BPC shall record reasons for the same.

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### 2.5.7 Bidders to inform themselves fully

- 2.5.7.1. The Bidders shall make independent enquiry and satisfy themselves with respect to all the required information, inputs, conditions and circumstances and factors that may have any effect on his Bid. Once the Bidders have submitted their Bids, the Bidders shall be deemed to have inspected and examined the site conditions (including but not limited to its surroundings, its geological condition and the adequacy of transport facilities to the site), the laws and regulations in force in India, the transportation facilities available in India, the grid conditions, the adequacy and conditions of roads, bridges, railway sidings, ports, etc. for unloading and/or transporting heavy pieces of material and has based its design, equipment size and fixed its price taking into account all such relevant conditions and also the risks, contingencies and other circumstances which may influence or affect the transmission of power. Accordingly, each Bidder acknowledges that, on being selected as Successful Bidder and on acquisition of one hundred percent (100%) of the equity shares of the ......[Insert the name of the SPV], the TSP shall not be relieved from any of its obligations under the RFP Project Documents nor shall the TSP be entitled to any extension in Scheduled COD mentioned in this RFP or financial compensation for any reason whatsoever.
- 2.5.7.2. In their own interest, the Bidders are requested to familiarize themselves with all relevant laws of India, including without limitation, the Electricity Act 2003, the Income Tax Act 1961, the Companies Act, 1956 / Companies Act, 2013 (as the case may be), Environment Protection Act 1986 and Forest (Conservation) Act, 1980, the Customs Act, the Foreign Exchange Management Act, Land Acquisition Act, 1894, the Indian Telegraph Act 1885, Labour & Employment Laws of India, [Insurance Act] the regulations/standards framed by the Commissions and CEA, all other related acts, laws, rules and regulations prevalent in India, as amended from time to time.

In addition to the above, the Bidders are required to familiarize themselves with all relevant technical codes and standards, including but not limited to the Grid Code / State Grid Code, Central Electricity Authority (Installation and Operations of Meters) Regulations, 2006, Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2007, Central Electricity Regulatory Commission Grant of Connectivity, Long-term Access and Medium - Term Open Access in Inter-State Transmission and related matters) Regulations, 2009, Central Electricity Authority (Technical Standards for construction of Electrical Plants and Electric Lines) Regulation, 2010, Central Electricity Authority (Technical Standards for Communication System in Power System Operation) Regulations, 2020, Central Electricity Regulatory Commission (Sharing of Inter-State Transmission Charges and Losses) Regulations, 2020 and other relevant Rules/ Regulations/ Guidelines issued by the Central Government, the CERC and the CEA and amendments thereof.

The BPC shall not entertain any request for clarifications from the Bidders regarding the above laws / acts / rules / regulations / standards. Non-awareness of the same shall not be a reason for the Bidder to request for extension in Bid Deadline. The Bidders undertake and agree that, before submission of their Bid, all such factors as generally brought out above, have been fully investigated and considered while submitting their Bids.

2.5.7.3. The Survey Report has been prepared in good faith, and on best endeavor basis. Neither BPC & Nodal Agency nor their employees or advisors/consultants make any representation

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or warranty, express or implied, or accept any responsibility or liability, whatsoever, in respect of any statements or omissions made in the Survey Report, or the accuracy, completeness or reliability of information contained therein, and shall incur no liability under any law, statute, rules or regulations as to the accuracy, reliability or completeness of such Survey Report, even if any loss or damage is caused to the Bidders by any act or omission on their part.

- 2.5.7.4. Bidders shall make best efforts and carry out its own due diligence upon survey report provided by BPC and shall consider all possible techno-commercial factors before submission of Bid. Bidders may also visit the route of the Transmission Lines associated with the Project and the surrounding areas and obtain / verify all information which they deem fit and necessary for the preparation of their Bid. Bidders may also carry out required surveys and field investigation for submission of their Bid. Bidders may also opt for any other route and is not bound to follow the route suggested in survey report provided by BPC.
- 2.5.7.5. Failure to investigate, examine and to inspect site or subsurface conditions fully shall not be grounds for a Bidder to alter its Bid after the Bid Deadline nor shall it relieve a Bidder from any responsibility for appropriately eliminating the difficulty or costs of successfully completing the Project.
- 2.5.7.6. The Selected Bidder shall obtain all necessary Consents, Clearances and Permits as required. The Bidders shall familiarize itself with the procedures and time frame required to obtain such Consents, Clearances and Permits.
- 2.5.7.7. The technical requirements of integrated grid operation are specified in the Indian Electricity Grid Code (IEGC). The Bidders should particularly acquaint themselves with the requirements of connection conditions, operating code for regional grids, scheduling and dispatch instructions/codes, etc. The Bidders are also advised to fully familiarize themselves with the real time grid conditions in the country. Information regarding grid parameters such as voltage and frequency is available on the websites of Regional / State Load Despatch Centres.

### 2.5.8 Minimum Equity holding/Equity Lock-in

2.5.8.1. (a) The aggregate equity share holding of the Selected Bidder, in the issued and paid up equity share capital of ......[Insert the name of the SPV] shall not be less than Fifty one percent (51%) up to a period of (1) one year after COD of the Project;

(b) In case the Selected Bidder is a Bidding Consortium, then any Member (other than the Lead Member) of such Bidding Consortium shall be allowed to divest its equity as long as the other remaining Members (which shall always include the Lead Member) hold the minimum equity specified in (a) above.

 as an Affiliate / Parent Company / Ultimate Parent Company, the shares held by such entity shall be transferred to another Affiliate / Parent Company / Ultimate Parent Company.

Provided that in case the Lead Member or Bidding Company is holding equity through Affiliate/s, Ultimate Parent Company or Parent Company, such restriction shall apply to such entities.

(d) All transfer(s) of shareholding of ......[Insert the name of the SPV] by any of the entities referred to above, shall be after prior written intimation to the Nodal Agency.

- 2.5.8.3. For computation of effective Equity holding, the Equity holding of the Selected Bidder or its Ultimate Parent Company in such Affiliate(s) or Parent Company and the equity holding of such Affiliate (s) or Ultimate Parent Company in ......[Insert the name of the SPV] shall be computed in accordance with the example given below:

If the Parent Company or the Ultimate Parent Company of the Selected Bidder A directly holds thirty percent (30%) of the equity in ......[Insert the name of the SPV] then holding of Selected Bidder A in ......[Insert the name of the SPV] shall be thirty percent (30%);

If Selected Bidder A holds thirty percent (30%) equity of the Affiliate and the Affiliate holds fifty percent (50%) equity in ......[Insert the name of the SPV], then for the purposes of ascertaining the minimum equity/equity lock-in requirements specified above, the effective holding of Bidder A in ......[Insert the name of the SPV] shall be fifteen percent (15%), (i.e., 30%* 50%);

2.5.8.4. The provisions as contained in this Clause 2.5.8 and Article 19.1 of the Transmission Service Agreement shall override the terms of the Consortium Agreement submitted by the Bidder as part of the RFP.

### 2.6 **Project Schedule**

2.6.1. All Elements of the Project are required to be commissioned progressively as per the schedule given in the following table;

Sl. No.	Name of the Transmission Element	Effortivo	Percentage of Quoted Transmission Charges recoverable on Scheduled COD of the Element of the Project	Element(s) which are pre- required for declaring the commercial operation (COD) of the respective Element
1.	Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus Reactor Future provisions: Space for 765/400kV ICTs along with bays: 2 nos. 765kV line bay along with switchable line reactor: 6nos. 765kV Bus Reactor along with bays: 2 nos. 400/220 kV ICTs along with bays: 2 nos. 400 kV line bays along with switchable line reactor: 4 nos. 400kV Bus Reactor along with bays: 1nos. 220 kV line bays: 4nos.	18	17.59%	All elements of scheme are required to be commissioned simultaneously as their utilization is dependent on commissioning of each other.
2.	LILO of both circuit of Ajmer- Chittorgarh 765 kV D/c at Beawar		15.59%	
3.	LILO of 400kV Kota –Merta line at Beawar		1.25%	
4.	Fatehgarh-3 PS – Beawar 765 kV D/c along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line		65.57%	

The payment of Transmission Charges for any Element irrespective of its successful commissioning on or before its Scheduled COD shall only be considered after successful commissioning of the Element(s) which are pre-required for declaring the commercial operation of such Element as mentioned in the above table.

Scheduled COD for overall Project: 18 months from Effective Date.

Note: List of Element(s) along with the critical Element(s) to be provided by CEA

### 2.7 Due dates

- 2.7.1. The Bidders should submit the Bids online through the electronic bidding platform before the Bid Deadline i.e. on or before 1100 hours (IST) on 18.04.2022. In addition to the online submission, the Bidder with lowest Final Offer will be required to submit original hard copies of Annexure 3, Annexure 4 (if applicable), Annexure 6 (if applicable) and Annexure 14 before issuance of LoI.
- 2.7.2. Important timelines are mentioned below:

Date	Event
10.02.2022	Issuance of RFP
02.03.2022	Submission of written clarifications/amendments, if any, on the RFP / RFP Project Documents by Bidders so as to reach BPC by 1700 hours. Such written clarifications/amendments shall be in the format provided in Annexure-20.
09.03.2022	Pre-Bid meeting(s)
21.03.2022	Issue of written clarifications and revised RFP documents
30.04.2022	Issue of final RFP Project Documents
18.04.2022	Submission of Bid (Online submission of Bid through electronic bidding portal)
18.04.2022	Opening of Technical Bid
22.04.2022	Shortlisting and announcement of Qualified Bidders on bidding portal
25.04.2022	Opening of Financial Bid - Initial Offer
26.04.2022	Electronic reverse auction (Financial Bid – Final Offer) for the Qualified Bidders.
29.04.2022	Submission of original hard copies of Annexure 3, Annexure 4, Annexure 6, as applicable and Annexure 14 by the bidder with lowest Final Offer
04.05.2022	Selection of Successful Bidder and issue of LOI
17.05.2022	Signing of RFP Project Documents and transfer of

2.7.3. To enable BPC to meet the schedule, all Bidders are expected to respond expeditiously during the bidding process. If any milestone/activity falls on a day which is not a working day or which is a public holiday then the milestone/activity shall be achieved/ completed on the next working day.

### 2.8 Validity of the Bid

- 2.8.1. The Bid shall remain valid for a period of one hundred and eighty (180) days from the Bid Deadline. The BPC reserves the right to reject any Bid which does not meet aforementioned validity requirement.
- 2.8.2. The BPC may solicit the Bidders' consent for an extension of the period of validity of the Bid. The request and the response, thereafter, shall be in writing. In the event any

Bidder refuses to extend its Bid validity as requested by the BPC, the BPC shall not be entitled to invoke the Bid Bond. A Bidder accepting the BPC's request for validity extension shall not be permitted to modify its Bid and such Bidder shall, accordingly, extend the validity of the Bid Bond as requested by the BPC within seven (7) days of such request, failing which the Bid shall not be considered as valid.

### 2.9 Method of Submission

- 2.9.1. Both the Technical and Financial Bids duly filled in, all formats and supporting shall be scanned and uploaded online through electronic bidding platform in the manner specified in Annexure A
- 2.9.2. It may be noted that Technical Bid shall not contain any information/document relating to Financial Bid. If Technical Bid contains any such information/documents, the BPC shall not be responsible for premature opening of the Financial Bid.

All pages of the Bid, except for the Bid Bond (Annexure 14) and any other document executed on non-judicial stamp paper, forming part of the Bid and corrections in the Bid, if any, must be signed by the authorized signatory on behalf of the Bidder. It is clarified that the same authorized signatory shall sign all pages of the Bid. However, any published document submitted in this regard shall be signed by the authorized signatory at least on the first and last page of such document.

2.9.3. No change or supplemental information to a Bid already submitted will be accepted after the Bid Deadline, unless the same is requested for by the BPC as per Clause 2.5.6 (k).

Provided that a Bidder shall always have the right to withdraw / modify its Bid before the Bid Deadline. No Technical Bid or Initial Offer shall be modified, substituted or withdrawn by the Bidder on or after the Bid Deadline.

### 2.10 Preparation cost

- 2.10.1. The Bidders shall be responsible for all the costs associated with the preparation of the Bid and participation in discussions and attending pre-bid meetings, and finalization and execution of the RFP Project Documents (other than the TSA), etc. BPC shall not be responsible in any way for such costs, regardless of the conduct or outcome of the process of tariff based competitive bidding for selection of Bidder as TSP as per Bidding Guidelines.
- 2.10.2. The cost of this RFP is Rupees Five Lakh Only (Rs. 5,00,000) or U.S. Dollar Seven Thousand Only (US\$ 7,000) plus GST as per applicable rate, which shall be non-refundable. This amount shall be paid via electronic transfer to the following Bank Account:

Bank Name, Address	IDFC First Bank Limited
& Branch	Wholesale Banking Outlet Express Building, 2nd Floor,
	9-10 Bahadur Shah Zafar Marg, New Delhi-110002
Bank Account Name	REC Power Development & Consultancy Limited (formerly
	REC Power Distribution Company Limited)
Bank Account No	10000697415
Bank IFSC Code No	IDFB0020101

Immediately after issuance of RFP document, the Bidder shall submit the Pre-Award Integrity Pact in the format as prescribed in Annexure B, which shall be applicable for and during the bidding process, duly signed on each page by any whole-time Director / Authorized Signatory, duly witnessed by two persons, and shall be submitted by the Bidder in two (2) originals in a separate envelope, duly superscripted with Pre-Award Integrity Pact. The Bidder shall submit the Pre-Award Integrity Pact on non-judicial stamp paper of Rs. 100/- each duly purchased from the National Capital Territory of Delhi. In case the Bidder is in a consortium, the Pre-Award Integrity Pact shall be signed and submitted by each member of the Consortium separately.

### 2.11 Bid Bond

- 2.11.1. Each Bidder shall submit the Bid accompanied by Bid Bond issued by any of the Banks listed in Annexure-17. The Bid Bond shall be valid for a period of thirty (30) days beyond the validity of the Bid.
- 2.11.2. Subject to the provisions of Clause 2.15.5, the Bid Bond may be invoked by the BPC or its authorized representative, without any notice, demure, or any other legal process upon occurrence of any of the following:
  - Bidder withdraws during the period of Bid Validity as specified in this RFP or as extended by mutual consent of the respective Bidder(s) and the BPC
  - Failure to execute the Share Purchase Agreement as per the provisions of Clause 2.15.2; or
  - Failure to furnish the Contract Performance Guarantee as per Clause 2.12; or
  - Failure to acquire one hundred percent (100%) equity shares of ......[Insert the name of the SPV], along with all its related assets and liabilities, in accordance with the provisions of Clause 2.15.2; or
  - Failure to comply with the provisions of Clause 2.15.5 and Clause 2.15.6, leading to annulment of the award of the Project.
  - Bidders submitting any wrong information or making any misrepresentation in their Bid as mentioned in Clause 2.5.6.

Intimation of the reasons of the invocation of the Bid Bond shall be given to the Selected Bidder by the BPC within three (3) working days after such invocation.

- 2.11.3. The Bid Bond of the Selected Bidder shall be returned on submission of the Contract Performance Guarantee as per Clause 2.12 and the relevant provisions of the Transmission Service Agreement.
- 2.11.4. The Bid Bond of all the Bidders, whose Bids are declared non-responsive, shall be returned within a period of thirty (30) days after the date on which the Financial Bids are opened.

2.11.5. The Bid Bond of all unsuccessful Bidders shall be returned and released by the BPC on the same day on which the ......[Insert the name of the SPV] is transferred to the Selected Bidder. The Bid Bond of the Successful Bidder shall be returned on submission of Contract Performance Guarantee as per Clause 2.12 of this RFP and the provisions of the Transmission Service Agreement.

### 2.12 Contract Performance Guarantee

- 2.12.1. Within ten (10) days from the date of issue of the Letter of Intent, the Selected Bidder, on behalf of the TSP, will provide to the Nodal Agency the Contract Performance Guarantee for an amount of Rs. 96.00 Crore (Rupees Ninety Six Crore Only). The Contract Performance Guarantee shall be initially valid for a period up to three (3) months after the Scheduled COD of the Project and shall be extended from time to time to be valid for a period up to three (3) months after the COD of the Project and shall be dealt with in accordance with the provisions of the Transmission Service Agreement. The Contract Performance Guarantee shall be issued by any of the banks listed in Annexure-17.
- 2.12.2. In case the Selected Bidder is unable to obtain the Contract Performance Guarantee for the total amount from any one bank specified in Annexure-17, the Selected Bidder may obtain the same from not more than three (3) banks specified in Annexure-17.

### 2.13 Opening of Bids

2.13.1. Technical Bid will be opened by the Bid Opening Committee as per the following time schedule and in the office of Central Electricity Authority, in the online presence of Bidders' representatives who wish to attend:

Opening of Envelope (Technical Bid): 1130 hours (IST) on 18.04.2022

or such other dates as may be intimated by BPC to the Bidders.

In the event of any of above dates falling on a day which is not a working day or which is a public holiday, then the bids shall be opened on the next working day at the same venue and time.

Opening of Initial Offer: Initial Offer shall be opened by the Bid Opening Committee in presence of the Bid Evaluation Committee at 1130 hours (IST) on 25.04.2022 in the office of CEA.

- 2.13.2. The following information from each Bid will be read out to all the Bidders at the time of opening of Technical Bid:
  - Name of the Bidding Company / Consortium Members in case of Bidding Consortium.

### Information to be provided after opening of Initial Offer:

Only the lowest Initial Offer (s) shall be communicated to all the Qualified Bidders to participate in the e-reverse bidding process. During the e-reverse bidding process only the lowest prevailing bid should be visible to all the bidders on the electronic platform.

### 2.14 Enquiries

Written clarifications on the RFP and other RFP Project Documents as per Clause 2.3 and 2.4 may be sought from:

Chief Executive Officer, REC Power Development and Consultancy Limited (formerly REC Power Distribution Company Limited) (A wholly owned subsidiary of REC Limited) REC Corporate Head Quarter, D Block, Plot No. I – 4, Sec – 29 Gurugram – 122 001 Email: pshariharan@recl.in, pshariharan@recpdcl.in

### 2.15 Other Aspects

- 2.15.1. The draft of the Transmission Service Agreement has been attached to this RFP. In addition to above, the following documents have also been attached to this RFP:
  - a) Share Purchase Agreement

When the drafts of the above RFP Project Documents are provided by the BPC, these RFP Project Documents shall form part of this RFP as per Formats -1 & 2 of Annexure 20.

Upon finalization of the RFP Project Documents after incorporating the amendments envisaged in Clause 2.4 of this RFP, all the finalized RFP Project Documents shall be provided by BPC to the Bidders at least fifteen (15) days prior to the Bid Deadline.

The Transmission Service Agreement and Share Purchase Agreement shall be signed in required number of originals so as to ensure that one (1) original is retained by each party to the Agreement(s) on the date of transfer of SPV.

- 2.15.2. Within ten (10) days of the issue of the Letter of Intent, the Selected Bidder shall:
  - a) provide the Contract Performance Guarantee in favour of the Nodal Agency as per the provisions of Clause 2.12;
  - b) execute the Share Purchase Agreement and the Transmission Service Agreement;
  - c) acquire, for the Acquisition Price, one hundred percent (100%) equity shareholding of ......[Insert the name of the SPV] from REC Power Development and Consultancy Limited, who shall sell to the Selected Bidder, the equity shareholding of ......[Insert the name of the SPV], along with all its related assets and liabilities;

Stamp duties payable on purchase of one hundred percent (100%) of the equity shareholding of ......[Insert the name of the SPV], along with all its related assets and liabilities, shall also be borne by the Selected Bidder.

Provided further that, if for any reason attributable to the BPC, the above activities are not completed by the Selected Bidder within the above period of ten (10) days as mentioned in this Clause, such period of ten (10) days shall be extended, on a day for day basis till the end of the Bid validity period.

- 2.15.3. After the date of acquisition of the equity shareholding of ......[Insert the name of the SPV], along with all its related assets and liabilities, by the Selected Bidder,
  - i. the authority of the BPC in respect of this Bid Process shall forthwith cease and any actions to be taken thereafter will be undertaken by the Nodal Agency,
  - ii. all rights and obligations of ......[Insert the name of the SPV], shall be of the TSP,
  - iii. any decisions taken by the BPC prior to the Effective Date shall continue to be binding on the Nodal Agency and
  - iv. contractual obligations undertaken by the BPC shall continue to be fulfilled by the TSP.
  - v. Further, the TSP shall execute the Agreement(s) required, if any, under Central Electricity Regulatory Commission (Sharing of Inter-State Transmission Charges and Losses) Regulations as amended from time to time.
- 2.15.4. Within five (5) working days of the issue of the acquisition of the SPV by the Successful Bidder, the TSP shall apply to the Commission for grant of Transmission License and make an application to the Commission for the adoption of Transmission Charges, as required under Section 63 of The Electricity Act 2003.
- 2.15.5. If the Selected Bidder / TSP fails or refuses to comply with any of its obligations under Clauses 2.15.2, 2.15.3 and 2.15.4, and provided that the other parties are willing to execute the Share Purchase Agreement and REC Power Development and Consultancy Limited is willing to sell the entire equity shareholding of ......[Insert the name of the SPV], along with all its related assets and liabilities, to the Selected Bidder, such failure or refusal on the part of the Selected Bidder shall constitute sufficient grounds for cancellation of the Letter of Intent. In such cases, the BPC / its authorized representative(s) shall be entitled to invoke the Bid Bond of the Selected Bidder.
- 2.15.6. If the TSP fails to obtain the Transmission License from the Commission, it will constitute sufficient grounds for annulment of award of the Project.
- 2.15.7. The annulment of award, as provided in Clauses 2.15.5 and 2.15.6 of this RFP, will be done by the Government on the recommendations of National Committee on Transmission. However, before recommending so, National Committee on Transmission will give an opportunity to the Selected Bidder / TSP to present their view point.

2.15.8. The annulment of the award, under Clause 2.15.5 or 2.15.6 of this RFP, shall be sufficient grounds for blacklisting the bidder, whose award has been annulled, for a period of five years or more, as decided by the National Committee on Transmission, provided that the blacklisting shall be done only after giving the bidder an opportunity for showing cause.

### 2.16 Confidentiality

- 2.16.1. The parties undertake to hold in confidence this RFP and RFP Project Documents and not to disclose the terms and conditions of the transaction contemplated hereby to third parties, except:
  - a) to their professional advisors;
  - b) to their officers, contractors, employees, agents or representatives, financiers, who need to have access to such information for the proper performance of their activities;
  - c) disclosures required under Law, without the prior written consent of the other parties of the concerned agreements.

Provided that the TSP agrees and acknowledges that the Nodal Agency may at any time, disclose the terms and conditions of the RFP and RFP Project Documents to any person, to the extent stipulated under the Law or the Bidding Guidelines.

### 2.17 Right of the BPC to reject any Bid

BPC reserves the right to reject all or any of the Bids/ or cancel the RFP without assigning any reasons whatsoever and without any liability.

**2.18** Non submission and/or submission of incomplete data/ information required under the provisions of RFP shall not be construed as waiver on the part of BPC of the obligation of the Bidder to furnish the said data / information unless the waiver is in writing.

### 2.19 Fraudulent and Corrupt Practices

- 2.19.1. The Bidders and their respective officers, employees, agents and advisers shall observe the highest standard of ethics during the Bid process and subsequent to the issue of the LoI Notwithstanding anything to the contrary contained herein, or in the LoI, the BPC shall reject a Bid, withdraw the LoI, as the case may be, without being liable in any manner whatsoever to the Bidder, if it determines that the Bidder has, directly or indirectly or through an agent, engaged in corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice in the Bid process. In such an event, the BPC shall forfeit the Bid Bond, without prejudice to any other right or remedy that may be available to the BPC hereunder or otherwise.
- 2.19.2. Without prejudice to the rights of the BPC under Clause 2.19.1 hereinabove and the rights and remedies which the BPC may have under the LoI, if a Bidder is found by the BPC to have directly or indirectly or through an agent, engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice during the Bid process, or after the issue of the LoI, such Bidder & its Affiliates shall not be

eligible to participate in any tender or RFP issued by any BPC for an indefinite period from the date such Bidder is found by the BPC to have directly or indirectly or through an agent, engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practices, as the case may be.

- 2.19.3. For the purposes of this Clause 2.19, the following terms shall have the meaning hereinafter respectively assigned to them:
  - "corrupt practice" means (i) the offering, giving, receiving, or soliciting, directly a) or indirectly, of anything of value to influence the actions of any person connected with the Bid process (for avoidance of doubt, offering of employment to or employing or engaging in any manner whatsoever, directly or indirectly, any official of the BPC who is or has been associated or dealt in any manner, directly or indirectly with the Bid process or the LoI or has dealt with matters concerning the Transmission Service Agreement or arising there from, before or after the execution thereof, at any time prior to the expiry of one year from the date such official resigns or retires from or otherwise ceases to be in the service of the BPC, shall be deemed to constitute influencing the actions of a person connected with the Bid Process); or (ii) engaging in any manner whatsoever, whether during the Bid Process or after the issue of the LoI or after the execution of the Transmission Service Agreement, as the case may be, any person in respect of any matter relating to the Project or the LoI or the Transmission Service Agreement, who at any time has been or is a legal, financial or technical adviser of the BPC in relation to any matter concerning the Project;
  - b) **"Fraudulent practice"** means a misrepresentation or omission of facts or suppression of facts or disclosure of incomplete facts, in order to influence the Bid process;
  - c) **"Coercive practice"** means impairing or harming, or threatening to impair or harm, directly or indirectly, any person or property to influence any person's participation or action in the Bid process;
  - d) **"undesirable practice"** means (i) establishing contact with any person connected with or employed or engaged by the BPC with the objective of canvassing, lobbying or in any manner influencing or attempting to influence the Bid process; or (ii) having a Conflict of Interest; and
  - e) **"Restrictive practice"** means forming a cartel or arriving at any understanding or arrangement among Bidders with the objective of restricting or manipulating a full and fair competition in the Bid process.

**SECTION - 3** 

### EVALUATION OF THE TECHNICAL AND FINANCIAL BID

### **SECTION 3**

### **1. EVALUATION OF BID**

### **3.1.** The evaluation process of Technical Bid comprises the following five steps:

- Step I Responsiveness check
- Step II- Compliance with submission requirements
- Step III– Evaluation of Technical Bids
- Step IV– Evaluation of Financial Bids
- Step V Bidder Selection

### **3.2.** STEP I – Responsiveness check

The Technical Bid submitted by the Bidder shall be initially scrutinized to establish "Responsiveness". Subject to clause 2.5.6 (k), any of the following conditions shall cause the Technical Bid to be "Non-responsive":

- a) Technical Bid that are incomplete.
- b) Technical Bid not signed by authorized signatory and / or stamped in the manner indicated in this RFP.
- c) All pages of the Technical Bid submitted but not initialed by the authorized signatories on behalf of the Bidder.
- d) Technical Bid not including the covering letter as per Annexure 1.
- e) Technical Bid submitted by a Bidding Consortium not including the Consortium Agreement.
- f) Technical Bid contains material inconsistencies in the information and documents submitted by the Bidder, affecting the Qualification Requirements.
- g) Bidder submitting or participating in more than one Bid either as a Bidding Company or as a Member of Bidding Consortium.
- h) More than one Member of the Bidding Consortium or a Bidding Company using the credentials of the same Parent/Affiliate.
- i) Information not submitted in formats specified in the RFP.
- j) Applicable Board resolutions, or any other document, as provided in Clause 2.5.2, not being submitted;
- k) Bid not accompanied by a valid Bid Bond or Bid Security Declaration, as applicable;
- 1) Non submission of power of attorney, supported by a Board resolution;
- m) Bid validity being less than that required as per Clause 2.8 of this RFP;

- n) Bid not containing Format-1 (Bidders' Undertakings) of Annexure-8;
- o) Bidder having Conflict of Interest
- p) The Bidder has not submitted a disclosure as per Annexure 13.
- q) Bidders delaying in submission of additional information or clarifications sought by the BPC.
- r) If the Bidder makes any misrepresentation as specified in Clause 3.7.
- s) Bid being conditional in nature.
- t) More than one Member of the Bidding Consortium or a Bidding Company using the credentials of the same Parent/Affiliate.

### 3.3. STEP II - Compliance with submission requirements

Each Bidder's Technical Bid shall be checked for compliance with the submission requirements set forth in this RFP before the evaluation of Technical Bid is taken up. Annexure 16 and Annexure 11A shall be used to check whether each Bidder meets the stipulated requirements.

### 3.4. STEP III -Evaluation of Technical Bid

Evaluation of Technical Bid will be carried out considering the information and documents furnished by the Bidders as required under this RFP. This step would involve technical and financial evaluation of the details/ documents furnished by the Bidding Company / Bidding Consortium in support of meeting the Qualification Requirements

### 3.4.1. Interpolation of financial data.

For the Qualification Requirements data provided by the Bidders in foreign currency, equivalent rupees of Networth will be calculated using bills selling exchange rates (card rate) USD/INR of State Bank of India prevailing on the date of closing of the accounts for the respective financial year as certified by their Banker.

For the purpose of calculating the aggregate capital expenditure/construction experience of the projects completed/ commissioned where such projects are executed outside India and capital expenditure is denominated in foreign currency, bills selling exchange rates (card rate) USD/INR of State Bank of India prevailing on the date of closing of the financial year in which the projects were completed and as certified by their Banker shall be considered.

For the projects executed in the current financial year bills selling (card rate) USD/INR of State Bank of India prevailing on seven (7) days prior to the last date of submission of Technical Bid and as certified by their Banker shall be considered.

For currency other than USD, Bidders shall convert such currency into USD as per the exchange rates certified by their Banker prevailing on the relevant date and used for such

conversion. Such Bidders shall submit necessary certification from their Banker for the exchange rate used in the conversation.

If the exchange rate for any of the above dates is not available, the rate for the immediately available previous day shall be taken into account.

- 3.4.2. Bidders meeting the Qualification Requirements, subject to evaluation as specified in Clauses 3.2 to 3.4 shall be declared as Qualified Bidders and eligible for opening of Initial Offer.
- 3.4.3. The BPC shall upload the list of all Qualified Bidders and Non-Qualified Bidders on the bidding portal along with the reasons for non-qualification.

### **3.5. STEP IV - Evaluation of Financial Bids**

3.5.1. The Bids which have been found Qualified by the BPC, based on the Steps I to III as specified above in Clauses 3.2.to 3.4, shall be opened and Quoted Transmission Charges of such Initial Offer shall be ranked on the basis of the ascending Initial Offer submitted by each Qualified Bidder.

Based on such ranking of the Qualified Bidders, in the first fifty per cent of the ranking (with any fraction rounded off to higher integer) or four Qualified Bidders, whichever is higher, shall qualify for participating in the electronic reverse auction.

Provided however, in case only one Bidder remains after the Evaluation of Technical Bid (Steps 1 to III) as per Clause 3.2 to 3.4, the Initial Offer of such Bidder shall not be opened and the matter shall be referred to the Government.

Provided that in the event the number of Qualified Bidders is between two and four, then each of the responsive Bidder shall be considered as Qualified Bidders.

Provided that in the event of identical Quoted Transmission Charges discovered from the Initial Offer having been submitted by one or more Bidders, all such Bidders shall be assigned the same rank for the purposes of determination of Qualified Bidders. In such cases, all Qualified Bidders who shares the same rank till 50% of the rank (with any faction rounded off to higher integer) determined above, shall qualify to participate in the electronic reverse auction stage. In case 50% of the rank is having less than four (4) Bidders and the rank of the fourth (4th) Bidder is shared by more than one Bidder, then all such all such Bidders who share the rank of the fourth Bidder shall qualify to participate in the electronic reverse auction.

- 3.5.2. The Financial Bids comprising of both Initial Offer and Final Offer submitted by the Bidders shall be scrutinized to ensure conformity with the provisions of Clause 2.5.3 of this RFP. Any Bid not meeting any of the requirements as per Clause 2.5.3 of this RFP may cause the Bid to be considered "Non-responsive", at the sole decision of the BPC. Financial Bid not in conformity with the requirement of SI. No. (c) of Clause 2.5.3 of this RFP shall be rejected.
- 3.5.3 The Bidders shall quote the single annual Quoted Transmission Charges as specified in the format at Annexure -21.

### 3.6. STEP V - Bidder Selection

3.6.1. The prevailing lowest Quoted Transmission Charges discovered from Final Offers shall only be displayed during the e-reverse bidding and the Bidder quoting such Final Offer will always remain anonymous during the e-reverse bidding. The Bidder with the prevailing lowest Quoted Transmission Charges discovered from Final Offers at the close of the scheduled or extended period of e-reverse bidding as mentioned in clause 2.5 shall be declared as the Successful Bidder, subject to verification of the original hard copies of Annexure 3, Annexure 4 (if applicable), Annexure 6 (if applicable) and Annexure 14. The Letter of Intent shall be issued to such Successful Bidder in two (2) copies.

However, if no bid is received during the e-reverse bidding stage then the Bidder with lowest quoted initial transmission charges ("Initial Offer") during e-bidding stage shall be declared as the Successful Bidder, subject to verification of the original hard copies of Annexure 3, Annexure 4 (if applicable), Annexure 6 (if applicable) and Annexure 14. The Letter of Intent shall be issued to such Successful Bidder in two (2) copies.

In case, there is a discrepancy between the online submission and physical documents, the bid would be out rightly rejected and the bidder shall be construed to have engaged in the fraudulent practice as defined in Clause 2.19.3 with consequences as mentioned in Clause 2.19.2. Further, in such a case, the provisions of Clause 2.5.6 (j) shall apply.

- 3.6.2. The Selected Bidder shall unconditionally accept the LoI, and record on one (1) copy of the LoI, "Accepted unconditionally", under the signature of the authorized signatory of the Successful Bidder and return such copy to the BPC within seven (7) days of issue of LoI.
- 3.6.3. If the Successful Bidder, to whom the Letter of Intent has been issued, does not fulfill any of the conditions specified in Clauses 2.15.2, 2.15.3 and Clause 2.15.4, then subject to Clause 2.15.5, the BPC reserves the right to annul the award of the Project and cancel the Letter of Intent. Further, in such a case, the provisions of Clause 2.5.6 (j) shall apply.
- 3.6.4. The BPC, in its own discretion, has the right to reject all Bids if the Quoted Transmission Charges are not aligned to the prevailing prices.

### **3.7.** Misrepresentation by the Bidder

If the Bidder conceals any material information or makes a wrong statement or misrepresents facts or makes a misleading statement in the Technical Bid or Bid, as the case may be, in any manner whatsoever, in order to create circumstances for the acceptance of its Technical Bid/Bid, the BPC reserves the right to reject such Technical Bid/Bid, and/ or cancel the Letter of Intent, if issued. Further, in case Letter of Intent is cancelled, consequences as per provisions of the RFP shall follow.

### 3.8. Disposition of Technical Bid

- 3.8.1. Technical Bid found to be Non-responsive as per Clause **3.2**, due to any of the following conditions, shall be liable for rejection.
  - Technical Bid that is incomplete.

- Technical Bid not signed by authorized signatory and / or stamped in the manner indicated in this RFP.
- All pages of the Technical Bid submitted but not initialed by the authorized signatories on behalf of the Bidder.
- Technical Bid not including the covering letter as per Annexure 1.
- Technical Bid contains material inconsistencies in the information and documents submitted by the Bidder, affecting the Qualification Requirements.
- Information not submitted in formats specified in the RFP.
- The Bidder has not submitted a disclosure as per Annexure 13.
- Bidders delaying in submission of additional information or clarifications sought by the BPC.
- 3.8.2. Technical Bid found to be Non-responsive as per Clause **3.2**, due to any of the following conditions, shall be rejected.
  - Technical Bid not received by the scheduled date and time.
  - Technical Bid submitted by a Bidding Consortium not including the Consortium Agreement.
  - Bidder submitting or participating in more than one response either as a Bidding Company or as a Member of Bidding Consortium.
  - More than one Member of the Bidding Consortium or a Bidding Company using the credentials of the same Parent/Affiliate.
  - Technical Bid having Conflict of Interest.
  - If the Bidder makes any misrepresentation as specified in Clause **3.7**.
- 3.9. BPC reserves the right to interpret the Bid in accordance with the provisions of this RFP document and make its own judgment regarding the interpretation of the same. In this regard, BPC shall have no liability towards any Bidder and no Bidder shall have any recourse to BPC with respect to the qualification process.

BPC shall evaluate Bid using the process specified in Clause 3.1 to 3.6, at its sole discretion. BPC's decision in this regard shall be final and binding.

### **SECTION - 4**

### **ANNEXURES FOR BID**

**REC Power Development and Consultancy Limited** 

### **SECTION – 4**

### I. Formats for Bid

The following formats are required to be included in the Bidder's Technical and Financial Bid. These formats are designed to demonstrate the Bidder's compliance with the Qualification Requirements set forth in Clause 2.1 of Section -2.

### **Technical Bid**

- 1. Format for the Covering Letter
- 2. Format for Letter of Consent from Consortium Members
- 3. Format for evidence of authorized signatory's authority (Power of Attorney)
- 4. Format for Power of Attorney from to be provided by each of the other Members of the Consortium in favor of the Lead Member
- 5. Format for Bidder's composition and ownership structure and Format for Authorization
- 6. Format for Consortium Agreement
- 7. Formats for Qualification Requirement
- 8. Format of Bidders Undertaking and details of Equity Investment
- 9. Authorization from Parent/Affiliate of Bidding Company/Member of Bidding Consortium whose technical/financial capability has been used by the Bidding Company/Member of Bidding Consortium.
- 10. Undertaking from the Technically / Financially Evaluated Entity(ies) or from Ultimate Parent Company for equity investment
- 11. Format of Board Resolutions
- 12. Format for Illustration of Affiliates
- 13. Format for Disclosure
- 14. Format for Bid Bond
- 14A. Format for Bid Security Declaration
- 15. Format for Contract Performance Guarantee
- 16. Checklist for Technical Bid submission requirements
- 22. Format for Affidavit

In addition to the online submission, the Bidder with lowest Final Offer will be required to submit original hard copies of Annexure 3, Annexure 4 (if applicable), Annexure 6 (if applicable) and Annexure 14 before issuance of LoI.

### **Financial Bid**

- 21. Format for Financial Bid
- II. The following formats are for the information to the Bidders to enable them to submit their Bid.
  - 11A. Illustration For Applicable Board Resolution Requirements Under Clause 2.5.2
  - 17. List of Banks
  - 18. GRID Map of the Project
  - 19. Format for clarification/amendments on the RFP/RFP Project Documents
  - 20. Formats for RFP Project Documents

Bidder may use additional sheets to submit the information for its detailed Bid.

**REC Power Development and Consultancy Limited** 

### **ANNEXURE 1 - COVERING LETTER**

### (The covering letter should be on the Letter Head of the Bidding Company/ Lead Member of the Consortium)

Date:	•••	••	••	• •	••	•••	•		•		• •	•	• •	•		•		•		•	• •		•		•	
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To,

Chief Executive Officer, REC Power Development and Consultancy Limited (formerly REC Power Distribution Company Limited) (A wholly owned subsidiary of REC Limited) REC Corporate Head Quarter, D Block, Plot No. I – 4, Sec – 29 Gurugram – 122 001

Dear Sir,

- Sub: Bid for selection of Bidder as Transmission Service Provider to establish Inter-State Transmission System for "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process.
  - 1. Being duly authorized to present and act on behalf of M/s ...... (insert name of Bidding Company / Bidding Consortium) (hereinafter called the "Bidder") and having read and examined in detail the Request for Proposal (RFP) document, the undersigned hereby submit our Technical Bid with duly signed formats and Financial Bid (Initial Offer) as stipulated in RFP document for your consideration.
  - 2. It is confirmed that our Bid is consistent with all the requirements of submission as stated in the RFP document and subsequent clarifications/amendments as per Clause 2.3 and 2.4 of RFP.
  - 3. The information submitted in our Bid is complete, is strictly as per the requirements stipulated in the RFP document and is correct to the best of our knowledge and understanding. We would be solely responsible for any errors or omissions in our Bid.
  - 4. We hereby agree and undertake to procure the products associated with the Transmission System as per provisions of Public Procurement (Preference to Make in India) orders issued by Ministry of Power vide orders No. 11/5/2018 Coord. dated 28.07.2020 for

transmission sector, as amended from time to time read with Department for Promotion of Industry and Internal Trade (DPIIT) orders in this regard.

We hereby also agree and undertake to comply with Department of Expenditure, Ministry of Finance vide Order (Public Procurement No 1) bearing File No. 6/18/2019-PPD dated 23.07.2020, Order (Public Procurement No 2) bearing File No. 6/18/2019-PPD dated 23.07.2020 and Order (Public Procurement No. 3) bearing File No. 6/18/2019-PPD, dated 24.07.2020, as amended from time to time, regarding public procurement from a bidder of a country, which shares land border with India.

- 5. We hereby agree to comply with Ministry of Power order no. 25-11/6/2018 PG dated 02.07.2020 as amended from time to time.
- 6. We are herewith submitting legally binding board resolution for the total equity requirement of the Project.

# [Sl. No 7 to be inserted only in case the Bidder is a Bidding Company / Lead Member of a Consortium and has sought qualification on the basis of technical and financial capability of its Affiliate(s) and/or its Parent]

- 8. We confirm that there are no litigations or disputes against us, which materially affect our ability to fulfill our obligations with regard to the Project.
- 9. We hereby confirm that we shall continue to maintain compliance with Qualification Requirements till the execution of the Transmission Service Agreement. Further, in case we emerge as Selected Bidder for the Project, we shall continue to maintain compliance with Qualification Requirements till the COD of the Project.
- 10. We confirm that we have studied the provisions of relevant Indian laws and regulations required to enable us to build, own, operate and transfer the said Project and to prepare this Bid.
- 11. We hereby confirm that we shall abide unreservedly with BPC's decision in the qualification process for selection of Qualified Bidder and further warrant that under no circumstances we shall challenge either the BPC's decision or its right to make such decision at any time in the future.

- 12. We confirm that the Bid shall remain valid for a period of one eighty (180) days from the Bid Deadline.
- 13. The details of contact person are furnished as under: Name: ..... Designation: ..... Name of the Company: Address of the Bidder: Phone Nos.: Fax Nos.: E-mail address:

### 14. Bid Bond

### 15. Acceptance

We hereby unconditionally and irrevocably agree and accept that the decision made by the BPC on any matter regarding or arising out of the RFP shall be binding on us. We hereby expressly waive any and all claims in respect of Bid process.

### 16. Familiarity With Relevant Indian Laws & Regulations

We confirm that we have studied the provisions of relevant Indian laws and regulations as required to enable us to submit this Bid and execute the RFP Project Documents (other than TSA), in the event of our selection as the TSP. We further undertake and agree that all such factors as mentioned in Clause 2.5.7 of RFP have been fully examined and considered while submitting the Bid.

It is confirmed that our Bid is consistent with all the requirements of submission as stated in the RFP and subsequent communications from BPC.

The information submitted in our Bid is complete, strictly as per the requirements stipulated in the RFP and is correct to the best of our knowledge and understanding. We would be solely responsible for any errors or omissions in our Bid.

We confirm that we have not taken any deviation so as to be deemed non-responsive with respect to the provisions stipulated at Clause 2.5.1, of this RFP.

Thanking you,

Yours sincerely,

(Name and Signature of the authorized signatory in whose name Power of Attorney/ Board Resolution as per Clause 2.5.2 is issued)

Name:	
Designation:	
Address:	

Date:	
Place:	

**Company Rubber Stamp** 

### ANNEXURE 2 - LETTER OF CONSENT FROM CONSORTIUM MEMBERS

(On the letter head of each Member of the Consortium including Lead Member)

Date:		•	•	•	•									•	•	•	•	•	•	•		•			•	•	•			•	•	•	•		• •	
From:		•	•	•	•		•						•	•	•	•	•	•	•	•	• •	•	•	•	•	•	•	• •		•	•	•	•	•	• •	•
	•	•	•	•	•	• •	•	•	• •		• •			•	•	•	•	•	•	•	• •	•	•	•	•	•	•	• •		•	•	•	•	•	•••	•
	•	•	•	•	•		•				• •		•	•	•	•	•	•	•	•	• •	•	•	•	•	•	•	• •	•••	•	•	•	•	•	•••	•
Tel. No.:		•	•	•	•		•							•	•	•	•	•	•	•	• •	•		•	•	•	•			•	•	•	•	•	• •	
Fax No.:		•	•	•	•		•						•	•		•	•	•	•	•		•	•		•	•	•			•	•	•	•	•		
E-mail address	:		•			•	•	•	•	•	•	•	•	•	•	•	• •		•	•	•	•	•	• •		•	•	•	•	•	•			•	•	•

To,

Chief Executive Officer, REC Power Development and Consultancy Limited (formerly REC Power Distribution Company Limited) (A wholly owned subsidiary of REC Limited) REC Corporate Head Quarter, D Block, Plot No. I – 4, Sec – 29 Gurugram – 122 001

Dear Sir,

Sub: Bid for selection of Bidder as Transmission Service Provider to establish Inter-State Transmission System for "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F " through tariff based competitive bidding process.

We, the undersigned Member of ...... (Insert name of the Bidding Consortium) have read, examined and understood the RFP document for the short-listing of Bidders as prospective TSP to establish Inter-State Transmission System for **Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F** " through tariff based competitive bidding process. We hereby confirm our concurrence with the Bid including in particular the Consortium Agreement submitted by ...... (Insert name of the Lead Member) in response to the RFP document.

We hereby confirm our commitment to participate in the said Bidding Consortium and invest ...... % of the total equity requirement for the Project as per the terms of the Consortium Agreement dated ...... and board resolution for such investment commitment is enclosed herewith.

We hereby confirm that in accordance with Clause 2.1.4 of the RFP, we are enclosing legally binding undertaking supported by a board resolution from the ...... (Insert name of Technically Evaluated Entity and / or Financially Evaluated Entity or its Ultimate Parent Company, as the case may be) that all the equity investment obligations of ...... (Insert name of the Member) shall be deemed to be equity investment obligations of the ...... (Insert name of Technically Evaluated Entity and / or Financially Evaluated Entity or its Ultimate Parent Company, as the case may be) and in the event of any default by...... (Insert name of the Member), the same shall be met by...... (Insert

**REC Power Development and Consultancy Limited** 

name of Technically Evaluated Entity and / or Financially Evaluated Entity or its Ultimate Parent Company, as the case may be). [Insert if applicable]

The details of contact person	are	e f	u	rr	ni	sl	16	eċ	1 8	as	ι	ır	ıd	le	r:										
Name:	•••	•••		•••		•		• •	••			• •	••		•••	• •	•	••		•••	•••	•••	•	•••	•
Designation:	•••	•••		•••		•		• •	••			• •	••	••	•••	•••	•	••		• •	•••	•••	•	•••	•
Name of the Company:	•••	•••		•••		•		• •	••			• •	••	••	•••	•••	•	••		• •	•••	•••	•	•••	•
Address:	•••	••		•••		•		• •	••	•••		• •	• •	••	• •	•••	•	••		•••	•••	•••	•	•••	•
Phone Nos.:	•••	••		•••		•		• •	••	•••		• •	• •	•••	• •	•••	•	••		•••		•••	•	•••	•
Fax Nos.:	•••	••		••		•	•••	• •	••	••	••	• •	• •	••	•••	•••	•	••		•••	••	•••	•	•••	•
E-mail address:	•••	•••	••	•••	• •	•	•••	• •	••	••	••	• •	••	••	•••	•••	•	••	••	•••	•••	•••	•	•••	•

Dated the ..... day of ..... of 20...

Thanking you,

Yours faithfully,

(Signature)

Name: Designation:

(Signature, Name, Designation of Authorized Signatory of Consortium Member and Company's Seal)

### ANNEXURE 3 - FORMAT FOR EVIDENCE OF AUTHORIZED SIGNATORY'S AUTHORITY (POWER OF ATTORNEY)

### **POWER OF ATTORNEY**

### (To be on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution. Foreign companies submitting bids are required to follow the applicable law in their country)

We hereby agree to ratify all acts, deeds and things lawfully done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney shall and shall always be deemed to have been done by us.

All the terms used herein but not defined shall have the meaning ascribed to such terms under the RFP.

For ...... [Insert name of the Bidder on whose behalf PoA is executed]

(Signature)

Name: ..... Designation: .....

Accepted

(Signature of the Attorney)

Name:	
Designation:	
Address:	

(Name, Designation and Address of the Attorney)

**REC Power Development and Consultancy Limited** 

Specimen signatures of attorney attested by the Executant

(Signature of the Executant)

(Signature of Notary Public)

Place:	
Date:	

### Notes:

- 1) To be executed by Bidding Company or the Lead Member, in the case of a Bidding Consortium, as the case maybe.
- 2) The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required, the same should be under common seal of the executant affixed in accordance with the applicable procedure. Further, the person whose signatures are to be provided on the power of attorney shall be duly authorized by the executant(s) in this regard.
- 3) Also, wherever required, the executant(s) should submit for verification the extract of the charter documents and documents such as a Board resolution / power of attorney, in favour of the Person executing this power of attorney for delegation of power hereunder on behalf of the executant(s).
- 4) In case of foreign Bidders, refer to clause 2.5.6 (p)

### ANNEXURE 4 - FORMAT FOR POWER OF ATTORNEY TO BE PROVIDED BY EACH OF THE OTHER MEMBERS OF THE CONSORTIUM IN FAVOUR OF THE LEAD MEMBER

### **POWER OF ATTORNEY**

(To be on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution. Foreign companies submitting bids are required to follow the applicable law in their country)

KNOW ALL MEN BY THESE PRESENTS THAT M/s....., having its office registered at ..... M/s .....and ..... having its registered office at ......, (Insert names and registered offices of all Members of the Consortium), the Members of Consortium, have formed a Bidding Consortium named ..... (insert name of the Consortium) (hereinafter called the "Consortium") vide Consortium Agreement dated..... and having agreed to appoint M/s.... as the Lead Member of the said Consortium do hereby constitute, nominate and appoint M/s.....a company incorporated under the laws of .....and having its Registered / Head Office at .....as our duly constituted lawful Attorney (hereinafter called as "Lead Member") which is one of the Members of the Consortium, to act as the Lead Member and our true and lawful attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to submission of Consortium's Bid for the Project, including signing and submission of the Bid and all documents related to the Bid, including, undertakings, letters, certificates, acceptances, clarifications, guarantees, etc, making representations to the BPC, and providing information / responses to the BPC, representing us and the Consortium in all matters before the BPC, and generally dealing with the BPC in all matters in connection with our Bid for the said Project, till completion of the bidding process in accordance with the RFP and signing of the Share Purchase Agreement by all the parties thereto.

It is expressly understood that in the event of the Consortium being selected as Successful Bidder, this Power of Attorney shall remain valid, binding and irrevocable until the Bidding Consortium achieves execution of all RFP Project Documents.

We, as the Member of the Consortium, agree and undertake to ratify and confirm all whatsoever the said Attorney/Lead Member has done on behalf of the Consortium Members pursuant to this Power of Attorney and the same shall bind us and deemed to have been done by us.

All the terms used herein but not defined shall have the meaning ascribed to such terms under the RFP.

**IN WITNESS WHEREOF** M/s ....., as the Member of the Consortium have executed these presents on this...... day of ......

For and on behalf of Consortium Member

**REC Power Development and Consultancy Limited** 

### (Signature of the Authorized Signatory)

Name:
Designation:
Place:
Date:
Name:
Designation:
Place:
Date:

### Accepted

Specimen signatures of attorney attested

(Signature)

••	٠	•	• •	• •	•	•	•	•	•	•	٠	•	•	•	•	•	•	•	•	•	•	•	•	•	•	٠	•	

٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠	٠

### (Signature of Notary Public)

.....

(Name, Designation and Address of the Attorney)

Place: ..... Date: .....

### Notes:

- 1. The mode of execution of the power of attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required, the same should be under common seal of the executant affixed in accordance with the applicable procedure. Further, the person whose signatures are to be provided on the power of attorney shall be duly authorized by the executant(s) in this regard.
- 2. Also, wherever required, the executant(s) should submit for verification the extract of the charter documents and documents such as a Board resolution / power of attorney, in favour of the Person executing this power of attorney for delegation of power hereunder on behalf of the executant(s).
- 3. In case of foreign Bidders, refer to clause 2.5.6 (p)

### **ANNEXURE 5 - FORMAT FOR BIDDER'S COMPOSITION AND OWNERSHIP STRUCTURE**

#### 1. **Corporate Details:**

Please provide the following information for the Bidder. If the Bidder is a Consortium, please provide this information for each Member including the Lead Member:

### a. Company's Name, Address, and Nationality:

	Name	:	
	Addre	SS:	
	Websi	ite Address	:
	Count	ry of Origin	1:
b.	Year	Organized	:
c.	Comp		ness Activities:
e.			applicable serial number al Address in India (if applicable):
f.	Name	of the Aut	horized Signatory:
g.	Telep	hone Num	ber:
h.	Email	Address:	
i.	Telefa	ax Number	:
j.	Please	e provide t	he following documents:
	i	incorporatio	e Memorandum and Articles of Association and certificate of on or other equivalent organizational document (as applicable), heir amendments, certified by the Company Secretary as

of

Attachment 1 for Bidding Company / each Member of Bidding Consortium including Lead Member.

ii. Authority letter (as per format for authorization given below) in favour of BPC from the Bidder/every Member of the Consortium authorizing BPC to seek reference from their respective bankers & others as Attachment 2 as per Clause 2.1.6 of the RFP.

### 2. Details of Ownership Structure:

Equity holding of Bidding Company/ each Member of Bidding Consortium including Lead Member owning 10% or more of total paid up equity.

Name of the Bidding Company / Consortium Member: ...... Status of equity holding as on .....

	Name of the Equity Holder	Type and No. of Shares owned	Extent of Voting Control (%)
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			

### Notes:

- 1. The above table is to be filled in separately for each Consortium Member.
- 2. Status of equity holding should be provided not earlier than thirty (30) days prior to Bid Deadline.

### For and on behalf of Bidding Company / Lead Member of the Bidding Consortium

M/s.....

(Signature of authorized representative) Name: Designation:

.....

### (Stamp)

Date:	 
Place:	 

**REC Power Development and Consultancy Limited** 

### FORMAT FOR AUTHORISATION

### (In case of Bidding Consortium, to be given separately by each Member) (On Non – judicial stamp paper duly attested by notary public. Foreign companies submitting bids are required to follow the applicable law in their country)

The undersigned hereby authorize(s) and request(s) all our Bankers, including its subsidiaries and branches, any person, firm, corporation or authority to furnish pertinent information deemed necessary and requested by REC Power Development and Consultancy Limited to verify our Bid for selection of Bidder as Transmission Service Provider to establish Inter-State Transmission system for **"Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F** " through tariff based competitive bidding process or regarding our project development experience, financial standing and general reputation.

For and on behalf of M/s..... (Insert Name of Bidding Company or Member of the Consortium)

 (Signature)

 Name of Authorized Signatory:

 (Signature and Name of the authorized signatory of the Company)

 Place:

 Date:

 (Company rubber stamp/seal)

(Signature of Notary Public)

Place: ..... Date: .....

### ANNEXURE 6 - FORMAT FOR CONSORTIUM AGREEMENT

### (To be on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution. Foreign companies submitting bids are required to follow the applicable law in their country)

**AND WHEREAS,** Clause 2.2.4 of the RFP document stipulates that the Bidders qualifying on the strength of a Bidding Consortium will have to submit a legally enforceable Consortium Agreement in a format specified in the RFP document wherein the Consortium Members have to commit equity of a specific percentage in the Project.

**AND WHEREAS,** Clause 2.2.4 of the RFP document also stipulates that the Bidding Consortium shall provide along with the Bid, a Consortium Agreement as per prescribed format whereby the Consortium Members undertake to be liable for raising the required funds for its respective equity investment commitment as specified in Consortium Agreement.

### NOW THEREFORE, THIS INDENTURE WITNESSTH AS UNDER:

In consideration of the above premises and agreement all the parties in this Consortium do hereby mutually agree as follows:

- 2. The Lead Member is hereby authorized by the Members of Consortium and parties to the Consortium Agreement to bind the Consortium and receive instructions for and on behalf of the Members.

- 3. Notwithstanding anything contrary contained in this Consortium Agreement, the Lead Member shall always be liable for the equity investment obligations of all the Consortium Members, i.e., for both its own equity contribution as well as the equity contribution of other Members.
- 4. The Lead Member shall be liable and responsible for ensuring the individual and collective commitment of each of the Members of the Consortium in discharging all their respective equity obligations. Each Consortium Member further undertakes to be individually liable for the performance of its part of the obligations without in any way limiting the scope of collective liability envisaged in this agreement.
- 5. Subject to the terms of this agreement, the share of each Member of the Consortium in the "issued equity share capital of the project company" shall be in the following proportion: (if applicable)

Name	Percentage of equity holding in the Project
Party 1	
Party n	
Total	100%

[**Note:** The percentage equity holding for any Consortium Member in the Project cannot be zero in the above table]

- 6. The Lead Member shall inter alia undertake full responsibility for liaising with lenders and mobilizing debt resources for the Project and achieving financial closure.
- 7. In case of any breach of any of the equity investment commitment by any of the Consortium Members, the Lead Member shall be liable for the consequences thereof.
- 8. Except as specified in the Agreement, it is agreed that sharing of responsibilities as aforesaid and equity investment obligations thereto shall not in any way be a limitation of responsibility of the Lead Member under these presents.
- 9. It is further specifically agreed that the financial liability for equity contribution of Lead Member shall, not be limited in any way so as to restrict or limit its liabilities. The Lead Member shall be liable irrespective of their scope of work or financial commitments.
- It is expressly understood and agreed between the Members that the responsibilities and obligations of each of the Members shall be as delineated as annexed hereto as Appendix-I, forming integral part of this Agreement. It is further agreed by the Members that the above sharing of responsibilities and obligations shall not in any way be a limitation of joint and several responsibilities and liabilities of the Members, with regards to all matters relating to the Project.
- 11. It is clearly agreed that the Lead Member shall ensure performance under the Agreements and if one or more Consortium Members fail to perform its /their respective obligations

under the Agreement(s), the same shall be deemed to be a default by all the Consortium Members.

- 12. This Consortium Agreement shall be construed and interpreted in accordance with the Laws of India and courts at **Delhi** alone shall have the exclusive jurisdiction in all matters relating thereto and arising there under.
- 13. It is hereby agreed that, the Lead Member shall furnish the bid bond, as stipulated in the RFP, on behalf of the Consortium Members.
- 14. It is hereby agreed that in case of selection of Bidding Consortium as the selected bidder, the parties to this Consortium Agreement do hereby agree that they shall furnish the contract performance guarantee on behalf of the TSP in favor of the Nodal Agency, as stipulated in the RFP and Transmission Service Agreement.
- 15. It is further expressly agreed that the Consortium Agreement shall be irrevocable and shall form an integral part of the RFP Project Document and shall remain valid till the execution of the Share Purchase Agreement, unless expressly agreed to the contrary by the Nodal Agency. Over the term of the Transmission Service Agreement, Central Electricity Regulatory Commission (Sharing of Inter-State Transmission Charges and Losses) Regulations as amended from time to time shall apply on the Consortium Members.
- 16. The Lead Member is authorized and shall be fully responsible for the accuracy and veracity of the representations and information submitted by the Consortium Members respectively from time to time in response to the RFP and for the purposes of the Project.
- 17. It is hereby expressly agreed between the parties to this Consortium Agreement that neither party shall assign or delegate its rights, duties or obligations under this Agreement except with the prior written consent of the Nodal Agency.

### THIS CONSORTIUM AGREEMENT:

- a. has been duly executed and delivered on behalf of each party hereto and constitutes the legal, valid, binding and enforceable obligation of each such party,
- b. sets forth the entire understanding of the parties hereto with respect to the subject matter hereof;
- c. may not be amended or modified except in writing signed by each of the parties and with prior written consent of the Nodal Agency.

**IN WITNESS WHEREOF,** the parties to the Consortium Agreement have, through their authorized representatives, executed these present on the Day, Month and Year first mentioned above.

For and on behalf of Consortium Member 1 (Party 1) M/s.....

## (Signature of authorized signatory)

Name:	 	 	
Designation:	 	 	
Place:	 	 	
Date:			

For and on behalf of Consortium Member n (Party n) M/s.....

(Signature of authorized signatory)

Name:	
Design	nation:
Place:	
Date:	

### Attested:

(Signature)	
(Notary Public)	

Place:	
Date:	

Note: In case of foreign Bidders, refer to clause 2.5.6 (p)

Name of the Consortium Member	Responsibilities under the Consortium Agreement
M/s (Party 1)	
M/s	
M/s (Party n)	

#### Appendix 1 to the Consortium Agreement:

#### ANNEXURE 7 A - FORMAT FOR QUALIFICATION REQUIREMENT

#### A. NET WORTH

To, Chief Executive Officer, REC Power Development and Consultancy Limited (formerly REC Power Distribution Company Limited) (A wholly owned subsidiary of REC Limited) REC Corporate Head Quarter, D Block, Plot No. I – 4, Sec – 29 Gurugram – 122 001

Dear Sir,

Sub: Bid for selection of Bidder as Transmission Service Provider to establish Inter-State Transmission System for "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F " through tariff based competitive bidding process

#### 1. [Note: Applicable in case of Bidding Company]

We certify that the Financially Evaluated Entity(ies) had a Networth of Rs. ...... Crore or equivalent USD* computed as per instructions in this RFP based on unconsolidated audited annual accounts (refer Note-2 below) of any of the last three (3) financial years as provided in Clause 2.2.3, immediately preceding the Bid Deadline. Also, the Networth of any of the last three (3) financial years is not negative.

Name of Financially Evaluated Entity(ies)	Relationship with Bidding Company**	Financial Year	Networth (Rs. Crore)					
1								
2								
3								
••••								
Total Networth								

*Equivalent USD shall be calculated as per provisions of Clause 3.4.1.

** The column for "Relationship with Bidding Company" is to be filled in only in case financial capability of Parent/Affiliate has been used for meeting Qualification Requirements.

#### 2. [Note: Applicable in case of Bidding Consortium]

We certify that the Financially Evaluated Entity(ies) had a minimum Networth of Rs. ...... Crore or equivalent USD* computed as per instructions in the RFP and based on unconsolidated audited annual accounts (refer Note-2 below) of any of the last three (3) financial years as provided in Clause 2.2.3, immediately preceding the Bid Deadline. Also, the Networth of any of the last three (3) financial years is not negative.

Standard RFP for Selection of Bidder as Transmission Service

Name of Consortium Member	Equity Commitment in the Project (%)	Networth of Member (Rs. Crore)	Networth Requirement to be met by Member in proportion to the Equity Commitment (Rs. Crore)	Whether the Member meets the Networth Requirement
(1)	(2)	(3) (As per table below)	(4)= (2 x Total Networth requirement for the Project)	(5)
1				Yes / No
2				Yes / No
••				Yes / No
Total Networth for	r financial			
requireme	nt			

#### Member – I (Lead Member)

[Note: Similar particulars for each Member of the Consortium is to be furnished, duly certified by the Member's Statutory Auditors]

i. Name of Member:

- ii. Total Networth requirement: Rs ..... Crore
- iii. Percentage of equity commitment for the Project by the Member: .....%
- iv. Networth requirement for the Member***: Rs. ..... Crore
- v. Financial year considered for the Member:

Name of Financially Evaluated Entity(ies)	Relationship** with Member of Consortium	Financial Year	Networth (Rs. Crore)
1			
2			
3			
Total Netw	orth		

- * Equivalent USD shall be calculated as per provisions of Clause 3.4.1;
- ** The column for "Relationship with Member of Consortium" is to be filled in only in case the financial capability of Parent / Affiliate has been used for meeting Qualification Requirements;
- *** Networth requirement to be met by Member should be in proportion to the equity commitment of the Member for the Project.

#### Yours faithfully

(Signature and name of the authorized signatory of the Company and Stamp)

Name:	
Date:	
Place:	

# (Signature and Stamp of statutory Auditors of Bidding Company / each Member of Consortium)

Name:	 •••		•	 		•	•	• •	 		•	•		•					•	•				•								
Date:		•••	•	 ••	•	•	•	• •	 ••			•	•	•			•	•	•	•			•	•	•	•	•	•	• •	 •	•	
Place:		•••	•	 ••	•	•	•	• •	 ••	•	•	•	•	•	• •	••	•	•	•	•	• •	• •	•	•	•	•	•	•	• •	 •	•	•
Date:			•	 		•	•	• •	 			•		•					•	•				•				•				

#### Notes:

- 1. Along with the above format, in a separate sheet, please provide details of computation of Networth of last three (3) financial years duly certified by Statutory Auditor.
- 2. Audited consolidated annual accounts of the Bidder may be used for the purpose of financial criteria provided the Bidder has at least 26% equity in each company whose accounts are merged in the audited consolidated accounts and provided further that the financial capability of such companies (of which accounts are being merged in the consolidated accounts) shall not be considered again for the purpose of evaluation of the Bid.
- 3. In case Bidder or a Member of Consortium takes recourse to its Parent/Affiliate for meeting technical / financial requirements, then the financial years considered for such purpose should be same for the Bidder / Member of Consortium and their respective Parent / Affiliate.

#### ANNEXURE 7B - FORMAT FOR TECHNICAL REQUIREMENT

To,

Chief Executive Officer, REC Power Development and Consultancy Limited (formerly REC Power Distribution Company Limited) (A wholly owned subsidiary of REC Limited) REC Corporate Head Quarter, D Block, Plot No. I – 4, Sec – 29 Gurugram – 122 001

Dear Sir,

Sub: Bid for selection of Bidder as Transmission Service Provider to establish Inter-State Transmission System for "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F " through tariff based competitive bidding process

#### 1. To be used by Bidder using the development experience in infrastructure sector

We certify that M/s. ..... (Insert name of Technically Evaluated Entity(ies)) have experience of development of projects in the Infrastructure sector in the last five (5) years whose aggregate capital expenditure is Rs. ..... Crore or equivalent USD*. We further certify that the capital expenditure of any single project considered for meeting the technical Qualification Requirement is not less than Rs. ..... Crore or equivalent USD*. For this purpose, capital expenditure incurred on projects which have been either wholly completed / commissioned or partly completed projects put under commercial operation and for which operation has commenced till at least seven (7) days prior to the Bid Deadline has been considered.

The project(s) considered for the purpose of technical experience (as per table given below) have been executed and owned to the extent as indicated in the table below (to be atleast twenty – six percent (26%)) by the Bidding Company / Lead Member of the Consortium / our Parent / our Affiliate(s) [strike off whichever is not applicable] on operation of the projects.

This technical requirement has been calculated as per the instructions provided in the RFP on the basis of following projects:

Name of Company (which has executed the project at (3)) whose technical capability has been used for Qualification Requirement	Relationship** with Bidding Company / Lead Member	Project name	Nature of Project (BOOT, BOT, BOOM, DBFOT etc.)	Relevant Infrastructure sector	Date of Financial Closure of the Project (in DD / MM / YYYY)	Date of Completion / Commissioning / Commercial Operation of partly completed projects	Project cost (Rs. Crore)	Percentage Equity Holding of Company at (1) in Completed project(s)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		 (Project 1)						

Standard RFP for Selection of Bidder as Transmission Service

Name of Company (which has executed the project at (3)) whose technical capability has been used for Qualification Requirement	Relationship** with Bidding Company / Lead Member	Project name	Nature of Project (BOOT, BOT, BOOM, DBFOT etc.)	Relevant Infrastructure sector	Date of Financial Closure of the Project (in DD / MM / YYYY)	Date of Completion / Commissioning / Commercial Operation of partly completed projects	Project cost (Rs. Crore)	Percentage Equity Holding of Company at (1) in Completed project(s)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Total (Rs. Crore)								

- * Equivalent USD shall be calculated as per provisions of Clause _____
- ** The column for "Relationship with Bidding Company / Lead Member" is to be filled in only in case technical capability of Parent/Affiliate has been used for meeting Qualification Requirements.

We further certify that the Company(ies) as indicated in column (1) of the above table, whose technical capability has / have been used for meeting the qualification requirement, has / have held shareholding respectively of atleast twenty – six percent (26%)from the date of financial closure till the date of commissioning / completion of the above project(s).

#### 2. To be used by Bidder using construction experience in infrastructure sector.

We certify that M/s. ...... (Insert name of Technically Evaluated Entity(ies)) have received aggregate payments not less than Rs. ...... Crore or equivalent USD (calculated as per provisions in Clause 3.4.1) from its client(s) for construction works fully completed during the last 5(five) financial years. We further certify that the payment received from each project shall not be less than Rs. ...... Crore or equivalent USD (calculated as per provisions in Clause 3.4.1). For this purpose, payments received on projects that have been commissioned/completed at least seven (7) days prior to the Bid Deadline shall be considered. Further only the payments (gross) actually received, during such 5 (five) financial years shall qualify for purposes of computing the technical capacity.

We also confirm that construction works does not include cost of land supply of goods or equipment except when such goods or equipment form part of a turn-key construction contract/ EPC contract for the project.

This technical requirement has been calculated as per the instructions provided in the RFP on the basis of following projects:

Name of Company (which has executed the project at (3)) whose technical capability has been used for	Relationship** with Bidding Company / Lead Member	Project name	Nature of Project (EPC, Turnkey etc)	Relevant Infrastructure sector	Date of award of contract (in dd/mm/yy)	Date of Completion / Commissioning	Payment received (Rs. Crore)
------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------	-----------------	--------------------------------------------------	--------------------------------------	--------------------------------------------------	------------------------------------------	------------------------------------

Qualification Requirement							
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		 Project 1					
	Total (Rs. Crore)						

Yours faithfully

(Signature and name of the authorized signatory of the Company and stamp)

Name:				• •		•				•	•				•		•	•			•				•	 •	•••	•
Date:	••	•	•	• •	 •	•	•	• •	 •	•	•	• •	••	•	•	 •	•	•	 •	•	•	• •	••	•	•	 •	•••	•
Place:	••	•	•	• •	 •	•	•	• •	 •	•	•		• •	•	•	 •	•	•	 •	•	•		• •	•	•	 •	•	•

.....

(Signature and Stamp of statutory Auditors of Bidding Company/ Lead Member of Consortium)

Name:	
Date:	
Place:	

Date: .....

#### Notes:

1. Along with the above format, in a separate sheet, please provide details of computation of capital expenditure of projects duly certified by Statutory Auditor of the project company. In addition, the Statutory Auditor of the project company should also certify that the capital expenditure of projects commissioned or completed 7 days prior to Bid Deadline has been capitalized in the books of accounts.

Additionally, in case construction experience is used, a certificate(s) from the statutory auditors stating the payments received and the concerned client(s) stating the works commissioned during the past 5 years in respect of the projects specified above. In case a particular job/ contract has been jointly executed by the Bidder (as part of a consortium), it should further support its claim for the share in work done for that particular job/ contract by producing a certificate from its statutory auditor or the client.

2. In case the accounts for the financial year in which the project claimed for meeting qualification requirement has been commissioned are not audited, the Bidder shall give declaration in this regard duly certified by its statutory auditor. In such a case,

Bidder shall provide details of computation of capital expenditure of such project(s) duly certified by Statutory Auditor of the project company and the Statutory Auditor of the project company should also certify that the capital expenditure of projects commissioned or completed shall be capitalized in the books of accounts upon finalization.

3. The unconsolidated audited annual accounts of both the TEE and the Bidding Company / Lead Member for the respective financial years (financial years in which financial closure was achieved to the financial year in which the said project was completed / commissioned) should be submitted.

#### ANNEXURE 7C - FORMAT FOR TECHNICAL & FINANCIAL REQUIREMENT – RELATIONSHIP & DETAILS OF EQUITY SHAREHOLDING

[To be filled by Bidding Company / each Member of the Bidding Consortium including Lead Member if credentials of Parent and / or Affiliates have been used by them]

To,

Chief Executive Officer, REC Power Development and Consultancy Limited (formerly REC Power Distribution Company Limited) (A wholly owned subsidiary of REC Limited) REC Corporate Head Quarter, D Block, Plot No. I – 4, Sec – 29 Gurugram – 122 001

Dear Sir,

#### Sub: Bid for selection of Bidder as Transmission Service Provider to establish Inter-State Transmission System for "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F " through tariff based competitive bidding process

We certify that M/s. ..... (insert name of the **Bidding Company / Consortium Members**) have considered the technical and financial capability of its Parent and / or Affiliates, for the purpose of meeting Qualification Requirements as per the instructions provided in the RFP. The name of Parent and / or Affiliate, nature of relationship(s) with such Parent and / or Affiliate and details of equity holding are as follows:

Name of Company whose credentials considered	Type of credentials considered (technical and / or financial)	Relationship with Bidding Company / Consortium Member (Parent / Affiliate)	Details of equity shareholding (refer notes below)
Company 1			

#### NOTES:

- i. In case of Parent, the equity holding of the Parent in the Bidding Company / Member of the Bidding Consortium, including the Lead Member of the Consortium, need to be specified.
- ii. In case of Affiliate under direct control of Bidder, the equity holding of the Bidding Company / Member of the Bidding Consortium, including the Lead Member of the Consortium in the Affiliate, needs to be specified.

- iii. In case of Affiliate under common control of Parent, the equity holding of the Parent in the Affiliate of the Bidding Company / Member of the Bidding Consortium, including the Lead Member of the Consortium, needs to be specified.
- iv. Relationship of Parent / Affiliate with Bidding Company / Member of Consortium to be at the most seven (7) days prior to the Bid Deadline (as per Clause 2.1.4 of RFP)

Yours faithfully

### (Signature and name of the authorized signatory of the Company and stamp)

Name:		•	•	•	•	•	•	•	•	•	•	•	•			•	•	•	•	•	•	•	•	•	•	•	• •	 •
Date:		•	•	•	•	•	•	•	•	•	•	•	•		• •	•	•	•	•	•	•	•	•	•	•	•	• •	 •
Place:	•	•	•	•	•	•	•	•	•	•	•	•	•	• •	• •	•	•	•	•	•	•	•	•	•	•	•	• •	 •

# (Signature and Stamp of statutory Auditors of Bidding Company / each Member of Bidding Consortium)

Name:					• •	••	•	•	• •	 •	•	•	 •	•	•	•	 	•		•	•	•	•		•••
Date:	•••						•	•	•		•	•	 •	•	•	•	 	•		•	•	•	•		•••
Place:	•••		•				•	•	•		•	•	 •	•	•	•	 •	•	•	•	•	•	•		
Date:	••	••	•	•	• •	••	•	•	• •	 •	•	•	 •	•	•	•	 •	•	•	•	•	•	•	• •	•••

#### ANNEXURE 7D - ADDITIONAL INFORMATION FOR VERIFICATION OF FINANCIAL AND TECHNICAL CAPABILITIES OF BIDDERS.

(Name of Bidder (Bidding Company/ Bidding Consortium or Technically/Financially

**Evaluated Entity(ies)**)

(Note: In case of Consortium, details to be filled in by Lead Member for each Member of the Consortium including the Lead Member and in case of the qualification requirements of Technically / Financially Evaluated Entity(ies) being used, to be filled by each of such entity(ies)

#### i. Financial capability (Attachment 1):

1. Bidders shall attach unconsolidated / consolidated audited annual accounts, statements, as the case may be, (refer Clause 2.1.3) for the last three (3) financial years as Attachment 1. Such unconsolidated audited annual accounts shall include a Balance Sheet, Profit and Loss Account, Auditors Report and profit appropriation account.

#### ii. Technical capability (Attachment 2):

a. This attachment shall include details of projects completed/commissioned or partly completed projects for which commercial operation has commenced to be considered for the purpose of meeting Qualification Requirements.

Particulars	Year 1	Year 2	Year 3	Year 4	Year 5
Name(s) of project(s) from					
Infrastructure sectors					
Location(s) including country(s)					
where project was set up					
Nature of Project					
Voltage level (if any)					
Capital cost of project(s) Rs. in					
Crore					
*Status of the project					
% of equity owned in the project(s)					

1. To be used by Bidder using development experience in infrastructure sector

- *Note 1: Date of completion/commissioning/commercial operation to be mentioned
  - **Note 2:** For each project listed in the table, the Bidder shall furnish an executive summary including the following information:
- Project model, i.e., BOO, BOOT, BOOM;

- Debt financing and equity raised and provided by Bidder/Bidder's Parent/Bidder's Affiliate for the project, including names of lenders and investors;
- Size and type of installation;
- Technical data/information on major equipment installed
- Description of role performed by the Bidder/Bidder's Parent/Bidder's Affiliate on the project
- Clearances taken by the Bidder/Bidder's Parent/Bidder's Affiliate including but limited to right-of-way (RoW), forest clearance and other statutory / Govt. clearances.
- Cost data (breakdown of major components)
- Name of EPC and/or other major contractor
- Construction time for the project
- Names, addresses and contact numbers of owners of the projects
- Operating reliability over the past five (5) years or since date of commercial operation
- Operating environmental compliance history
- Names of supervisory entities or consultant, if any
- Date of commercial operation
- Total duration of operation
- 2. To be used by Bidder using construction experience in infrastructure sector

Particulars	Year 1	Year 2	Year 3	Year 4	Year 5
Name(s) of project(s) from					
Infrastructure sectors					
Location(s) including country(s)					
where project was set up					
Nature of Project					
Voltage level (if any)					
Revenue received Rs. in Crore					
*Status of the project					
% of equity owned in the project(s)					

*Note 1: Date of completion/commissioning/commercial operation to be mentioned

- **Note 2:** For each project listed in the table, the Bidder shall furnish an executive summary including the following information:
- Project model, i.e., EPC, Turnkey;
- Size and type of installation;
- Technical data/information on major equipment installed
- Description of role performed by the Bidder/Bidder's Parent/Bidder's Affiliate on the project
- Cost data (breakdown of major components)
- Name of sub-contractor
- Construction time for the project
- Names, addresses and contact numbers of owners of the projects

- Operating reliability over the past five (5) years or since date of commercial operation
- Operating environmental compliance history
- Names of supervisory entities or consultant, if any
- Date of commercial operation
- Total duration of operation

#### iii. Attachment-3:

a. For each project listed in Attachment 2 above, certificates of final acceptance and/or certificates of good operating performance duly issued by owners for the project and the same shall be certified as true by authorized signatory of the Bidding Company or the Lead Member of Consortium). In case the project listed in Attachment 2 is under BOOT / DBFOT mechanism, the certificates of final acceptance and/or certificates of good operating performance must be issued by the authority / independent engineer of the project as defined in the respective project agreement.

For and on behalf of Bidding Company/Consortium

M/s.....

### (Signature of authorized signatory)

Name:	
Designation:	
Date:	
Place:	

#### **ANNEXURE 8 - UNDERTAKING AND DETAILS OF EQUITY INVESTMENT**

Format 1: Bidders' Undertakings

[On the Letter Head of the Bidding Company/Lead Member of Bidding Consortium]

Date: .....

To,

Chief Executive Officer, REC Power Development and Consultancy Limited (formerly REC Power Distribution Company Limited) (A wholly owned subsidiary of REC Limited) REC Corporate Head Quarter, D Block, Plot No. I – 4, Sec – 29 Gurugram – 122 001

Dear Sir,

#### Sub: Bidders' Undertakings in respect of Bid for selection of Bidder as TSP to establish Inter-State transmission system for "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F "

We hereby undertake on our own behalf and on behalf of the TSP, that if selected as the Successful Bidder for the Project:

- 1. The Project shall comply with all the relevant electricity laws, codes, regulations, standards and Prudent Utility Practices, environment laws and relevant technical, operational and safety standards, and we shall execute any agreements that may be required to be executed as per law in this regard.
- 2. We confirm that the Project shall also comply with the standards and codes as per Clause 1.6.1.2 of the RFP and the TSP shall comply with the provisions contained in the Central Electricity Regulatory Commission Grant of Connectivity, Long-term Access and Medium-term Open Access in inter-state Transmission and related matters Open Access) Regulations, 2009.
- 3. We give our unconditional acceptance to the RFP dated 10.02.2022 issued by the BPC and the RFP Project Documents, as amended, and undertake to ensure that the TSP shall execute all the RFP Project Documents, as per the provisions of this RFP.
- 4. We have submitted the Bid on the terms and conditions contained in the RFP and the RFP Project Documents. Further, the Financial Bid submitted by us is strictly as per the format provided in Annexure 21 of the RFP, without mentioning any deviations, conditions, assumptions or notes in the said Annexure.
- 5. Our Bid is valid up to the period required under Clause 2.8 of the RFP.

- 6. Our Bid has been duly signed by authorized signatory and stamped in the manner and to the extent indicated in this RFP and the power of attorney / Board resolution in requisite format as per RFP has been enclosed with this undertaking.
- 7. We have assumed that if we are selected as the Successful Bidder, the provisions of the Consortium Agreement, to the extent and only in relation to equity lock in and our liability thereof shall get modified to give effect to the provisions of Clause 2.5.8 of this RFP and Article 18.1 of the Transmission Service Agreement. (*Note: This is applicable only in case of a Bidding Consortium*)
- 8. We confirm that our Bid meets the Scheduled COD of each transmission Element and the Project as specified below:

Sl. No.	Name of the Transmission Element	Effective	Percentage of Quoted Transmission Charges recoverable on Scheduled COD of the Element of the Project	Element(s) which are pre- required for declaring the commercial operation (COD) of the respective Element
1.	Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus Reactor Future provisions: Space for 765/400kV ICTs along with bays: 2 nos. 765kV line bay along with switchable line reactor: 6nos. 765kV Bus Reactor along with bays: 2 nos. 400/220 kV ICTs along with bays: 2 nos. 400 kV line bays along with switchable line reactor: 4 nos. 400kV Bus Reactor along with bays: 1nos.	18	17.59%	All elements of scheme are required to be commissioned simultaneously as their utilization is dependent on commissioning of each other.
2.	220 kV line bays: 4nos. LILO of both circuit of Ajmer- Chittorgarh 765 kV D/c at Beawar		15.59%	
3.	LILO of 400kV Kota –Merta line at Beawar		1.25%	]
4.	Fatehgarh-3 PS – Beawar 765 kV D/c along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line		65.57%	

We agree that the payment of Transmission Charges for any Element irrespective of its successful commissioning on or before its Scheduled COD shall only be considered after the successful commissioning of Element(s) which are pre - required for declaring the commercial operation of such Element as mentioned in the above table.

#### Scheduled COD for the Project: 18 months from the Effective Date

- 9. We confirm that our Financial Bid conforms to all the conditions mentioned in this RFP, and in particular, we confirm that:
  - a. Financial Bid in the prescribed format of Annexure 21 has been submitted duly signed by the authorized signatory.
  - b. Financial Bid is unconditional.
  - c. Only one Financial Bid has been submitted.
- 10. We have neither made any statement nor provided any information in this Bid, which to the best of our knowledge is materially inaccurate or misleading. Further, all the confirmations, declarations and representations made in our Bid are true and accurate. In case this is found to be incorrect after our acquisition of ......[Insert the name of the SPV], pursuant to our selection as Selected Bidder, we agree that the same would be treated as a TSP's Event of Default under Transmission Service Agreement, and relevant provisions of Transmission Service Agreement shall apply.
- 11. We confirm that there are no litigations or other disputes against us which materially affect our ability to fulfill our obligations with regard to the Project as per the terms of RFP Project Documents.
- 12. Power of attorney/ Board resolution as per Clause 2.5.2 is enclosed.

#### Signature and name of the authorized signatory of the Company and stamp of Bidding Company or Lead member of Consortium

Note:

1. In case of foreign Bidders, refer to clause 2.5.6 (p)

#### Format 2: Details of equity investment in Project

- 1.1.a Name of the Bidding Company/ Bidding Consortium:
- 1.1.b Name of the Lead Member in the case of a Bidding Consortium:
- 1.2 Investment details of the Bidding Company/Member of the Bidding Consortium investing in ......[Insert the name of the SPV] as per Clause 2.5.8.2.

S. No.	Name of the Bidding Company/ Member in case of a Bidding Consortium	Name of the Company investing in the equity of the [Insert the name of the SPV]	Relationship with Bidding Company /Member of the Bidding Consortium	% of equity participation in the [Insert the name of the SPV]
(1)	(2)	(3)	(4)	(5)
TOTAL				100%

* In case the Bidder proposes to invest through its Affiliate(s) / Parent Company / Ultimate Parent Company, the Bidder shall declare shareholding pattern of such Affiliate(s) / Parent Company / Ultimate Parent Company and provide documentary evidence to demonstrate relationship between the Bidder and the Affiliate(s) / Parent Company / Ultimate Parent Company. These documentary evidences could be, but not limited to, demat account statement(s) / Registrar of Companies' (ROC) certification / share registry book, etc duly certified by Company Secretary.

Members of the Consortium or the Bidding Company making investment in the equity of the ......[Insert the name of the SPV] themselves to fill in their own names in the column (3)

## Signature and Name of authorized signatory in whose name power of attorney has been issued

Signature of authorized signatory

Name:
Designation:
Date
Company rubber stamp

#### ANNEXURE 9 -AUTHORISATION FROM PARENT / AFFILIATE OF BIDDING COMPANY / MEMBER OF BIDDING CONSORTIUM WHOSE TECHNICAL / FINANCIAL CAPABILITY HAS BEEN USED BY THE BIDDING COMPANY / MEMBER OF BIDDING CONSORTIUM.

[On the Letter Head of the Parent /Affiliate]

Name:
Full Address:
Геlephone No.:
E-mail address:
Fax / No.:

#### То

Chief Executive Officer, REC Power Development and Consultancy Limited (formerly REC Power Distribution Company Limited) (A wholly owned subsidiary of REC Limited) REC Corporate Head Quarter, D Block, Plot No. I – 4, Sec – 29 Gurugram – 122 001

Dear Sir,

#### Sub: Authorization for use of Technical / Financial Capability of M/s...... (Insert name of Parent / Affiliate) by M/s ...... (Insert name of Bidding Company / Member of Bidding Consortium).

We refer to the RFP dated 10.02.2022 ('RFP') issued by you for selection of Bidder as Transmission Service Provider for establishing the Inter-State Transmission System for "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F ".

We confirm that M/s. ...... (Insert name of Bidding Company/ Consortium Member) has been authorized by us to use our technical and/or financial capability [strikeout whichever is not applicable] for meeting the Qualification Requirements for **"Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F** ".

We have carefully read and examined in detail the RFP including in particular, Clause 2.1.4 of the RFP, and we are also submitting legally binding undertaking supported by a board resolution that all the equity investment obligations of M/s..... (Insert Name of Bidding Company / Consortium Member), shall be deemed to be our equity investment obligations and in the event of any default the same shall be met by us. For and on behalf of M/s..... (Insert Name of Parent / Affiliate)

#### (Signature and Name of the authorized signatory of the Company and stamp)

Name:	
Date:	
Place:	

. . . . . . .

#### Notes:

. . .

1. The above undertaking can be furnished by Ultimate Parent of Technically Evaluated Entity or Financially Evaluated Entity, as the case maybe, if legally binding undertaking is also furnished by the Ultimate Parent on behalf of such Financially Evaluated Entity/Technically Evaluated Entity.

#### ANNEXURE 10- FORMAT OF UNDERTAKING BY TECHNICALLY / FINANCIALLY EVALUATED ENTITY / ULTIMATE PARENT COMPANY

[On the Letter Head of the Technically / Financially Evaluated Entity / Ultimate Parent Company]

Name:	
Full Address:	
Геlephone No.:	
E-mail address:	
Fax/No.:	

To:

Chief Executive Officer, REC Power Development and Consultancy Limited (formerly REC Power Distribution Company Limited) (A wholly owned subsidiary of REC Limited) REC Corporate Head Quarter, D Block, Plot No. I – 4, Sec – 29 Gurugram – 122 001

Sub: <u>Undertaking for equity investment</u>

Dear Sir,

We refer to the Request for Proposal dated ______ ('RFP') issued by you regarding setting up of Inter-State transmission system for **"Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F** " Project on build, own, operate and transfer basis.

In view of the above, we hereby undertake to you and confirm that in the event of failure of ......[Insert the name of the Bidder or the Consortium Member] to invest in full or in part, in the equity share capital of .......[Insert the name of the SPV] as specified in the Bid, we shall invest the said amount not invested by......[Insert the name of the Bidder or the Consortium Member] in .......[Insert the name of the SPV] by purchase of existing shares or subscribing to the new shares of ......[Insert the name of the SPV], as stipulated by you.

We have attached hereto certified true copy of the Board resolution whereby the Board of Directors of our Company has approved issue of this Undertaking by the Company.

All the terms used herein but not defined, shall have the meaning as ascribed to the said terms under the RFP.

Certified as true.

#### 

#### (Signature and Name of the authorized signatory of the Company and stamp)

#### Note:

1. Wherever required, extract of the charter documents and documents such as a Board resolution should be submitted for verification.

#### ANNEXURE 11 - FORMATS FOR BOARD RESOLUTIONS

#### <u>Format 1</u> Format of the Board resolution for the Bidding Company / each Member of the Consortium / investing Affiliate / Parent Company / Ultimate Parent Company, where applicable

[Reference Clause 2.5.2 of the RFP and the illustrations in Annexure 11A]

[Note: The following resolution no.1 needs to be passed by the Boards of each of the entity/(ies) making equity investment]

1. **RESOLVED THAT** pursuant to the provisions of the Companies Act, 1956 / Companies Act 2013 (as the case may be) and compliance thereof and as permitted under the Memorandum and Articles of Association of the company, approval of the Board be and is hereby accorded for investment of......% (.....per cent) of the total equity share capital of .......[Insert the name of the SPV] representing the entire amount proposed to be invested by the company for the transmission system for **"Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F** ", partly by acquisition of the existing equity shares from .......[Insert the name of the SPV] and / or partly by subscribing to the new equity shares, as per the terms of the RFP.

[Note: Equity investment obligations by the Bidding Company/each Member of the Bidding Consortium/investing Affiliate or Parent or Ultimate Parent should add up to 100%.]

[Note: In the event the Bidder is a Bidding Consortium, the following Board resolution no. 2 also needs to be passed by the Lead Member of the Bidding Consortium]

2. **RESOLVED THAT** approval of the Board be and is hereby accorded to contribute such further amount over and above the ;..... percentage (__%) limit to the extent becoming necessary towards the total equity share in the ......[Insert the name of the SPV], obligatory on the part of the company pursuant to the terms and conditions contained in the Consortium Agreement dated ......executed by the company as per the provisions of the RFP.

[Note: In the event, the investing entity is an Affiliate or Parent or Ultimate Parent of the Bidder, the following Board resolution no. 3 shall also be passed by the Bidder]

[Note: The following resolution no. 4 is to be provided by the Bidding Company / Lead Member of the Consortium only]

4. FURTHER RESOLVED THAT MR/MS ......be and is hereby authorized to take all the steps required to be taken by the Company for submission of the Bid, including in particular, signing of the Bid, making changes thereto and submitting amended Bid, all the documents related to the Bid, certified copy of this Board resolution or letter or undertakings etc, required to be submitted to BPC as part of the Bid or such other documents as may be necessary in this regard.

Certified True Copy

Company rubber stamp to be affixed

#### [Notes:

- 1) This certified true copy should be submitted on the letterhead of the Company, signed by the Company Secretary or any Whole Time Director/ Manager (supported by a specific board resolution) of the Bidding Company or the Lead Member of Consortium.
- 2) The contents of the format may be suitably re-worded indicating the identity of the entity passing the resolution, i.e., the Bidding Company, each Member of the Bidding Consortium.
- 3) This format may be modified only to the limited extent required to comply with the local regulations and laws applicable to a foreign entity submitting this resolution. For example, reference to Companies Act 1956/Companies Act 2013 (as the case may be) may be suitably modified to refer to the law applicable to the entity submitting the resolution. However, in such case, the foreign entity shall submit an unqualified opinion issued by the legal counsel of such foreign entity, stating that the Board resolutions are in compliance with the applicable laws of the respective jurisdictions of the issuing company and the authorizations granted therein are true and valid.]

#### Format 2

#### Format for the Board resolution of Technically / Financially Evaluated Entity / Ultimate Parent Company (in case credentials of such TEE/ FEE has been utilized by the Bidding Company or Bidding Consortium)

The Board, after discussion, at the duly convened Meeting on ...... [Insert date], with the consent of all the Directors present and in compliance of the provisions of the Companies Act, 1956 / 2013, passed the following Resolution:

#### **Certified True Copy**

#### Company rubber stamp to be affixed

#### Note:

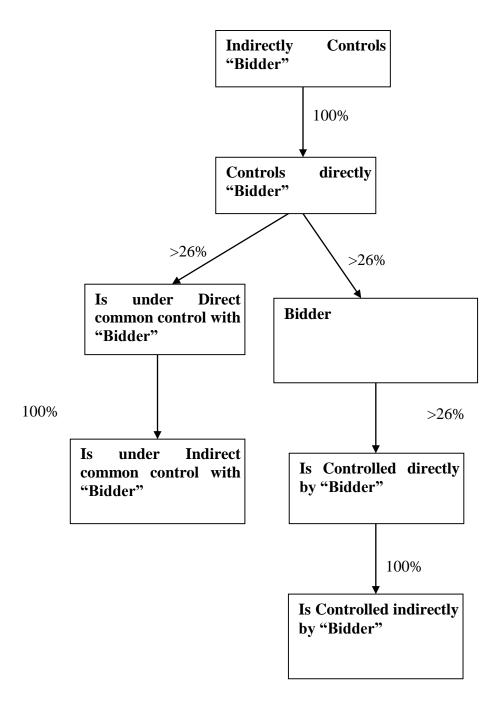
- 1. This certified true copy should be submitted on the letterhead of the Company, signed by the Company Secretary or any Whole-time Director/Manager (supported by a specific board resolution) of Bidding Company or Lead Member of the Consortium.
- 2. The contents of the format may be suitably re-worded indicating the identity of the entity passing the resolution.
- 3. This format may be modified only to the limited extent required to comply with the local regulations and laws applicable to a foreign entity submitting this resolution. For example, reference to Companies Act 1956 / Companies Act 2013 (as the case may be) may be suitably modified to refer to the law applicable to the entity submitting the resolution. However, in such case, the foreign entity shall submit an unqualified opinion issued by the legal counsel of such foreign entity, stating that the Board resolutions are in compliance with the applicable laws of the respective jurisdictions of the issuing company and the authorizations granted therein are true and valid.

#### ANNEXURE 11A – ILLUSTRATION FOR APPLICABLE BOARD RESOLUTION REQUIREMENTS UNDER CLAUSE 2.5.2

Investor in the TSP	Entities (other than Bidder) whose credentials (financial and/or technical) used by the Bidder for meeting RFP criteria	Applicable Board Resolutions	Requirement of Undertaking (Annexure 10)
Bidder himself for 100% equity	None	a) Format 1 of Annexure 11 - Resolution: 1, 2 and 4 from the Bidder	None
Bidder himself for 100% equity	Affiliate and/or Parent Company and/or Ultimate Parent	<ul> <li>a) Format 1 of Annexure 11 - Resolution: 1, 2, and 4 from the Bidder</li> <li>b) Format 2 of Annexure 11 by either Technically/ Financially Evaluated Entity(ies) whose credentials have been used, or Ultimate Parent.</li> <li>Provided, if the Bidder himself is the Ultimate Parent, then Format 2 need not be provided.</li> </ul>	Yes, by either Technically / Financially Evaluated Entity(ies) Affiliate(s) whose credentials have been used, or Ultimate Parent. Provided, if the Bidder himself is the Ultimate Parent, then the undertaking need not be provided.
Bidder himself + others (Affiliate and/or Parent Company and/or Ultimate Parent) in aggregate holding 100% equity	None	<ul> <li>a) Format 1 of Annexure 11 - Resolution: 1,2, 3 and4 from the Bidder.</li> <li>b) Format 1 of Annexure 11 - Resolution: 1 from the Affiliate and /or Parent and /or Ultimate Parent investing in the equity</li> </ul>	None
Bidder himself + others (Affiliate and/or Parent Company	Affiliate and/or Parent Company and/or Ultimate Parent	a) Format 1 of Annexure 11 - Resolution: 1,2, 3 and 4 from the Bidder. b) Format 1 of Annexure 11 -	Yes, by either Parent/ Affiliate(s) whose credentials have been used, or Ultimate Parent

Investor in the TSP	Entities (other than Bidder) whose credentials (financial and/or technical) used by the Bidder for meeting RFP criteria	Applicable Board Resolutions	Requirement of Undertaking (Annexure 10)
and/or		Resolution: 1 from the	
Ultimate		Affiliate and/or Parent	
Parent) in		and/or Ultimate Parent	
aggregate		investing in the equity	
holding 100%		c) Format 2 of	
equity		Annexure 11 by either	
		Parent / Affiliate(s)	
		whose credentials have	
		been used and /or	
		Ultimate Parent	
		investing in the equity	

**ANNEXURE 12 - FORMAT FOR ILLUSTRATION OF AFFILIATES** 



**NOTE:** Bidder to provide the illustration, as applicable in their case, duly certified by the Company Secretary and supported by documentary evidence in this regard.

#### **ANNEXURE 13 - FORMAT FOR DISCLOSURE**

#### [On the letter head of Bidding Company / Each Member in a Bidding Consortium]

Date: .....

#### DISCLOSURE

We hereby declare that the following companies with which we/ have direct or indirect relationship are also separately participating in this Bid process as per following details

S. No.	Name of the Company	Relationship
1.		
2.		
3.		

In case there is no such company please fill in the column "name of the company" as Nil.

Further we confirm that we don't have any Conflict of Interest with any other company participating in this bid process.

#### **Certified as True**

(Signature)

Name: .....

#### Signature & Name of authorized signatory of the Company and Stamp

The above disclosure should be signed and certified as true by the authorized signatory of the Bidding Company or of the Member, in case of a Consortium).

#### ANNEXURE 14 - FORMAT OF THE BID BOND

#### FORMAT OF THE UNCONDITIONAL AND IRREVOCABLE BANK GUARANTEE FOR BID BOND

### (To be on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution.)

The Guarantor Bank shall make payment hereunder on first demand without restriction or conditions and notwithstanding any objection, disputes, or disparities raised by the Bidder or any other person. The Guarantor Bank shall not require _____[Name of BPC] or its authorized representative to justify the invocation of this BANK GUARANTEE, nor shall the Guarantor Bank have any recourse against _____[Name of BPC] or its authorized representative in respect of any payment made hereunder.

This BANK GUARANTEE shall be interpreted in accordance with the laws of India.

The Guarantor Bank represents that this BANK GUARANTEE has been established in such form and with such content that it is fully enforceable in accordance with its terms as against the Guarantor Bank in the manner provided herein.

**REC Power Development and Consultancy Limited** 

This BANK GUARANTEE shall not be affected in any manner by reason of merger, amalgamation, restructuring or any other change in the constitution of the Guarantor Bank.

This BANK GUARANTEE shall be a primary obligation of the Guarantor Bank and accordingly _____[Name of BPC] or its authorized representative shall not be obliged before enforcing this BANK GUARANTEE to take any action in any court or arbitral proceedings against the Bidder, to make any claim against or any demand on the Bidder or to give any notice to the Bidder to enforce any security held by _____[Name of BPC] or its authorized representative or to exercise, levy or enforce any distress, diligence or other process against the Bidder.

Notwithstanding anything contained hereinabove, our liability under this Guarantee is restricted to Rupees ______ Only (Rs _____ Crore) and it shall remain in force until ........... [Date to be inserted on the basis of Clause 2.11 of RFP], with an additional claim period of three hundred sixty five (365) days thereafter. We are liable to pay the guaranteed amount or any part thereof under this BANK GUARANTEE only if _____ [Name of BPC] or its authorized representative serves upon us a written claim or demand.

#### Witness:

1 Name and Address	Signature: Name:
2 Name and Address	Designation with Stamp:
	Signature
	Attorney as per power of attorney
	No
	For:

...... [Insert Name of the Bank]

#### Banker's Stamp and Full Address:

Dated this......day of...... 20......

#### Notes:

1. The Stamp Paper should be in the name of the Executing Bank.

## ANNEXURE 14 A- FORMAT OF THE BID SECURITY DECLARATION [VALID TILL RFP ISSUED ON OR BEFORE 31.12.2021]

#### **ANNEXURE 15 - FORMAT FOR CONTRACT PERFORMANCE GUARANTEE**

### (To be on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution.

#### Foreign entities submitting Bids are required to follow the applicable law in their country)

In consideration of the ...... [Insert name of the SPV or Selected Bidder on behalf of SPV or Lead Member in case of the Consortium, with address] agreeing to undertake the obligations under the Transmission Service Agreement dated ...... and the execute the RFP Project Documents with the Selected Bidder, regarding setting up the Project, the......[Insert name and address of the bank issuing the guarantee and address of the head office] (hereinafter referred to as "Guarantor Bank") hereby agrees unconditionally unequivocally, irrevocably and pay to the Nodal to Agency at..... [Insert Place and Address of the Nodal Agency indicated in TSA] forthwith on demand in writing from the Nodal Agency or any Officer authorized by it in this behalf, any amount up to and not exceeding Rupees.....Crores (Rs.....) only [Insert the amount of the bank guarantee] on behalf of M/s..... [Insert name of the Selected Bidder / SPV].

This guarantee shall be valid and binding on the Guarantor Bank up to and including .....and shall not be terminable by notice or any change in the constitution of the Bank or the term of the Transmission Service Agreement or by any other reasons whatsoever and our liability hereunder shall not be impaired or discharged by any extension of time or variations or alternations made, given, or agreed with or without our knowledge or consent, by or between parties to the respective agreement.

Our liability under this Guarantee is restricted to Rupees ...... Crores (Rs.....) only. Our Guarantee shall remain in force until...... [Insert the date of validity of the Guarantee as per Clause 2.12.1 of the RFP]. The Nodal Agency shall be entitled to invoke this Guarantee up to three hundred sixty five (365) days of the last date of the validity of this Guarantee.

The Guarantor Bank hereby expressly agrees that it shall not require any proof in addition to the written demand from the Nodal Agency, made in any format, raised at the above mentioned address of the Guarantor Bank, in order to make the said payment to the Nodal Agency.

The Guarantor Bank shall make payment hereunder on first demand without restriction or conditions and notwithstanding any objection by ______ [Name of SPV], ...... [Insert name of the Selected Bidder], ...... [Insert name of the TSP] and/or any other person. The Guarantor Bank shall not require the Nodal Agency to justify the invocation of this BANK GUARANTEE, nor shall the Guarantor Bank have any recourse against the Nodal Agency in respect of any payment made hereunder.

This BANK GUARANTEE shall be interpreted in accordance with the laws of India.

The Guarantor Bank represents that this BANK GUARANTEE has been established in such form and with such content that it is fully enforceable in accordance with its terms as against the Guarantor Bank in the manner provided herein.

**This BANK GUARANTEE** shall not be affected in any manner by reason of merger, amalgamation, restructuring, liquidation, winding up, dissolution or any other change in the constitution of the Guarantor Bank.

This BANK GUARANTEE shall be a primary obligation of the Guarantor Bank and accordingly the Nodal Agency shall not be obliged before enforcing this BANK GUARANTEE to take any action in any court or arbitral proceedings against ______[Name of SPV] or the Selected Bidder, to make any claim against or any demand on ______[Name of SPV] or the Selected Bidder, as the case may be, or to give any notice to ______[Name of SPV] or the Selected Bidder, as the case may be, or to enforce any security held by the Nodal Agency or to exercise, levy or enforce any distress, diligence or other process against .........[Name of SPV] or the Selected Bidder, as the case may be.

The Guarantor Bank acknowledges that this BANK GUARANTEE is not personal to the Nodal Agency and may be assigned, in whole or in part, (whether absolutely or by way of security) by Nodal Agency to any entity to whom the Nodal Agency is entitled to assign its rights and obligations under the Transmission Service Agreement.

The Guarantor Bank hereby agrees and acknowledges that the Nodal Agency shall have a right to invoke this Bank Guarantee either in part or in full, as it may deem fit.

Notwithstanding anything contained hereinabove, our liability under this Guarantee is restricted to Rupees ......Crores (Rs ......) only and it shall remain in force until [Date to be inserted on the basis of Article 3.1.2 of TSA], with an additional claim period of three hundred sixty five (365) days thereafter. This BANK GUARANTEE shall be extended from time to time for such period, as may be desired by...... [Insert name of the Selected Bidder or Lead Member in case of the Consortium or SPV]. We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only if the Nodal Agency serves upon us a written claim or demand.

#### In witness where of:

Signature
Name:
Power of attorney No.:
For:

#### Notes:

1. The Stamp Paper should be in the name of the Executing Bank.

**REC Power Development and Consultancy Limited** 

## ANNEXURE 16 – FORMAT OF CHECKLIST FOR TECHNICAL BID SUBMISSION REQUIREMENTS

[This format needs to be duly filled in, signed by the authorized signatory of the Bidder (Bidding Company / Lead Member in case of a Bidding Consortium) and submitted along with the Bidder's Technical Bid]

	Technical Bid Submission Requirements	Response (Yes / No)
1.	Format for the Covering Letter on the letterhead of Bidding Company or Lead Member of the Consortium, as applicable;	
2.	Format for Letter of Consent from each Consortium Member, including Lead Member, on their respective letterheads;	
3.	Format for evidence of authorized signatory's authority;	
4.	Board resolution from the Bidding Company / Lead Member of the Consortium in favour of the person executing the Power of Attorney as per <b>Annexure 3</b> ;	
5.	Power of Attorney from each Consortium Member in favour of Lead Member to be provided by each of the other Members of the Consortium as per <b>Annexure 4</b> ;	
6.	Board Resolution from each Member of the Consortium, other than the Lead Member, in favour of their respective authorized representatives for executing the POA, Consortium Agreement and signing of the requisite formats;	
7.	Format for Bidder's composition and ownership structure, along with status of equity holding (owning ten percent or more of the total paid up equity) not earlier than thirty (30) days prior to the Bid Deadline as per <b>Annexure 5</b> ;	
8.	Consortium Agreement duly signed as per <b>Annexure 6</b> , along with Appendix-1, indicating the responsibilities and obligations of each Member of the Consortium;	
9.	Format for Qualification Requirement:	
	a. Calculation sheets, detailing computation of Networth considered for meeting Qualifying Requirements, duly signed and stamped by the Statutory Auditor of the Bidding Company / each Member in case of a Bidding Consortium / FEE in cases where credentials of FEE is taken;	
	<ul> <li>b. Calculation sheets, detailing computation of capital expenditure of projects and revenue received in construction projects considered for meeting Qualification Requirements, duly signed and stamped by the Statutory Auditor of the Bidding Company /</li> </ul>	

	Technical Bid Submission Requirements	Response (Yes / No)
	Lead Member in case of Bidding Consortium / TEE in cases where credentials of TEE is taken;	
	c. Last financial year unconsolidated / consolidated audited annual accounts / statements, as the case may be, of the Financially Evaluated Entity / Technical Evaluated Entity	
	d. Unconsolidated audited annual accounts of both the TEE and the Bidding Company/Lead member, as applicable, from the financial years in which financial closure was achieved till the financial year in which the said project was completed / commissioned.	
10.	Copy of the Memorandum and Articles of Association and certificate of incorporation or other organizational document (as applicable), including their amendments, certified by the Company Secretary of Bidding Company or each Member in case of a Consortium including Lead Member.	
11.	Attachment of <b>Annexure 7(D)</b> , detailing projects completed / commissioned and for which commercial operation has commenced including Executive Summary for each project.	
12.	For each project listed in the attachment above, certified true copy of the certificates of final acceptance and / or certificates of good operating performance duly issued by owners or clients for the project, duly signed by authorized signatory in support of technical capability as defined in Clause 2.1.2 of RFP.	
13.	Authority letter in favour of BPC from the Bidder/every Member of the Consortium authorizing the BPC to seek reference from their respective bankers & others.	
14.	Authorization from Parent / Affiliate of Bidding Company / Member of Bidding Consortium whose technical / financial capability has been used by the Bidding Company / Member of Bidding Consortium.	
15.	Initialing of all pages of Technical Bid by the Authorized Signatory in whose favour the POA ( <b>Annexure 3</b> ) has been executed.	
16.	Format for Illustration of Affiliates at the most seven (7) days prior to the Bid Deadline, duly certified by Company Secretary and supported by documentary evidence.	
17.	Certified copy of the Register of Members / Demat Account Statement, Share Certificate, Annual Return filed with ROC	

	Technical Bid Submission Requirements	Response (Yes / No)
	etc. submitted as documentary evidence along with <b>Annexure 12</b> .	
18.	Format for Disclosure by Bidding Company / each Member of the Consortium.	
19.	Format for Affidavit by the Bidding Company / each Member of the Consortium	
20.	Format for Authorization submitted in Non-Judicial stamp paper duly notarized.	
21.	Bidders Undertaking and details of Equity Investment	
22.	Proof of Payment of RFP Fees	
23.	Bid Bond/Bid Security Declaration (As applicable)	
24.	Board Resolution as per Annexure 11 (If required)	

[Note: The checklist is not exhaustive. Bidders are required to submit all the information/documents as per requirement of RFP]

#### For and on behalf of Bidder

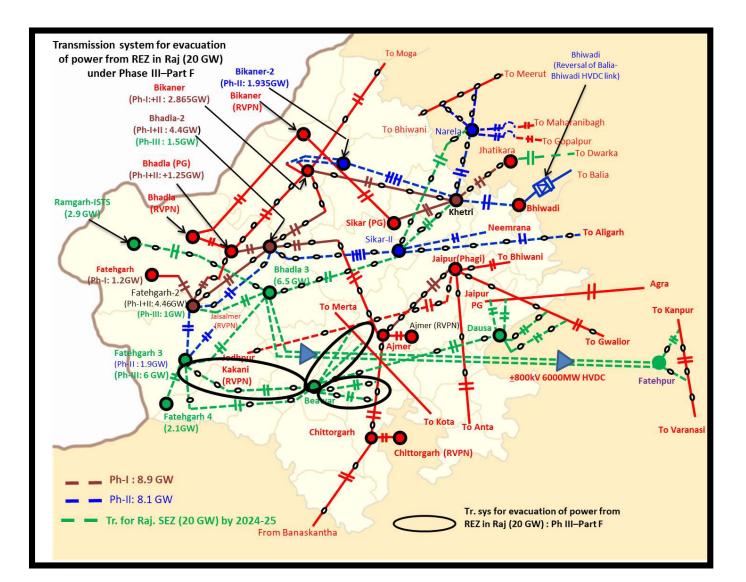
M/s. .....

(Signature of authorized signatory)

#### **ANNEXURE 17 – LIST OF BANKS**

All Scheduled Commercial Banks as per Second Schedule of RBI Act-1934 and any amendments thereof.





# ANNEXURE 19 - FORMAT FOR CLARIFICATIONS / AMENDMENTS ON THE RFP / RFP PROJECT DOCUMENTS

S. No.	Name of the Document	Clause No. and Existing provision	Clarification required	Suggested text for the amendment	Rationale for the Clarification or Amendment

Signature .....

Name.....

For

#### **Bidder's Rubber Stamp and Full Address.**

(Note: This format shall be used for submission of requests for clarifications/ amendments on the draft RFP Project Documents as per the provisions of Clause 2.3.1)

## **ANNEXURE 20 - LIST FOR RFP PROJECT DOCUMENTS**

- **ENCLOSURE 1: TRANSMISSION SERVICE AGREEMENT (Provided separately)**
- **ENCLOSURE 2:** SHARE PURCHASE AGREEMENT (Provided Separately)

## **ANNEXURE 21 - FORMAT FOR FINANCIAL BID**

## [To be uploaded online]

#### Quoted Transmission Charges .....

#### Notes

- 1. The Bidders are required to ensure compliance with the provisions of Clause 2.5.3 of this RFP.
- 2. Quotes to be in Rupees Millions and shall be up to two (2) decimal points.
- 3. The contents of this format shall be clearly typed.
- 4. The Financial Bid shall be digitally signed by the authorized signatory in whose name power of attorney as per Clause 2.5.2 is issued.
- 5. Ensure only one value for annual Transmission Charges is quoted. The same charge shall be payable every year to TSP for the term of TSA.

## **ANNEXURE 22 – FORMAT FOR AFFIDAVIT**

# [On non-judicial stamp paper. Foreign companies submitting bids are required to follow the applicable law in their country]

#### AFFIDAVIT

We [including any of our Affiliate and Consortium Member & any of its Affiliate], hereby declare that as on Bid Deadline:

- a. the Bidder & any of its Affiliate including any Consortium Member & any of its Affiliate, their directors or key personnel have not been barred or included in the blacklist by any government agency or authority in India, the government of the jurisdiction of the Bidder or Members where they are incorporated or the jurisdiction of their principal place of business, any international financial institution such as the World Bank Group, Asian Development Bank, African Development Bank, Inter-American Development Bank, Asian Infrastructure Investment Bank etc. or the United Nations or any of its agencies; or
- b. the Bidder & any of its Affiliate including any Consortium Member & any of its Affiliate or their directors have not been convicted of any offence in India or abroad.

We further declare that following investigations are pending / no investigation is pending [strike off whichever is not applicable] against us [including any of our Consortium Member or Affiliate or Parent or Ultimate Parent or Affiliate] or CEO or any of our directors/ manager/key managerial personnel of the Applicant /Consortium Member or their Affiliates.

We further undertake to inform the BPC of any such matter as mentioned above on its occurrence after the date of this affidavit till the Effective Date.

We undertake that, in case, any information provided in relation to this affidavit is found incorrect at any time hereafter, our BID / Letter of Intent / contract (if entered) would stand rejected / recalled / terminated, as the case may be.

.....

Signature and Name of the authorized signatory of the Company Bidding Company / Lead Member of the Bidding Consortium

(Signature of Notary Public)

Place: ..... Date: .....

**REC Power Development and Consultancy Limited** 

Note: In case any investigation is pending against the Applicant, including any Consortium Member or Affiliate, or CEO or any of the directors/ manager/key managerial personnel of the Applicant /Consortium /Member or their Affiliates, full details of such investigation including the name of the investigating agency, the charge/offence for which the investigation has been launched, name and designation of persons against whom the investigation has been launched and other relevant information should be disclosed under this affidavit.

## **ANNEXURE** A

## Technical Details with respect to electronic bidding

## **Registration Methodology**

In order to submit online bids in the e-bidding process for selection of Transmission Service Provider, interested Bidders are required to register themselves with the e-procurement website of MSTC Limited namely <u>www.mstcecommerce.com/eprochome/tsp/index.jsp</u>. To register with the website, the Bidder is required to fill up the online form available under the link Register as Vendor in the above website and fill up the same and click on Submit.

During this process, the bidder shall create his user id and password and keep note of the same. The bidder shall ensure that the secrecy of his user id and password is maintained at all time and he/she shall alone be responsible for any misuse of the user id and password.

The bidder may check the details entered by it before final submission. On successful submission of the online registration Form, the bidder shall receive a confirmation mail in the registered email address advising the bidder to submit the following documents.

- i. Self attested Income Tax PAN Card. In case of a registered Company or Firm, the Firm's PAN card and in case of a proprietorship firm, proprietor's personal PAN card is required. In case of partnership firm, PAN of the firm and that of the authorized partner are to be submitted.
- ii. Copy of the confirmation email Letter received from MSTC after successful completion of on-line registration..
- iii. A non refundable registration fee of Rs 10,000/- plus applicable GST to be paid online.

Please provide details of payment made like UTR No, remitting bank name, date of payment and amount in the covering letter.

The bidder shall have to submit all the above documents to MSTC Limited for verification and activation of their login ids. The bidders should send scanned copies of the above documents to the designated email id only which is given below.

#### <u>tsp@mstcindia.co.in</u>

It may be noted that bidders need not visit any of the offices of MSTC Limited for submission of the documents.

Contact persons of MSTC Limited:

#### Mr. Chirag Sindhu, 9830336290

#### Mr. Setu Dutt Sharma, 7878055855

Once the complete set of documents and requisite registration fee are received from a bidder, MSTC shall activate the bidder's login after verification / scrutiny of the documents. MSTC Limited

reserves the right to call for additional documents from the bidder if needed and the bidder shall be obliged to submit the same.

On completion of the above stated registration process, a bidder shall be able to login to MSTC's website.

## ANNEXURE B

## Draft Pre-Award Integrity Pact

### GENERAL

This pre-bid contract Agreement (herein after called the Integrity Pact) is made on ..... month of . . . . . . . . . . . . . . 20..... between, day of the on one hand, [Insert Name & designation of representative of BPC] (hereinafter called the "Bid Process Coordinator/ BPC", which expression shall mean and include, unless the context otherwise requires, his successors in the office and assigns) of the First Part and M/s ..... represented by Shri ...... [Insert Name & Designation of Authorized Signatory of the Bidder/ Lead Member of Consortium] (hereinafter called the "Bidder" which expression shall mean and include, unless the context otherwise requires, his successors and permitted assigns) of the Second Part.

WHEREAS the BPC is conducting the bidding process for selection of bidder as Transmission Service Provider (TSP) for "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" who will be responsible to set up the transmission project on build, own, operate and transfer (BOOT) basis and to provide Transmission Service.

WHEREAS the Bidder is a Private Company/Public Company/Government Undertaking/ Partnership, constituted in accordance with the relevant law in the matter and the BPC is a Public Sector Undertaking (PSU) performing its function on behalf of the Ministry of Power, Government of India.

NOW, THEREFORE,

To avoid all forms of corruption by following a system that is fair, transparent and free from any influence/prejudiced dealings during the complete bidding process with a view to:-

Enabling the BPC to select the bidder as TSP in conformity with the defined procedures by avoiding the high cost and the distortionary impact of corruption on public procurement, and

Enabling Bidder to abstain from bribing or indulging in any corrupt practice in order to emerge as selected bidder by providing assurance to them that their competitors will also abstain from bribing and other practices and the BPC will commit to prevent corruption, in any form, by its officials by following transparent procedures.

The parties hereto hereby agree to enter into this Integrity Pact and agree as follows:

#### **Commitments of BPC**

- 1.1 The BPC undertakes that no official of the BPC, connected directly or indirectly with the bidding process, will demand, take a promise for or accept, directly or through intermediaries, any bribe, consideration, gift, reward, favour or any material or immaterial benefit or any other advantage from the BIDDER, either for themselves or for any person, organization or third party related to the bidding process in exchange for an advantage in the bidding process, bid evaluation, contracting or implementation process related to the contract.
- 12 The BPC will, during the bidding stage, treat all bidders alike, and will provide to all bidders the same information and will not provide any such information to any particular bidder which could afford an advantage to that particular bidder in comparison to the other bidders.
- 13 All the officials of the BPC will report the appropriate Government office any attempted or completed breaches of the above commitments as well as any substantial suspicion of such a breach.
- 2. In case of any such preceding misconduct on the part of such official(s) is reported by the Bidder to the BPC with the full and verifiable facts and the same is *prima facie* found to be correct by the BPC, necessary disciplinary proceedings, or any other action as deemed fit, including criminal proceedings may be initiated by the BPC and such a person shall be debarred from further dealings related to the bidding process. In such a case while an enquiry is being conducted by the BPC the proceedings under the bidding process would not be stalled.

## **Commitments of Bidder**

- 3. The Bidder commits itself to take all measures necessary to prevent corrupt practices, unfair means and illegal activities during any stage of its bid or during any pre award stage in order to emerge as Selected Bidder or in furtherance to secure it and in particular commits itself to the following:-
- 3.1 The Bidder will not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the BPC, connected directly or indirectly with the bidding process, or to any person, organization or third party related to the bidding process in exchange for any advantage in the bidding, evaluation, contracting and implementation of the bidding process.
- 32 The Bidder further undertakes that it has not given, offered or promised to give, directly

or indirectly any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the BPC or otherwise in bidding process or for bearing to do or having done any act in relation to bidding process or any other contract with the Government for showing or forbearing to show favour or disfavour to any person in relation to the bidding process or any other contract with the Government.

- 33 The Bidder shall disclose the name and address of agents and representatives and Indian Bidder shall disclose their foreign principals or associates.
- 3.4 The Bidder shall disclose the payments to be made by them to agents/brokers or any other intermediary, in connection with this bid .
- 35 The Bidder further confirms and declares to the BPC that the Bidder has not engaged any individual or firm or company whether Indian or foreign to intercede, facilitate or in any way to recommend to the BPC or any of its functionaries, whether officially or unofficially for selection of Bidder as TSP, nor has any amount been paid, promised or intended to be paid to any such individual, firm or company in respect of any such intercession, facilitation or recommendation.
- 3.6 The Bidder, either while presenting the bid or during pre-award negotiations or before signing the Share Purchase Agreement, shall disclose any payments he has made, is committed to or intends to make to officials of the BPC or their family members, agents, brokers or any other intermediaries in connection with the bidding process and the details of services agreed upon for such payments.
- 3.7 The Bidder will not collude with other parties interested in the bidding process to impair the transparency, fairness and progress of the bidding process.
- 3.8 The Bidder will not accept any advantage in exchange for any corrupt practice, unfair means and illegal activities.
- 39 The Bidder shall not use improperly, for purpose of competition or personal gain, or pass on to others, any information provided by the BPC as part of the business relationship, regarding plans, technical proposal and business details, including information contained in any electronic data carrier. The Bidder also undertakes to exercise due and adequate care lest any such information is divulged.
- 3.10 The Bidder commits to refrain from giving any complaint directly or through any other manner without supporting it with full and verifiable facts.
- 3.11 The Bidder shall not instigate or cause to instigate any third person to commit any of the

actions mentioned above.

3.12 The Bidder shall not lend to or borrow any money from or enter into any monetary dealings or transactions, directly or indirectly, with any employee of the BPC.

## 4. Previous Transgression

- 4.1 The Bidder declares that no previous transgression occurred in the last three years immediately before signing of this Integrity Pact, with any other company in any country in respect of any corrupt practices envisaged hereunder or with any Public Sector Enterprise in India or any Government Department in India that could justify Bidder's exclusion from the bidding process.
- 42 The Bidder agrees that if it makes incorrect statement on this subject, Bidder can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

## 5. Bid Bond (Security Deposit)

- 5.1 Along with the technical bid, the Bidder shall submit Bid Bond for an amount of Rs. ...... (as per the amount specified in Request for Proposal (RFP) Document) issued by ...... [Insert Name of the Banks from the list provided in RFP Document] as Earnest Money/Security Deposit, with the BPC.
- 52 The Earnest Money/Security Deposit shall be valid & retained by the BPC for such period as specified in the RFP Document.
- 53 No interest shall be payable by the BPC to the Bidder on Earnest Money/Security Deposit for the period of its currency.

## 6. Sanctions for Violations

- 6.1 Any breach of the aforesaid provisions by the Bidder or any one employed by it or acting on its behalf (whether with or without the knowledge of the Bidder) shall entitle the BPC to take all or anyone of the following actions, wherever required:-
  - (i) To immediately call off the pre-award negotiations without assigning any reason or giving any compensation to the Bidder. However, the proceedings with the other Bidder (s) would continue.
  - (ii) The Bid Bond (in pre-award stage) shall stand forfeited either fully or partially, as

decided by the BPC and the BPC shall not be required to assign any reason therefore.

- (iii) To immediately cancel the award, if already awarded, without giving any compensation to the Bidder.
- (iv) To cancel all or any other contracts with the Bidder. The Bidder shall be liable to pay compensation for any loss or damage to the BPC resulting from such cancellation/rescission.-
- (v) To debar the Bidder from participation in any tender or RFP issued by any BPC for an indefinite period.
- (vi) To recover all sums paid in violation of this Pact by Bidder to any middleman or agent or broker with a view to securing the award.
- 62 The BPC will be entitled to take all or any of the actions mentioned at para 6.1 (i) to (vi) of this Pact also on the Commission by the Bidder or anyone employed by it or acting on its behalf (whether with or without the knowledge of the Bidder), of an offence as defined in Chapter IX of the Indian Penal code, 1860 or Prevention of Corruption Act, 1988 or any other statute enacted for prevention of corruption.
- 63 The decision of the BPC to the effect that a breach of the provisions of this Pact has been committed by the Bidder shall be final and conclusive on the Bidder. However, the Bidder can approach the Independent Monitor(s) appointed for the purposes of this Pact.

## 7. Independent Monitors

- 7.1 The BPC has appointed Independent Monitors (hereinafter referred to as Monitors) for this Pact in consultation with the Central Vigilance Commission (Names and Addresses of the Monitors to be given).
- 72 The task of the Monitors shall be to review independently and objectively, whether and to what extent the parties comply with the obligations under this Pact.
- 73 The Monitors shall not be subject to instructions by the representatives of the parties and perform their functions neutrally and independently.
- 7.4 Both the parties accept that the Monitors have the right to access all the documents relating to the project/procurement, including minutes of meetings.
- As soon as the Monitor notices, or has reason to believe, a violation of this Pact, he will so inform the Authority designated by the BPC.

- 7.6 The Bidder accepts that the Monitors has the right to access without restriction to all Project documentation of the BPC including that provided by the Bidder. The Monitor shall be under contractual obligation to treat the information and documents of the Bidder /Subcontractors(s) with confidentially. [As all the bid documents are with BPC only]
- 7.7 The BPC will provide to the Monitors sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the parties. The parties will offer to the monitor the option to participate in such meetings.
- 78 The Monitor will submit a written report to the designated Authority of the BPC/Secretary in the Department within 8 to 10 weeks from the date of reference or intimation to him by the BPC / Bidder and, should the occasion arise, submit proposals for correcting problematic situations.

## 8. Facilitation of Investigation

In case of any allegation of violation of any provisions of this Pact or payment of commission, the BPC or its agencies shall be entitled to examine all the documents including the Books of Accounts of the Bidder and the Bidder shall provide necessary information and documents in English and shall extend all possible help for the purpose of such examination.

## 9. Law and Place of Jurisdiction

This Pact is subject to Indian Law. The place of performance and jurisdiction is the seat of the BPC.

## 10. Other Legal Actions

The actions stipulated in this Integrity Pact are without prejudice to any other legal action that may follow in accordance with the provisions of the any extent law in force relating to any civil or criminal proceedings.

## 11. Validity

- 11.1 The validity of this Integrity Pact shall be from date of its signing and upto 6 months from the date of transfer of project specific SPV i.e. signing of Share Purchase Agreement with BPC. In case Bidder is unsuccessful, this Integrity Pact shall expire after 15 days from the date of transfer of project specific SPV to successful bidder.
- 112 Should one or several provisions of this Pact turn out to be invalid, the remainder of this Pact shall remains valid. In this case, the parties will strive to come to an agreement to

their original intentions.

12. The fattles hereby sign this integrity fact at 011	12.	The Parties hereby sign this Integrity Pact at	on
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Bid Process Coordinator (BPC)	BIDDER
Name of the Officer Designation Name of the BPC with address	Name of Whole time Director/Authorized Signatory Name of the Bidder with address
Witness:	
	Witness:
1	1
2	2

## ANNEXURE C

## Technical Specifications of Transmission System

### SPECIFIC TECHNICAL REQUIREMENTS FOR TRANSMISSION LINE

- A.1.0 The design, routing and construction of transmission lines shall be in accordance with Chapter V, Part A of CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations 2010, as amended from time to time.
- A.2.0 Selection of tower type shall be made as per CEA Regulations, however in case lattice type towers are used, the following shall also be applicable:
- A.2.1 Steel section of grade E 250 and/or grade E 350 as per IS 2062, only are permitted for use in towers, extensions, gantry structures and stub setting templates. For towers in snowbound areas, steel sections shall conform to Grade-C of IS-2062.
- A.2.2 Towers shall be designed as per IS-802:2015, however the drag coefficient of the tower shall be as follows: -

Solidity Ratio	Drag Coefficient
Upto 0.05	3.6
0.1	3.4
0.2	2.9
0.3	2.5
0.4	2.2
0.5 and above	2.0

- A.3.0 Transmission Service Provider (TSP) shall adopt any additional loading/design criteria for ensuring reliability of the line, if so desired and /or deemed necessary.
- A.4.0 Transmission line shall be designed considering wind zones as specified in wind map given in National Building Code 2016, Vol.1. The developer shall also make his own assessment of local wind conditions and frequent occurrences of high intensity winds (HIW) due to thunderstorms, dust-storms, downburst etc. along the line route and wherever required, higher wind zone than that given in wind map shall be considered for tower design for ensuring reliability of line. Further, for transmission line sections passing within a distance of 50 km from the boundary of two wind zones, higher of the two wind zones shall be considered for design of towers located in such sections.
- A.5.0 765 kV towers, triple and quadruple circuit towers and towers with more than two subconductors per phase up to 400 kV shall be designed for reliability level 2. However, tall river crossing towers and special towers shall be designed for reliability level 3.

- A.6.0 A) For power line crossing of 400 kV or above voltage level (if crossing over the existing line), large angle & dead end towers (i.e. D/DD/QD) shall be used on either side of power line crossing.
  - B) For power line crossing of 132kV and 220kV (or 230kV) voltage level, angle towers(B/C/D/DB/DC/DD/QB/QC/QD) shall be used on either side of power line crossing depending upon the merit of the prevailing site condition and line deviation requirement.
  - C) For power line crossing of 66 kV and below voltage level, suspension/tension towers shall be provided on either side of power line crossing depending upon the merit of the prevailing site condition and line deviation requirement.
  - D) For crossing of railways, national highways and state highways, rules/regulations of appropriate authorities shall be followed.
- A.7.0 The relevant conductor configuration shall be as follows: -**Type of conductor:** ACSR / AAAC / AL59

Transmission	ACSR	Equivalent	Equivalent	Sub-
line	Conductor	AAAC conductor	AL59 conductor	conductor
	specified	based on 53.5%	based on 59%	Spacing
		conductivity of	conductivity of	
		Al Alloy	AL Alloy*	
765kV D/C	Zebra: Stranding	Stranding details:	Stranding	
(Hexa Zebra)	54/3.18 mm-Al +	61/3.19mm,	details:	
transmission	7/3.18 mm-Steel,	28.71 mm	61/3.08mm,	
lines	428 sq mm,	diameter;	27.72 mm	
	Aluminium area,	487.5 sq.mm	diameter;	457 mm
	28.62 mm	Aluminium alloy	454 sq.mm	
	diameter	area	Aluminium alloy	
	Maximum DC	Maximum DC	area	
	Resistance at 20°C	Resistance at 20°C	Maximum DC	
	(Ω/km): 0.06868	(Ω/km): 0.06815	Resistance at	
	Minimum UTS:	Minimum UTS:	$20^{\circ}$ C ( $\Omega$ /km):	
	130.32 kN	135.6 kN	0.0653	
			Minimum UTS:	
			108 kN	
400kV D/C	<b>Moose: Stranding</b>	Stranding	Stranding	
(Twin Moose)	54/3.53mm-Al +	details:	details:	
transmission	7/3.53 mm-Steel,	61/3.55mm	61/3.31 mm	
lines	31.77 mm	31.95mm	29.79 mm	
	diameter	diameter;	diameter;	450 mm
	528.5 sq. mm,			
	Aluminium area,	604 sq. mm	525 sq. mm	
		Aluminium alloy	Aluminium alloy	
	Maximum DC	area	area	
	Resistance at			

#### **Basic parameters:**

Transmission line	ACSR Conductor specified	Equivalent AAAC conductor based on 53.5% conductivity of Al Alloy	Equivalent AL59 conductor based on 59% conductivity of AL Alloy*	Sub- conductor Spacing
	20°C (Ω/km)	Maximum DC	Maximum DC	
	0.05552	Resistance at 20°C	Resistance at	
	Minimum UTS:	(Ω/km): 0.05506	$20^{\circ}$ C ( $\Omega$ /km):	
	161.20 kN	Minimum UTS:	0.0566	
		159.80 kN	Minimum UTS:	
			124.70 kN	

Note:

- 1. *To select any size above the minimum, the sizes mentioned in the Indian standard i.e IS-398(part-6) should be followed.
- 2. The transmission lines shall have to be designed for a maximum operatingconductor temperature of 85 deg C.
- A.8.0 The required phase to phase spacing and horizontal spacing for 765kV and 400kV line shall be governed by the tower design as well as minimum live metal clearances for 765kV and 400kV voltage level under different insulator swing angles. However, the phase to phase spacing for 765kV and 400kV lines shall not be less than 15m and 8m respectively.
- A.9.0 All electrical clearances including minimum live metal clearance, ground clearance and minimum mid span separation between earth wire and conductor shall be as per Central Electricity Authority (Measures Relating to Safety & Electric Supply) Regulations as amended from time to time and IS: 5613. Since these clearances for 765kV are not included in CEA Regulation/ Indian Standard, following values shall be considered:

#### Minimum live metal clearances for 765 kV line:

- a) (i) Under stationary conditions:
  - From tower body: For 765 kV D/C: 6.1 m For 765 kV S/C: 5.6 m
  - (ii) Under Swing conditions

Wind Pressure Condition	Minimum Electrical Clearance
a) Swing angle (25°)	4.4 mtrs
b) Swing angle (55°)	1.3 mtrs

- b) Minimum ground clearance: 18 m
- c) Minimum mid span separation between earthwire and conductor: 9.0 m

## Minimum live metal clearances for 400 kV line:

a) (i) Under stationary conditions:

#### From tower body: 3.05m

(ii)	Under	Swing	conditions	
------	-------	-------	------------	--

Wind Pressure Condition	Minimum Electrical Clearance
a) Swing angle (22°)	3.05 mtrs
b) Swing angle (44°)	1.86 mtrs

b) Minimum ground clearance: 8.84 m

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- c) Minimum mid span separation between earthwire and conductor: 9.0 m
- A.10.0 Shielding angle shall not exceed 10 deg for 765kV D/C and 20 deg for 400kV transmission line.
- A.11.0 The Fault current for design of line shall be 50kA for 1 sec for 765kV and 63kA for 1 sec for 400kV.
- A.12.0 In case of 765kV & 400kV voltage class lines, at least one out of two earth wires shall be OPGW and second earth wire, if not OPGW, shall be either of galvanized standard steel (GSS) or AACSR or any other suitable conductor type depending upon span length and other technical consideration.
- A.13.0 Each tower shall be earthed such that tower footing impedance does not exceed 10 ohms. Pipe type or Counterpoise type earthing shall be provided in accordance with relevant IS. Additional earthing shall be provided on every 7 to 8 kms distance at tension tower for direct earthing of both shield wires. If site condition demands, multiple earthing or use of earthing enhancement compound shall be used.
- A14.0 Pile type foundation shall be used for towers located in river or creek bed or on bank of river having scourable strata or in areas where river flow or change in river course is anticipated, based on detailed soil investigation and previous years' maximum flood discharge of the river, maximum velocity of water, highest flood level, scour depth & anticipated change in course of river based on river morphology data of at least past 20 years to ensure availability and reliability of the transmission line.
- A.15.0 Transmission line route shall be finalized, in consultation with appropriate authorities so as to avoid the habitant zones of endangered species and other protected species. Bird diverters, wherever required, shall be provided on the line.
- A.16.0 The raised chimney foundation is to be provided in areas prone to flooding/water stagnation like paddy field /agricultural field & undulated areas to avoid direct contact of water with steel part of tower. The top of the chimney of foundation should be at least above HFL (High Flood Level) or the historical water stagnation/ logging level (based on locally available data) or above High Tide Level or 500 mm above Natural Ground level (whichever is higher).
- A.17.0 Routing of transmission line through protected areas of India shall be avoided to the extent possible. In case, it is not possible to avoid protected areas, the towers of the transmission line upto 400 kV level which are installed in protected areas shall be designed for Multicircuit (4 circuits) configuration of same voltage level considering reliability level of at least two (2). The top two circuits of these multi-circuit towers shall be used for stringing of the transmission line under present scope and the bottom two circuits shall be made available for stringing of any future transmission line of any transmission service providers/ State transmission utilities/Central transmission utilities passing through the same protected area. Further, the configuration and coordinates of such transmission towers shall be submitted to CEA, CTU & BPC by the TSP.

## SPECIFIC TECHNICAL REQUIREMENTS FOR SUBSTATION

The proposed 765/400/220kV substation near **Beawar** shall be conventional AIS type generally conforming to the requirements of CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations 2010, as amended from time to time. Extension of 765kV **Fatehgarh-3** substation shall be conventional AIS type generally conforming to the requirements of CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations 2010, as amended from time to time.

#### **B.1.0** Salient features of Substation Equipment and Facilities

The design and specification of substation equipment are to be governed by the following factors:

#### **B.1.1** Insulation Coordination

The system design parameters for substations/switchyards shall be as given below:

Sl No	Description of parameters	765/400kV	Beawar s/s	Extn. of 765kV Fatehgarh-3 s/s
		765 kV System	400 kV System	765 kV System
1.	System operating voltage	765kV	400kV	765kV
2.	Maximum voltage of the system (rms)	800kV	420kV	800kV
3.	Rated frequency	50Hz	50Hz	50Hz
4.	No. of phase	3	3	3
5.	Rated Insulation levels			
i)	Impulse withstand voltage for (1.2/50 micro sec.)			
	<ul> <li>for equipment other than Transformer and Reactor</li> <li>for Insulator String</li> </ul>	2100kVp	1425kVp	2100kVp
	for mountor burng	2100kVp	1550kVp	2100kVp
ii)	Switching impulse withstand voltage (250/2500 micro sec.) dry and wet		1050kVp	1550kVp
iii)	One-minute power frequency dry withstand voltage (rms)	830kV	630kV	830kV
6.	Corona extinction voltage	508 kV	320kV	508 kV
7.	Max. radio interference voltage for frequency between 0.5 MHz and 2 MHz	2500 micro- volts at 508 kV rms	1000 micro- volts at 266kV rms	2500 micro-volts at 508 kV rms
8.	Minimum creepage distance for insulator string/ longrod insulators/ outdoor bushings		13020 mm (31mm/kV)	24800 mm (31mm/kV)

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Sl No	Description of parameters	765/400kV Beawar s/s		Extn. of 765kV Fatehgarh-3 s/s	
		765 kV System	400 kV System	765 kV System	
9.	Minimum creepage distance for switchyard equipment	20000 (25mm/kV)	10500mm (25mm/kV)	20000 (25mm/kV)	
10.	Max. fault current	50 kA	63 kA	50 kA	
11.	Duration of fault	1 sec	1 Sec	1 sec	

#### **B.1.2** Switching Scheme

The switching schemes, as mentioned below, shall be adopted at various voltage levels of substation/switchyard:

Substation	765kV side	400kV side	220kV side (Future)
765/400/220kV Beawar s/s	One & Half	One & Half	Double Main &
	breaker (AIS)	breaker (AIS)	Transfer (AIS)
765kV Fatehgarh-3 s/s	One & Half		
	breaker (AIS)		

#### Notes: -

- *i)* At 765kV & 400kV voltage level, each circuit of a double circuit transmission line shall be terminated in different diameters.
- *ii) Transformers and bus reactors of same HV rating shall be placed in different diameters (i.e. Two transformers of same HV rating shall not be connected in the same diameter and similarly, two bus reactors of same HV rating shall also not be connected in the same diameter).*
- *iii)* TSP shall also keep space provision for future 220kV Bus Coupler bay and 220kV Transfer Bus Coupler bay.
- *iv)* Connection arrangement of Switchable Line reactors shall be such that it can be used as Line rector as well as Bus reactor with suitable NGR bypass arrangement.

#### **B.2.0** Substation Equipment and facilities (Voltage level as applicable):

The switchgear shall be designed and specified to withstand operating conditions and duty requirements. All equipment shall be designed considering the following capacity.

Sl. No	Description of bay	765/400kV Beawar		Extn. of 765kV Fatehgarh-3 s/s
		765kV	400kV	765kV
1.	Bus Bar	4000 A	4000 A	4000 A
2.	Line bay	3150 A	3150 A	3150 A
3.	ICT bay	3150 A	3150 A	3150 A
4.	Bus Reactor bay	3150 A	3150 A	3150 A
5.	Switched Line Reactor Bay	3150 A		3150 A

## B.2.1 $(765/\sqrt{3})/(400/\sqrt{3})/33$ kV, Single Phase Autotransformer

500 MVA,  $(765/\sqrt{3})/(400/\sqrt{3})/33$ kV, 1-phase Transformer (including arrangement for 3-phase bank formation of 1500 MVA) shall conform to CEA's "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV and above)" as amended upto date available on CEA website

Spare 1-phase Transformer unit shall be placed and connected in such a way that in case of fault in any unit of any of the transformer banks (including for future transformer banks) can be replaced by spare unit without physically moving it.

#### **B.2.2** (765/ $\sqrt{3}$ ) kV, Single Phase Shunt Reactor

110 MVAR, 765/ $\sqrt{3}$  kV, 1-Phase **Reactor** (including arrangement for 3-phase bank formation of 330 MVAR) shall conform to CEA's "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV and above)" as amended upto date available on CEA website

Spare 1-phase Shunt Reactor unit shall be placed and connected in such a way that the spare unit can be utilized for all the bus and line reactor banks (including for future reactor banks) without its physical movement.

# Neutral Grounding Reactor (NGR) and Surge Arrester for 765 kV Line Reactors (as applicable)

The neutral of the line reactors (wherever provided) shall be grounded through adequately rated Neutral Grounding Reactors (NGR) to facilitate single phase autoreclosure, provided that the NGR shall be provided with bypass arrangement through a breaker so that the line reactor can be used as Bus reactor as and when required. The neutral of bus reactor shall be solidly grounded. The resistive value of NGR for each circuit at both ends of 765kV D/c Fatehgarh-3– Beawar S/s shall be 450 ohms.

NGR shall be oil filled or dry type air core for outdoor application. NGR shall conform to CEA's "Standard specifications and technical parameters of transformers and reactors (66kV and above)". Technical parameters of NGR shall be as specified in Annexure-A of abovementioned document.

The surge arresters (rated voltage of arrester in co-ordination with ohmic value of NGR shall be decided by the TSP) shall be provided & physically located between the neutral of shunt reactor (brought out at 145kV class bushing) and neutral grounding reactor. The surge arresters shall be of heavy duty station class gapless Metal oxide (ZnO) type conforming in general to IEC-60099-4. Arresters shall be hermetically sealed units, of self-supporting construction, suitable for mounting on structures.

#### B.2.3 420kV, 3-phase, Shunt Reactor

125 MVAR, 420kV, 3-Phase Reactor shall conform to CEA's "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV and above)" available on CEA website.

#### **B.2.4** 765kV and 400kV AIS Substation equipment (as applicable)

#### **B.2.4.1** Circuit Breakers (AIS)

The circuit breakers and accessories shall conform to IEC: 62271-100, IEC: 62271-1 and shall be of SF6 Type. The circuit breakers shall be of class C2-M2 (as per IEC) with regard to restrike probability during capacitive current breaking and mechanical endurance. The rated break time shall not exceed 40ms for 765kV & 400kV circuit breakers. The Circuit breakers controlling 765kV lines shall be provided either with pre-insertion closing resistor of about 450 ohms maximum with 9 ms insertion time or with Controlled Switching Device. The Circuit breakers controlling 400kV lines of more than 200 km length shall be provided either with pre insertion closing resistor of about 450 ohms maximum with 9 ms insertion closing resistor of about 400 ohms maximum with 8 ms insertion time or with Controlled Switching Device (CSD). 765kV and 400kV Circuit breakers shall be provided with single phase and three phase auto reclosing. The short line fault capacity shall be same as the rated capacity and this is proposed to be achieved without use of opening resistors. The controlled switching device shall be provided in Circuit breakers of switchable line reactor and in Main & Tie circuit breakers of line with non-switchable line reactors and Bus reactors and 765/400kV Transformers.

#### **B.2.4.2** Isolators (AIS)

The isolators shall comply to IEC 62271-102 in general.765kV Isolator design shall be double break or vertical break or knee-type. 400kV shall be double break type. All Isolators and earth switches shall be motor operated. Earth switches shall be provided at various locations to facilitate maintenance. Isolator rated for 765kV and 400kV shall be of extended mechanical endurance class - M2 and suitable for bus transfer current switching duty as per IEC-62271-102. Main blades and earth blades shall be interlocked and interlock shall be fail safe type. 765kV & 400kV earth switches for line isolator shall be suitable for induced current switching duty as defined for Class-B.

## **B.2.4.3** Current Transformers (AIS)

Current Transformers shall comply with IEC 61869 in general. All ratios shall be obtained by secondary taps only. Generally, Current Transformers (CT) for 765kV & 400kV shall have six cores (four for protection and two for metering). The burden and knee point voltage shall be in accordance with the requirements of the system including possible feeds for telemetry. Accuracy class for protection core shall be PX and for metering core it shall be 0.2S. The rated burden of cores shall be closer to the maximum burden requirement of metering & protection system (not more than 20VA for metering core) for better sensitivity and accuracy. The instrument security factor shall be less than 5 for CTs upto 400kV and less than 10 for CTs of 765kV voltage class.

## **B.2.4.4** Capacitive Voltage Transformers (AIS)

Capacitive Voltage transformers shall comply with IEC 61869 in general. These shall have three secondaries out of which two shall be used for protection and one for metering. Accuracy class for protection cores shall be 3P and for metering core shall be 0.2. The Capacitive voltage transformers on lines shall be suitable for Carrier Coupling. The Capacitance of CVT for 400kV shall be of 4400/8800 pF depending on PLCC requirements whereas the Capacitance of CVT for 765kV shall be 8800 pF. The rated burden of cores shall be closer to the maximum burden requirement of metering & protection system (not more than 50VA for metering core) for better sensitivity and accuracy.

#### **B.2.4.5** Surge Arresters (AIS)

624kV & 336kV Station High (SH) duty gapless type Surge arresters with thermal energy (W_{th}) of minimum 13 kJ/kV and 12 kJ/kV conforming to IEC 60099-4 in general shall be provided for 765 kV and 400 kV systems respectively. Other characteristics of Surge arrester shall be chosen in accordance with system requirements. Surge arresters shall be provided near line entrances, Transformers & Reactor so as to achieve proper insulation coordination. Surge Arresters shall be provided with porcelain/ polymer housing fitted with pressure relief devices. A leakage current monitor with surge counter shall be provided with each surge arrester.

#### **B.2.5** Protection Relaying & Control System

The protective relaying system proposed to be provided for transmission lines, autotransformers, reactors and bus bars to minimize the damage to the equipment in the events of faults and abnormal conditions, is dealt in this section. All main protective relays shall be numerical type with IEC 61850 communication interface **and should have Interoperability during** integration **of numerical relays to communicate over IEC61850 protocol with RTU/SAS/IEDs of different OEMs** All numerical relays shall have built in disturbance recording feature.

The protection circuits and relays of transformer and reactor shall be electrically and physically segregated into two groups each being independent and capable of providing uninterrupted protection even in the event of one of the protection groups failing, to obtain redundancy, and to take protection systems out for maintenance while the equipment remains in service.

#### a. Transmission Lines Protection

765kV and 400kV lines shall have Main-I numerical three zone distance protection scheme with carrier aided inter-tripping feature. 765kV and 400kV lines shall also have Main-II numerical distance protection scheme like Main-I but from different make that of Main-I. The Main-I and Main-II protection relays of same make may be provided only if they are of different hardware & manufacturing platform or different principle of operation.

However, Line Current Differential relay (with back up distance protection feature) as Main–I and Main-II shall be considered at both ends for short lines (line length below 30kM) having Fiber Optic communication link. Differential relay at remote end shall be provided by the TSP. Associated power & control cabling and integration with SAS at remote end shall be provided by respective bay owner.

In case of loop in loop out of transmission lines, the existing protection scheme shall be studied and suitable up-gradation (if required) shall be carried out.

Further, all 765kV and 400kV lines shall be provided with single and three phase autoreclosing facility to allow reclosing of circuit breakers in case of transient faults. These lines shall also be provided with distance to fault locators to identify the location of fault on transmission lines.

All 765kV and 400kV lines shall also be provided with two stages over voltage protection. Over voltage protection & distance to fault locator may be provided as in-built feature of Main-I & Main-II protection relays. Auto reclose as built-in function of Bay Control Unit (BCU) is also acceptable.

The Main-I and Main-II protection relays shall be fed from separate DC sources and shall be mounted in separate panels.

For 765kV and 400kV transmission lines, directional IDMT earth fault relay should be provided as standalone unit or in-built feature of Main-I and Main -II feature.

#### **b.** Auto Transformer Protection

These shall have the following protections:

- i) Numerical Differential protection
- ii) Numerical Restricted earth fault protection
- iii) Numerical Back-up Over-current and earth fault protection on HV & MV side
- iv) Numerical Over fluxing protection on HV & MV side
- v) Numerical Overload alarm

Further, Numerical Back-up Over-current and earth fault protection on HV & MV side of autotransformer shall not be combined with other protective functions in the main relays and shall be independent relays. Besides these, power transformers shall also be provided with Buchholz relay, protection against high oil and winding temperature and pressure relief device etc.

Suitable monitoring, control (operation of associated circuit breaker & isolator) and protection for LT auxiliary transformer connected to tertiary winding of auto-transformer for the purpose of auxiliary supply shall be provided. The Over current and other necessary protection shall be provided for the auxiliary transformer. These protection and control may be provided as built in feature either in the bay controller to be provided for the auxiliary system or in the control & protection IEDs to be provided for autotransformer.

#### c. 765kV & 400kV Reactor Protection

Reactor shall be provided with the following protections:

- i) Numerical Differential protection.
- ii) Numerical Restricted earth fault protection
- iii) Numerical Back-up impedance protection

Besides these, reactors shall also be provided with Buchholz relay, MOG with low oil level alarm, protection against oil and winding temperatures & pressure relief device, etc.

#### d. Bus Bar Protection

The high-speed low impedance type bus bar differential protection, which is essential to minimize the damage and maintain system stability at the time of bus bar faults, shall be provided for 765kV and 400kV buses. Duplicated bus bar protection is envisaged for 765kV & 400kV bus-bar protection. Bus bar protection scheme shall be such that it operates selectively for each bus and incorporate necessary features required for ensuring security. The scheme shall have complete bus bar protection for present as well as future bays envisaged i.e. input / output modules for future bays shall also be provided.

Bus Bar protection system for new substation shall be de-centralized (distributed) type.

In case, the bus section is provided, then each side of bus section shall have separate set of bus bar protection schemes.

For existing substations, the existing bus bar protection shall be augmented as per requirement.

#### e. Local Breaker Back up Protection

This shall be provided for each 765kV and 400kV circuit breakers and will be connected to de-energize the affected stuck breaker from both sides.

Notes:

- 1. LBB & REF relays shall be provided separately from transformer differential relay.
- 2. LBB relay may also be provided as built-in protection function of distributed bus bar protection scheme; however, in such case separate LBB relay shall be provided for tie bays (in case of One and Half breaker scheme).
- 3. Over fluxing & overload protection can be provided as built-in feature of differential relay.
- 4. In 765kV & 400kV switchyard, if spare bay of half diameter is identified as future, Tie CB relay panel shall be with Auto-reclosure feature.

## **B.2.6** Substation Automation System

a) For all the new substations, state of art Substation Automation System (SAS) conforming to IEC-61850 shall be provided. The distributed architecture shall be used for Substation Automation system, where the controls shall be provided through Bay

control units. The Bay control unit is to be provided bay wise for voltage level 220kV and above. All bay control units as well as protection units are normally connected through an Optical fiber high speed network. The control and monitoring of circuit breaker, dis-connector, re-setting of relays etc. can be done from Human Machine Interface (HMI) from the control room.

The functions of control, annunciation, disturbance recording, event logging and measurement of electrical parameters shall be integrated in Substation Automation System.

At new substations, the Substation Automation System (SAS) shall be suitable for operation and monitoring of the complete substation including proposed future bays/elements.

In existing substations with Substation automation system (SAS), augmentation of existing SAS shall be done for bays under present scope.

In existing Substations where Substation automation is not provided, control functions shall be done through control panels.

Necessary gateway & modems (as required) shall be provided to send data to RLDC/SLDC as per their requirement. Any augmentation work at RLDC/SLDC is excluded from TSP's scope. However, all the configuration work at substation end required to send data to RLDC/SLDC shall be in the scope of TSP.

#### b) Time synchronisation equipment

Time synchronization equipment complete in all respect including antenna, cable, processing equipment required to receive time signal through GPS or from National Physical Laboratory (NPL) through INSAT shall be provided at new substations. This equipment shall be used to synchronize SAS & IEDs etc.

#### **B.3.0** Substation Support facilities

Certain facilities required for operation & maintenance of substations as described below shall be provided at new substation. In existing substation, these facilities have already been provided and would be extended/ augmented as per requirement.

## **B.3.1** AC & DC power supplies

For catering the requirements of three phase & single-phase AC supply and DC supply for various substation equipment (for present and future scope), the following arrangement is envisaged: -

For LT Supply at each new Substation, two (2) nos. of LT Transformers (minimum 800kVA for substations with highest voltage rating as 765kV and minimum 630kVA for substations with highest voltage rating as 400kV) shall be provided out of which one shall be connected with SEB/DISCOM supply and other one shall be connected to tertiary of Transformer.

Metering arrangement with Special Energy Meters (SEMs) shall be provided by TSP at 33kV tertiary of Transformer for drawing auxiliary supply at new substation. Such SEMs shall be provided by CTU at the cost of the TSP. Accounting of such energy drawn by the TSP shall be done by RLDC/RPC as part of Regional Energy Accounting.

Additionally, Active Energy Meters may be provided at the same point in the 33kV tertiary of Transformer by local SEB/DISCOM for energy accounting.

- 2 sets of 220V battery banks for control & protection and 2 sets of 48V battery banks for PLCC/ communication equipment shall be provided at each new Substation. Each battery bank shall have a float-cum-boost charger. Battery shall be of VRLA type. At new substation, sizing of battery and battery charger shall be done based on the number of bays specified (including future bays) as per CEA Regulations and relevant IS. 2 sets of 48 V battery banks for PLCC and communication equipment for present and future scope shall have at least 10-hour battery backup and extended backup, if required.
- iii) Suitable AC & DC distribution boards and associated LT Switchgear shall be provided at new substation.

For new substation, following switch boards shall be considered with duplicate supply with bus coupler/ sectionalizer and duplicate outgoing feeders except for Emergency lighting distribution board which shall have only one incoming feeder:

- (a) 415V Main Switch board -1 nos.
- (b) AC distribution board -1 nos.
- (c) Main lighting distribution board -1 no.
- (d) Emergency lighting distribution board -1 no.
- (e) 220 Volt DC distribution board -2 nos.
- (f) 48 Volt DC distribution board -2 nos.

Sizing of LT Switchgear shall be suitable to cater the requirement for all present and future bays. AC & DC distribution boards shall have modules for all the feeders (including future as specified).

- iv) At new Substation, one no. of DG set (minimum 500 kVA for substations with highest voltage rating as 765kV and minimum 250kVA for substations with highest voltage rating as 400kV) shall be provided for emergency applications.
- v) For substation extensions, existing facilities shall be augmented as required.

### **B.3.2** Fire Fighting System

Fire-fighting system for substation including transformer & reactor shall conform to CEA (Measures Relating to Safety & Electric Supply) Regulations.

Further, adequate water hydrants and portable fire extinguishers shall be provided in the substations. The main header of firefighting system shall be suitable for extension to bays covered under the future scope; necessary piping interface in this regard shall be provided.

At existing substations, the fire-fighting systems as available shall be extended to meet the additional requirements.

#### **B.3.3** Oil evacuating, filtering, testing & filling apparatus

To monitor the quality of oil for satisfactory performance of transformers, shunt reactors and for periodical maintenance necessary oil evacuating, filtering, testing and filling apparatus would be provided at new substations. Oil storage tanks of adequate capacities for storage of transformer oil would be provided.

#### **B.3.4** Illumination

Normal & emergency AC & DC illumination shall be provided adequately in the control room & other buildings of the substation. The switchyard shall also be provided with adequate illumination.

Lighting of the entire control room building, fire-fighting pump house, other building (if any) and switchyard shall be done by LED based low power consumption luminaires.

#### B.3.5 Control Room

For new substation, substation control room shall be provided to house substation work stations for station level control (SAS) alongwith its peripheral and recording equipment, AC & DC distribution boards, DC batteries & associated battery chargers, Fire Protection panels, Telecommunication panels & other panels as per requirements. Air conditioning shall be provided in the building as functional requirements. Main cable trenches from the control room shall have adequate space provision for laying of cables from control room for all the future bays also.

At existing substations, the adequacy of size of control room shall be ascertained and the same shall be augmented as per requirement.

## **B.3.6** Control Concept

All the EHV circuit breakers in substation/switching stations shall be controlled and synchronized from the switchyard control room/remote control center. Each breaker would have two sets of trip circuits which would be connected to separate DC supplies for greater reliability. All the isolators shall have control from remote/local whereas the earth switches shall have local control only.

## **B.3.7** Visual monitoring system (VMS) for watch and ward of substation premises:

Visual monitoring system for effective watch and ward of substation premises shall cover all the transformers and reactors, all other major AIS Equipment (such as CB, isolators, CT, CVT, SA etc. as applicable), GIS bays, panel room, all the gates of switchyard and all entry and exit points of control room building and accordingly the location of cameras shall be decided. The camera shall be high definition color CCD camera with night vision feature. The VMS data partly/completely shall be recorded (minimum for 15 days) at least @25fps (or better) and stored on network video recorder. The system shall use video signals from various cameras installed at different locations, process them for viewing on workstations/monitors in the control room and simultaneously record all the cameras.

Mouse/keyboard controllers shall be used for pan, tilt, zoom and other functions of the desired camera. The Visual Monitoring System shall have provision of WAN connectivity for remote monitoring.

All camera recordings shall have Camera ID & location/area of recording as well as date/time stamp. The equipment should generally conform to Electromagnetic compatibility requirement for outdoor equipment in EHV substation.

At existing substations, the visual monitoring system if available shall be augmented as per existing or better specification as required.

#### **B.4** General Facilities

- a) Line Gantry/Towers are envisaged for bays under present scope only. However, for adjacent future line bay, tower shall be designed for extension (considering Quad conductors for 765kV & 400kV future lines ) wherever applicable.
- b) Bay extension works at existing substation shall be executed by TSP in accordance with the requirement/provisions mentioned above. However, interface points shall be considered keeping in view the existing design/arrangement at the substation.
- c) TSP has to arrange for construction power and water on its own.
- d) All outdoor steel structures including anchor/foundation bolts shall be fully galvanized. The weight of the zinc coating shall be at least 610 gm/sq.m, however, for coastal/creek regions it shall be at least 900 gm/sq.m.
- e) In 765kV & 400kV switchyard, if spare bay of half diameter is identified as future, all the equipment for Tie & Future bay shall be designed considering the current rating of line bay i.e. 3150A.
- f) Boundary wall shall be brick masonry wall with RCC frame or Stone masonry wall or Precast RCC wall under present scope along the property line of complete substation area including future switchyard area to prevent encroachment and unauthorized access. Minimum height of the boundary wall shall be of 1.8 m from finished ground level (FGL) as per CEA Measures Relating to Safety and Electric Supply Regulations.

## **B.5** EXTENSION OF EXISTING SUBSTATION

The following drawings/details of existing substation is attached with the RFP documents for further engineering by the bidder.

Sl. No.	Drawing Title	Drawing No./Details	Rev. No.		
А.	765kV Fatehgarh-3 (AIS) S/S				
1.0	Single Line Diagram	Yet to be finalized by			
2.0	General Arrangement	the developer. The			
3.0	Earthmat Layout	same may be availed			
4.0	Visual Monitoring System	from the developer on			
5.0	Bus Bar Protection	finalization.			
6.0	Substation Automation System (SAS)				

Bidder is also advised to visit the substation sites and acquaint themselves with the topography, infrastructure such as requirement of roads, cable trench, drainage etc. and also the design philosophy.

## SPECIFIC TECHNICAL REQUIREMENTS FOR COMMUNICATION

The communication requirement shall be in accordance to CEA (Technical Standards for Communication System in Power System Operations) Regulations, 2020, CERC (Communication System for inter-State transmission of electricity) Regulations, 2017, and CEA (Cyber Security in Power Sector) Guidelines, 2021, all above documents as amended from time to time.

The protections for transmission line and the line compensating equipment shall have hundred percent back up communication channels i.e. two channels for tele- protection in addition to one channel for speech plus data for each direction

In order to meet the requirement for grid management and operation of substations, Transmission Service Provider (TSP) shall provide the following:

#### C.1.0 LILO of both circuits of Ajmer – Chittorgarh 765kV D/c at Beawar

On LILO of both circuits of Ajmer – Chittorgarh 765kV D/c at Beawar, TSP to supply, install & commission OPGW and earthwire as per Tower Configurations:

- (i) For Multi Circuit Tower Configuration: Two (2) no. OPGW cable containing 24 Fibres (24F) on both the Earthwire peaks
- (ii) For Double Circuit Tower configuration (for both Loop In and Loop Out portion): One (1) no. OPGW cable containing 24 Fibres (24F) to be installed on one earthwire peak & conventional earthwire on other earthwire peak for both Loop In and Loop Out Lines.

The TSP shall install OPGW cables from Gantry of Beawar S/s up to the LILO tower with all associated hardware including Vibration Dampers, LILO Tower, mid-way & gantry Joint Boxes (called **OPGW Hardware** hereafter) and finally terminate in Joint Boxes at Beawar. If repeater required to meet the link budget requirement of Ajmer – Beawar & Beawar – Chittorgarh link the same shall be provided by TSP.

TSP shall finalize the location of repeater station depending upon the actual site conditions. Further TSP shall comply to the requirements mentioned as per **Appendix-F.1**.

Maintenance of OPGW Cable and OPGW Hardware shall be responsibility of TSP.

## C.2.0 LILO of Kota – Merta 400 kV at Beawar

On LILO of Kota – Merta 400 kV line at Beawar, TSP shall supply, install & commission Two (2) no. OPGW cable containing 24 Fibres (24F) on both the E/W peaks of tower.

The TSP shall install OPGW cables from gantry of Beawar S/s up to the LILO tower with all associated hardware including Vibration Dampers, LILO tower, mid-way & gantry Joint Boxes (called **OPGW Hardware** hereafter) and finally terminate in Joint Boxes at Beawar. If repeater required to meet the link budget requirement of Kota – Beawar & Beawar – Merta link the same shall be provided by TSP.

TSP shall finalize the location of repeater station depending upon the actual site conditions. Further TSP shall comply to the requirements mentioned as per **Appendix-F.1**.

Maintenance of OPGW Cable and OPGW Hardware shall be responsibility of TSP.

#### C.3.0 Fatehgarh-3 – Beawar 765 kV D/c line

On Fatehgarh-3 – Beawar 765 kV D/c line, TSP shall supply, install & commission One (1) no. OPGW cable containing 24 Fibres (24F) on one E/W peak and conventional earth wire on other E/W peak.

The TSP shall install this OPGW from gantry of Fatehgarh -3 up to the gantry of Beawar S/s with all associated hardware including Vibration Dampers, mid-way & gantry Joint Boxes (called **OPGW Hardware** hereafter) and finally terminate in Joint Boxes at end Substations. Repeater/s are required to meet link budget requirement of Fatehgarh-3 – Beawar link.

TSP shall finalize the location of repeater station depending upon the actual site conditions. Further TSP shall comply to the requirements mentioned as per **Appendix-F.1**.

#### C.4.0 Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus Reactor

- (i) TSP shall supply, install & commission 2 no. FODP (96 F) alongwith panel and approach Cable (24F each) with all associated hardware fittings from gantry tower to Control Room for all the incoming lines envisaged under the present scope.
- (ii) TSP shall supply, install & commission One or more STM-16 (FOTE) equipment alongwith panel/s supporting minimum seven (7) directions with MSP (Multiplex Section Protection – 1+1). These directions shall exclude protected (1+1) local patching among equipment (if any). Communication equipment shall be provided with necessary interfaces to meet the voice and data communication requirement among Beawar, Ajmer, Chittorgarh, Kota, Merta, Repeater Stations & Fatehgarh-3 S/s. TSP to also provide suitable optical interfaces/equipment at Fatehgarh-3, Ajmer, Chittorgarh, Merta, Kota Substations FOTE to meet link budget

requirement for connectivity with Beawar Station if required. The suitable DC Power Supply and backup to be provided for communication equipment.

- (iii) FODP & FOTE equipment with panels shall be provided in Control Room of Beawar PS. FOTE & FODP Eq can be accommodated in same panel to optimize space.
- (iv) The new communication equipment under the present scope shall be compatible for integration with existing regional level centralized NMS. The local configuration of the new communication equipment shall be the responsibility of TSP. The configuration work in the existing centralized NMS for integration of new Communication equipment shall be done by Regional ULDC Team, however all the necessary support in this regard shall be ensured by TSP.
- (v) TSP shall supply, install & commission required no. of Phasor Measurement Units (PMUs) for all 400kV and above voltage line bays (under the scope of this project) at Beawar S/s, these PMUs shall support latest IEEE C-37.118 protocols. These PMUs shall be provided with GPS clock and LAN switch and shall connect with LAN switch of control room with Fibre Optic cable. These PMUs shall be connected with the FOTE at Substation for onwards data transmission to the PDC (Phasor Data Concentrator) located at respective RLDC. However, configuration work in existing PDC at RLDC for new PMU integration is not in scope of TSP (shall be done by respective RLDC), however all the necessary support in this regard shall be ensured by TSP.
- (vi) TSP shall supply, install & commission Firewall in redundant mode (1+1) in line with the specification attached at **Annexure F.1**
- (vii) The maintenance of all the communication equipment including FOTE, FODP, approach cable, PMUs, DCPS alongwith Battery Bank shall be the responsibility of TSP.

## C.5.0 PLCC & PABX:

Power line carrier communication (PLCC) equipment complete for speech, tele-protection commands and data channels shall be provided on each transmission line. The PLCC equipment shall in brief include the following: -

- Coupling device, line traps, carrier terminals, protection couplers, HF cables, PABX (if applicable) and maintenance and testing instruments.
- At new substation, a telephone exchange (PABX) of 24 lines shall be provided at as means of effective communication among various buildings of the substation, remote end substations and with control centers (RLDC/SLDC) etc.
- Coupling devices shall be suitable for phase to phase coupling for 400kV Transmission lines. The pass band of coupling devices shall have sufficient marginfor adding communication channel in future if required. Necessary protection devices for safety of personnel and low voltage part against power frequency voltages and transient over voltage shall also be provided.
- The line traps shall be broad band tuned suitable for blocking the complete range of carrier frequencies. Line Trap shall have necessary protective devices such as lightning arresters for the protection of tuning device. Decoupling network consisting of line traps and coupling capacitors may also be required at certain substation in case of extreme frequency congestion.
- The carrier terminals shall be of single side-band (SSB) amplitude modulation (AM) type and shall have 4 kHz band width. PLCC Carrier terminals and Protection couplers shall be considered for both ends of the line.

- PLCC equipment for all the transmission lines covered under the scheme (consisting of one set of analog PLCC channel along with circuit protection coupler and one set of Digital protection coupler for both ends) shall be provided by TSP. CVT & Wave trap for all the line bays under present scope shall be provided by TSP.
- TSP shall provide/ undertake necessary addition/ modification/ shifting/ recommissioning etc. of PLCC equipment due to LILO of transmission lines (wherever applicable). The make & model of existing PLCC system is as follows:

Sl. No.	Name of the existing line	Make & Model of PLCC
1.	765kV Ajmer- Chittorgarh D/c line	Analog PLCC
		Make – ABB
		Model – ETL-81 + NSD50
		Digital PLCC
		Make – ABB
		Model – NSD-70D
2.	400kV Kota – Merta line	Make – ABB
		Model – ETL-41

- All other associated equipment like cabling, coupling device and HF cable shall also be provided by the TSP.
- 2 sets of 48V battery banks for PLCC and communication equipment shall be provided at each new Substation with at least 10 hours battery backup and extended backup, if required.

#### C.7.0 Next Generation Firewall (NGFW) Requirement

- TSP shall provide 2 nos. Next Generation Firewalls (NGFW); one No. Main & one No. Standby having electrical ethernet interfaces/ports and placed between FOTE & SAS gateway/s at the substation. All ethernet based applications (e.g. PMU, AMR, VOIP, SAS/SCADA etc.) shall be terminated in the firewall ports directly. Each port of firewall shall work as a separate zone. Firewall shall be hardware based with functionality of Block/Allow/drop and IPSec VPN (network encryption).
- Minimum 16 Nos. of ports/interfaces shall be provided in each firewall (i.e. Main & Standby) TSP can use either single firewall or multiple firewalls to meet this interfaces requirement, each for main as well as standby firewall. Minimum throughput of firewall shall be 300 Mbps.
- The Firewall shall be managed/ configured as standalone at present and shall also have compatibility to manage/configure through Centralized Management Console (CMC) remotely in future.
- OEM Support on 24x7 basis for 7 years shall be provided for all the functions & features of the Firewall.
- Firewall shall be tested and certified for ISO15408 Common Criteria for least EAL4+. Further, the OEM must certify that it conforms to Secure Product Development Life Cycle requirements as per IEC62443-4-1. The firewall shall generate reports for NERC-CIP Compliance.

The specifications for the firewalls are given at **Annexure-F.1** and schematic diagram showing firewall placement given at **Figure F.1**.

## Appendix-F.1

#### **Repeater Requirements**

• If the repeater location is finalized in the Control Room of a nearby substation, TSP shall provide 1 no. OPGW (48F) on a single Earthwire peak with OPGW Hardware & mid-way Joint Boxes etc. of the line crossing the main line and 1 no. Approach Cable (48F) with all associated hardware fittings, to establish connectivity between crossing point of main transmission line up to the repeater equipment in substation control room. TSP shall co-ordinate for Space & DC power supply sharing for repeater equipment.

TSP shall provide FODP, FOTE (with STM-16 capacity) with suitable interfaces require for link budget of respective link.

#### OR

• If the repeater location is finalized in the nearby substation premises, the TSP shall identify the Space for repeater shelter in consultation with station owner. Further TSP shall provide 1 no. OPGW (48F) on a single Earthwire peak with OPGW Hardware & mid-way Joint Boxes etc. of the line crossing the main line and 1 no. Approach Cable (48F) / UGFO (48F) with all associated hardware fittings, to establish connectivity between crossing point of main transmission line up to the substation where the repeater shelter is to be housed. TSP shall provide repeater shelter along with FODP, FOTE (with STM-16 capacity) with suitable interfaces require for link budget of respective link, reliable power supply provisioning for AC and DC supply, battery bank, Air Conditioner and other associated systems.

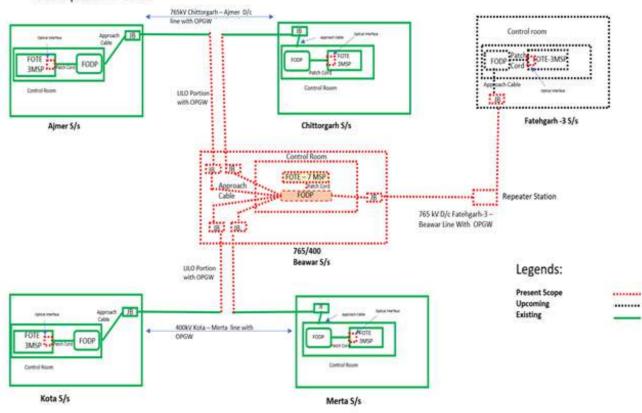
#### OR

• If the repeater location is finalized on land near the transmission tower. TSP shall make the provisions for Land at nearby tower for repeater shelter. Further TSP shall provide 1 no. Approach Cable (48F) / UGFO (48F) with all associated hardware fittings to establish connectivity up to the location of repeater shelter.

TSP shall provide repeater shelter along with FODP, FOTE (with STM-16 capacity) with suitable interfaces require for link budget of respective link, reliable power supply provisioning for AC and DC supply, battery bank, Air Conditioner and other associated systems

Maintenance of OPGW Cable and **OPGW Hardware**, repeater equipment & items associated with repeater shelter shall be responsibility of TSP.

Note: Existing Station owner/s to provide necessary support to integrate different equipment & applications of new extended bays with the existing substation e.g. Communication (through FOTE), PMUs, Voice etc. for smooth operation and monitoring of new added grid elements.



Proposed Communication for Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under phase III –Part F

Figure F.1

Annexure F.1

# Specifications of Next Generation Firewall (NGFW)

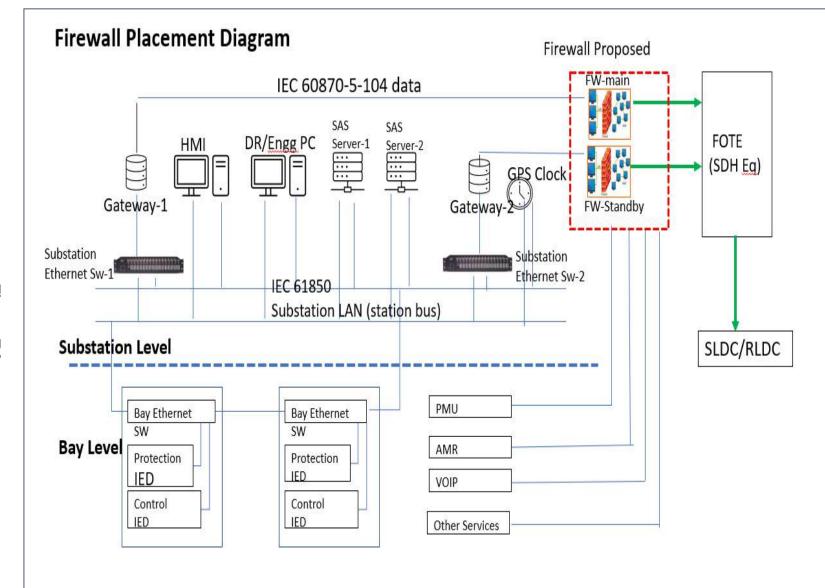
1. NGFW shall have following features including but not limited to:

Encryption through IPSec VPN (Virtual Private Network), Deep Packet Inspection (DPI), Denial of service (DoS) & Distributed Denial of Service (DDoS) prevention, Port Block/ Allow, rules/ policies for block/allow, IP (Internet Protocol) & Media Access Control (MAC) spoofing protection, threat detection, Intrusion Prevention System (IPS), Anti-Virus, Anti-Spyware, Man In The Middle (MITM) attack prevention.

- 2. The proposed firewall shall be able to handle (alert, block or allow) unknown /unidentified applications e.g. unknown TCP & UDP packets. It shall have the provision to define application control list based on application group and/or list.
- 3. Firewall shall have feature and also have capability to update the definition/ Signatures of Anti-Virus online as well as offline. Firewall shall also be compatible to update the definitions/signatures through CMC. There shall be a defined process for security patching and firmware up-gradation. There shall be a feature to field validate firmware checksum. The same shall also be validated before using the OEM provided file/binary in the process of firmware up-gradation and security patching
- 4. Firewall shall have Management Console port to configure remotely.
- 5. Firewall shall be EMI/EMC compliant in Substation environment as per IEC 61850-3.
- 6. Firewall shall be rack mounted in existing standard equipment cabinets.
- 7. Firewall shall have support of SCADA applications (IEC-60870-5-104), ICCP, PMU (IEEE C37.118), Sub-Station Automation System (IEC 61850), Ethernet and other substation environment protocols.
- 8. Client based Encryption/ VPN must support different Operating System platforms e.g. Windows, Linux & Mac.
- 9. The solution must have content and comprehensive file detection policies, blocking the files as function of their types, protocols and directions.
- 10. Firewall shall have logging facility as per standard logs/events format. Firewall shall have features to export the generated/stored logs/events in csv (Comma Separated Value) and also any other standard formats for offline usage, analysis and compliance. Firewall shall have suitable memory architecture and solution to store and be enable to export all logs/events for a period of last 90 days at any given time.
- 11. Firewall shall have features and be compatible with local as well as central authentication system (RADIUS, LDAP, or TACACS+) for user account and access right management. It shall also have Role Based User management feature.
- 12. Firewall shall have the capability to configure sufficient number of VLANs.
- 13. Firewall shall have the capability to support sufficient number of sessions.
- 14. Firewall shall have provision to configure multiple IP Sec VPNs, at least 100 nos., (one-to-many or many-to-one). Shall support redundant operation with a similar router after creation of all the IP Sec VPN. IPSec VPN shall support encryption protocols as AES128, AES256 and hashing algorithms as MD5 and SHA1. IPSec VPN throughput shall support at least 300 Mbps
- 15. Firewall shall be capable of SNMP v3 for monitoring from Network Management system. It shall also have SNMPv3 encrypted authentication and access security
- 16. Firewall shall support in Active/Passive or Active-Active mode with High Availability features like load balancing, failover for firewall and IPsec VPN without losing the session connectivity.

- 17. Firewall should have integrated traffic shaping (bandwidth, allocation, prioritisation, etc.) functionality
- 18. Firewall shall support simultaneous operation with both IPv4 and IPv6 traffic
- 19. Firewall shall be compatible with SNTP/NTP or any other standards for clock synchronization
- 20. Firewall shall have the features of port as well as MAC based security
- 21. Firewall shall support exporting of logs to a centralized log management system (e.g. syslog) for security event and information management.
- 22. Firewall time shall be kept synchronised to official Indian Timekeeping agency, time.nplindia.org.
- 23. Firewall product shall be provided with all applicable updates at least until 36 months since the applicable date of product shipping to the concerned utility.

**RFP for Selection of Bidder as Transmission Service Provider** 



## **Frequently Asked Queries:**

### **1.0** Transmission Line:

- 1.1 Please clarify that whether shutdowns for crossing of existing transmission lines of POWERGRID/STUs/ Power Evacuation Lines from Generation Plants/ Any other Transmission Licensee will be given to TSP on chargeable basis or free of cost.
  - **Reply:** Shutdowns for crossing of existing transmission lines of POWERGRID/ STUs/ Power Evacuation Lines from Generation Plants/ Any other Transmission Licensee will be given to TSP by the concerned owner of the lines as per their own terms & conditions. As far as shutdown of ISTS lines are concerned the same can be availed by approaching respective Regional Power Committee.
- 1.2 We understand that the suggested swing angle criteria are applicable for Suspension Insulator in Suspension Tower. Further, you are requested to provide similar swing angle and clearance criteria for Pilot Insulator with Jumper & Jumper.
  - **Reply:** It is clarified that the swing angle criteria (as mentioned in RFP) for transmission lines is applicable for Suspension Insulator in Suspension Tower. Further, as per Clause 3.0 of Specific Technical Requirements for transmission lines, Transmission service Provider (TSP) shall adopt any additional loading/design criteria for ensuring reliability of the line, if so desired and /or deemed necessary.
- 1.3 We request you to kindly allow that use of diamond configuration at Power line crossings and the existing owner of the lines may be directed to allow the same for the successful bidders.
  - **Reply:** Power line crossing including Diamond configuration is responsibility of the TSP. TSP shall formally submit the profile of the crossing section to the owner of the existing line suggesting proposed crossing alternatives. The crossing will have to be carried out as per approval of owner of the existing line.
- 1.4 It is requested you to kindly provide present status of Forest Clearances if any transmission line corridor area falling in wildlife forest / reserve forest/ mangroves.
  - **Reply:** Based on the preliminary route survey, the process of initiation of forest clearance for the forest stretches, if any, enroute the proposed line alignment will be initiated by way of writing letters to the concerned authority (ies). However, it may be noted that it will be the responsibility of TSP for obtaining forest clearance for the forest stretches as provided in the survey report and also for any forest area encountered during detailed survey.

#### 2.0 Substation

2.1 We understand that space for storage of O&M spare shall be provided by existing owner within the station boundary without any cost. Kindly confirm.

**Reply**: Space for storage of O&M spares shall be arranged by TSP on its own.

2.2 We presume that the O&M for the end Termination bays will be in the scope of the TSP and TSP shall not be liable for any payment towards O&M to the existing owner of the substation. Kindly confirm.

**Reply:** Operation and maintenance of the bays is solely responsibility of the TSP.

- 2.3 With reference to subject scheme of existing sub-station, we assumed following scope of work:
  - (a) We assumed internal road is available and need not to consider in the present scope of work.
  - (b) Drainage is available and need not to consider in the present scope of work.
  - (c) Cable trench extension in adjacent to Main cable trench only under present scope of work.
  - (d) Levelled area being provided by developer for bay extension.

**Reply:** Regarding requirement of internal road, drainage, cable trench, leveling of the bay extension area, bidder is advised to visit site and acquaint themselves with the provisions/facilities available at substation.

2.4 Kindly provide the soil investigation report of soil parameters of existing substation.

**Reply**: Bidder is advised to visit the substation site and ascertain the requisite parameters.

2.5 Kindly confirm, energy accounting of aux. power consumption. Whether it will be on chargeable basis or part of transmission loss.

**Reply:** It will be on chargeable basis.

2.6 We understand that VMS requirement is for unmanned stations only. For Manned stations VMS is not compulsory.

**Reply:** VMS shall be provided in line with requirements of RfP document.

2.7 It is understood that Construction water and power shall be provided free of cost to TSP by respective substation owner for construction of new bays.

**Reply:** Arrangement of construction power & water is in the scope of TSP.

2.8 It is understood that existing fire hydrant system shall be extended by the TSP for bay extension.

**Reply:** Existing fire hydrant system shall be extended from existing system (if required)

2.9 Please clarify that Status of land acquisition for Substations. Whether the lands have been acquired by BPC and will be transferred to TSP.

**Reply:** The acquisition of land for substation is in the scope of TSP.

- 2.10 We understood that no any dedicated metering CT & CVT required for Line/feeders. Further, we understood that requisite Energy meters for various 765kV, 400kV & 220kV Feeders shall be provided & installed by CTU free of cost to TSP.
  - **Reply:** Dedicated metering CT and CVT are not required for line/feeders. Metering core of existing CT/CVT can be used provided accuracy class is matching with metering requirement. Requisite Special Energy Meters shall be provided and installed by CTU at the cost of TSP in C&P panel subject to space availability, else, in separate metering panel (to be provided by TSP at its cost).

## 3.0 Communication

- 3.1 What are the usage of OPGW, FOTE, PMU etc. under communication requirement of RFP?
  - **Reply**: User shall be responsible for providing compatible equipment along with appropriate interface for uninterrupted communication with the concerned control center and shall be responsible for successful integration with the communication system provided by CTU. Communication systems e.g. OPGW, FOTE, PMU etc. are required for grid operation through RLDC/SLDC, speech communication, tele-protection and

tele-metering.

- 3.2 Is space for installation of communication panels are provided to TSP in existing Substations incase new bays are in the scope of TSP?
  - **Reply**: The space related issues are deliberated in the RFP itself. TSP to carry out survey of the existing substation for physical space requirement. In case space is not available in the existing substation then TSP shall accommodate the same in the respective bay SPR (Switchyard Panel Room)/Bay Kiosk/ Relay panel room in case of GIS s/s. Further, TSP to connect and integrate the proposed FOTE with the existing FOTE in the control room.

In Case 132kV Substation TSP shall accommodate the said panels either by extension of existing control room or other arrangements.

- 3.3 How is the OPGW laying done in case of LILO lines?
  - **Reply**: In case LILO lines are on same towers (e.g. both Line in and Line Out portion are on same towers, generally done LILO of S/C lines). Then 2x24F OPGW shall be required to install by TSP on both earthwire peak on 400kV & 765kV lines where two E/W peaks are available. On 220 & 132kV lines where only one E/W peak is available TSP to install one no. 48F OPGW.

Incase LILO lines are on different towers (e.g. both Line In and Line Out portion are on different towers, generally done LILO of D/C lines). Then 1x24F OPGW shall be required to install by TSP on one earthwire peak, on both Line In and Line Out portions of 400kV & 765kV lines. On 220 &132kV lines where only one E/W peak is available TSP to install one no. 24F OPGW in place of conventional earthwire.

- 3.4 How is the OPGW laying done in case Multi circuit Towers?
  - **Reply**: In case two different lines are using common multi circuit portion for some distance (originating from different stations, may be terminating on same or on different stations). Two no. 24F OPGW to be installed on both E/W peaks for common M/C portion of 765kV & 400kV lines.

Incase 220/132kV lines using multi circuit portion where single E/W peak is available one no. 48F may be installed for common multi circuit portion.

Amendment –I dated 18.04.2022 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI. No	Clause No.	Existing Provis	sions	Ne	ew / Revised (	Clause		
• 1.	2.7.1 of	The Bidders sho	ould submit the Bids online through the electronic	Th	ne Bidders sh	ould submit the Bids online through the electronic		
	RFP	bidding platform	before the Bid Deadline i.e. on or before 1100 hours	bic	dding platform	before the Bid Deadline i.e. on or before 1100 hours		
		(IST) on <b><u>18.04.2</u></b>	<b>022</b> . In addition to the online submission, the Bidder	(IS	ST) on <u>02.06.2</u>	<b>022</b> . In addition to the online submission, the Bidder		
		with lowest Final	Offer will be required to submit original hard copies	wi	th lowest Fina	I Offer will be required to submit original hard copies		
		of Annexure 3, A	nnexure 4 (if applicable), Annexure 6 (if applicable)	of	Annexure 3, A	Annexure 4 (if applicable), Annexure 6 (if applicable)		
		and Annexure 14	4 before issuance of Lol	an	d Annexure 1	4 before issuance of Lol		
2.	2.7.2 of RFP					Important timelines are mentioned below:		
		Date	Event		Date	Event		
		21.03.2022	Issue of written clarifications and revised RFP		09.05.2022	Issue of written clarifications and revised RFP		
			documents			documents		
		30.04.2022	Issue of final RFP Project Documents		18.05.2022	Issue of final RFP Project Documents		
		18.04.2022	Submission of Bid (Online submission of Bid		02.06.2022	Submission of Bid (Online submission of Bid		
			through electronic bidding portal)			through electronic bidding portal)		
		18.04.2022	Opening of Technical Bid		02.06.2022	Opening of Technical Bid		
		22.04.2022	Shortlisting and announcement of Qualified		10.06.2022	Shortlisting and announcement of Qualified		
			Bidders on bidding portal			Bidders on bidding portal		
		25.04.2022	Opening of Financial Bid - Initial Offer		13.06.2022	Opening of Financial Bid - Initial Offer		
		26.04.2022	Electronic reverse auction (Financial Bid – Final		14.06.2022	Electronic reverse auction (Financial Bid – Final		
			Offer) for the Qualified Bidders.			Offer) for the Qualified Bidders.		
		29.04.2022	Submission of original hard copies of Annexure		17.06.2022	Submission of original hard copies of Annexure		
			3, Annexure 4, Annexure 6, as applicable and			3, Annexure 4, Annexure 6, as applicable and		
			Annexure 14 by the bidder with lowest Final			Annexure 14 by the bidder with lowest Final		
			Offer			Offer		

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SI.	Clause	Existing Provis	sions	N	New / Revised Clause		
No	No.						
•		04.05.2022 17.05.2022	Selection of Successful Bidder and issue of LOI Signing of RFP Project Documents and transfer of[Insert the name of the SPV]		22.06.2022 04.07.2022	Selection of Successful Bidder and issue of LOI Signing of RFP Project Documents and transfer of[Insert the name of the SPV]	
3.	2.13.1 of RFP	Opening of Envelope (Technical Bid): 1130 hours (IST) on <b>18.04.2022</b>			 Opening of Envelope (Technical Bid): 1130 hours (IST) on <u>02.06.2022</u>		
		 Opening of Initial Offer: Initial Offer shall be opened by the Bid Opening Committee in presence of the Bid Evaluation Committee at 1130 hours (IST) on <u>25.04.2022</u> in the office of CEA.					

Amendment-II dated 10.05.2022 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

Sl No.	Clause No.	Existing Provision	New / Revised Clause	
1 1	Clause No 2.12	Contract Performance Guarantee	Contract Performance Guarantee	
	of SECTION – 2 of Information and Instructions for Bidders in RFP	2.12.1. Within ten (10) days from the date of issue of the Letter of Intent, the Selected Bidder, on behalf of the TSP, will provide to the Nodal Agency the Contract Performance Guarantee for an amount of <b>Rs. 96.00 Crore (Rupees Ninety-Six</b> <b>Crore Only)</b> . The Contract Performance Guarantee shall be initially valid for a period up to three (3) months after the Scheduled COD of the Project and shall be extended from time to time to be valid for a period up to three (3) months after the COD of the Project and thereafter shall be dealt with in accordance with the provisions of the Transmission Service Agreement. The Contract Performance Guarantee shall be issued by any of the banks listed in Annexure17.	2.12.1. Within ten (10) days from the date of issue of the Letter of Intent, the Selected Bidder, on behalf of the TSP, will provide to the Nodal Agency the Contract Performance Guarantee for an amount of <b>Rs. 57.60 Crore (Rupees Fifty-Seven Crore Sixty Lakhs Only).</b> The Contract Performance Guarantee shall be initially valid for a period up to three (3) months after the Scheduled COD of the Project and shall be extended from time to time to be valid for a period up to three (3) months after the COD of the Project and thereafter shall be dealt with in accordance with the provisions of the Transmission Service Agreement. The Contract Performance Guarantee shall be issued by any of	
2	ARTICLE: 3 in	3 CONDITIONS SUBSEQUENT	the banks listed in Annexure17. 	
	TSA	3.1 Satisfaction of conditions subsequent by the TSP	3.1 Satisfaction of conditions subsequent by the TSP	
		3.1.1 Within ten (10) days from the date of issue of Letter of Intent, the Selected Bidder, shall:	3.1.1 Within ten (10) days from the date of issue of Letter of Intent, the Selected Bidder, shall:	

The Selected Bidder, on behalf of the TSP, will provide to the Central Transmission Utility of India Limited (being the Nodal Agency) the Contract Performance Guarantee for an amount of <b>Rs. 96.00 Crore (Rupees Ninety-Six Crore Only)</b>	The Selected Bidder, on behalf of the TSP, will provide to the Central Transmission Utility of India Limited (being the Nodal Agency) the Contract Performance Guarantee for an amount of <u>Rs. 57.60 Crore (Rupees Fifty-Seven Crore</u> <u>Sixty Lakhs Only).</u>
3.3 Consequences of non-fulfilment of	
conditions subsequent	3.3 Consequences of non-fulfilment of conditions subsequent
3.3.1 If any of the conditions specified in Article	2.2.1 If any of the conditions manified in Article
3.1.3 is not duly fulfilled by the TSP even within three (3) Months after the time specified therein, then on and from the expiry of such period and	3.3.1 If any of the conditions specified in Article 3.1.3 is not duly fulfilled by the TSP even within three (3) Months after the time specified therein,
until the TSP has satisfied all the conditions specified in Article 3.1.3, the TSP shall, on a	then on and from the expiry of such period and until the TSP has satisfied all the conditions
monthly basis, be liable to furnish to Central Transmission Utility of India Limited (being the	specified in Article 3.1.3, the TSP shall, on a monthly basis, be liable to furnish to Central
Nodal Agency) additional Contract Performance	Transmission Utility of India Limited (being the
Guarantee of <b>Rupees Nine Crore Sixty Lakh Only</b>	Nodal Agency) additional Contract Performance
<b>(Rs. 9.60 Crore)</b> within two (2) Business Days of expiry of every such Month. Such additional	Guarantee of <u>Rupees Five Crore Seventy-Six</u> <u>Lakh Only (Rs. 5.76 Crore)</u> within two (2)
Contract Performance Guarantee shall be	Business Days of expiry of every such Month.
provided to Central Transmission Utility of India	Such additional Contract Performance Guarantee
Limited (being the Nodal Agency) in the manner	shall be provided to Central Transmission Utility
provided in Article 3.1.1 and shall become part of	of India Limited (being the Nodal Agency) in the
the Contract Performance Guarantee and all the	manner provided in Article 3.1.1 and shall
provisions of this Agreement shall be construed	become part of the Contract Performance
accordingly. Central Transmission Utility of India	Guarantee and all the provisions of this
Limited (being the Nodal Agency) shall be entitled to hold and / or invoke the Contract Performance	Agreement shall be construed accordingly. Central Transmission Utility of India Limited
to note and / of invoke the contract l'enormalice	Central Hallshillssion Othity of mula Lilliteu

		Guarantee, including such additional Contract Performance Guarantee, in accordance with the provisions of this Agreement. 	<ul> <li>(being the Nodal Agency) shall be entitled to hold and / or invoke the Contract Performance Guarantee, including such additional Contract Performance Guarantee, in accordance with the provisions of this Agreement.</li> <li>3.3.3 If the Nodal Agency elects to terminate this Agreement as per the provisions of Article 3.3.2, the TSP shall be liable to pay to the Nodal Agency an amount of <b>Rs. 57.60 Crore (Rupees Fifty-Seven Crore Sixty Lakhs Only)</b> as liquidated damages. The Nodal Agency shall be entitled to recover this amount of damages by invoking the Contract Performance Guarantee to the extent of liquidated damages, which shall be required by the Nodal Agency, and the balance shall be returned to TSP, if any.</li> </ul>
3	ARTICLE: 6 in TSA	······	······
		6.5 Return of Contract Performance Guarantee	6.5 Return of Contract Performance Guarantee
		6.5.1 The Contract Performance Guarantee as	
		submitted by TSP in accordance with Article 3.1.1 shall be released by the Nodal Agency within three	6.5.1 The Contract Performance Guarantee as submitted by TSP in accordance with Article 3.1.1
		(3) months from the COD of the Project. In the	shall be released by the Nodal Agency within
		event of delay in achieving Scheduled COD of any	three (3) months from the COD of the Project. In
		of the Elements by the TSP (otherwise than due to	the event of delay in achieving Scheduled COD of
1			
		reasons as mentioned in Article 3.1.3 or Article 11) and consequent part invocation of the	any of the Elements by the TSP (otherwise than due to reasons as mentioned in Article 3.1.3 or

		Agency, Nodal Agency shall release the Contract Performance Guarantee, if any remaining unadjusted, after the satisfactory completion by the TSP of all the requirements regarding achieving the Scheduled COD of the remaining Elements of the Project. It is clarified that the Nodal Agency shall also return / release the Contract Performance Guarantee in the event of (i) applicability of Article 3.3.2 to the extent the Contract Performance Guarantee is valid for an amount in excess of <b>Rs. 96.00 Crore (Rupees</b> <b>Ninety-Six Crore Only)</b> , or (ii) termination of this Agreement by the Nodal Agency as mentioned under Article 3.3.4 of this Agreement.	Contract Performance Guarantee by the Nodal Agency, Nodal Agency shall release the Contract Performance Guarantee, if any remaining unadjusted, after the satisfactory completion by the TSP of all the requirements regarding achieving the Scheduled COD of the remaining Elements of the Project. It is clarified that the Nodal Agency shall also return / release the Contract Performance Guarantee in the event of (i) applicability of Article 3.3.2 to the extent the Contract Performance Guarantee is valid for an amount in excess <b>Rs. 57.60 Crore (Rupees Fifty-</b> <b>Seven Crore Sixty Lakhs Only)</b> , or (ii) termination of this Agreement by the Nodal Agency as mentioned under Article 3.3.4 of this Agreement.
4	ARTICLE: 14 in		······
	TSA	14.3 Monetary Limitation of liability	14.3 Monetary Limitation of liability
		14.3.1 A Party ("Indemnifying Party") shall be liable to indemnify the other Party ("Indemnified Party") under this Article 14 for any indemnity claims made in a Contract Year only up to an amount of <b>Rupees Six Crore Forty Lakh Only (Rs.</b> <u>6.40 Crore</u> ).	14.3.1 A Party ("Indemnifying Party") shall be liable to indemnify the other Party ("Indemnified Party") under this Article 14 for any indemnity claims made in a Contract Year only up to an amount of <b>Rupees Three Crore Eighty-Four Lakh</b> <b>Only (Rs. 3.84 Crore)</b> .
5	RFP & TSA	Name of the Project Specific SPV	Name of the Project Specific SPV
			All the reference to the name of the SPV may be read as " <b>Beawar Transmission Limited</b> "

Amendment- III dated 30.05.2022 to RFP Documents "Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI. No.	Clause No.	Existing Clause	New/ Revised Clause
1.	Annexure 11: Format 1	RESOLVED THAT pursuant to the provisions of the Companies Act, 1956 / Companies Act 2013 (as the case may be) and compliancethe entire amount proposed to be invested by the company for the transmission system for "Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part F", partly by acquisition of the existing equity shares from[Insert <b>the</b> <b>name of the SPV]</b> and / or partly by subscribing to the new equity shares, as per the terms of the RFP	Companies Act, 1956 / Companies Act 2013 (as the case may be) and compliancethe entire

Amendment –IV date 06.06.2022 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI.	Clause	Existing Provis	sions	Ne	w / Revised	Clause
No	No.					
1.	2.7.1 of	The Bidders sho	ould submit the Bids online through the electronic	Th	e Bidders sh	ould submit the Bids online through the electronic
	RFP	bidding platform	before the Bid Deadline i.e. on or before 1100 hours		01	before the Bid Deadline i.e. on or before 1100 hours
		(IST) on <u>02.06.2</u>	<b>022</b> . In addition to the online submission, the Bidder	(IS	ST) on <u><b>04.07.2</b></u>	<b><u>022</u></b> . In addition to the online submission, the Bidder
			Offer will be required to submit original hard copies			I Offer will be required to submit original hard copies
		of Annexure 3, A	nnexure 4 (if applicable), Annexure 6 (if applicable)			Annexure 4 (if applicable), Annexure 6 (if applicable)
		and Annexure 14	4 before issuance of Lol	an	d Annexure 1	4 before issuance of Lol
2.	2.7.2 of	Important timelin	es are mentioned below:	Im	portant timelir	es are mentioned below:
	RFP			ľ		
		Date	Event		Date	Event
		09.05.2022	Issue of written clarifications and revised RFP		10.06.2022	Issue of written clarifications and revised RFP
			documents			documents
		18.05.2022	Issue of final RFP Project Documents		20.06.2022	Issue of final RFP Project Documents
		02.06.2022	Submission of Bid (Online submission of Bid		04.07.2022	Submission of Bid (Online submission of Bid
			through electronic bidding portal)			through electronic bidding portal)
		02.06.2022	Opening of Technical Bid		04.07.2022	Opening of Technical Bid
		10.06.2022	Shortlisting and announcement of Qualified		12.07.2022	Shortlisting and announcement of Qualified
			Bidders on bidding portal			Bidders on bidding portal
		13.06.2022	Opening of Financial Bid - Initial Offer		13.07.2022	Opening of Financial Bid - Initial Offer
		14.06.2022	Electronic reverse auction (Financial Bid – Final		14.07.2022	Electronic reverse auction (Financial Bid – Final
			Offer) for the Qualified Bidders.			Offer) for the Qualified Bidders.
		17.06.2022	Submission of original hard copies of Annexure		18.07.2022	Submission of original hard copies of Annexure
			3, Annexure 4, Annexure 6, as applicable and			3, Annexure 4, Annexure 6, as applicable and
			Annexure 14 by the bidder with lowest Final			Annexure 14 by the bidder with lowest Final
			Offer			Offer

SI.	Clause	Existing Provis	ions	N	ew / Revised	Clause		
No	No.							
		22.06.2022	Selection of Successful Bidder and issue of LOI		22.07.2022	Selection of Successful Bidder and issue of LOI		
		04.07.2022	Signing of RFP Project Documents and transfer		01.08.2022	Signing of RFP Project Documents and transfer		
			of[Insert the name of the SPV]			of[Insert the name of the SPV]		
3.	2.13.1 of							
	RFP							
			velope (Technical Bid): 1130 hours (IST) or	O	pening of Enve	elope (Technical Bid): 1130 hours (IST) on <u>04.07.2022</u>		
		<u>02.06.2022</u>						
					•	ial Offer: Initial Offer shall be opened by the Bid		
			al Offer: Initial Offer shall be opened by the Bio		•	ittee in presence of the Bid Evaluation Committee at		
			ttee in presence of the Bid Evaluation Committee a	t   11	30 hours (IST	) on <u>13.07.2022</u> in the office of CEA.		
		1130 hours (IST)	on <u>13.06.2022</u> in the office of CEA.					

Amendment-V dated 22.06.2022 on the Request for Proposal Document and Transmission Service Agreement for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

Sl	Clause	Existing Provision	New / Revised Clause
No.	No.		
1	Para	Establishment, operation and maintenance of the Project on	Establishment, operation and maintenance of the Project on
	1.6.1.1	build, own, operate and transfer basis and completion of all	build, own, operate and transfer basis and completion of all
	of RFP	the activities for the Project, including survey, detailed	the activities for the Project, including survey, detailed
		project report formulation, arranging finance, project	project report formulation, arranging finance, project
		management, necessary Consents, Clearances and Permits	management, necessary Consents, Clearances and Permits
		(way leave, environment & forest, civil aviation, railway/	(way leave, environment & forest, civil aviation, railway/
		road/ river/ canal/ power crossing/ PTCC, etc.), land	road/ river/ canal/ power crossing/ PTCC, etc.), land
		compensation, design, engineering, equipment, material,	compensation, design, engineering, equipment, material,
		construction, erection, testing & commissioning. Further, the	construction, erection, testing & commissioning. Further, the
		actual location of substations, switching stations or HVDC	actual location of substations, switching stations or HVDC
		terminal or inverter stations in the scope of TSP shall not be	terminal or inverter stations in the scope of TSP shall not be
		beyond <u><b>1 Km radius</b></u> of the location proposed by the BPC in	beyond <u>3 Km radius</u> of the location proposed by the BPC in
		the survey report.	the survey report.
	Dama		
2	Para	The TSP shall be responsible for	The TSP shall be responsible for
	5.1.4 (a)	(a) (To be delated by the DDO is seen as lead a socialities is	(a) IT a basis dela tanà has tha DDO in anno ana landa aminisitian ia
	of TSA	(a) [To be deleted by the BPC in case no land acquisition is	(a) [To be deleted by the BPC in case no land acquisition is
		involved in the Project and replaced by "deleted"] acquisition	involved in the Project and replaced by "deleted"] acquisition
		of land for location specific substations, switching stations or	of land for location specific substations, switching stations or
		HVDC terminal or inverter stations. Also, the actual location of substations, switching stations or HVDC terminal or	HVDC terminal or inverter stations. Also, the actual location of substations, switching stations or HVDC terminal or
		inverter stations shall not be beyond <u>1 Km radius</u> of the	inverter stations shall not be beyond <u>3 Km radius</u> of the
		location proposed by the BPC in the survey report;	location proposed by the BPC in the survey report;
			_ · · · · · · · · · · · · · · · · · · ·

Amendment –VI dated 04.07.2022 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI.	Clause	Existing Provis	sions	Nev	w / Revised	Clause
No	No.					
1.	2.7.1 of	The Bidders sho	ould submit the Bids online through the electronic	The	e Bidders sh	ould submit the Bids online through the electronic
	RFP	bidding platform	before the Bid Deadline i.e. on or before 1100 hours	bid	ding platform	before the Bid Deadline i.e. on or before 1100 hours
		(IST) on <u>04.07.2</u>	<b>022</b> . In addition to the online submission, the Bidder			<b>022</b> . In addition to the online submission, the Bidder
			Offer will be required to submit original hard copies			I Offer will be required to submit original hard copies
		of Annexure 3, A	Annexure 4 (if applicable), Annexure 6 (if applicable)			Annexure 4 (if applicable), Annexure 6 (if applicable)
		and Annexure 14	4 before issuance of Lol	and	d Annexure 1	4 before issuance of Lol
2.	2.7.2 of	Important timelin	les are mentioned below:	Imp	oortant timelir	es are mentioned below:
	RFP					
		Date	Event		Date	Event
		10.06.2022	Issue of written clarifications and revised RFP		11.07.2022	Issue of written clarifications and revised RFP
			documents			documents
		20.06.2022	Issue of final RFP Project Documents		20.07.2022	Issue of final RFP Project Documents
		04.07.2022	Submission of Bid (Online submission of Bid		04.08.2022	Submission of Bid (Online submission of Bid
			through electronic bidding portal)			through electronic bidding portal)
		04.07.2022	Opening of Technical Bid		04.08.2022	Opening of Technical Bid
		12.07.2022	Shortlisting and announcement of Qualified		12.08.2022	Shortlisting and announcement of Qualified
			Bidders on bidding portal			Bidders on bidding portal
		13.07.2022	Opening of Financial Bid - Initial Offer		16.08.2022	Opening of Financial Bid - Initial Offer
		14.07.2022	Electronic reverse auction (Financial Bid – Final		17.08.2022	Electronic reverse auction (Financial Bid – Final
			Offer) for the Qualified Bidders.			Offer) for the Qualified Bidders.
		18.07.2022	Submission of original hard copies of Annexure		22.08.2022	Submission of original hard copies of Annexure
			3, Annexure 4, Annexure 6, as applicable and			3, Annexure 4, Annexure 6, as applicable and
			Annexure 14 by the bidder with lowest Final			Annexure 14 by the bidder with lowest Final
			Offer			Offer

SI.	Clause	<b>Existing Provis</b>	ions	Ne	New / Revised Clause		
No	No.						
		22.07.2022	Selection of Successful Bidder and issue of LOI		25.08.2022	Selection of Successful Bidder and issue of LOI	
		01.08.2022	Signing of RFP Project Documents and transfer		05.09.2022	Signing of RFP Project Documents and transfer	
			of[Insert the name of the SPV]			of Beawar Transmission Limited	
3.	2.13.1 of	 Opening of Envelope (Technical Bid): 1130 hours (IST) or <u>04.07.2022</u>		Opening of Envelope (Technical Bid): 1130 hours (IST) on <u>04.08.2022</u>			
	RFP						
		Opening of Initial Offer: Initial Offer shall be opened by the Bid		Op	Opening of Initial Offer: Initial Offer shall be opened by		
		Opening Commi	ttee in presence of the Bid Evaluation Committee at	Op	pening Commi	ittee in presence of the Bid Evaluation Committee at	
		1130 hours (IST)	) on <u>13.07.2022</u> in the office of CEA.	11	1130 hours (IST) on 16.08.2022 in the office of CEA.		

Amendment –VII dated 04.08.2022 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI.	Clause	Existing Provis	sions	N	ew / Revised	Clause
No	No.	_				
1.	2.7.1 of		idders should submit the Bids online through the electronic			ould submit the Bids online through the electronic
	RFP	0.	before the Bid Deadline i.e. on or before 1100 hours		01	before the Bid Deadline i.e. on or before 1100 hours
			<b>022</b> . In addition to the online submission, the Bidder		-	2022. In addition to the online submission, the Bidder
			Offer will be required to submit original hard copies			I Offer will be required to submit original hard copies
			nnexure 4 (if applicable), Annexure 6 (if applicable)			Annexure 4 (if applicable), Annexure 6 (if applicable)
			4 before issuance of Lol			4 before issuance of Lol
2.	2.7.2 of	Important timelin	les are mentioned below:	Im	nportant timelir	nes are mentioned below:
	RFP				r	
		Date	Event		Date	Event
		04.08.2022	Submission of Bid (Online submission of Bid		18.08.2022	Submission of Bid (Online submission of Bid
			through electronic bidding portal)			through electronic bidding portal)
		04.08.2022	Opening of Technical Bid		18.08.2022	Opening of Technical Bid
		12.08.2022	Shortlisting and announcement of Qualified		26.08.2022	Shortlisting and announcement of Qualified
			Bidders on bidding portal			Bidders on bidding portal
		16.08.2022	Opening of Financial Bid - Initial Offer		29.08.2022	Opening of Financial Bid - Initial Offer
		17.08.2022	Electronic reverse auction (Financial Bid – Final		30.08.2022	Electronic reverse auction (Financial Bid – Final
			Offer) for the Qualified Bidders.			Offer) for the Qualified Bidders.
		22.08.2022	Submission of original hard copies of Annexure		02.09.2022	Submission of original hard copies of Annexure
			3, Annexure 4, Annexure 6, as applicable and			3, Annexure 4, Annexure 6, as applicable and
			Annexure 14 by the bidder with lowest Final			Annexure 14 by the bidder with lowest Final
			Offer			Offer
		25.08.2022	Selection of Successful Bidder and issue of LOI		07.09.2022	Selection of Successful Bidder and issue of LOI
		05.09.2022	Signing of RFP Project Documents and transfer		19.09.2022	Signing of RFP Project Documents and transfer
			of Beawar Transmission Limited			of Beawar Transmission Limited

SI.	Clause	Existing Provisions	New / Revised Clause
No	No.		
-			
3.	2.13.1 of		
	RFP		
		Opening of Envelope (Technical Bid): 1130 hours (IST) on	Opening of Envelope (Technical Bid): 1130 hours (IST) on 18.08.2022
		<u>04.08.2022</u>	
		Opening of Initial Offer: Initial Offer shall be opened by the Bid	Opening of Initial Offer: Initial Offer shall be opened by the Bid
		Opening Committee in presence of the Bid Evaluation Committee at	Opening Committee in presence of the Bid Evaluation Committee at
		1130 hours (IST) on <u>16.08.2022</u> in the office of CEA.	1130 hours (IST) on <u>29.08.2022</u> in the office of CEA.

Amendment –VIII dated 05.08.2022 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

Sl No.	Clause No.		Existing Pro	visions				New / Revis	ed Clause		
1	Annexure C: SPECIFIC	B.1.2 Switching	Scheme			B.	1.2 Switching S	Scheme			
	TECHNIC AL REQUIRE MENTS	adopted	The switching schemes, as mentioned below, shall be adopted at various voltage levels of substation/switchyard:				The switching schemes, as mentioned below, shall adopted at various voltage levels substation/switchyard:				
	FOR SUBSTAT ION of RFP &	Substation	765kV side	400kV side	220kV side (Future)		Substation	765kV side	400kV side	220kV side (Future)	
	Schedule: 1 of TSA	765/400/220k V Beawar s/s	One & Half breaker (AIS)	One & Half breaker (AIS)	Double Main & Transfer (AIS)		765/400/220k V Beawar s/s	One & Half breaker (AIS)	One & Half breaker (AIS)	Double Main & Transfer (AIS)	
		765kV Fatehgarh-3 s/s	One & Half breaker (AIS)				765kV Fatehgarh-3 s/s	One & Half breaker (AIS)			
		<ul> <li>Notes: - <ol> <li>At 765kV &amp; 400kV voltage level, each circuit of a double circuit transmission line shall be terminated in different diameters.</li> <li>Transformers and bus reactors of same HV rating shall be placed in different diameters (i.e. transformers of same HV rating shall not be in the same diameter and</li> </ol> </li> </ul>				i) ii)	circuit transm shall be termi Transformers placed in diffe	ission line (orig nated in differe and bus reacto erent diameters	ginating from f nt diameters. ors of same H (i.e. transform	cuit of a double same substation) V rating shall be ners of same HV and similarly bus	

2       Annexure C: SPECIFIC TECHNIC AL       B.5.0 EXTENSION OF EXISTING SUBSTATION C. SPECIFIC TECHNIC AL       S.5.0 EXTENSION OF EXISTING SUBSTATION C. SPECIFIC TECHNIC AL       S.5.0 EXTENSION OF EXISTING SUBSTATION C. SPECIFIC TECHNIC AL       B.5.0 EXTENSION OF EXISTING SUBSTATION C. SPECIFIC TECHNIC AL       S.5.0 EXTENSION OF EXISTING SUBSTATION C. SPECIFIC TECHNIC AL       S.5.0 EXTENSION OF EXISTING SUBSTATION C. SPECIFIC TECHNIC AL       B.5.0 EXTENSION OF EXISTING SUBSTATION C. SO SUBSTAT ION of R. SO SUBSTAT ION of R. SO SUBSTAT ION O Single Line Diagram       C. SN SUBSTAT ION SINGL A. SO SO SO SO SO SO SO SO SO SO SO SO SO				milarly bus reactors of the same diameter	f same HV rating shal ).	ll also not		actors of same HV rating ameter).	g shall also not be in	the same	
2       Annexure C: SPECIFIC TECHNIC AL BSUBSTAT ION of RFP & Schedule: 1 of TSA       B.5.0 EXTENSION OF EXISTING SUBSTATION C: SPECIFIC TECHNIC AL BS.0 EXTENSION OF EXISTING SUBSTATION C: SUBSTAT ION of RFP & Schedule: 1       B.5.0 EXTENSION OF EXISTING SUBSTATION The following drawings/details of existing substation is attached with the RFP documents for further engineering by the bidder:       B.5.0 EXTENSION OF EXISTING SUBSTATION The following drawings/details of existing substation is attached with the RFP documents for further engineering by the bidder:       B.5.0 EXTENSION OF EXISTING SUBSTATION The following drawings/details of existing substation is attached with the RFP documents for further engineering by the bidder:       B.5.0 EXTENSION OF EXISTING SUBSTATION C. SUBSTAT ION of RFP & Schedule: 1       Signel Line Drawing No/ Existing System S.0 Bus Bar       Rev. Do Signel Line Diagram C/ENGG/SS/FAT SIGD/01					1 0 0		-				
SPECIFIC C: SPECIFIC AL Network AL     B.5.0 EXTENSION OF EXISTING SUBSTATION     B.5.0 EXTENSION OF EXISTING SUBSTATION       SPECIFIC AL     The following drawings/details of existing substation is attached with the RFP documents for further engineering by the bidder:     B.5.0 EXTENSION OF EXISTING SUBSTATION       SPECIFIC AL     The following drawings/details of existing substation is attached with the RFP documents for further engineering by the bidder:     B.5.0 EXTENSION OF EXISTING SUBSTATION       No.     The following drawings/details of existing substation is attached with the RFP documents for further engineering by the bidder:     The following drawings/details of existing substation is attached with the RFP documents for further engineering by the bidder:       SUBSTAT ION of RFP & Schedule: 1 of TSA     Single Line Diagram     The drawings are vet to be finalized by developer.     ±       2.0     General Arrangement     The drawings are vet to be finalized by developer.     ±       3.0     Earthmat Layout 4.0     Visual Monitoring System     ±     2.0     General Arrangement Arrangement     ±       3.0     Earthmat Layout 4.0     Visual Monitoring System     5.0     Bus Bar Protection     5.0     Bus Bar Protection			sh	call be such that it car	n be used as Line recte	or as well	be	such that it can be used	l as Line rector as we		
C: SPECIFIC TECHNIC AL REQUIRE MENTS FOR SUBSTAT ION of RFP & Schedule: 1 of TSAThe following drawings/details of existing substation is attached with the RFP documents for further engineering by the bidder:The following drawings/details of existing substation is attached with the RFP documents for further engineering by the bidder:The following drawings/details of existing substation is attached with the RFP documents for further engineering by the bidder:SI.Drawing TitleDrawing No./ DetailsRev. No.No.A765kV Fatehgarh-3 (AIS) S/SI.0SingleLineThe drawings are vet to be finalized by developer.0C/ENGG/SS/FAT EHGARH- 3/SLD/01012.0General Arrangement 3.0Earthmat Layout 4.03.0Earthmat Layout 4.0Visual Monitoring System5.0BusBar5.0BusBar							we bu	ork for utilizing existin is reactor) spare Reactor	g 110 MVAR (suppl for switchable line r	ied with	
SPECIFIC TECHNIC AL REQUIRE MENTS FOR SUBSTAT ION of RFP & Schedule: 1 of TSAThe following drawings/details of existing substation is attached with the RFP documents for further engineering by the bidder:The following drawings/details of existing substation is attached with the RFP documents for further engineering by the bidder:The following drawings/details of existing substation is attached with the RFP documents for further engineering by the bidder:SI.Drawing Title No.Drawing No./ DetailsRev. No.No.ION of RFP & Schedule: 1 of TSA1.0Single DiagramThe drawings are vet to be finalized by developer2.0General Arrangement3.0Earthmat Layout 4.0Visual Monitoring System3.0Earthmat Layout 4.0Visual Monitoring System5.0BusBar	2	Annexure	<b>B.5.0</b> E	<b>XTENSION OF EXI</b>	STING SUBSTATIO	N	<b>B.5.0</b>	EXTENSION OF EXIST	<b>FING SUBSTATION</b>		
TECHNIC AL REQUIRE MENTS FOR SUBSTAT ION of RFP & Schedule: 1 of TSAattached with the RFP documents for further engineering by the bidder:attached with the RFP documents for further engineering by the bidder:SI.Drawing Title DetailsDrawing No./ Rev. DetailsRev. No.SUBSTAT ION of RFP & Schedule: 1 of TSADrawing Title DiagramDrawing No./ The drawings are vet to be finalized by developer.SI.Drawing Title Drawing No./ Rev. DetailsDrawing No./ Rev. DetailsRev. No.2.0General Arrangement 3.0Earthmat Layout 4.0Visual Monitoring System3.0Earthmat Layout 4.0Visual Monitoring System5.0BusBar5.0BusBar5.0BusBar											
AL REQUIRE MENTS FOR SUBSTAT ION of RFP & Schedule: 1 of TSA       the bidder:       bidder:         2.0       General Arrangement 3.0       The drawings Earthmat Layout 4.0       The drawings are vet to be finalized by developer.       :-       SI. No.       Drawing Title Drawing No./ No.       Drawing No./ Rev. Details       Rev. No.         2.0       General Arrangement 5.0       The drawings are vet to be finalized by developer.       :-       :-       1.0       Single Line Diagram       C/ENGG/SS/FAT EHGARH- 3/SLD/01       01         2.0       General Arrangement 5.0       :-       :-       :-       :-       :-       :-         3.0       Earthmat Layout 4.0       :-       :-       :-       :-       :-       :-         5.0       Bus       Bar       :-       :-       :-       :-       :-											
REQUIRE MENTS FOR SUBSTAT ION of RFP & of TSASl.Drawing Title Drawing TitleDrawing No./ DetailsRev. No.1.0Single DiagramLine vet to be finalized by developer.The drawings are vet to be finalized by developer.:-2.0General ArrangementC/ENGG/SS/FAT ydeveloper.013.0Earthmat Layout 4.0Visual Monitoring System2.0General Arrangement:-5.0BusBar5.0BusBar					ients for further engin	eering by					
MENTS FOR SUBSTAT ION of RFP & of TSASl.Drawing Title Drawing TitleDrawing No./ DetailsRev. No.1.0Single DiagramLine DiagramThe drawings are yet to be finalized by developer2.0General ArrangementGeneral Arrangement3.0Earthmat Layout4.0Visual Monitoring System5.0BusBar5.0BusBar			the blue				biddei				
SUBSTAT ION of RFP & Schedule: 1 of TSAA.765kV Fatehgarh-3 (AIS) S/SA.765kV Fatehgarh-3 (AIS) S/S1.0SingleLineThe drawings are yet to be finalized by developer1.0Single Line DiagramC/ENGG/SS/FAT EHGARH- 3/SLD/01012.0General ArrangementArrangement2.0General Arrangement2.0General Arrangement3.0Earthmat Layout 4.0Visual Monitoring System5.0BusBar5.0Bus Bar5.0Bus Bar Protection		-	Sl.	Drawing Title	Drawing No./	Rev.	Sl.	Drawing Title	Drawing No./	Rev.	
ION of RFP & Schedule: 1 of TSAI.0Single Line DiagramLine to be finalized by developer.The drawings are yet to be finalized by developerI.0Single Line DiagramC/ENGG/SS/FAT EHGARH- 3/SLD/01012.0General Arrangement2.0General Arrangement1.0Single Line DiagramC/ENGG/SS/FAT EHGARH- 3/SLD/01013.0Earthmat Layout4.0Visual Monitoring System5.0BusBar5.0BusBar			No.			No.	No.			No.	
RFP & Schedule: 1 of TSADiagramInterformation of the binding of the b											
Arrangementyet to be finalized3.0Earthmat Layout4.0Visual MonitoringSystemSystem5.0BusBusBar		RFP & Schedule: 1	1.0	U U	yet to be finalized	=	1.0	Single Line Diagram	EHGARH-	<u>01</u>	
3.0Earthmat Layout4.0Visual Monitoring System5.0BusBusBar			2.0				2.0	General Arrangement	-		
System     System       5.0     Bus     Bar       5.0     Bus     Bar			3.0	Earthmat Layout					by developer.		
5.0 Bus Bar 5.0 Bus Bar Protection			4.0	Ŭ			4.0	U			
							<b></b>				
			5.0				5.0				
System)				<b>`</b>				(400KV System)		L]	

6.0	Substation Automation System (SAS)		6.0	Substation Automation System (SAS)	

Amendment –IX dated 11.08.2022 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI	Clause		Existing P	rovisions			New / R	evised Clause			
No.	No.										
1	Annexure										
	C:	B.5.0 I	EXTENSION OF EXIS	TING SUBSTATION		B.5.0 I	EXTENSION OF EX	<b>(ISTING SUBSTATION</b>			
	SPECIFIC				-	,					
	TECHNIC					• •	letails of existing subst				
	AL		ed with the RFP	documents for	further			ocuments for further eng	ineering		
	REQUIRE	engine	ering by the bidder:			by the	bidder:				
	MENTS FOR	SI.	Drowing Title	Drawing No./	Dev	SI.	Drowing Title	Drawing No./	Rev.		
	SUBSTAT	No.	Drawing Title	Drawing No./ Details	Rev. No.	No.	Drawing Title	Drawing No./ Details	No.		
	ION of	A.	765kV Fatehgarh-3		NO.	A.	765kV Fatehgarh		NO.		
	RFP &	<b>A.</b> 1.0	_	C/ENGG/SS/FAT	01	<b>A.</b> 1.0	Single Line		01		
	Schedule:	1.0	Diagram	EHGARH-	01	1.0	Diagram	GARH-3/SLD/01	01		
	1 of TSA		Diagram	3/SLD/01		2.0	General	C/ENGG/SS/FATEH	00		
		2.0	General	The drawings		2.0	Arrangement	<u>C/ENGG/35/PATEH</u> GARH-3/GA/01	<u>00</u>		
		2.0	Arrangement	are yet to be	-	3.0	Earthmat Layout	KPTL/PGCIL/WO-	01		
		3.0	Earthmat Layout	finalized by		3.0	Earthinat Layout	<u>SS-033/02E/RGH-</u>	<u>01</u>		
		4.0	Visual Monitoring	developer.				<u>88-655/02E/((GTF</u> II/009			
			System			4.0	Visual	The drawings are			
		5.0	Bus Bar Protection			н т. <b>с</b>	Monitoring	yet to be finalized	-		
			(400kV System)				System	by developer.			
		6.0	Substation			5.0	Bus Bar	The drawings are			
			Automation System				Protection	yet to be finalized	-		
			(SAS)				(400kV System)	by developer.			
			, , , , , , , , , , , , , , , , , , ,			6.0	Substation	GE Make, KZ3DSA1	С		
							Automation				
							System (SAS)				

Amendment –X dated 17.08.2022 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI.	Clause	Existing Provis	sions	N	ew / Revised	Clause		
No	No.	_						
-								
1.	2.7.1 of		ould submit the Bids online through the electronic		The Bidders should submit the Bids online through the electronic			
	RFP	bidding platform	before the Bid Deadline i.e. on or before 1100 hours		01	before the Bid Deadline i.e. on or before 1100 hours		
		(IST) on <u>18.08.2</u>	<b>022</b> . In addition to the online submission, the Bidder	``	,	2022. In addition to the online submission, the Bidder		
			Offer will be required to submit original hard copies			I Offer will be required to submit original hard copies		
		of Annexure 3, A	nnexure 4 (if applicable), Annexure 6 (if applicable)			Annexure 4 (if applicable), Annexure 6 (if applicable)		
		and Annexure 14	4 before issuance of Lol	ar	nd Annexure 1	4 before issuance of Lol		
2.	2.7.2 of	Important timelin	les are mentioned below:	In	nportant timelir	nes are mentioned below:		
	RFP							
		Date	Event		Date	Event		
		18.08.2022	Submission of Bid (Online submission of Bid		25.08.2022	Submission of Bid (Online submission of Bid		
			through electronic bidding portal)			through electronic bidding portal)		
		18.08.2022	Opening of Technical Bid		25.08.2022	Opening of Technical Bid		
		26.08.2022	Shortlisting and announcement of Qualified		02.09.2022	Shortlisting and announcement of Qualified		
			Bidders on bidding portal			Bidders on bidding portal		
		29.08.2022	Opening of Financial Bid - Initial Offer		05.09.2022	Opening of Financial Bid - Initial Offer		
		30.08.2022	Electronic reverse auction (Financial Bid – Final		06.09.2022	Electronic reverse auction (Financial Bid – Final		
			Offer) for the Qualified Bidders.			Offer) for the Qualified Bidders.		
		02.09.2022	Submission of original hard copies of Annexure		09.09.2022	Submission of original hard copies of Annexure		
			3, Annexure 4, Annexure 6, as applicable and			3, Annexure 4, Annexure 6, as applicable and		
			Annexure 14 by the bidder with lowest Final			Annexure 14 by the bidder with lowest Final		
			Offer			Offer		
		07.09.2022	Selection of Successful Bidder and issue of LOI		14.09.2022	Selection of Successful Bidder and issue of LOI		
		19.09.2022	Signing of RFP Project Documents and transfer		26.09.2022	Signing of RFP Project Documents and transfer		
			of Beawar Transmission Limited			of Beawar Transmission Limited		

SI.	Clause	Existing Provisions	New / Revised Clause
No	No.		
-			
3.	2.13.1 of	······	
	RFP		
		Opening of Envelope (Technical Bid): 1130 hours (IST) on	Opening of Envelope (Technical Bid): 1130 hours (IST) on <u>25.08.2022</u>
		<u>18.08.2022</u>	
		Opening of Initial Offer: Initial Offer shall be opened by the Bid	Opening of Initial Offer: Initial Offer shall be opened by the Bid
		Opening Committee in presence of the Bid Evaluation Committee at	Opening Committee in presence of the Bid Evaluation Committee at
		1130 hours (IST) on <u>29.08.2022</u> in the office of CEA.	1130 hours (IST) on <u>05.09.2022</u> in the office of CEA.

Amendment –XI dated 24.08.2022 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI.	Clause	Existing Provis	sions	Ne	ew / Revised	Clause
No	No.	•				
1.	2.7.1 of	The Bidders sho	ould submit the Bids online through the electronic	Tł	ne Bidders sh	ould submit the Bids online through the electronic
	RFP	bidding platform	before the Bid Deadline i.e. on or before 1100 hours	bio	dding platform	before the Bid Deadline i.e. on or before 1100 hours
		(IST) on <u>25.08.2</u>	<b>022</b> . In addition to the online submission, the Bidder		,	<b>022</b> . In addition to the online submission, the Bidder
			Offer will be required to submit original hard copies			I Offer will be required to submit original hard copies
			nnexure 4 (if applicable), Annexure 6 (if applicable)			Annexure 4 (if applicable), Annexure 6 (if applicable)
			4 before issuance of Lol			4 before issuance of Lol
2.	2.7.2 of	Important timelin	es are mentioned below:	Im	nportant timelir	es are mentioned below:
	RFP					
		Date	Event		Date	Event
		25.08.2022	Submission of Bid (Online submission of Bid		09.09.2022	Submission of Bid (Online submission of Bid
			through electronic bidding portal)			through electronic bidding portal)
		25.08.2022	Opening of Technical Bid		09.09.2022	Opening of Technical Bid
		02.09.2022	Shortlisting and announcement of Qualified		19.09.2022	Shortlisting and announcement of Qualified
			Bidders on bidding portal			Bidders on bidding portal
		05.09.2022	Opening of Financial Bid - Initial Offer		20.09.2022	Opening of Financial Bid - Initial Offer
		06.09.2022	Electronic reverse auction (Financial Bid – Final		21.09.2022	Electronic reverse auction (Financial Bid – Final
			Offer) for the Qualified Bidders.			Offer) for the Qualified Bidders.
		09.09.2022	Submission of original hard copies of Annexure		26.09.2022	Submission of original hard copies of Annexure
			3, Annexure 4, Annexure 6, as applicable and			3, Annexure 4, Annexure 6, as applicable and
			Annexure 14 by the bidder with lowest Final			Annexure 14 by the bidder with lowest Final
			Offer			Offer
		14.09.2022	Selection of Successful Bidder and issue of LOI		29.09.2022	Selection of Successful Bidder and issue of LOI
		26.09.2022	Signing of RFP Project Documents and transfer		10.10.2022	Signing of RFP Project Documents and transfer
			of Beawar Transmission Limited			of Beawar Transmission Limited

SI.	Clause	Existing Provisions	New / Revised Clause
No	No.		
-			
3.	2.13.1 of		
	RFP		
		Opening of Envelope (Technical Bid): 1130 hours (IST) on	Opening of Envelope (Technical Bid): 1130 hours (IST) on 09.09.2022
		<u>25.08.2022</u>	
		Opening of Initial Offer: Initial Offer shall be opened by the Bid	Opening of Initial Offer: Initial Offer shall be opened by the Bid
		Opening Committee in presence of the Bid Evaluation Committee at	Opening Committee in presence of the Bid Evaluation Committee at
		1130 hours (IST) on <u>05.09.2022</u> in the office of CEA.	1130 hours (IST) on <u>20.09.2022</u> in the office of CEA.

Amendment –XII dated 09.09.2022 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI. No	Clause No.	Existing Provis	sions	Ne	ew / Revised	Clause			
1.	2.7.1 of	The Bidders sho	ould submit the Bids online through the electronic		The Bidders should submit the Bids online through the electronic				
	RFP	bidding platform	before the Bid Deadline i.e. on or before 1100 hours			before the Bid Deadline i.e. on or before 1100 hours			
		(IST) on <u>09.09.2</u>	<b>022</b> . In addition to the online submission, the Bidder		(IST) on <u><b>30.09.2022</b></u> . In addition to the online submission, the Bidder				
			Offer will be required to submit original hard copies			I Offer will be required to submit original hard copies			
		of Annexure 3, A	nnexure 4 (if applicable), Annexure 6 (if applicable)			Annexure 4 (if applicable), Annexure 6 (if applicable)			
		and Annexure 14	nd Annexure 14 before issuance of Lol			4 before issuance of Lol			
2.	2.7.2 of Important timelines are mentioned below: RFP				portant timelir	nes are mentioned below:			
		Date	Event		Date	Event			
		09.09.2022	Submission of Bid (Online submission of Bid		30.09.2022	Submission of Bid (Online submission of Bid			
			through electronic bidding portal)			through electronic bidding portal)			
		09.09.2022	Opening of Technical Bid		30.09.2022	Opening of Technical Bid			
		19.09.2022	Shortlisting and announcement of Qualified		10.10.2022	Shortlisting and announcement of Qualified			
			Bidders on bidding portal			Bidders on bidding portal			
		20.09.2022	Opening of Financial Bid - Initial Offer		11.10.2022	Opening of Financial Bid - Initial Offer			
		21.09.2022	Electronic reverse auction (Financial Bid – Final		12.10.2022	Electronic reverse auction (Financial Bid – Final			
			Offer) for the Qualified Bidders.			Offer) for the Qualified Bidders.			
		26.09.2022	Submission of original hard copies of Annexure		17.10.2022	Submission of original hard copies of Annexure			
			3, Annexure 4, Annexure 6, as applicable and			3, Annexure 4, Annexure 6, as applicable and			
			Annexure 14 by the bidder with lowest Final			Annexure 14 by the bidder with lowest Final			
			Offer			Offer			
		29.09.2022	Selection of Successful Bidder and issue of LOI		20.10.2022	Selection of Successful Bidder and issue of LOI			
		10.10.2022	Signing of RFP Project Documents and transfer		31.10.2022	Signing of RFP Project Documents and transfer			
			of Beawar Transmission Limited			of Beawar Transmission Limited			

SI.	Clause	Existing Provisions	New / Revised Clause
No	No.		
3.	2.13.1 of	······	
	RFP		
		Opening of Envelope (Technical Bid): 1130 hours (IST) on	Opening of Envelope (Technical Bid): 1130 hours (IST) on 30.09.2022
		<u>09.09.2022</u>	
		Opening of Initial Offer: Initial Offer shall be opened by the Bid	Opening of Initial Offer: Initial Offer shall be opened by the Bid
		Opening Committee in presence of the Bid Evaluation Committee at	Opening Committee in presence of the Bid Evaluation Committee at
		1130 hours (IST) on <u>20.09.2022</u> in the office of CEA.	1130 hours (IST) on <u>11.10.2022</u> in the office of CEA.

Amendment-XIII dated 21.09.2022 to the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI. No.	Clause No.	Existing Clause	New/Revised Clause
1.	RFP Specific Technical Requirem ents for Substatio n Clause No. B.2.2	B.2.1 Shunt Reactor               Neutral Grounding Reactor (NGR) and Surge Arrester for         765 kV Line Reactors            The resistive value of NGR for each circuit at both ends of         765kV D/c Fatehgarh-3– Beawar S/s shall be 450 ohms.	<ul> <li>B.2.1 Shunt Reactor</li> <li></li> <li>Neutral Grounding Reactor (NGR) and Surge Arrester for 765</li> <li>kV Line Reactors</li> <li></li> <li>The ohmic value of NGR for each circuit at both ends of 765kV D/c</li> <li>Fatehgarh-3– Beawar S/s shall be 450 ohms.</li> <li></li> </ul>
2.	RFP "Specific Technical Requirem ent for Substatio n"	<ul> <li>B.3.0 Substation Support facilities</li> <li>B.3.1 AC &amp; DC power supplies</li> <li>B.3.1 AC &amp; DC power supplies</li> <li>(ii) 2 sets of 220V battery banks for control &amp; protection and 2 sets of 48V battery banks for PLCC/ communication equipment shall be provided at each new Substation. Each battery bank shall have a float-cum-boost charger. Battery shall be of VRLA type. At new substation, sizing of battery and battery charger shall be done based on the number of bays specified (including future bays) as per CEA Regulations and relevant IS. 2 sets of 48 V battery banks for PLCC and communication equipment for present and future scope shall have at least 10-hour battery backup and extended backup, if required.</li> </ul>	<ul> <li>B.3.0 Substation Support facilities</li> <li>B.3.1 AC &amp; DC power supplies</li> <li>B.3.1 AC &amp; DC power supplies</li> <li>(ii) 2 sets of 220V battery banks for control &amp; protection and 2 sets of 48V battery banks for PLCC/ communication equipment shall be provided at each new Substation. Each battery bank shall have a float-cum-boost charger. At new substation, sizing of 220 V battery and battery charger shall be done based on the number of bays specified (including future bays) as per CEA Regulations and relevant IS. 2 sets of 48 V battery banks for PLCC and communication equipment shall be provided at each new Substation with at least 10-hour battery backup and extended backup, if required.</li> </ul>

Amendment –XIV dated 30.09.2022 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI.	Clause	Existing Provisions			New / Revised Clause			
No	No.	, and the second se						
1.	2.7.1 of	The Bidders sho	Bidders should submit the Bids online through the electronic			The Bidders should submit the Bids online through the electronic		
	RFP	bidding platform	before the Bid Deadline i.e. on or before 1100 hours	bidding platform before the Bid Deadline i.e. on or before 1100 hours				
		(IST) on <u>30.09.2</u>	<b>022</b> . In addition to the online submission, the Bidder	(IST) on <u><b>14.10.2022</b></u> . In addition to the online submission, the Bidder				
			Offer will be required to submit original hard copies		with lowest Final Offer will be required to submit original hard copies			
			nnexure 4 (if applicable), Annexure 6 (if applicable)		of Annexure 3, Annexure 4 (if applicable), Annexure 6 (if applicable)			
			nd Annexure 14 before issuance of Lol			and Annexure 14 before issuance of Lol		
2.	2.7.2 of	Important timelin	are mentioned below: Important timelines are mentioned below:					
	RFP							
		Date	Event		Date	Event		
		30.09.2022	Submission of Bid (Online submission of Bid		14.10.2022	Submission of Bid (Online submission of Bid		
			through electronic bidding portal)			through electronic bidding portal)		
		30.09.2022	Opening of Technical Bid		14.10.2022	Opening of Technical Bid		
		10.10.2022	Shortlisting and announcement of Qualified		25.10.2022	Shortlisting and announcement of Qualified		
			Bidders on bidding portal			Bidders on bidding portal		
		11.10.2022	Opening of Financial Bid - Initial Offer		26.10.2022	Opening of Financial Bid - Initial Offer		
		12.10.2022	Electronic reverse auction (Financial Bid – Final		27.10.2022	Electronic reverse auction (Financial Bid – Final		
			Offer) for the Qualified Bidders.			Offer) for the Qualified Bidders.		
		17.10.2022	Submission of original hard copies of Annexure		31.10.2022	Submission of original hard copies of Annexure		
			3, Annexure 4, Annexure 6, as applicable and			3, Annexure 4, Annexure 6, as applicable and		
			Annexure 14 by the bidder with lowest Final			Annexure 14 by the bidder with lowest Final		
			Offer			Offer		
		20.10.2022	Selection of Successful Bidder and issue of LOI		04.11.2022	Selection of Successful Bidder and issue of LOI		
		31.10.2022	Signing of RFP Project Documents and transfer		14.11.2022	Signing of RFP Project Documents and transfer		
			of Beawar Transmission Limited			of Beawar Transmission Limited		

SI.	Clause	Existing Provisions	New / Revised Clause
No	No.		
3.	2.13.1 of		
	RFP		
		Opening of Envelope (Technical Bid): 1130 hours (IST) on	Opening of Envelope (Technical Bid): 1130 hours (IST) on 14.10.2022
		<u>30.09.2022</u>	
		Opening of Initial Offer: Initial Offer shall be opened by the Bid	Opening of Initial Offer: Initial Offer shall be opened by the Bid
		Opening Committee in presence of the Bid Evaluation Committee at	Opening Committee in presence of the Bid Evaluation Committee at
		1130 hours (IST) on <u>11.10.2022</u> in the office of CEA.	1130 hours (IST) on <u>26.10.2022</u> in the office of CEA.

Amendment –XV dated 14.10.2022 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI.	Clause	Existing Provisions Ne			New / Revised Clause		
No	No.						
-							
1.	2.7.1 of		ould submit the Bids online through the electronic		ne Bidders sh	ould submit the Bids online through the electronic	
	RFP	bidding platform	before the Bid Deadline i.e. on or before 1100 hours		0.	before the Bid Deadline i.e. on or before 1100 hours	
		(IST) on <u>14.10.2</u>	<b>022</b> . In addition to the online submission, the Bidder		,	<b><u>022</u></b> . In addition to the online submission, the Bidder	
			Offer will be required to submit original hard copies			I Offer will be required to submit original hard copies	
		of Annexure 3, A	nnexure 4 (if applicable), Annexure 6 (if applicable)			Annexure 4 (if applicable), Annexure 6 (if applicable)	
		and Annexure 14	4 before issuance of Lol	ar	nd Annexure 1	4 before issuance of Lol	
2.	2.7.2 of	Important timelin	es are mentioned below:	Im	nportant timelir	es are mentioned below:	
	RFP						
		Date	Event		Date	Event	
		14.10.2022	Submission of Bid (Online submission of Bid		14.11.2022	Submission of Bid (Online submission of Bid	
			through electronic bidding portal)			through electronic bidding portal)	
		14.10.2022	Opening of Technical Bid		14.11.2022	Opening of Technical Bid	
		25.10.2022	Shortlisting and announcement of Qualified		22.11.2022	Shortlisting and announcement of Qualified	
			Bidders on bidding portal			Bidders on bidding portal	
		26.10.2022	Opening of Financial Bid - Initial Offer		23.11.2022	Opening of Financial Bid - Initial Offer	
		27.10.2022	Electronic reverse auction (Financial Bid – Final		24.11.2022	Electronic reverse auction (Financial Bid – Final	
			Offer) for the Qualified Bidders.			Offer) for the Qualified Bidders.	
		31.10.2022	Submission of original hard copies of Annexure		28.11.2022	Submission of original hard copies of Annexure	
			3, Annexure 4, Annexure 6, as applicable and			3, Annexure 4, Annexure 6, as applicable and	
			Annexure 14 by the bidder with lowest Final			Annexure 14 by the bidder with lowest Final	
			Offer			Offer	
		04.11.2022	Selection of Successful Bidder and issue of LOI		02.12.2022	Selection of Successful Bidder and issue of LOI	
		14.11.2022	Signing of RFP Project Documents and transfer		12.12.2022	Signing of RFP Project Documents and transfer	
			of Beawar Transmission Limited			of Beawar Transmission Limited	

SI.	Clause	Existing Provisions	New / Revised Clause
No	No.		
3.	2.13.1 of		
	RFP		
		Opening of Envelope (Technical Bid): 1130 hours (IST) on	Opening of Envelope (Technical Bid): 1130 hours (IST) on 14.11.2022
		<u>14.10.2022</u>	
		Opening of Initial Offer: Initial Offer shall be opened by the Bid	Opening of Initial Offer: Initial Offer shall be opened by the Bid
		Opening Committee in presence of the Bid Evaluation Committee at	Opening Committee in presence of the Bid Evaluation Committee at
		1130 hours (IST) on <u>26.10.2022</u> in the office of CEA.	1130 hours (IST) on <u>23.11.2022</u> in the office of CEA.

Amendment –XVI dated 14.11.2022 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI.	Clause	Existing Provisions Ne			New / Revised Clause		
No	No.						
-							
1.	2.7.1 of		ould submit the Bids online through the electronic		ne Bidders sh	ould submit the Bids online through the electronic	
	RFP	bidding platform	before the Bid Deadline i.e. on or before 1100 hours		0.	before the Bid Deadline i.e. on or before 1100 hours	
		(IST) on <u>14.11.2</u>	<b>022</b> . In addition to the online submission, the Bidder		,	<b><u>022</u></b> . In addition to the online submission, the Bidder	
			Offer will be required to submit original hard copies			I Offer will be required to submit original hard copies	
		of Annexure 3, A	nnexure 4 (if applicable), Annexure 6 (if applicable)			Annexure 4 (if applicable), Annexure 6 (if applicable)	
		and Annexure 14	4 before issuance of Lol	ar	nd Annexure 1	4 before issuance of Lol	
2.	2.7.2 of	Important timelin	les are mentioned below:	Im	nportant timelir	es are mentioned below:	
	RFP						
		Date	Event		Date	Event	
		14.11.2022	Submission of Bid (Online submission of Bid		14.12.2022	Submission of Bid (Online submission of Bid	
			through electronic bidding portal)			through electronic bidding portal)	
		14.11.2022	Opening of Technical Bid		14.12.2022	Opening of Technical Bid	
		22.11.2022	Shortlisting and announcement of Qualified		22.12.2022	Shortlisting and announcement of Qualified	
			Bidders on bidding portal			Bidders on bidding portal	
		23.11.2022	Opening of Financial Bid - Initial Offer		26.12.2022	Opening of Financial Bid - Initial Offer	
		24.11.2022	Electronic reverse auction (Financial Bid – Final		27.12.2022	Electronic reverse auction (Financial Bid – Final	
			Offer) for the Qualified Bidders.			Offer) for the Qualified Bidders.	
		28.11.2022	Submission of original hard copies of Annexure		30.12.2022	Submission of original hard copies of Annexure	
			3, Annexure 4, Annexure 6, as applicable and			3, Annexure 4, Annexure 6, as applicable and	
			Annexure 14 by the bidder with lowest Final			Annexure 14 by the bidder with lowest Final	
			Offer			Offer	
		02.12.2022	Selection of Successful Bidder and issue of LOI		04.01.2023	Selection of Successful Bidder and issue of LOI	
		12.12.2022	Signing of RFP Project Documents and transfer		16.01.2023	Signing of RFP Project Documents and transfer	
			of Beawar Transmission Limited			of Beawar Transmission Limited	

SI.	Clause	Existing Provisions	New / Revised Clause
No	No.		
-			
3.	2.13.1 of		
	RFP		
		Opening of Envelope (Technical Bid): 1130 hours (IST) on	Opening of Envelope (Technical Bid): 1130 hours (IST) on 14.12.2022
		<u>14.11.2022</u>	
		Opening of Initial Offer: Initial Offer shall be opened by the Bid	Opening of Initial Offer: Initial Offer shall be opened by the Bid
		Opening Committee in presence of the Bid Evaluation Committee at	Opening Committee in presence of the Bid Evaluation Committee at
		1130 hours (IST) on <u>23.11.2022</u> in the office of CEA.	1130 hours (IST) on <u>26.12.2022</u> in the office of CEA.

Amendment –XVII dated 14.12.2022 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI.	Clause	Existing Provisions Ne			New / Revised Clause		
No	No.						
1.	2.7.1 of	The Bidders sho	ould submit the Bids online through the electronic	Tł	ne Bidders sh	ould submit the Bids online through the electronic	
	RFP	bidding platform	before the Bid Deadline i.e. on or before 1100 hours	bi	dding platform	before the Bid Deadline i.e. on or before 1100 hours	
		(IST) on <u>14.12.2</u>	022. In addition to the online submission, the Bidder	(15	ST) on <u><b>28.12.2</b></u>	<b>2022</b> . In addition to the online submission, the Bidder	
			Offer will be required to submit original hard copies	wi	th lowest Fina	I Offer will be required to submit original hard copies	
		of Annexure 3, A	nnexure 4 (if applicable), Annexure 6 (if applicable)	of	Annexure 3, A	Annexure 4 (if applicable), Annexure 6 (if applicable)	
		and Annexure 1	4 before issuance of Lol	ar	nd Annexure 1	4 before issuance of Lol	
2.	2.7.2 of	Important timelin	les are mentioned below:	Im	nportant timelir	nes are mentioned below:	
	RFP						
		Date	Event		Date	Event	
		14.12.2022	Submission of Bid (Online submission of Bid		28.12.2022	Submission of Bid (Online submission of Bid	
			through electronic bidding portal)			through electronic bidding portal)	
		14.12.2022	Opening of Technical Bid		28.12.2022	Opening of Technical Bid	
		22.12.2022	Shortlisting and announcement of Qualified		05.01.2023	Shortlisting and announcement of Qualified	
			Bidders on bidding portal			Bidders on bidding portal	
		26.12.2022	Opening of Financial Bid - Initial Offer		09.01.2023	Opening of Financial Bid - Initial Offer	
		27.12.2022	Electronic reverse auction (Financial Bid – Final		10.01.2023	Electronic reverse auction (Financial Bid – Final	
			Offer) for the Qualified Bidders.			Offer) for the Qualified Bidders.	
		30.12.2022	Submission of original hard copies of Annexure		13.01.2023	Submission of original hard copies of Annexure	
			3, Annexure 4, Annexure 6, as applicable and			3, Annexure 4, Annexure 6, as applicable and	
			Annexure 14 by the bidder with lowest Final			Annexure 14 by the bidder with lowest Final	
			Offer			Offer	
		04.01.2023	Selection of Successful Bidder and issue of LOI		18.01.2023	Selection of Successful Bidder and issue of LOI	
		16.01.2023	Signing of RFP Project Documents and transfer		30.01.2023	Signing of RFP Project Documents and transfer	
			of Beawar Transmission Limited			of Beawar Transmission Limited	

SI.	Clause	Existing Provisions	New / Revised Clause
No	No.		
-			
3.	2.13.1 of		
	RFP		
			Opening of Envelope (Technical Bid): 1130 hours (IST) on <u>28.12.2022</u>
		<u>14.12.2022</u>	
		<b>.</b>	
		Opening of Initial Offer: Initial Offer shall be opened by the Bid	Opening of Initial Offer: Initial Offer shall be opened by the Bid
		Opening Committee in presence of the Bid Evaluation Committee at	
		1130 hours (IST) on <u>26.12.2022</u> in the office of CEA.	1130 hours (IST) on <u>09.01.2023</u> in the office of CEA.
4.	ANNEX	Registration Methodology	Registration Methodology
	URE - A		
		In order to submit online bids in the e-bidding process for selection	In order to submit online bids in the e-bidding process for selection of
	Technic	of Transmission Service Provider, interested Bidders are required to	Transmission Service Provider, interested Bidders are required to
	al	register themselves with the e-procurement website of MSTC	register themselves with the e-procurement website of MSTC Limited
	Details	Limited namely	namely https://www.mstcecommerce.com/eproc/. To register with
	with	www.mstcecommerce.com/eprochome/tsp/index.jsp. To	the website, the Bidder is required to fill up the online form available
	respect	register with the website, the Bidder is required to fill up the online	under the link Register as Vendor in the above website and fill up the
	to	form available under the link Register as Vendor in the above website	same and click on Submit.
	electroni	and fill up the same and click on Submit.	
	С		
	bidding	·····	

Amendment –XVIII dated 28.12.2022 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI. No	Clause No.	Existing Provisions			New / Revised Clause		
• 1.	RFP	9. Issue of RFP do	ocument:	ę	9. Issue of RFP document:		
		Bank Nan	ne, IDFC First Bank Limited	[	Bank N	lame,	IDFC First Bank Limited
		Address & Branc	h Wholesale Banking Outlet Express		Address & Bra	anch	Birla Towers, 4 th Floor East Tower &
			Building, 2nd Floor, 9-10 Bahadur				LGF West Tower, Barakhamba Road,
			Shah Zafar Marg, New Delhi-110002				<u>New Delhi -110001</u>
		Bank Account Nan	me REC Power Development & Consultancy		Bank Account	Name	REC Power Development & Consultancy
			Limited (formerly REC Power				Limited (formerly REC Power
			Distribution Company Limited)				Distribution Company Limited)
		Bank Account No	10000697415		Bank Account N	No	10000697415
		Bank IFSC Code N	No IDFB0020101		Bank IFSC Coc	de No	IDFB0020101
2.	2.7.1 of		d submit the Bids online through the electronic		The Bidders should submit the Bids online through the electronic		
	RFP	01	fore the Bid Deadline i.e. on or before 1100 hours		01		the Bid Deadline i.e. on or before 1100 hours
			2. In addition to the online submission, the Bidder		(IST) on <u><b>30.01.2023</b></u> . In addition to the online submission, the Bidde		
			ffer will be required to submit original hard copies		with lowest Final Offer will be required to submit original hard copies		
			exure 4 (if applicable), Annexure 6 (if applicable) efore issuance of Lol		of Annexure 3, Annexure 4 (if applicable), Annexure 6 (if applicable)		
3.	2.7.2 of				and Annexure 14 before issuance of Lol Important timelines are mentioned below:		
5.	RFP	Important timelines are mentioned below:		'			
		Date	Event		Date		Event
		28.12.2022 Su	ubmission of Bid (Online submission of Bid		30.01.2023	Subm	ission of Bid (Online submission of Bid
		th	rough electronic bidding portal)			throug	gh electronic bidding portal)

Clause	Existing Provisions N		Ne	New / Revised Clause			
No.							
	28.12.2022	Opening of Technical Bid		30.01.2023	Opening of Technical Bid		
	05.01.2023	0		07.02.2023	Shortlisting and announcement of Qualified		
		Bidders on bidding portal			Bidders on bidding portal		
					Opening of Financial Bid - Initial Offer		
	10.01.2023			09.02.2023	Electronic reverse auction (Financial Bid – Final		
		,			Offer) for the Qualified Bidders.		
	13.01.2023	<b>o</b> 1		13.02.2023	Submission of original hard copies of Annexure		
					3, Annexure 4, Annexure 6, as applicable and		
		-			Annexure 14 by the bidder with lowest Final		
					Offer		
					Selection of Successful Bidder and issue of LOI		
	30.01.2023			27.02.2023	Signing of RFP Project Documents and transfer		
		of Beawar Transmission Limited			of Beawar Transmission Limited		
RFP							
		velope (Technical Bid): 1130 hours (IST) on	Opening of Envelope (Technical Bid): 1130 hours (IST) on 30.01.202				
	<u>28.12.2022</u>						
	Opening of Initia	al Offer: Initial Offer shall be energed by the Bid	Or	ooning of Initi	ial Offer: Initial Offer shall be opened by the Bid		
		· · ·		•	ittee in presence of the Bid Evaluation Committee at		
		•		•	) on <u>08.02.2023</u> in the office of CEA.		
RFP				,	·		
	•			•			
	2.10.2. The cos	st of this RFP is Rupees Five Lakh Onlv (Rs.	2.1	10.2. The cos	t of this RFP is Rupees Five Lakh Only (Rs. 5,00,000)		
					Dollar Seven Thousand Only (US\$ 7,000) plus GST		
		No.         28.12.2022           05.01.2023         09.01.2023           10.01.2023         10.01.2023           13.01.2023         13.01.2023           2.13.1 of RFP            0pening of En         28.12.2022            Opening of En           28.12.2022            No.            2.13.1 of RFP            Opening of En         28.12.2022               2.10 Preparat            2.10 Preparat	No.       28.12.2022       Opening of Technical Bid         05.01.2023       Shortlisting and announcement of Qualified Bidders on bidding portal       09.01.2023         09.01.2023       Opening of Financial Bid - Initial Offer         10.01.2023       Electronic reverse auction (Financial Bid – Final Offer) for the Qualified Bidders.         13.01.2023       Submission of original hard copies of Annexure 3, Annexure 4, Annexure 6, as applicable and Annexure 14 by the bidder with lowest Final Offer         18.01.2023       Selection of Successful Bidder and issue of LOI 30.01.2023         30.01.2023       Signing of RFP Project Documents and transfer of Beawar Transmission Limited         2.13.1 of RFP          Opening of Envelope (Technical Bid): 1130 hours (IST) on 28.12.2022          Opening of Initial Offer: Initial Offer shall be opened by the Bid Opening Committee in presence of the Bid Evaluation Committee at 1130 hours (IST) on <u>09.01.2023</u> in the office of CEA.         RFP       2.10       Preparation cost	No.       28.12.2022       Opening of Technical Bid         05.01.2023       Shortlisting and announcement of Qualified Bidders on bidding portal       09.01.2023       Opening of Financial Bid - Initial Offer         10.01.2023       Electronic reverse auction (Financial Bid – Final Offer) for the Qualified Bidders.       13.01.2023       Submission of original hard copies of Annexure 3, Annexure 4, Annexure 6, as applicable and Annexure 14 by the bidder with lowest Final Offer         18.01.2023       Selection of Successful Bidder and issue of LOI 30.01.2023       Signing of RFP Project Documents and transfer of Beawar Transmission Limited         2.13.1 of RFP            Opening of Initial Offer: Initial Offer shall be opened by the Bid Opening Committee in presence of the Bid Evaluation Committee at 1130 hours (IST) on 09.01.2023 in the office of CEA.          RFP       2.10       Preparation cost          Quencing Committee in presence of the Bid Evaluation Committee at 1130 hours (IST) on 09.01.2023 in the office of CEA.       11         RFP       2.10       Preparation cost        2.	No.         28.12.2022         Opening of Technical Bid         30.01.2023           05.01.2023         Shortlisting and announcement of Qualified Bidders on bidding portal         09.01.2023         Opening of Financial Bid - Initial Offer         08.02.2023           10.01.2023         Opening of Financial Bid - Initial Offer         08.02.2023         09.02.2023           10.01.2023         Electronic reverse auction (Financial Bid – Final Offer) for the Qualified Bidders.         13.02.2023         09.02.2023           13.01.2023         Submission of original hard copies of Annexure 3, Annexure 4, Annexure 6, as applicable and Annexure 14 by the bidder with lowest Final Offer         17.02.2023         13.02.2023           2.13.1 of RFP               Opening of Envelope (Technical Bid): 1130 hours (IST) on 28.12.2022               Opening of Initial Offer: Initial Offer shall be opened by the Bid Opening Committee in presence of the Bid Evaluation Committee at 1130 hours (IST) on <u>99.01.2023</u> in the office of CEA.         Opening of Initial Ohurs (IST)            RFP         2.10         Preparation cost               2.10         Preparation cost		

SI.	Clause	Existing Provisions		New / Revise	New / Revised Clause		
No	No.						
-							
		plus GST as	ST as per applicable rate, which shall be non-		er applica	ble rate, which shall be non-refundable. This	
		refundable. Thi	s amount shall be paid via electronic transfer	amo	unt shall b	be paid via electronic transfer to the following	
		to the following Bank Account:		Banl	< Account:		
		Bank Name, IDFC First Bank Limited		Bank	Name,	IDFC First Bank Limited	
		Address & Branch	Wholesale Banking Outlet Express	Address &	<b>Branch</b>	Birla Towers, 4th Floor East Tower &	
			Building, 2nd Floor, 9-10 Bahadur			LGF West Tower, Barakhamba Road,	
			Shah Zafar Marg, New Delhi-110002			<u>New Delhi -110001</u>	
		Bank Account Name	REC Power Development & Consultancy	Bank Accou	int Name	REC Power Development & Consultancy	
			Limited (formerly REC Power Distribution			Limited (formerly REC Power Distribution	
			Company Limited)			Company Limited)	
		Bank Account No	10000697415	Bank Accou	int No	10000697415	
		Bank IFSC Code No	Code No IDFB0020101		Code No	IDFB0020101	
			·				
					<u></u>		

Amendment –XIX dated 09.01.2023 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (2000) under Phase-III Part F" through tariff based competitive bidding process

SI. No	Clause No.		Existing Provisions							
1.	RFP & TSA	Scope of the Project				Scope of the Project				
		SI. No.	Scope of the Transmission Scheme	Scheduled COD in months from Effective Date		SI. No.	Scope of the Transmission Scheme	Scheduled COD in months from Effective Date		
		1	Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus Reactor 765/400kV 1500 MVA ICTs: 2 nos. (7x500 MVA, including one spare unit) 330 MVAr, 765 kV bus reactor- 2 nos. (7x110 MVAr, including one spare unit) 765kV ICT bays – 2 nos. 400 kV ICT bays – 2 nos. 765 kV line bays – 6 nos. 400 kV ICT bays – 2 nos. 765kV reactor bay- 2 nos. 125 MVAr, 420kV bus reactor – 2 nos. 420 kV reactor bay – 2 nos. <b>Future provisions: Space for</b> 765/400kV ICTs along with bays: 2 nos. <b>765kV line bay along with</b> <b>switchable line reactor: 6nos.</b>	18		1	Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus Reactor 765/400kV 1500 MVA ICTs: 2 nos. (7x500 MVA, including one spare unit) 330 MVAr, 765 kV bus reactor- 2 nos. (7x110 MVAr, including one spare unit) 765kV ICT bays – 2 nos. 400 kV ICT bays – 2 nos. 765 kV line bays – 6 nos. 400kV line bay- 2 nos. 765kV reactor bay- 2 nos. 125 MVAr, 420kV bus reactor – 2 nos. 420 kV reactor bay – 2 nos. <b>Future provisions: Space for</b> 765/400kV ICTs along with bays: 2 nos. <b>765kV line bay along with</b> <b>switchable line reactor: 8nos.</b>	18		

SI. No	Clause No.	Existing Provisions	New / Revised Clause 552
		<ul> <li>765kV Bus Reactor along with bays: 2 nos.</li> <li>400/220 kV ICTs along with bays: 2nos.</li> <li>400 kV line bays along with switchable line reactor: 4 nos.</li> <li>400kV Bus Reactor along with bays: 1no.</li> <li>220 kV line bays: 4nos.</li> <li>2</li> <li>LILO of both circuit of Ajmer- Chittorgarh 765 kV D/c at Beawar</li> <li>3</li> <li>LILO of 400kV Kota –Merta line at Beawar</li> <li>4</li> <li>Fatehgarh-3– Beawar 765 kV D/c along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line</li> <li>Switching equipment for 765 kV 330 MVAR switchable line reactor –4 nos. 765 kV, 330 MVAr Switchable line reactor- 4 nos.</li> </ul>	<ul> <li>765kV Bus Reactor along with bays: 2nos 400/220 kV ICTs along with bays: 2nos. 400 kV line bays along with switchable line reactor: 4 nos. 400kV Bus Reactor along with bays: 1no. 220 kV line bays: 4nos.</li> <li>2 LILO of both circuit of Ajmer- Chittorgarh 765 kV D/c at Beawar</li> <li>3 LILO of 400kV Kota –Merta line at Beawar</li> <li>4 Fatehgarh-3– Beawar 765 kV D/c along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line</li> <li>Switching equipment for 765 kV 330 MVAR switchable line reactor –4 nos. 765 kV, 330 MVAr Switchable line reactor- 4 nos.</li> </ul>
		Note: (i) Developer of Fategarh-3 S/s to provide 2 nos. of 765 kV line bays at Fatehgarh-3 S/s along with space for 765kV switchable line reactors.	

#### Amendment –XX dated 30.01.2023 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

Sl.	Clause	Existing Provision	ons	N	ew / Revised C	lause	
No.	No.						
1.	2.7.1 of	of The Bidders should submit the Bids online through the electronic bidding T			The Bidders should submit the Bids online through the electronic bidding		
	RFP	platform before t	he Bid Deadline i.e. on or before 1100 hours (IST) on	pla	atform before	the Bid Deadline i.e. on or before 1100 hours (IST) on	
			dition to the online submission, the Bidder with lowest	_		dition to the online submission, the Bidder with lowest Final	
			e required to submit original hard copies of Annexure 3,			equired to submit original hard copies of Annexure 3,	
			pplicable), Annexure 6 (if applicable) and Annexure 14			applicable), Annexure 6 (if applicable) and Annexure 14	
		before issuance of			efore issuance o		
2.	2.7.2 of	Important timeline	es are mentioned below:	In	nportant timelin	es are mentioned below:	
	RFP						
		Date	Event		Date	Event	
		30.01.2023	Submission of Bid (Online submission of Bid		20.02.2023	Submission of Bid (Online submission of Bid	
			through electronic bidding portal)			through electronic bidding portal)	
		30.01.2023	Opening of Technical Bid		20.02.2023	Opening of Technical Bid	
		07.02.2023	Shortlisting and announcement of Qualified Bidders		28.02.2023	Shortlisting and announcement of Qualified Bidders	
			on bidding portal			on bidding portal	
		08.02.2023	Opening of Financial Bid - Initial Offer		01.03.2023	Opening of Financial Bid - Initial Offer	
		09.02.2023	Electronic reverse auction (Financial Bid - Final		02.03.2023	Electronic reverse auction (Financial Bid – Final	
			Offer) for the Qualified Bidders.			Offer) for the Qualified Bidders.	
		13.02.2023	Submission of original hard copies of Annexure 3,		07.03.2023	Submission of original hard copies of Annexure 3,	
			Annexure 4, Annexure 6, as applicable and			Annexure 4, Annexure 6, as applicable and Annexure	
			Annexure 14 by the bidder with lowest Final Offer			14 by the bidder with lowest Final Offer	
		17.02.2023	Selection of Successful Bidder and issue of LOI		10.03.2023	Selection of Successful Bidder and issue of LOI	
		27.02.2023	Signing of RFP Project Documents and transfer of		20.03.2023	Signing of RFP Project Documents and transfer of	
			Beawar Transmission Limited			Beawar Transmission Limited	
3.	2.13.1 of						
	RFP						

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Sl. No.	Clause No.	Existi	ng Provisions		N	lew / ]	Revised Clause	
INO.	110.	Openir	ng of Envelope (Technical Bid): 1130 hours (IS	ST) on <u><b>30.01.2023</b></u>	0	penin	g of Envelope (Technical Bid): 1130 hours (IS	ST) on <u><b>20.02.2023</b></u>
		-	ng of Initial Offer: Initial Offer shall be opened	• • • •		-	g of Initial Offer: Initial Offer shall be open	• • •
			ittee in presence of the Bid Evaluation Common <b>08.02.2023</b> in the office of CEA.	mittee at 1130 hours			ittee in presence of the Bid Evaluation Commit <b>3.2023</b> in the office of CEA.	tee at 1130 hours (IST)
4.	RFP &		of the Project				of the Project	
	TSA		-			•	-	
		SI.	Scope of the Transmission Scheme	Scheduled COD		SI.	Scope of the Transmission Scheme	Scheduled COD
		No.		in months from Effective Date		No.		in months from Effective Date
		1	Establishment of 2x1500MVA 765/400kV			1	Establishment of 2x1500MVA 765/400kV	
			Substation at suitable location near Beawar				Substation at suitable location near Beawar	
			along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus				along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus	
			Reactor & 2x125 MVAr 420KV Bus Reactor				Reactor & 2x125 MVAr 420KV Bus Reactor	
			765/400kV 1500 MVA ICTs: 2 nos.				765/400kV 1500 MVA ICTs: 2 nos.	
			(7x500 MVA, including one spare unit)				(7x500 MVA, including one spare unit)	
			330 MVAr, 765 kV bus reactor- 2 nos.	18			330 MVAr, 765 kV bus reactor- 2 nos.	18
			(7x110 MVAr, including one spare unit)				(7x110 MVAr, including one spare unit)	
			765kV ICT bays – 2 nos.				765kV ICT bays – 2 nos.	
			400  kV ICT bays - 2  nos.				400  kV ICT bays - 2  nos.	
			765 kV line bays – 6 nos. 400kV line bay- 2 nos.				765 kV line bays – 6 nos. 400kV line bay- 2 nos.	
			765kV reactor bay- 2 nos.				765kV reactor bay- 2 nos.	
			125  MVAr, 420 kV  bus reactor - 2  nos.				125  MVAr, 420 kV  bus reactor - 2  nos.	
			420 kV reactor bay – 2 nos.				420 kV reactor bay – 2 nos.	

Sl.ClauseExisting ProvisiNo.No.		Exist	ing Provisions	New	New / Revised Clause		
110.	<u>N0.</u>	2 3 4	Future provisions: Space for765/400kV ICTs along with bays: 2 nos.765kV line bay along with switchable linereactor: 8nos.765kV Bus Reactor along with bays: 2 nos.400/220 kV ICTs along with bays: 2nos.400 kV line bays along with switchable linereactor: 4 nos.400kV Bus Reactor along with bays: 1no.220 kV line bays: 4nos.LILO of both circuit of Ajmer-Chittorgarh765 kV D/c at BeawarLILO of 400kV Kota –Merta line at BeawarFatehgarh-3– Beawar 765 kV D/c alongwith 330 MVAr Switchable line reactor foreach circuit at each end of Fatehgarh-3–	2 3 4	Future provisions: Space for765/400kV ICTs along with bays: 2 nos.765kV line bay along with switchable linereactor: 8nos.765kV Bus Reactor along with bays: 2nos400/220 kV ICTs along with bays: 2nos.400 kV line bays along with switchable linereactor: 4 nos.400kV Bus Reactor along with bays: 1no.220 kV line bays: 4nos.LILO of both circuit of Ajmer-Chittorgarh765 kV D/c at BeawarLILO of 400kV Kota –Merta line at BeawarFatehgarh-3– Beawar 765 kV D/c alongwith 330 MVAr Switchable line reactor foreach circuit at each end of Fatehgarh-3–		
		5	Beawar 765 kV D/c lineSwitching equipment for 765 kV 330MVAR switchable line reactor -4 nos.765 kV, 330 MVAr Switchable line reactor-4 nos.± 2x300MVAr STATCOM, 4x125 MVArMSC, 2x125 MVAr MSR at Fatehgarh-3 PS	5	Beawar 765 kV D/c line         Switching equipment for 765 kV 330         MVAR switchable line reactor -4 nos.         765 kV, 330 MVAr Switchable line reactor-4 nos.         ± 2x300MVAr STATCOM, 4x125 MVAr         MSC, 2x125 MVAr MSR at Fatehgarh-3         PS along with 2 nos. of 400 kV bays at		
		Note:		Note	Fatehgarh-3 PS		

Sl.	Clause	Existing Provisions	New / Revised Clause
No.	No.		
		(i) Developer of Fategarh-3 S/s to provide 2 nos. of 765 kV line bays at	
		<u> Fatehgarh-3 S/s for Fatehgarh-3 S/s – Beawar 765kV D/c line along</u>	Fatehgarh-3 S/s for Fatehgarh-3–Beawar 765 kV D/c line along with
		with space for 765kV switchable line reactors.	765kV switchable line reactors.
		(ii) <b>Developer of Fategarh-3</b> S/s shall provide space at Fatehgarh-3 S/s	(ii) <u>±300 MVAr STATCOM should be placed in each 400 kV bus section of</u>
		for STATCOM.	Fatehgarh-3 PS (Phase-III Part E1).
			(iii) <b>POWERGRID</b> shall provide space at Fatehgarh-3 S/s for
			STATCOM along with MSC & MSR and associated 400kV bays.

Amendment –XXI dated 20.02.2023 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI.	Clause	Existing Provis	sions	N	ew / Revised	Clause	
No	No.	_					
-							
1.	2.7.1 of	The Bidders sho	•		The Bidders should submit the Bids online through the electronic		
	RFP	bidding platform	Ū		dding platform	before the Bid Deadline i.e. on or before 1100 hours	
			023. In addition to the online submission, the Bidder		ST) on <u><b>13.03.2</b></u>	2023. In addition to the online submission, the Bidder	
			Offer will be required to submit original hard copies			I Offer will be required to submit original hard copies	
			nnexure 4 (if applicable), Annexure 6 (if applicable)			Annexure 4 (if applicable), Annexure 6 (if applicable)	
		and Annexure 14	4 before issuance of Lol	ar	nd Annexure 1	4 before issuance of Lol	
2.	2.7.2 of	Important timelin	es are mentioned below:	In	nportant timelir	nes are mentioned below:	
	RFP						
		Date	Event		Date	Event	
		20.02.2023	Submission of Bid (Online submission of Bid		13.03.2023	Submission of Bid (Online submission of Bid	
			through electronic bidding portal)			through electronic bidding portal)	
		20.02.2023	Opening of Technical Bid		13.03.2023	Opening of Technical Bid	
		28.02.2023	Shortlisting and announcement of Qualified		21.03.2023	Shortlisting and announcement of Qualified	
			Bidders on bidding portal			Bidders on bidding portal	
		01.03.2023	Opening of Financial Bid - Initial Offer		23.03.2023	Opening of Financial Bid - Initial Offer	
		02.03.2023	Electronic reverse auction (Financial Bid – Final		24.03.2023	Electronic reverse auction (Financial Bid – Final	
			Offer) for the Qualified Bidders.			Offer) for the Qualified Bidders.	
		07.03.2023	Submission of original hard copies of Annexure		29.03.2023	Submission of original hard copies of Annexure	
			3, Annexure 4, Annexure 6, as applicable and			3, Annexure 4, Annexure 6, as applicable and	
			Annexure 14 by the bidder with lowest Final			Annexure 14 by the bidder with lowest Final	
			Offer			Offer	
		10.03.2023	Selection of Successful Bidder and issue of LOI		03.04.2023	Selection of Successful Bidder and issue of LOI	
		20.03.2023	Signing of RFP Project Documents and transfer		13.04.2023	Signing of RFP Project Documents and transfer	
			of Beawar Transmission Limited			of Beawar Transmission Limited	

SI.	Clause	Existing Provisions	New / Revised Clause
No	No.		
3.	2.13.1 of RFP		
		Opening of Envelope (Technical Bid): 1130 hours (IST) on 20.02.2023	
		Opening of Initial Offer: Initial Offer shall be opened by the Bid	
		Opening Committee in presence of the Bid Evaluation Committee at 1120 hours (IST) on <b>01 03 2022</b> in the office of CEA	
4.	Article	1130 hours (IST) on <u>01.03.2023</u> in the office of CEA. <b>13</b> EVENTS OF DEFAULT AND TERMINATION	1130 hours (IST) on <u>23.03.2023</u> in the office of CEA. <b>13</b> EVENTS OF DEFAULT AND TERMINATION
	13 of TSA docume	13.1 TSP's Event of Default	13.1 TSP's Event of Default
	nt		
		<u>k. deleted</u>	k. the TSP fails to take the possession of the land required for location specific substations, switching stations or HVDC
			terminal or inverter stations and / or fails to pay the requisite price to the parties and / or any State Government authority
			from whom the land is acquired, within twelve (12) months from the Effective Date.
5.	RFP & TSA		New Clause Added
	IJA		Specific Technical Requirement for STATCOM

# Appendix 1

## 1. Introduction:

This technical specification for a Static Synchronous Compensator (STATCOM) Station consists of STATCOM, Mechanically Switched Capacitors (MSCs) and Mechanically Switched Reactors (MSRs) (to be installed at MV bus) including associated coupling Transformer (rated 400/xx kV) and other equipment connected to the 400 kV bus. MV voltage level (xx kV) of the coupling Transformer can be chosen by the TSP to optimize the offered solution which meets functional requirement of this Technical Specification.

The STATCOM station shall operate asymmetrically in the leading and lagging MVAR region as applicable to reach the dynamic range specified. The purpose of the STATCOM station is to regulate the voltage of 400 kV Bus [Point of Common Coupling (PCC)]. The Configuration and the nominal rating of the STATCOM station is specified in this document.

The main building block of the STATCOM should be single phase VSC based convertor valve (multi-level) operating in a way to eliminate or minimize ac filter requirement to High pass filter only and connected to the xx kV bus through air core reactors. The STATCOM may comprise of multiple identical STATCOM units (minimum two) operating in parallel.

#### **1.1 Definitions and Abbreviations**

For the purpose of this specification, the following definitions / abbreviations are used:

**PCC**: Point of Common Coupling. The connection point between the STATCOM and the power system at which performance requirements are defined.

**Reference Voltage (Vref)**: The Point on the voltage/current (V/I) characteristic where the static synchronous compensator (STATCOM) is at zero output (i.e. where no reactive power is absorbed from or supplied to the transmission system where the voltage is controlled)

MV: Medium Voltage.

**STATCOM Unit**: Static Synchronous Compensator based on Multi-Module technology and including air core reactors as needed, Valve cooling, switchgear and its control and protection.

**STATCOM**: Static Synchronous Compensator consisting of multiple STATCOM Units operating in parallel and connected to a common coupling Transformer. A static synchronous generator operated as a shunt connected compensator, whose capacitive or inductive output current can be controlled independently of the ac system voltage.

**MSC**: Mechanically Switched Capacitor (Including Switchgear). A shunt-connected circuit containing a mechanical power-switching device in series with a capacitor bank and a current limiting reactor.

**MSR**: Mechanically Switched Reactor (Including Switchgear). A shunt-connected circuit containing a mechanical power- switching device in series with a reactor.

**Sub Module**: Basic single power module of a Multi Module STATCOM unit Valve. It is a Part of a STATCOM unit valve comprising controllable switches and diodes connected in full bridge arrangement, together with their immediate auxiliaries, and storage capacitor, if any, where each controllable switch consists of one or more switched valve device(s) connected in series.

**Valve**: Electrically and mechanically combined assembly comprised of forced commutated devices (for example, IGBT) assembled in levels, complete with all connections, auxiliary components, and mechanical structures, which can be connected in series with each phase of reactor of a STATCOM unit.

**Valve Section**: Electrical assembly defined for test purposes, comprising one of several sub modules.

**Valve Structure**: Physical structure holding valve(s), which is insulated to the full system voltage above earth potential.

**STATCOM Station**: STATCOM Station includes 400 kV Switchgear, Coupling Transformer, STATCOM, MSCs (as applicable), MSRs (as applicable) along with its switchgears and complete integrated control and protection whose outputs are coordinated. (Complete turnkey delivery at site).

**CT**: Current Transformer.

**VT**: Voltage Transformer.

**SAS**: Substation Automation System.

**Response Time**: the duration from a step change in control signal until the voltage changes by 90% of its final change, before any overshoot.

Settling Time: The duration from a step change in control signal input until the STATCOM output settles to within  $\pm 5\%$  of required control output.

**Slope**: The ratio of the voltage change to the current change over a defined controlled range of the STATCOM, normally the full (inductive plus capacitive) range at nominal voltage, expressed as percentage.

**VSC**: Voltage Source Convertor, A forced commutated device (for example, IGBT) based self-commutated convertor that is capable of generating ac voltage from DC capacitor.

**Voltage/Current (V/I) Characteristic**: The relationship between the current of the STATCOM and the voltage at its point of connection.

**Lagging Operation**: Inductive operation or reactive power absorption of the STATCOM similar to a shunt reactor.

**Leading Operation**: Inductive operation or reactive power generation of the STATCOM similar to a shunt Capacitor.

**TSP:** Transmission Service Provider

#### 2. Relevant Standard:

STATCOM Station shall comply with the following standards (latest edition):

Sl. No.	Description	Standard
1.	Voltage sourced converter (VSC) valves for STATCOM	IEC- 62927
		IEEE- 1052
		IEC-60747
2.	Control, protection & monitoring	IEC-61000
		IEC-60255
3.	Valve Hall for housing the equipments as above	IEC-60071
	comprising of:	IEC-60270
	- wall bushings for connection between converter	IEC-60137
	phases and decoupling reactors,	
	- piping and tubing connections of the cooling system to converter	
	- connection of the control cabinet with the converter	
	through optical fibers	
	- internal lighting, auxiliary power supply (AC and	
	DC) and power socket system	
	- internal HVAC system	
4.	X kV, dry insulated, air core and air self-cooled	IEC- 60076
	decoupling reactors. Mechanically Switched Reactors,	
	half-reactors stacked on above the other, Outdoor	
	installation, Complete with supporting structures	
5.	Power Capacitors (MSC etc.)	IEC-60871-1
6.	400 kV Power transformer (Coupling Transformer)	IEC-60076
		IEC-60354
7.	CT's and VT's	IEC- 61869
8.	Dis-connectors and Earthing Switches	IEC- 62271
9.	HV & MV Circuit Breakers	IEC- 62271
10.	Surge Arresters	IEC- 60099
11.	Auxiliary & grounding transformer	IEC- 60076
		IEEE C57.32
		IS- 5553 (Part 6)
12.	Neutral Grounding Resistor, charging resistor	IEEE- C57.32
13.	UPS, SMPS & Other Power supply units	IEC- 62040
		IEC- 61558

14.	Others items as per relevant standards specified elsewhere in the specification for substation works.	
15.	Cyber Security	IEC-62243

#### 3. Scope of work

The scope of work with regard to the works associated with the STATCOM comprises of  $\pm 2X300$  MVAr Modular Multi-level Voltage Source Converter (MMC-VSC) based STATCOM along with 4x125 MVAr MSC (Mechanically Switched Capacitors) and 2x125 MVAr MSR (Mechanically Switched Reactors). 02 Nos. STATCOM shall be distributed in two different 400 kV bus sections of the substation. The TSP shall be responsible for complete installation of STATCOM station along with the substation works as specified in the complete scope of work.

The TSP shall also perform the system studies (steady state and dynamic) according to the requirement mentioned and documentation of the same shall be preserved by TSP & to be submitted to CEA/CTU/GRID-INDIA, as per their request.

The switchgear for connection of STATCOM units, MSCs and MSRs provided on the secondary side of coupling transformer shall be of standard voltage rating as per IEC. The switchgear, structure, control, protection and substation automation on 400 kV side shall be as per applicable Technical Specification of the substation equipment.

Generally, the purpose of STATCOM is to improve system stability, provide damping, and to smooth out the step voltage change associated with MSCs, MSRs and external compensating equipment (i.e. any existing capacitor and reactor banks) switching and provide steady state VARs as needed to support the 400 kV bus voltage.

In order to get optimum control of MVAR, the control of MSCs and MSRs, as well as reactor banks connected on the 400 kV HV side, shall be integrated along with STATCOM control to provide steady state 400 kV bus voltage control in a smooth manner. MSRs and MSCs are to be switched to relieve the STATCOM from high level operation, reduce its continuous losses and maximize its dynamic control potential. The operating functions of the STATCOM Station shall include:

- Steady state voltage control of 400 kV bus,
- Balance steady state voltage at 400 kV bus,
- Dynamic over-voltage control,
- Transient and Dynamic stability control
- Damping of Power Oscillations

It is assumed that the arresters will limit any transient and switching surge over voltages and may also, by design, limit dynamic over voltages.

The requirement of reactive power compensation (as defined above) guaranteed by the TSP shall not be less than the levels specified considering following.

- The total cumulative Capacitive (+) and Inductive (-) MVAR rated Capacity of STATCOM Station as defined above comprising of STATCOM, MSCs (as applicable), MSRs (as applicable), coupling transformer, coupling reactor or any filter (if applicable) shall be rated at 1 p.u. voltage, 1 p.u. frequency and 20° Celsius ambient temperature at 400 kV Bus (Referred to as "Point of Common Coupling" or PCC).
- Capacity of one or more branches of MSC, MSR in STATCOM Station can be included in the offered STATCOM with equivalent capacity. Accordingly, ratings of STATCOM Unit/Branch equipments may be designed.

Example of equivalent acceptable solutions for each STATCOM Station is given below:

- **Option 1**: ±300MVAR STATCOM, 2x125MVAr Mechanically switched Shunt Capacitor (MSC), 1x125MVAr Mechanically switched Shunt Reactor (MSR).
- **Option 2**: +425/-300MVAR STATCOM, 1x125MVAr Mechanically switched Shunt Capacitor (MSC), 1x125MVAr Mechanically switched Shunt Reactor (MSR).
- **Option 3**: +300/-425MVAR STATCOM, 2x125MVAr Mechanically switched Shunt Capacitor (MSC).
- **Option 4**: ±425MVAR STATCOM, 1x125MVAr Mechanically switched Shunt Capacitor (MSC)

**Option 5**: +550/-425MVAR STATCOM

- The rated capability of STATCOM, MSC (as applicable) & MSR (as applicable) shall be at 400 kV (Referred to as "Point of Common Coupling" or PCC) and in the steady state frequency range of 48.5 Hz-50.5 Hz.
- The STATCOM Station including STATCOM Units, MSCs and MSRs shall be designed to operate continuously under the worst possible combination of steady state voltage and frequency range of 360-440 kV and 47.5 Hz – 52 Hz respectively and transient and temporary over voltages defined in Clause 6.1-f).

- The ac voltage unbalance at fundamental frequency shall be assumed equivalent to a negative phase sequence component of 1.5 % for equipment rating purposes.
- The reactive power compensation levels shall be determined by manufacturing tolerances of the components and measurements carried out using metering accuracy instrumentation at the 400 kV feed points to the STATCOM Station.
- The reactive power capability shall also be determined by calculations based on test values of appropriate quantities at the discretion of the owner.
- In calculations of capability and availability, the owner shall assume the most unfavourable combinations of control, manufacturing and measurement tolerances.
- In case more than one STATCOM Station are installed in a particular substation, each STATCOM Station shall be connected to 400 kV bus individually with complete separate downstream system. Each individual STATCOM station shall have complete independent yet coordinated control system to avoid simultaneous tripping of both STATCOM Stations. The system shall be design in such a way that single common contingency (other than loss of 400 kV voltage, abnormal system events) will not cause tripping of both STATCOM Stations.
- Operation of STATCOM Station shall not excite any resonance condition in connected Power System.
- Control of STATCOM Station shall be designed to prevent hunting between MSRs, MSCs and STATCOM.

# **3.1 STATCOM building**

The STATCOM station shall have independent building including a separate control room different from the main control room building of the Substation. The Building shall comprise of valve halls, cooling system room, control room, LT Switchgear room, Battery room, workshop, Document/Library and general facilities etc.

The STATCOM Building shall comprise of following facilities

- 1. Control & Relay Panel room
- 2. AC Distribution Board & DC Distribution Board room
- 3. Battery room
- 4. Service Room cum workshop

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- 5. Conference room
- 6. Valve hall
- 7. Cooling system room
- 8. Lobby
- 9. Corridor with minimum width of 1600 mm
- 10. Portico
- 11. Common Toilet
- 12. Provision of shaft for electrical, sanitary, water supply facilities
- 13. Other facilities as per functional requirement of building
- 14. Air Handling Unit (AHU) Room

## 4. Ambient Condition

STATCOM Station should be designed to perform under the ambient conditions of the site where the STATCOM is required to be installed.

## 5. Power System Characteristic

The following AC power system characteristics apply at the point of connection i.e. point of common coupling in this case (PCC). STATCOM station operation is required within the parameter value and duration given in following table:

S. No	Power System Characteristic	Value	unit
1.	Nominal ac system voltage, line-to-line	400	kV
2.	Maximum continuous ac system voltage, line-to- line	420	kV
3.	Minimum continuous ac system voltage, line-to-line	380	kV
4.	Maximum short-term ac system voltage, line-to-line	448	kV
5.	Maximum duration of item 4	10	S
6.	Minimum short-term ac system voltage, line-to-line	120	kV
7.	Maximum duration of item 6	5	S
8.	Continuous negative-sequence voltage component (used for performance calculation)	1	%
9.	Continuous negative-sequence voltage component (used for rating calculation)	1.5	%
10.	Continuous zero-sequence voltage component	1	%
11.	Nominal ac system frequency	50	Hz
12.	Maximum continuous ac system frequency	50.5	Hz

S. No	Power System Characteristic	Value	unit
13.	Minimum continuous ac system frequency	48.5	Hz
14.	Maximum short-term ac system frequency	52	Hz
15.	Minimum short-term ac system frequency	48	Hz
16.	Basic Insulation Level (BIL)	1550	kV peak
17.	Switching impulse level (SIL)	1050	kV peak
18.	Power Frequency Withstand voltage	630	kV
19.	1) Maximum three-phase fault current		
	a) for performance requirements	1 a) 63	kA
	b) for rating of STATCOM	1 b) 63	kA for 1s
	2) X/R (Positive/Negative Seq)	2) 34.8	
	3) X/R (Zero Seq)	3) 9.8	
	4) Clearing time - normal	4) 0.10	S
	5) Clearing time – backup	5) 0.75	S
20.	Maximum three-phase fault current	63	kA
21.	Minimum three-phase fault current		
	-for performance requirements	22.7	kA
	-for safe operation	22.7	kA
22.	Maximum single-phase fault current	63	kA
23.	Minimum single-phase fault current	13.3	kA
24.	Harmonic impedance sectors for each harmonic number up to the 49th harmonic or system impedance data as R-X values with frequency steps not larger than 1 Hz (for performance and/or STATCOM system component rating)	Chapter 7.3 Publication	
25.	Background harmonic voltage (or current) spectrum (for STATCOM components rating) (Distortion up to 15th Harmonic	5th Harmo 7th Harmo Other Harm (eao	onic 1.0% onics 0.5%
26.	Power System Phase Rotation	CC	W

# Specific Technical Requirement for STATCOM

# 6. STATCOM Station Characteristics

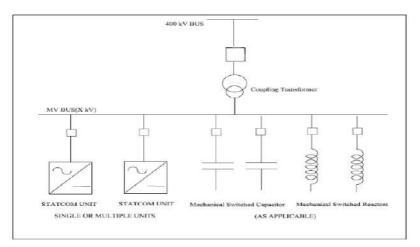
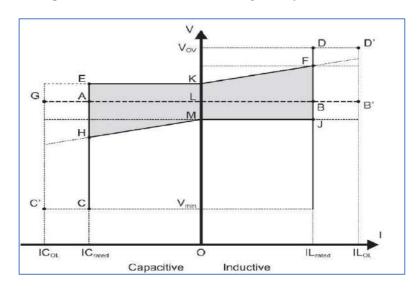
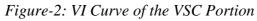


Figure-1: Conceptual Indicative Schematic diagram of STATCOM Station





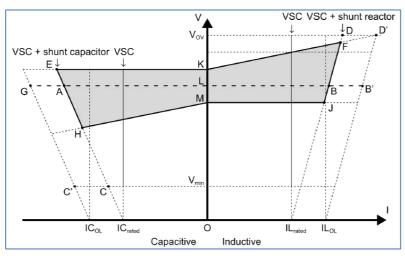


Figure-3: VI Curve of the STATCOM Station

#### 6.1. STATCOM Station Ratings

The output of a STATCOM Station shall be adjusted continuously over the range illustrated in Figure-3.

The following items define the ratings of the STATCOM station equipment.

- a) The STATCOM Station should regulate the 400 kV bus voltage to a reference voltage of 400 kV (1.0 per unit, Point L Figure-3), continuously adjustable between 0.95 per unit and 1.05 per unit.
- b) The nominal capacitive and inductive reactive power output of the STATCOM should be as defined in the scope, at 1.0 p.u. ac bus voltage and nominal system frequency, and 20°C ambient temperature (Point A and point B of figure-2).
- c) The slope of the STATCOM Station characteristic should be adjustable in steps of not greater than 0.5% between 1% and 8%, on a basis of cumulative MVA capacity of STATCOM Station (A+B in Figure-2).
- d) The STATCOM Station should continue to generate reactive power during temporary under voltage down to 120 kV (0.3 p.u.) for the duration of 5 seconds (Point C); the STATCOM system may be tripped (or blocked) if the under voltage persists for more than 5 seconds.
- e) The STATCOM should continue to absorb reactive power during temporary over voltages in a controlled manner as per the following.

Temporary Overvoltage	Duration
up to 600kV (1.5 p.u.p.u.)	10 seconds
up to 704kV (1.76 p.u.p.u.)	100 milli seconds
up to 800kV (2.0 p.u.p.u.)	50 milli seconds

STATCOM Station may be tripped if the respective temporary over voltages as mentioned above persists for more than its respective mentioned duration.

- f) The STATCOM Station should be capable of repeating temporary operation as defined in any one of item (d) and (e) as above for at least 3 charging cycles in 60 minutes .
- g) The coupling transformer and all bus equipment, such as filter branches (if applicable), MSC & MSR branches etc. and the MV Bus should be rated to withstand the specified continuous and short-term operation, and to withstand or be protected against voltage and current stresses that exceed these conditions.
- h) All equipment in the STATCOM Station should be capable of sustaining, without damage, any fault limited by the maximum design short circuit level of the system and the Coupling transformer impedance.

- i) The TSP shall assume the negative sequence voltage of 1% at rated short circuit level and provide control to reduce this unbalance.
- j) The injected harmonics by STATCOM Station under the full operating range measured at 400 kV Bus (PCC) in accordance with IEEE-519-2014 and limiting values of individual harmonic distortions and total harmonic distortion shall be 0.5% and 1% respectively.
- k) The STATCOM controls should be designed to correct negative sequence voltage during steady state operation.
- 1) The switching module design should include an appropriate allowance for stray capacitance and component tolerances.
- m) The STATCOM should be designed to prevent, or alternatively to withstand, false firing events, i.e., the firing of any valve at an incorrect time in the cycle or when not ordered.

# 6.2. Control Objectives

The control system shall control the STATCOM, MSCs, MSRs required under this specification, as well as all bus reactors on the 400 kV HV bus of the substation.

Operation logic for the breakers, disconnectors and earth-switches in the STATCOM Station shall also be incorporated in the control system. The control shall be programmable and shall have sufficient scope and flexibility (software programming margin of at least 20%) to permit re-programming according to future changes/addition in the power system. The operator interface must be integrated in a latest version of Windows environment.

# **6.2.1.** STATCOM Station Functions and Applications

# 6.2.1.1. Voltage Control mode (Automatic and Manual)

Control of the positive sequence component of the fundamental frequency voltage in steady state and dynamic operation, with slope in the range as specified at clause 6.1 c) above.

# **6.2.1.2.** Fixed Reactive Power Mode

In this mode, the reactive power output of the STATCOM as well as switching of MSRs and MSCs, should be manually controlled, by direct operator action. This feature is normally utilized for testing purpose.

# 6.2.1.3. Steady State Condition

The STATCOM Station shall provide necessary reactive power support to the 400 kV bus (PCC) to compensate for voltage variation under steady state.

# 6.2.1.4. Dynamic Over-voltage Control Performance

The STATCOM shall be required to provide necessary reactive power support with fast and smooth variation so that over-voltages under dynamic conditions are controlled. STATCOM shall smooth out the step caused by switching of MSCs and MSRs.

The operation of each STATCOM over its range of MVAR from full capacitive to full inductive capacity and vice-versa shall be on the basis of smooth variation.

## **6.2.1.5.** Transient and Dynamic Stability Performances

The STATCOM Station shall provide necessary reactive power so that transient and dynamic stability of the Owner's system are enhanced.

## 6.2.1.6. Damping of Power Oscillations

The STATCOM shall provide necessary damping to power oscillations by modulating its output in its entire range based on measured rate of change of power/frequency at the 400 kV bus. The damping controller would track local area oscillations as well as wide area oscillations and control would include several loops each focused on different frequency.

#### **6.2.1.7.** Facility for compensation of phase imbalance

Provide negative phase sequence voltage control to minimize presence of negative sequence content of the 400 kV bus voltage.

#### 6.2.1.8. Start up and Initial Switching

The operation of STATCOM Station during start-up/initial switching on should not create significant energizing transients causing voltage drop, voltage distortion and swinging of transmission voltage angle at the PCC bus by more than  $\pm 5\%$ . TSP shall have to ensure this analytically during design phase and also in the field after commissioning of the facility. TSP shall prepare the design documentation and the same shall be preserved by TSP and to be submitted to CEA/CTU/GRID-INDIA, as per their request.

## 6.2.1.9. Gain Supervision and Control

To control regulator gain in order to prevent oscillations and excessive overshoot in the STATCOM response, a gain supervision function shall be implemented.

This shall be an essential function for supervision of stability of the closed loop voltage control. The function of this controller is that when the supervision of the gain in the voltage regulator detects oscillations in the voltage controller output, the gain shall gradually be reduced until stability is reached. Normally it is a changed condition in the transmission system contribution to the closed loop gain that results in the instability. The reduction in the voltage regulator gain shall only balance the external change. The control should be adaptive in order to maximize its effectiveness. Gain reductions should be indicated and the reduction of the gain shall be able to be reset to nominal value by means of commands from the operator interface or automatically. A relative gain factor shall also be able to be changed from a gain optimizer.

#### 6.2.1.10. Coordinated reactive power control of external devices

To optimize the use of dynamic vars versus steady state vars, control of externally connected shunt capacitor or reactor banks shall be implemented. Such banks will be connected locally to a HV bus or/and at MV bus. For simultaneous control with the supplementary VSC current controller, coordination for the two functions shall be provided. External devices like MSCMSR can be switched ON or OFF to position the steady state operating point of the VSC so as to extend its dynamic range.

#### 6.2.1.11. Supplementary VSC current controller

To optimize the use of dynamic vars versus steady state vars, a control function that slowly reduces or offsets the STATCOM point of operation shall be implemented. By deliberately adjusting the voltage reference setting within a narrow window the STATCOM system output is pushed toward either a specific point or toward a window to preserve dynamic range. This slow operating function is meant to provide for slower controllers, such as externally connected shunt bank to operate and meet the slower long term voltage variations caused by daily or weekly load variations. Rapid changes in the system voltage that call for dynamic compensation will have priority over this type of controller.

#### 6.2.1.12. Gain optimization

To provide operation at optimal regulator gain, a fully automatic optimizing function shall be implemented. This function operates by inducing a small change in the STATCOM output. The gain is adjusted based on the network response signal.

# **6.2.1.13.** Control of Direct Current

During STATCOM operations, any flow of direct current to transformer MV side must be less than 25% of transformer magnetizing current. DC current flow in the transformer should be minimized by an independent control function which minimizes DC current. For presence of up to 0.2% second harmonic in 400 kV system, the STATCOM control should minimize DC current flow in the transformer.

# 6.2.2. Under Voltage Strategy

It is essential that the STATCOM Station operates in a robust manner when transmission system under voltages appears. For transmission system voltages down to 0.3 p.u., the STATCOM units must operate unrestricted, producing its rated capacitive current. The STATCOM must be designed to operate at transmission system under voltage, even considering that severe voltage unbalances can appear. The STATCOM must not be restricted by short term negative sequence voltages up to 1.5%, appearing in conjunction with under voltages.

Transmission system under voltages below 0.3 p.u. p.u.will appear in conjunction with transmission system faults. The STATCOM must ride through during faults and post fault under voltages. The minimum trip delay for the STATCOM Station, upon complete loss of the transmission system voltage shall not be less than 5 seconds. If station AC auxiliary power distribution is affected, critical loads must be fed from DC station batteries/UPS without tripping the STATCOM Station. Adequate capacity must be kept in DC station batteries/UPS to feed critical loads for smooth operation of the STATCOM Station battery system capable of delivering 100% load.

At under voltage conditions for the transmission system voltage, special control strategies are activated which override the normal control modes presented above. Normally if the voltage is low, the output from the STATCOM will be capacitive. If the voltage in all three phases goes below a level, but not greater than 0.3 p.u.p.u., a special under voltage strategy may be activated that controls the STATCOM output to 0 Mvar. As soon as the voltage goes higher than 0.3 p.u.p.u., the under voltage strategy is deactivated and the normal control will be in operation.

The STATCOM Station must not be tripped or shutdown automatically for under voltages appearing for less than 5 seconds. STATCOM Station must continue to operate at AC system Voltage up to 0.35 p.u.p.u.voltage on 2 phases with above 0% on the third phase or above 0.3 p.u.p.u.on all three phases until the fault is cleared and line is reclosed. The reclose time shall be up to 2.6 seconds.

# 6.2.3. Over Voltage Strategy

**6.2.1.** The TSP shall carry out dynamic stability study upfront in order to assess the dynamic overvoltage requirements. These studies shall include conditions with maximum and

minimum short circuit system MVA conditions, single phase and three phase faults as well as stuck breaker, outage of nearby generator and also with outage of parts of the STATCOM Station. It is important that the STATCOM Station rides through temporary over voltages and not trip when it is needed the most.

- **6.2.3.2.** The system should be able to withstand any 3 phase 5 cycle (100 ms) and single phase 10 cycles (200 ms) fault with consequent loss of a 400 kV double circuit line and loss of a 500 MW generator. The fault duration mentioned above correspond to time assumed for persistence of fault. For other system parameters refer clause 5 above (Power System Characteristics). In addition to above requirement, system contingency cases as provided in Annexure-I shall also be withstood.
- **6.2.3.3.** The 400 kV system and equipment to which the STATCOM Station is connected is designed to withstand switching surge overvoltage up to 2.5 p.u. and power frequency over voltages up to 1.5 p.u. with initial value of the temporary overvoltage up to 2.0 p.u. for 1-2 cycles. Based on arrestor coordination and under the worst case scenario the 400 kV system phase to ground peak over voltages may be expected as follows:
  - i) 650 kVp for 3 peaks
  - ii) 575 kVp up to 5 cycles
  - iii) 530 kVp up to 1 second
  - iv) 475 kVp up to 10 seconds
  - a) The STATCOM Station shall be designed to withstand these sequential over voltages.
  - b) If the over voltages greater than 1.1 p.u. are exceeded in magnitude and duration due to any system contingencies, suitable control action shall be taken by STATCOM Station to bear this kind of contingency.
  - c) The TSP shall evolve the insulation co-ordination of the components of the STATCOM Station after studies have been conducted to determine the overvoltage profile with the STATCOM connected to the system.
  - d) The TSP shall ensure that STATCOM Station will not excite ferro-resonance and sub-synchronous oscillation in the AC system. The study report in this regard shall be preserved and to be submitted to CEA/CTU/GRID-INDIA, if required.
  - e) It may also be noted that the tripping action for 400 kV lines is initiated if the overvoltage exceeds 1.12 p.u. for 10 seconds. The tripping of 400 kV lines is initiated if 1.5 p.u. voltage persists for more than 100 milli seconds. The over voltage strategy shall be coordinated with these setting such that the STATCOM Station rides through up to these levels.

# 6.2.4. STATCOM Station Over load/Over Current

The overvoltage cycles mentioned in clause 6.2.3.3 above create a corresponding current overload in the STATCOM Station components; the STATCOM Station and its components shall be designed to withstand these.

In addition to the above the STATCOM Station and its components shall be designed to withstand overloading caused due to the following eventualities.

- Short circuits and ground faults in the 400 kV system especially those occurring near to the STATCOM Station and medium voltage bus of the STATCOM Station.
- ii) Transient overvoltage due to switching operations and atmospheric effects.
- iii) Temporary over voltages.
- iv) Short circuits in the transformer secondary circuit such as
  - Bushing terminal fault
  - Flashover across a reactor, Bus Bar and other connected components/switchgear etc.
- v) Protection system faults.

If the rated overvoltage is exceeded as a result of prolonged stressing or for other reasons, the protection specified elsewhere in the specification shall come into effect to prevent damage.

#### 6.2.5. Dynamic Performance Controls of STATCOM Station

The TSP must describe in detail, the dynamic reactive power controls for enhancing stability margin and also damp oscillations of any critical frequencies. The dead band for continuous damping control must be very small so that there no discernible sustained oscillations.

#### 6.2.6. Protective Control Functions

TSP shall provide all necessary protections including Main and Back-up protections for all protective zones and equipments like transformers, STATCOM Units, MSCs (if applicable), MSRs (if applicable), MV Bus Bar etc. TSP shall provide any protective control functions to meet the performance requirement of STATCOM under the scope of the TSP.

#### a) Overvoltage Protection

TSP shall provide adequate overvoltage protection as a result of any normal operation, mal-operation or system event.

#### b) Over current Protection

TSP shall provide adequate over-current protection for the STATCOM Station as a result of any abnormal operation, mal-operation or system event.

# c) Gate level control Supervision

TSP shall provide adequate Sub module Gate level control supervision.

# 6.2.7. STATCOM Station Response

STATCOM station response shall be such that the change in measured system voltage to small disturbance should reach 90% of the desired total change within 30 ms of the initiating a 5% step change of voltage reference. The maximum overshoot should not exceed 120% of the total change and the settling time should not exceed 100 ms, after which the voltage should be within  $\pm$ 5% of the final value. This response characteristic within these limits must be respected when the system three-phase fault MVA is between the minimum and maximum value defined in clause-5. The response of the system voltage using the actual controller should be validated on a real time simulator during the Factory Acceptance Test (FAT) at the manufacturer's premises. For the purpose of STATCOM Station response time measurement and signal conversion of the voltage, error should not exceed 0.3%. The voltage response acquisition circuit should have a response time no longer than 10 ms. However, time longer than 10 ms can be allowed provided the requirement of STATCOM response time is met.

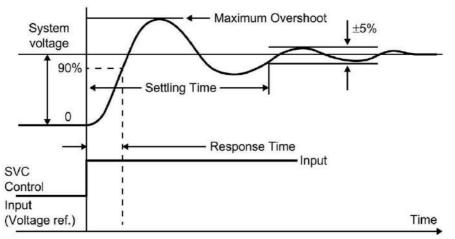


Figure-4 Response and Settling time

# 6.3. Harmonic performance and AC harmonic filter design

It is likely that with multi-level VSC based technology, no filters or only a small highpass filter will be needed. The STATCOM shall be operable without AC filters. The STATCOM Station should be designed to eliminate the effects of any harmonic resonance between its MSRs, MSCs banks, filters branches, and the AC system. To limit the harmonic distortion imposed on the 400 kV transmission system, additional contribution of harmonic distortion from the STATCOM Station to 400 kV system (PCC) should not exceed 1% for total and 0.5% for any specific harmonic.

## **6.3.1.** Filter performance

The distortion levels as specified should be met for the following:

- a) The continuous range of all system and environmental conditions.
- b) Variation in total filter capacitance due to manufacturing tolerance, ambient temperature, aging and changes in capacitance up to alarm level.
- c) Variation in tolerance for STATCOM parameters, such as transformer winding unbalances, valve firing variations MSC and MSR unequal reactor and capacitor reactance between phases.
- d) System frequency in the range of 48.5 Hz to 50.5 Hz. Calculation should take into account all possible combinations of STATCOMs, MSCs and MSRs.

#### 6.3.2. Filter component rating

The harmonic filter components (and other STATCOM components) should be rated to carry continuously the harmonic currents caused by the background harmonic distortion of the system and the harmonic currents produced by the STATCOM itself. Unless otherwise specified, harmonic currents from the system and the STATCOM of the same order should be added arithmetically. All filter harmonic currents of different order should be added quadratically (root sum of squares).

The rated voltage of capacitors should be derived from the largest arithmetic sum of the power-frequency and individual harmonic voltages obtained from stress calculations in continuous operating conditions (Note: Maximum fundamental voltage and maximum harmonic contributions may not exist at the same time for STATCOM configurations including MSRs or MSCs).

For filter capacitor voltage rating, the loss of capacitor unit or elements should be considered up to the trip level.

The rated voltage of so-called "low voltage" capacitors (e.g. in double or triple tuned filters) should be chosen such as to also withstand imposed transient stresses from faults, energization or other switching events.

#### 6.3.3. Harmonic at PCC

The STATCOM Station contribution to the harmonic distortion levels at the STATCOM Station connection point (PCC) to the transmission system shall not exceed the limits below.

Following are the maximum limits given using denominations according to IEEE STD 519-2019. The 2nd to the 60th harmonics should be considered.

Individual harmonics voltage distortion (Dn) < or = 0.5 %Total Harmonic voltage distortion factor (THD) < or = 1 %

#### 6.3.4. Harmonic calculation:

Chapter 7.3 of CIGRE Publication 139 together with information in PSSE network files given shall be used for the Network harmonic impedance.

#### 6.4 MV Switchyard

- Medium Voltage (MV) delta bus shall be grounded through a Grounding Transformer (i.e. zig-zag winding Transformer) along with suitable resistor in the neutral.
- MV Switchyard of different STATCOM Station branches shall be fenced with the fence height of 3 meter. Suitable arrangement i.e. electrified fence shall be done to prevent the encroachment of unwanted animal or other to minimize the probability of electrical faults (Ph-E, Ph-Ph). Further bus bar arrangement shall be made in a way to minimize the probability of electrical faults.
- Secondary side of the Coupling Transformer shall be provided with suitable surge capacitors to mitigate transfer surges.
- For MV bus bar, Aluminum conductor (Tube, Rectangular Hollow Section or C Section) may be used, however, suitable bus bar end cover/cap shall be provided to avoid any animal/bird entering the hollow space.

#### 6.5 Broadband Interference

#### 6.5.1 Radio Interference (RI)

The TSP shall take necessary precautions in the form of shielding of valve hall and building or Containers. Further, the following requirements shall also be met:

a) With the STATCOM Station operating at any load upto rated value and within the design range of firing angle, the radio interference level from electromagnetic or electrostatic inductions generated by the STATCOM station shall not exceed 100 micro-volts/m, under fair weather conditions, at any point outside the station fence. The RI criteria shall be achieved at all frequencies within the range of 150 kHz to 300MHz and with the STATCOM operation at any level up to and including rated value, the design shall provide correcting measures, should the specified design not being realized in the final installation.

- b) Measurements of actual RI at STATCOM Station shall be made by the TSP, at points along the above defined contour and at other critical point.
- c) RIV (Radio Interference voltage) measured at a phase to ground voltage (266 kV rms) in accordance to NEMA-107 shall not be more than 500 micro-volts for 400 kV system. For other system voltages IEC/NEMA in the order of preference shall be applicable.

# 6.5.2 Interference with Power Line carrier & open wire carrier system

The TSP shall take the necessary precaution in the form of noise suppression techniques and filtering devices to prevent harmful interferences from STATCOM Station to Power Line Carrier Communication (PLCC) system operating on connected AC transmission network.

The frequency spectra to be protected are:

System	Frequency spectrum
Power Line carrier	30 kHz to 500 kHz
Open wire carrier	5 kHz to 30 kHz

#### 6.6. Audible Noise

The TSP shall limit the audible noise in various areas of the STATCOM Station buildings and Containers to the following values.

Valve hall (Inside)	90 dBA
Mechanical equipment areas indoor (measured at 2 metre distance)	75 dBA
Mechanical equipment outdoor (Measured at 15 m distance)	75 dBA
Control Room Building*	60 dBA
At the limits of STATCOM STATION perimeter fence	80 dBA

*This is the background noise from the ventilation system adjacent rooms, control cubicles etc. Printers, recorders may be switched off during measurement.

# 6.7. Loss Requirements

**6.7.1.** The TSP must guarantee the total losses of STATCOM Station, be less than 1% of the reactive power output individually at its inductive limit (STATCOM+MSRs) and capacitive limit (STATCOM+MSCs) for the cumulative highest reactive power output of STATCOM Station at PCC with worse combination of manufacturing tolerances. For

the purpose of total loss measurements, it should be assumed that ambient temperature is 20°C, the PCC voltage is 1 per unit, and the slope setting is 1 %. The STATCOM system may not operate at these conditions, but they provide a common base.

- **6.7.2.** The total losses shall include all components, as well as different parts or subsystems of complete STATCOM Station such as coupling transformer, All VSC systems and components, MSC Capacitors and Reactors, MSR Reactors, Control and protection systems, including ancillary devices such as HMI, fault recorders, and SCADA, Auxiliary Power supply systems, cooling systems, Building ancillary services such as lighting, air conditioning, heating, and ventilation. It may be noted that for the redundant VSC valve levels and dual/redundant control and protection systems, the losses of redundant VSC valve levels and dual control and protection systems shall be considered during loss measurement.
- **6.7.3.** For the dual or redundant systems design of STATCOM Station, such as dual pumps or redundant fans, dual systems losses to be excluded, if the dual system is not in service during the normal operation of the STATCOM Station. However, dual systems should be included if they are required to be in service under the defined operating conditions. The same methodology shall be applied for HVAC (heating ventilation and air conditioning systems).
- **6.7.4.** The TSP is required to prepare documentation for the detailed calculation of total losses based on measurement during Factory Acceptance Tests of major equipment and systems mentioned above as per relevant IS/IEC/IEEE standards & same shall be preserved and to be submitted to CEA/CTU/GRID-INDIA, as per their request. Further for equipment/systems, whose loss measurement cannot be done during Factory Acceptance Test, the same can be measured at site, and a combination of calculation and measurement shall be used to derive the total losses as specified above. During Loss measurement, all fans and pumps; valve room and control room air-conditioning system shall be switched on. However, redundant fans, pumps & air-conditioners shall be kept off during loss measurement.
- **6.7.5.** During the factory tests the losses for the following equipment shall be measured/ assessed as detailed below:

# Coupling transformer:

Losses shall be measured at factory/lab at the maximum rating, at power frequency as per relevant

IEC/IS under below conditions:

i. No load loss (Iron loss) at rated voltage and fundamental frequency.

- ii. Load loss (copper loss) at rating corresponding to maximum continuous current and at 75°C.
- iii. Transformer cooling equipment's loss (Auxiliary loss) at rated voltage and fundamental frequency.

#### **Reactors:**

The losses shall be measured at factory/lab at the maximum rating at power frequency as per relevant IEC/IS.

<u>VSC Valves:</u> Converter losses are composed of losses in power electronic switches [Insulated Gate Bipolar Transistor (IGBT) or equivalent], made up of conduction and switching losses, and the losses in DC capacitors, resistors, and inductors used within the converter system. Refer IEEE-1052 for calculating VSC losses.

# Capacitor:

The capacitor losses shall be measured at manufacturer's works at power frequency as well as calculated to obtain the losses in the complete bank on the basis of factory measurement.

#### Auxiliary System:

Auxiliary power losses shall be calculated from the KW and efficiency of all motors (name plate rating) of the cooling system, air conditioning, ventilation etc. The higher of the total losses for the entire auxiliary systems occurring at full capacitive capacity MVAR or full Inductive MVAR as the case may be shall be considered for arriving at the total losses.

#### Harmonic Filters, if any:

The losses shall be calculated at the maximum STATCOM Station loading at 400 kV and 50 Hz.

The calculations shall be on the basis of tested results of the components.

# 6.8. Selection of Insulation levels

# 6.8.1. Arrestors:

Protective levels of arresters connected to the 400 kV AC Bus Bars of the STATCOM Station shall be coordinated with the insulation and surge arrester Characteristics of the 400 kV AC systems to which the STATCOM Station is to be connected. The specification and characteristics of the surge arresters installed in 400 kV AC system is given in Substation specification. The front of wave (FWWL), lightning impulse (LIWL)

and switching impulse (SIWL) withstand levels shall be determined by the following margins:

- a) A SIWL at least 1.15 times the switching impulse protection level.
- b) A LIWL which is an IEC standard level corresponding to the SIWL and shall be at least 1.25 times the lightning impulse protection level.
- c) A FWWL which is at least 1.25 times the front of wave protection level.

In addition to above minimum basic requirement the various insulations level of 400 kV equipment shall be as below. The STATCOM Station equipment, coupling transformers etc. shall be co- ordinated accordingly.

	SIWL	LIWL
All equipment including Transformer Bushing and winding	1050 kVp	1425 kVp

#### **6.8.2.** Valves

The requirement of insulation levels of the valves shall be as per the design requirement.

#### 6.8.3. Air clearances

The air clearances shall be determined by the TSP based on the required withstand levels for all waveforms in order to limit the probability of flashover within the STATCOM Station to a target value of one flashover in 15 years.

# 6.8.4. Switchyard

The air clearances for switchyard equipment shall be equal to or greater than minimum values as specified in IEC-60071. Altitude correction factor (if any) shall also be considered as per IEC.

#### 6.8.5. Leakage distances

The Creepage/leakage distance across insulation shall be determined by the TSP and shall be adequate to ensure that under condition of heavy pollution, the probability of a flash over of an insulator does not exceed one in 15 years. However, the leakage distance for all AC insulators for outdoor installation shall not be less than 25 mm/kV of the maximum operating phase to earth rms voltage at the insulator. The leakage distance of equipment connected to 400 kV systems shall not be less than 10500 mm.

Specific creepage distance for outdoor bushings, insulator strings and long rod insulators shall be minimum 31mm/kV.

#### 6.9. STATCOM Station availability and reliability

The following definitions apply:

#### 6.9.1. Outage terms:

a) Outage

The stage in which an equipment is unavailable for normal operation due to an event directly related to the equipment which results in reduction in STATCOM Station capacity.

b) Scheduled Outage

An outage which can be scheduled at least one week in advance

c) Forced outage

The stage in which the equipment is unavailable for normal operation but is not in the scheduled outage stage and which results in reduction in STATCOM Station capacity i.e. an outage which is not scheduled outage.

#### 6.9.2. Capacity terms

Maximum Continuous Capacity (Pm)

The maximum STATCOM Station capacity (MVAR) for which continuous operation under normal condition is possible.

#### **6.9.3.** Outage duration terms

Actual Outage Duration (AOD) The time elapsed in hours between the start and end of an outage.

#### **6.9.4.** Time Categories

- a) The number of hours in the reporting period in a full year, the period year is 8760 hours. If the equipment is commissioned, part way through a year, the period hours will be proportionately less than 8760 hours.
- b) Total Outage hour (TOH)

The sum of all outage duration within the reporting period. TOH = AOD

#### 6.9.5. Availability & Reliability Terms

#### Unavailability:

Unavailability is the duration for which the STATCOM Station is not available with specified rating due to forced outages per year. If part of the station is unavailable, then the unavailability duration shall be counted proportionally. However, if STATCOM is out then its duration shall count as fully unavailable STATCOM Station. However, If STATCOM unit is out then the STATCOM Station unavailability shall be counted proportionally STATCOM capacity. STATCOM Station Control system outage shall count as full STATCOM Station unavailability. 'OF' is the outage frequency which will be the number of forced outages per year.

The period basis for availability and reliability calculations shall be 12 months. The TSP shall ensure that the design will meet the specified guaranteed and design target value of availability and reliability.

Outage times for repair, maintenance and replacement of components shall be based on the premises that all items in the list of recommended spare parts are on hand, that all maintenance schedule of recommended maintenance are adhered to. Reliability calculations shall be made and shall be presented as the expected frequency of unscheduled loss of STATCOM Station capacity. For simultaneous occurrence of events, for either of which a loss of capacity would result, the longer repair time shall be counted.

The facilities shall be assumed to be utilized 100% of the time at 100% load, regardless of the actual reactive power generated/absorbed by the STATCOM Station. Hence the availability and reliability assessment will be based on the capability of STATCOM Station to generate/absorb the rated reactive power regardless of whether, it is in service or not.

#### 6.9.6. Availability Requirement

The calculated availability of the system considered on the annual basis shall be equal to or exceed the following target values.

Minimum availability requirement of each complete STATCOM Station

Guaranteed for STATCOM Station - 98%

The outages of STATCOM Station capacity caused by the failure of equipment outside the scope of the TSP shall not be considered for calculation of availability and reliability guarantee. However, such outage shall be restricted to

- 1) Complete loss to 400 kV supply (at PCC)
- 2) Human Error.

Circumstances causing curtailment of STATCOM Station capacity that will be included

in reliability and availability assessment and which can lead to forced outages shall include but not be limited to the following:

- a) Failure of equipment
- b) Mal-operation of control and protection system
- c) Failure to start
- d) Reduction in capacity.
- 6.9.7. <u>Reliability Requirement</u>
  - a) Reliability

In the assessment of reliability, the following events shall also be considered to constitute a STATCOM Station outage:

- i) A STATCOM Station shut down.
- ii) A reduction of STATCOM Station capacity due to outage of any component of STATCOM Station

The calculated reliability of the complete STATCOM Station shall be equal to or exceed the following design target values.

The average outage frequency per year for each STATCOM Station shall not exceed the following values:

	Design target for	Max acceptable Guaranteed
	STATCOM Station	value for STATCOM Station
Total Numbers of Forced	3 x Nos. of STATCOM	5 x Nos. of STATCOM
Outage	Station	Station

**6.9.8.** Guaranteed Failure Rate OF Sub modules (including all component and electronic): The maximum annual guaranteed failure rate of sub module (including all component and electronic) shall not exceed 1.0% per STATCOM. The failure rate shall not include failures directly attributable to operation and maintenance errors

# 6.9.9. GUARANTEED OF FAILURE RATE AC POWER CAPACITOR

The maximum guaranteed annual capacitor failure rate shall not exceed 0.15% except first unit failure. The capacitor shall be considered as failed if its Capacitance value varies more than  $\pm 5\%$  of the (actual measured) name plate value. Leakage of oil from the capacitor and deformation of the capacitor unit shall be considered as a failure even if the capacitance value is within the tolerance limits.

#### 7. Design Principles

The objective for the design of the STATCOM Station shall be to achieve high level of availability and reliability as specified. Special attention shall be given to design the STATCOM Station to avoid forced outages. The TSP shall conduct thorough design reviews to ensure minimum risk of such outages. The TSP shall give careful attention to related factors affecting STATCOM Station performance such as subsystem & system testing, protective relays co-ordination and proper setting of relays.

Except where greater reliability requirements are specified in these specifications, the design basis for STATCOM Station shall be such that no single contingency downstream from the medium voltage bus shall cause a total outage of the STATCOM Station. The following general criteria shall be followed for the design of the control system:

- a) Use of components similar to those whose reliability has already been proved in use.
- b) Use of good design practices, surge protection, filtering and interference buffers to assure Immunity to sensitive component and circuits against damage and interference by induced voltages and currents in the external cabling and cubicle wiring.
- c) Use of fail safe and self-checking design features.
- d) Use of component and equipment redundancy, by means of either duplication or triplication with automatic transfer facilities wherever necessary to meet the requirement of these specifications.
- e) Design which in the event of component failures, provide for transfer to a less complex operating mode.
- f) Provision of alarm, fault diagnosis & indication

#### 8. STATCOM Station Main Components

#### 8.1. STATCOM Unit

The main electrical data of the STATCOM Units are the following:

0	Rated voltage	20 kV Minimum
0	Rated frequency	50 Hz
0	Redundancy (Sub Module)	2 Nos. or 5% whichever is higher
0	Rated Power of each STATCOM unit/Branch	±50 MVAR Minimum
0	Valve Cooling	Deionized/Demineralized water

In general, the STATCOM units shall equally share the load however under contingency condition it should be possible to run the units with unequal load. Charging of the DC capacitors of Sub module during initial start-up shall be achieved by means of Resistors and bypass breaker arrangement. The charging resistor for DC capacitor of STATCOM Sub module should be designed for three charges per hour followed by appropriate cooling time. Power for the gate level control shall be derived internally from Sub module. The offered STATCOM Units with its Control system shall be suitably located inside the STATCOM Station Building.

# 8.1.1. STATCOM Valve

The valve shall be designed to meet the performance requirements described in this specification and as described below.

In order to ensure a modern low loss and reliable solution, the STATCOM valve assembly shall use the multi-module (including redundant sub modules) approach.

The valves shall be designed to ensure satisfactory operation according to the overall performance requirements and include all necessary auxiliary equipment required for smooth and reliable operation. The valves shall be indoor air-insulated and cooled by demineralized water. The valves shall be of modular design and have removable Sub-Module for ease of maintenance. The valves shall be mounted to allow easy access for visual inspection, routine maintenance and replacement, and facilities shall be provided to enable the easy access.

# 8.1.2. Semiconductor Switches

The electronic switches should be designed with the aim to achieve operation according to the overall performance requirements of the STATCOM Station. The valve shall be designed with individual semiconductor switches applied in a conservative manner with regard to their basic design parameters. The semiconductor switch shall meet the requirements of IEC 60747 except where otherwise specified herein. The proposed semiconductor switch shall be of a type which is in, or ready for, commercial operation with characteristics fully proven by recorded years of operation in other installations.

The semiconductor switches shall be designed to withstand all stresses expected under steady state, transient and temporary overvoltage conditions. Basic semiconductor devices shall be of the Press Pack type, or packaged to provide short circuit means in case of device failure such that the STATCOM can continue to operate without interruption. The adjacent sub module should be protected against possible explosion of semiconductor switch.

Under the restriction of redundancy (minimum two or 5% whichever is higher) i.e. the failure of any semiconductor switch or sub module or monitoring device etc. shall not

prevent continued system operation. In the event of any of the above failure, the STATCOM shall annunciate and identify the specific location of the failed device and continue operation until such time as repairs can be scheduled. During such time the next shutdown can be availed, the STATCOM must continue to operate without downgrading STATCOM capability.

The switching device's design should include an appropriate allowance for unequal voltage distribution across individual devices in the valve due to stray capacitor and component tolerances.

The switching device's design should include an appropriate allowance for unequal voltage distribution across individual devices in the valve due to stray capacitor and component tolerances.

Each switching device should be able to operate within component ratings, generally with at least two failed sub-module or level. The number of possible failed sub-modules or levels as specified shall be consistent with the availability requirements of the STATCOM system.

# **8.1.3.** Sub module for Multi-Module Topology

The key element of the Multi-Module topology shall be the Sub module. By increasing the number of these sub modules, it is possible to obtain high voltage with extremely low harmonic distortion and very low dv/dt using low switching frequency that reduces power losses. Sub module shall have the following characteristics:

Sub module shall be designed to guarantee high maintainability with self-sealing type hydraulic valves and electrical plugs for ease of installation or un-installation.

VSC sub-modules should be protected against overvoltages with appropriate strategies. Description of the failure mode of the switching device and the strategies used following failure should be provided.

In each fiber optic cable (having multiple fiber cores) used for control/communication purpose of sub-module at least two fiber cores shall remain available as spare for future use.

**8.1.4.** The STATCOM sub module has DC capacitors that require a charge to allow full functionality and performance. At the startup of the STATCOM Station, the capacitors are discharged. During the energization sequence of the STATCOM, Capacitors are charged from the main power grid via resistor operated in series to the main connection circuits. Once the desired charging voltages are reached, the charging resistor circuit is bypassed using bypass switch/breaker.

The Type and Rating of the charging resistor and associated bypass switch shall be designed with the aim to achieve operation according to the overall performance requirements of the STATCOM Station and shall conform to relevant Standard.

# 8.1.5. STATCOM Valve Cooling system

A closed-loop recirculating system shall be provided with full heat rejection capacity with redundancy for pumps, heat exchangers, and fans, appropriate to the STATCOM Station availability requirements. The cooling system should be able to maintain full capacity at maximum ambient temperature and maximum STATCOM reactive power output. The cooling system should be able to operate at the lowest ambient temperature and zero output specified. The Valve cooling system shall have black start capability and necessary UPS/UMD shall be provided separately for each STATCOM Unit.

The valve cooling system shall be designed to meet the performance requirements described in this specification and as described below.

- a) Each STATCOM Unit shall have its own de-ionized water valve cooling system with redundant pumps.
- b) For cooling the STATCOM valves, a deionized re-circulating (closed loop) water system shall be used.
- c) Water to air heat exchanger shall be used for cooling of this de-ionized water. Water to water heat exchanger shall not be employed.
- d) System shall be designed such that no shut down of STATCOM be resorted to for making up the deionized water in the system. The make-up water should comply with the recommended PH and purity.
- e) Cooling water shall have a constant flow rate irrespective of loading. The flow rate shall be decided on the basis of extreme operating conditions.
- f) The control system for cooling system shall be redundant type including the provision of redundant control supply and main power supply. However, in place of redundant control system for cooling system, suitable alternate mode is also acceptable meeting the requirement of fulfilling cooling system operation even if failure of cooling control.
- g) 2x100% pumps with one as standby shall be provided for the primary. Should a pump failure occur, the second pump should automatically switch in without shutting down the STATCOM. An alarm shall be displayed at the control panel for failure of first pump and standby pump in operation.

- h) Each cooling system shall be provided with independent/dedicated UMD supply however common battery for both UMD power supply may be accepted. A UMD system will provide an extended capability of the STATCOM Station to deliver reactive power without any interruption, adding a buffer against the system faults or during events such as delayed voltage recovery or TOV.
- The secondary cooling system shall be redundant type such that it shall be possible to take out 10% (minimum one number) of the cooler module (fan unit) of secondary cooling system without affecting the rated performance of STATCOM).
- j) The cooling system should be designed and provided to permit work on faulty pump / faulty fan without shutting down the system.
- k) Normally no make-up water shall be required however in case of expansion vessel level going low; same shall be replenished automatically by means of make-up water tank and make up water pump to be supplied with the system.
- TSP shall provide water treatment plant of sufficient capacity. The purification (treatment) system shall be designed to maintain the conductivity below 1 micro siemens. A resistivity cell in the outgoing water from deionizer should detect the depletion of ionized material. Filters and deionizers shall be designed to allow replacement during operation. Normal replacement shall not be required more than once every year.
- m) Filters and deionizer/deoxidizer material shall be designed to allow replacement within minutes without shutdown of the cooling unit. (Normal replacement should not be required more than once/year).
- n) Primary cooling system shall monitor its own operation and condition of cooling water.
- o) The protection system of cooling cycle shall have minimum following alarms:
- p) Depleted deionizing cell
  - i) Depleted deionizing cell
  - ii) Low water resistivity
  - iii) High water temperature
  - iv) Primary pump stopped
  - v) Fan stopped
  - vi) Primary pump or fan interlock circuits faulty
  - vii) Primary cycle (Make-up water) tank level low
  - viii) Failure of control supply.

- ix) UMD/UPS fault.
- q) Following shutdown alarms / TRIP shall be provided with cooling system protection. Excessive low water resistivity Excessive high water temperature, complete loss of auxiliary supply to primary pumps, low flow, Low Pressure etc.
- r) The dissipative components of the converter are cooled with deionized water.
- s) The power losses are transferred to the external ambient by means of a deionized water /air heat exchanger. All the piping and other components Complete instrumentation set has been mounted on board in order to check the status of the cooling system:
  - Conductivity gauge system.
  - Flow meter equipped with two set points (alarm and trip).
  - Pressure meter
  - Two thermometers for inlet and two thermometers for outlet (two set points for alarm and trip)
  - Thermostat
- t) The status of the cooling system is monitored by means of the control system.
- u) Replacement of certain cooling equipment (e.g., pumps, fans, cooler unit etc.), if defective, should be possible while the cooling system still operates.

# 8.1.6. Tests on STATCOM Unit Valve

All applicable tests i.e. Operational Type Tests (except Short-circuit test), Dielectric Type Tests & Test for valve insensitivity to electromagnetic disturbance shall be done as per latest edition of IEC 62927. Partial Discharge test shall be done during routine test of each sub module without DC Capacitor in addition to other routine/production tests specified in IEC 62927.

# 8.2. STATCOM Station Control equipment and operator interface

#### 8.2.1. Control Equipment

The control systems should achieve the functional objectives given in Clause 6.2. The accuracy of voltage should be within  $\pm$  1% of the reference voltage. The accuracy of the gradient and linearity of the slope delivered by the STATCOM Station should be defined in relation to the current deviation from the theoretical slope defined in Clause 3.1. The maximum deviation should be less than  $\pm$  5% of nominal current.

The control system design shall be based on single fail criterion i.e. failure of any one component in the system should not result in to outage of the complete system. As a minimum, a dual (hot standby) digital programmable controller shall be supplied for each STATCOM unit/branch and STATCOM Station to control the STATCOM, MSRs and

MSCs completely including the functions listed as mentioned below:

- a. The controller shall have diagnostic and self-checking features for both itself, and for valves, gate firing and drive circuits, interface hardware and software. This is required to reduce outage times and to facilitate fault finding.
- b. The Controller shall be reprogrammable. The Owner shall have at least the following possibility for changing the following reference and limit values via HMI:
- c. Closed loop Controllers:

The STATCOM Station controller shall have means to modify the reference set points. This refers to the functionality that will allow all the control parameters to be adjustable within selectable limits and is inclusive of, but not limited to following:

- o Voltage controller
- o Q controller (reactive power controller).
- o Supplementary VSC current controller.
- o Other supplementary control functions.
- d. Sequence Controllers:

The sequence control and open-loop controllers shall include the control of all switchgears and associated control gear and external devices.

- e. The Controller shall have at least 10% excess I/O capacity to allow future program upgrades to satisfy the changing requirements of the power systems or future extensions to the STATCOM Stations. As a minimum a control of up to 4 future HV shunt devices (reactors or capacitors) shall be included in the offer.
- f. All control signals available for remote control must also be available locally so as to ensure that a local operator can operate the STATCOM Station if the communications link between STATCOM Station and remote control centers is lost.
- g. A changeover switch shall be provided for control the selection of local or remote control.
- h. Tsp shall provide the equipment necessary for the purpose of control, protection and interlocking of all equipments within the scope of supply.
- i. TSP shall be responsible for design and coordination of control, protection and interlocking system and switching sequences within the STATCOM Station. All necessary interfacing required between AC switchyard equipment and STATCOM Station for the above purpose shall also be included in the scope of TSP.

- j. It is proposed to control STATCOM through a Supervisory Control and Data Acquisition (SCADA) System. All the data shall be acquired through suitable means from field and various components and control is executed through the redundant HMI. The local STATCOM Station Control system shall consist of Redundant STATCOM Station controller, redundant HMI workstation, Gateway, STATCOM Station Control System Engineering cum Disturbance Recorder (DR), PC which can also be used as standby HMI workstations in case of emergency with associated peripheral equipment such as color laser log Printers, Color laser jet fault record printer, GPS System, Inverter / UPS etc. all interconnected via redundant Ethernet based Station LAN Network. Each work-stations and PCs at STATCOM Station shall have at least 19" LED display.
- k. In addition to above, HMI workstation (identical to HMI Workstation provided in STATCOM Station control room) should also be provided in control room of main 400 kV substation. This HMI workstation should be powered from an independent UPS system sufficient enough to provide power to HMI workstation for minimum two hour in case of auxiliary power failure.
- 1. The control equipments shall satisfy the reliability and availability requirements specified in this specification
- m. All necessary measures shall be taken to ensure satisfactory operation in presence of harmonic current and voltage, noise and radio interference signals. The equipments shall be designed to operate in the environmental conditions specified in the specification.

# 8.2.2. Operator Interface

- Each STATCOM Station shall have a SCADA consisting of an HMI which shall provide a Centralized (local) operator control of the STATCOM Station functions. All human interface operations necessary for the control and monitoring of the STATCOM shall be provided at this point.
- b) Any abnormal condition requiring operator action or intervention or maintenance on any of the STATCOM Station subsystems shall be annunciated at the STATCOM Station control room and the Substation control room.
- c) The local HMI shall include the following diagrams as different screens in the display system:
  - i. Complete STATCOM Units and STATCOM Station single line diagram including EHV and MV busses
  - ii. AC Auxiliary supply and distribution

- iii. DC Auxiliary supply and distribution
- iv. STATCOM Valve cooling systems
- v. Interlocking system.
- d) These diagrams shall indicate status, alarms, voltages, currents, etc. The HMI shall provide complete diagnostics on alarm and trip indications as required and discussed in this specification, including SER information.
- e) A facility shall be provided whereby the local HMI features and functions shall be accessible from remote. A remote user shall be able to view screens and change STATCOM Station parameter settings.
- f) As the substation where STATCOM Station shall be installed, will be equipped with Sub-station Automation System (SAS) conforming to IEC 61850, it is required that STATCOM Station control and monitoring shall be integrated with SAS already provided at main 400 kV Sub-station by the TSP. It is proposed to connect STATCOM Station SCADA with SAS through a Gateway and the database, configuration etc. of main substation SAS shall be upgraded to incorporate STATCOM Station events, alarms, Controls (both switchgear and control functions of STATCOM Station like setting of parameters etc.) so that STATCOM Station can be effectively monitored and controlled from main substation SAS and shall be monitored from Load Dispatch Center (NRLDC).

# 8.3. STATCOM Station Protection System

#### 8.3.1 Protection system Design

- a) To ensure that faults are cleared within stability critical clearing time, to minimize damage to plant, and to avoid voltage collapse, loss of load or load limitations, TSP shall provide a high speed main protection scheme. An independent (having separate measurement system) back-up protection scheme shall be provided in the event of the main protection scheme failing or switched out for maintenance.
- b) The STATCOM Station shall be completely self-protecting (unit protection). STATCOM Station shall be protected from damage for all conditions of overcurrent, overvoltage, excessive reactive power loading, unbalance due to loss of capacitor elements, phase-to-phase and phase-to-ground faults, three phase faults, loss of cooling, semiconductor valve or control malfunction, faults (STATCOM, MV system) in individual primary connected components of the STATCOM, HV system faults, etc. The STATCOM Station shall withstand the maximum fault current for a period of the maximum fault clearing time as specified, considering second contingency cases due to the previously mentioned conditions.

- c) All protection equipment and systems should be properly co-ordinated to prevent incorrect operations of the protection equipment or systems during normal STATCOM Station operation, including anticipated abnormal conditions on the transmission system, as specified. Fail-safe principles should be applied throughout.
- **8.3.2.** The basic principle and order of precedence for the control and protection shall be, to take care of following:
  - Correctly identify a fault, problem or error condition,
  - Only if necessary, isolate the minimum number of components, subsystems whenever possible,
  - Utilize degraded modes to the maximum extent possible either directly (no interruption of the STATCOM Station operation) or indirectly (by tripping the STATCOM Station momentarily in order to isolate the branch and reenergisation of the STATCOM Station).
  - Trip STATCOM Station and Block.
  - a) Failure of the STATCOM Station Interface (SCADA interface) shall not result in a Protection trip of the STATCOM Station. A fail-safe philosophy shall be implemented to allow the STATCOM Station to operate safely and independently from the STATCOM Station Interface (SCADA interface).
  - b) Protection equipment shall be designed and applied to provide maximum discrimination between faulty and healthy circuits.
  - c) The Protection shall be sufficiently sensitive to cater for the full range from maximum to minimum fault level condition. The Protection shall also be suitable for a system fault level equal to the maximum short circuit capacity of the substation. All current transformer design shall be based on these fault levels.
  - d) All required protective, control devices, etc. including auxiliary instrument transformers and panels, relays, cabling, wiring, indication, and all other associated plant and material necessary for the effective operation of the protection systems shall be supplied and installed by TSP.
  - e) The protective relays shall be microprocessor based. Relays shall have approved characteristics and mounted in dust and moisture proof cases. The protective relays shall be provided with visual indication for starting, tripping and failure of the protective function. The LEDs shall be reset without opening the covers. The protection relays shall also be equipped with HMI facilities suitable for manual parameter settings and viewing of the settings. Relays with provision for manual operation from outside the case, other than for resetting, are not acceptable. Relay settings shall be visible and readable without having to remove

the relay cover. Relays shall be of approved construction and shall be arranged so that adjustments, testing and replacement can be effected with the minimum of time and labor. Auxiliary Relays of the hand reset type if provided shall be capable of being reset without opening the case. Electrically reset tripping relays shall be provided as necessitated by the system of control, such as for those circuits subject to remote supervisory control.

- f) Relay contacts shall be suitable for making and breaking the maximum currents which they may be required to control in normal service but where contacts of the protective relays are unable to deal directly with the tripping currents, approved Auxiliary tripping relays shall be provided. In such cases, the number of auxiliary tripping relays operating in tandem shall be kept to a minimum in order to achieve fast and reliable fault clearance times. Separate contacts shall be provided for alarm and tripping functions. Relay contacts shall make firmly without bounce and the whole of the relay mechanisms shall be as far as possible unaffected by vibration or external magnetic fields
- g) Steps shall be taken to protect the circuitry from externally impressed transient voltages which could reach the circuitry via connections to instrument transformers or the station battery. The outing of cables should be such as to limit interference to a minimum. Any auxiliary supplies necessary to power solid state circuits shall be derived from the main station battery and not from batteries internal to the protection.

# h) Relay communication

The Relays shall also have a communication port provided on the front of the relay for configuration and parameter settings as well as downloading of data. A direct port suitable for remote communication shall also be provided at the back of the Relay. This port shall conform to IEC - 61850.

# i) **Tripping schemes**

- Tripping of MV circuit breakers shall be done by means of two separated trip signals.
- Duplicate high security tripping circuits for MV Circuit Breaker shall comprise two independent high speed (less than 10 ms) high burden (greater than 150 W) tripping relays for each circuit, each with its own independent DC supply. The trip circuits for all circuit breakers need to be equipped with a "lockout" function and it shall be possible for this to be reset manually and remotely by the operator.

- j) The protection for the power system is based on a normal switching state and an occurrence of a single fault. This means that faults resulting from maintenance as well as the simultaneous occurrence of two or more faults are not taken into account.
- k) The input circuits of the digital protections shall be monitored by means of a plausibility check. If any incorrect information is found, the protection function shall be blocked by the protection. All protection relays shall have facilities for monitoring trip circuits. Detection of an interruption in the case of a switched on circuit breaker shall be signaled.

# l) Test facilities

- It shall be possible to test the protective device during operation without causing trips. Links shall be provided for isolation of individual protection trip circuits and the common protection trip circuit to each circuit breaker trip coil.
- Separate test facilities shall be provided for each current and voltage transformer secondary circuit so as to give access for testing of protection relays and associated circuits. The Test facility to be supplied shall have two selectable positions, a Service and a Test position. In the service Position, the test switch connects CTs and VTs signals to the Relays and trip commands to the circuit breaker trip coils. In the Test Position, the test switch applies a short-circuit to the CT secondary windings and open circuits the VT secondary cores and allow injection of secondary current and voltage into the relay. At the same time, the Trip commands to the Circuit Breaker Trip Coils are Isolated. The test Switch supplied shall be to the Approval of the Owner.
- m) The protection of the electrical system shall be designed and installed in such a way that the failed equipment is disconnected selectively and automatically. All equipment are to remain operative during transient phenomena, which may arise during switching or other disturbances to the system.

# n) Auxiliary DC Supplies

 The protection concept has to be designed in a way so that back-up protection is provided at all times. All protection relays shall be configured in a way that failure of one Auxiliary DC system will not affect the relay. If all DC supplies to the controllers are lost, the STATCOM Station breaker must be tripped via the protection panel.

# o) Electromagnetic Compatibility

- Electronic Relays and other electronic devices and the ancillary circuits connected to them, such as power supplies, current and voltage transformer secondaries, status or tripping or alarm circuits shall be designed to ensure that they are compatible for use in the hostile electrical environment found in an MV or HV substation.
- Adequate steps by means of suitable design, shall be taken to prevent Electromagnetic Interference (EMI), (generated by sources such as circuit breakers, disconnectors, lightning, radio or radar emissions, switching contactors in dc circuits etc.) or Electrostatic Discharges (ESD) from affecting relay performance or causing damage to components.
- All relays offered shall therefore have been type-tested to meet the current requirements of IEC Standards with respect to High Frequency disturbance, Fast Transients, Electrostatic Discharge, Radio Frequency Interference testing etc.
- p) List of Protection functions for STATCOM Station

# **Coupling Transformer Protection:**

- i) Biased Differential protection (87T)
- ii) REF protection (64T)
- iii) Overcurrent protection (50, 51)
- iv) Ground Overcurrent (51N)
- v) Overflux protection (HV and MV)
- vi) Transformer mechanical trips

# STATCOM MV Bus Protection:

- i) Bus Differential protection (87)
- ii) Ground over current protection (51N), used with neutral Grounding Transformer
- iii) Under / Over Voltage (59 Ph-Ph) protection
- iv) Over voltage (Open Delta) protection

# STATCOM Branch Protection:

- i) Differential protection (87)
- ii) Overload protection (49)
- iii) Overcurrent protection inside delta (50, 51)
- iv) Negative phase sequence protection (46)
- v) STATCOM branch overcurrent protection (50, 51, 50N, 51N)

# MSR Branch Protection:

- i) Differential protection (87)
- ii) Ground over current protection (51N)
- iii) Reactor branch unbalance protection (Negative Phase Sequence)
- iv) Thermal Overload protection

# MSC Branch Protection:

- i) Ground over current protection (51N)
- ii) Capacitor Overvoltage (Using current signal) protection.
- iii) Capacitor unbalance protection (60C)
- iv) Over current protection (50, 51)
- The protection functions listed above are minimum set of function to be provided, any additional protection required to fulfill the requirement of protection system shall also be provided.
- Further protection function of individual branch (STATCOM, MSC, MSR) shall trip the respective branch MV CB.
- All CBs shall be provided with individual Breaker Failure protection relay. Breaker Failure relay shall have the logic based on current signal or CB close open status.
- Any fault on MV bus will trip the 400 kV breaker. However, any branch fault shall be cleared by respective MV branch Circuit Breaker.
- Protection System for the STATCOM valve portion of the STATCOM station shall be provided in the redundant controllers to isolate the STACOM valve during internal overload/overvoltage, ground fault etc.

# 8.4. STATCOM Station Fault Recording System

An integrated Transient Fault Recording (TFR) System shall be supplied, installed & commissioned. This shall include trigger level settings for analog, etc. subject to review and comment. Disturbance and event recording facilities are required for local monitoring of the STATCOM following a disturbance on the power system or the STATCOM System. The following inputs are required:

- All analogue signals (output signals)
- All digital signals (control outputs, status indications, commands, alarms and trip indications). Internal STATCOM Station control signals/variables to be selectable.
- The accuracy of the TFR for event inputs shall be at least 100 µs (sampling rate of minimum 10 kHz).
- The TFR shall have provision for remote access and retrieval of recorded information on to a PC. For this purpose, a communication link to the Substation LAN shall be implemented.

• The remote software application for the data retrieval shall be included.

# 8.5. Mechanically Switched Reactor (MSR)

MSR is a fixed source of inductive reactive power connected in shunt to the MV bus of STATCOM Station and switched by means of Circuit breaker (with control switching device) based on the command from STATCOM Station control system. The rated capability of MSRs shall be at 400 kV (Referred to as "Point of Common Coupling" or PCC) and in the steady state frequency range of 48.5 Hz-50.5 Hz. However, The MSR Components shall be designed with the aim to achieve operation according to the overall performance requirements of the STATCOM Station. The individual components of MSR shall be able to withstand the onerous condition imposed by system overvoltage and harmonics. The MSR consists of 3-ph Air Core Reactor, 3-ph MV Circuit breaker (SF6/Vaccum type), associated current transformer, 3-ph Disconnector and associated safety grounding switch. The MSR area shall be fenced and castle key interlock with safety grounding switch shall be provided for human safety.

Specification for individual components like Air core reactors etc. is provided in the subsequent clause.

# 8.6. Mechanically switched capacitor (MSC)

MSC is a switched 3-phase capacitor bank connected in shunt to the MV bus of STATCOM station and switched automatically by means of Circuit breaker (with control switching device) based on the command from STATCOM Station control system. The rated capability of MSCs shall be at 400 kV (Referred to as "Point of Common Coupling" or PCC) and in the steady state frequency range of 48.5 Hz-50.5 Hz. However, TSP will ensure the corresponding values at PCC (400 kV) for possible operating condition measured at PCC. The MSC Components shall be designed with the aim to achieve operation according to the overall performance requirements of the STATCOM Station. The individual components of MSC shall be able to withstand the onerous condition imposed by system overvoltages and harmonics. The MSC consists of 3-ph AC power capacitor bank, current limiting air core reactor as required, 3-ph MV Circuit breaker (SF6/Vaccum type), associated current transformer, 3-ph Disconnector and associated safety grounding switch. The MSC area shall be fenced and castle key interlock with safety grounding switch shall be provided for human safety. Specification for individual components like Capacitors, Air core reactors etc. is provided in the subsequent clauses.

# 8.7. Air Core Reactors

- a) Reactors shall be air core, dry type, be suitable for outdoor installation and there shall be no tapping on the reactors. The insulation level shall be adequate and TSP has to ensure proper insulation coordination.
- b) The insulation of the reactor shall be class F and hot spot temperature rise shall not exceed 105°C above ambient temperature. Winding temperature rise shall not exceed 80°C above ambient temperature.
- c) The reactor shall be designed to withstand thermal dynamic shocks and mechanical shocks while in service and during erection.
- d) The reactor shall fully conform to the relevant IEC standard.
- e) The reactor shall be designed to withstand overloading due to over voltage as specified and shall also be subjected to excitation by harmonics; the reactor must be able to withstand such events without deterioration in normal life.
- f) All internal (with in a reactor coil) current carrying connections shall be welded/brazed or compressed joint.
- g) All terminals shall be either tin plated or silver plated.
- h) Lifting lugs shall be provided for handling of the reactor.
- i) The reactor shall be vertically mounted.
- j) The reactors shall be subjected to type and routine tests in accordance with the latest issue of IEC-60076 as appropriate to the type of reactor provided.
- k) Tests on Reactors: The reactors shall be subjected to type and routine tests in accordance with the latest issue of IEC-60076 as appropriate to the type of reactor provided.

# 8.8. AC POWER CAPACITORS

# i) General

a) The capacitor banks shall comprise of capacitor units, discharge devices, protection equipment, series reactor as required, earthing switches, suitably connected in series and parallel, mounted at ground level with protected fencing all round. The number, arrangement and connection of capacitor banks shall be designed to suit the requirement of compensator as a whole. If convenient, the capacitor banks may be used in conjunction with reactors. In this event the rating of capacitor shall be adequate to cope up with the harmonic loading. The

frequency variations shall also be considered. To limit the peak in rush current for switching in the capacitors, current limiting reactors with parallel connected damping resistors if required shall be connected in series with shunt capacitor banks.

- b) The capacitors shall be provided with internal type fuses. Alternatively, fuseless capacitor is also acceptable.
- c) Fuses shall not melt nor shall deteriorate when subjected to the inrush current during the life of the bank.
- d) With the capacitor charged to a peak voltage, the fuses associated with the healthy elements shall not melt when carrying the discharge current resulting from a breakdown of an element or from an external short circuit.
- e) Fuses shall be capable of disconnecting a faulty element over a range of voltage across the unit terminals from 0.9 times rated unit voltage (Un) to 2.0 Un. In addition, if all the elements in same row of an internally fused capacitor were to fail as a result of a cascading action, the last fuse element to melt shall be capable of successful disconnection with a voltage of not less than 1.5 times.
- f) After fuse operation the fuse assembly shall be able to withstand continuously at least 1.5 times rated unit voltage Un across the gap for 10 Seconds.
- g) Fuses shall be preferably of the current limiting type but fuse system shall in any event be designed to ensure that energy released into a faulty capacitor unit is less than the valve that will cause rupture or bursting of the container.
- h) The capacitor units shall be outdoor type. The container of the capacitor shall be of stainless steel.
- i) Each capacitor unit shall be readily accessible and replaceable without disturbing any other unit. The supporting frames shall be designed to provide adequate ventilation to the units.
- j) The dielectric fluid used in capacitor unit shall be environmentally safe & biodegradable, non-toxic. Polychlorinated biphenyle (PCB) type dielectric or any of its derivatives shall not be acceptable.

# ii) Construction & Design Requirement

- a) The capacitors shall conform to IEC-60871. The capacitors shall be provided with internally mounted discharge resisters with characteristics in accordance with IEC-60871.
- b) The current limiting reactors (as required) shall be dry type and connected in series with the capacitor bank. Suitable lifting lugs shall be provided.
- c) The capacitor enclosure shall have sufficient strength to withstand without damage or loss of life, mechanical load, both in operation and during erection. The loads shall include electromagnetic forces including those during faults external or internal to the capacitor bank, wind loading, forces due to expansion and contraction caused by ambient temperature and load variation and seismic effects all as specified.
- d) The capacitor units shall be interchangeable in order to reduce the spare requirements and simplify maintenance procedures.
- e) The capacitor stack shall be vibration free. Stack shall have a fixed potential, that is connected to one electrical points in the bank. The stack shall be of galvanized structural steel.
- f) The capacitor racks shall be supplied complete with all capacitor units, insulators, and connection and shall be equipped with lifting lugs/eyes to facilitate assembly into the stacks. The racks shall be constructed of galvanized structural steel. No drilling of galvanized steel shall be allowed. Each rack shall be labeled with the weight of the fully equipped racks, the phase and bank of which it forms a part. The maximum and minimum capacitor unit capacitance which may be substituted into the racks as spares shall be suitably identified. Suitable warning labels shall be affixed.
- g) The capacitor shall be specially designed to be suitable for intermittent duty to which they are suitable to.
- h) The capacitors should comply with the overload capacity as per NEMA.
- i) The capacitor elements shall be vacuum dried inside the case prior to impregnation with dielectric fluid. After impregnation, the capacitor unit shall be sealed immediately upon removal of the impregnated reservoir.
- j) The discharge register shall discharge the unit from peak operating voltage to less than 75 Volts within 10 minutes.

- k) The capacitor case shall be made from type 409 stainless steel or equivalent stainless steel with all joints welded and tested for leaks.
- All racks and bus insulators as well as the insulators used to insulate each stack of capacitor from ground level shall be pincap or post type. The minimum voltage rating shall be 15 kV and low frequency wet withstand voltage of all insulator used to insulate within or between the capacitor racks of a stack shall not be less than three times the actual voltage stress across the insulators. The insulator shall be outdoor type manufactured from wet porcelain. The insulators shall be bolted to the top members of the frame to support electric grade aluminum buses.
- m) The size and groupings of the individual capacitor units shall be such that a single blown fuse will not cause the voltage across parallel group to rise by more than 10%.
- n) The redundancy to be provided, shall be as per requirement specified regarding reliability and availability in clause mentioned elsewhere.

# iii) Capacitor Unit Failure Detection

The stages of capacitor units or element failure detection shall be provided as below.

- a) A three-step unbalanced current protection shall be provided in each capacitor bank to initially generate an alarm when the unbalance limit is reached and finally to trip the bank in case of limit being exceeded.
- b) The first stage shall generate an alarm and the capacitor unit shall continue in service. It may be assumed that the bank shall be disconnected for maintenance within 2 weeks.
- c) The second stage shall generate a separate alarm and a delayed trip signal which will disconnect the bank after two hours.
- d) The third stage shall cause immediate disconnection of Capacitor Bank.

# iv) Tests on Capacitors

All the tests on capacitor units shall be generally in accordance with the latest issue of IEC publication 60871.

# 8.9. Coupling Transformer

The TSP shall provide 04 Nos. single phase coupling transformer to operate as 3- ph bank with one unit as spare for stepping down the voltage from 400 kV system to a suitable medium voltage value as required. The Medium Voltage side of the coupling transformer to couple with the STATCOM shall not be less than 20 kV to ensure optimum power transformation.

The Coupling Transformer shall be designed with the aim to achieve operation according to the overall performance requirements of the STATCOM Station. The transformer should be designed & rated to carry complete capacitive and inductive reactive loading as specified for STATCOM Station including that of mechanically switched capacitor and Reactors etc.), as well as harmonic currents associated with the most onerous operating conditions of STATCOM Station, without loss of life.

The coupling transformer shall be designed in accordance with the most upto date experience in STATCOM application and shall incorporate the latest improvements of design currently employed in the industry. The Comprehensive design review of Coupling Transformer of STATCOM Station shall be carried out by the TSP.

#### **8.9.1.** General Requirements

The coupling transformer shall be designed electrically and mechanically for operating conditions peculiar to STATCOM Station operation, which shall include, but not be limited to the following:

- a) Electrical insulation problems resulting from the transformer being subjected to voltages of distorted sinusoidal wave shape because of saturation, harmonics, trapped DC in capacitors etc.
- b) The cumulative effect of electro-dynamic forces produced during valve commutation or other short circuit conditions imposed by valve design limitation and valve group operation.
- c) Harmonic currents due to STATCOM operation, with particular reference to additional stray losses resulting from these harmonic currents.
- d) No generation of uncharacteristic harmonics by the transformers.
- e) Stresses due to normal control operation and other onerous operations such as blocking and de-blocking.
- f) Stress due to fast response requirement of STATCOM for loading from 100% inductive to 100% capacitive and vice-versa.
- g) Overvoltage stresses for which STATCOM shall be designed as per specification would apply for transformer also.
- h) All other stresses for which STATCOM Station shall be designed as per specification would apply for transformer also.

- *i*) The transformer and all its accessories like Bushings, CTs etc. shall be designed to withstand without damage, the thermal and mechanical effects of any external short circuit to earth and of short circuit across the terminals of any winding for a period of 3 seconds. The short circuit level of 400 kV system to which the transformer shall be connected as per the maximum short circuit level of main substation. Short Circuit level of the Coupling Transformer shall be as per Short Circuit level of the respective Substation. Short circuit level for HV bushing shall be 63 kA for 1 Sec.
- j) The transformer shall be capable of being loaded in accordance with IEC-60076 or the overload conditions as specified which is worst. There shall be no limitation imposed by bushings during its terminal fault.
- k) The transformer shall be capable of withstanding the mechanical stresses caused by symmetrical or asymmetrical faults on any winding.
- 1) The transformer should be designed to carry a certain level of direct current consistent with the STATCOM design. To ensure minimum harmonic generation, the saturation flux density of the transformer should be higher than the maximum flux density reached over the full steady state (continuous operating) range; this margin shall be at least 10%. This maximum flux density (over the full steady state range) is obtained at the highest secondary voltage during any reactive power generation, highest reference voltage, minimum slope, and minimum continuous frequency. The flux density at the highest secondary voltage shall lie in the linear portion of the B-H curve. Any harmonic generated by the transformer should be considered by the design of the STATCOM.
- m) All protection class Current Transformers in coupling transformer shall be of PX/PS type. Other details of these Current Transformers shall be as per protection/metering requirement and shall be decided during detailed engineering. However, the parameters of WTI Current Transformer for each winding shall be as per Coupling Transformer manufacturer.
- n) Transformers shall be capable of operating under natural cooled condition up to the specified load. The forced cooling equipment shall come into operation by pre-set contacts of winding temperature indicator and the transformer shall operate as a forced cooling unit initially as ONAF up to specified load and then as OFAF. Cooling shall be so designed that during total failure of power supply to cooling fans and oil pumps, the transformer shall be able to operate at full load for at least ten (10) minutes without the calculated winding hot spot temperature exceeding 140 deg C. Transformers fitted with two coolers, each capable of dissipating 50 per cent of the loss at continuous maximum rating, shall be capable of operating for 20 minutes in the event of failure of the oil circulating pump or

blowers associated with one cooler without the calculated winding hot spot temperature exceeding 140 deg C at continuous max rating.

o) The transformer shall be free from any electrostatic charging tendency (ECT) under all operating conditions when all oil circulation systems are in operation. In general, oil flow speed shall not exceed 1.0 m/sec within winding in the oil flow system of the transformers. The manufacturer shall ensure that there is no electrostatic charging tendency in the design.

Sl. No.	Description	Unit	<b>Technical Parameters</b>
1.1	Rated Capacity		
	HV	MVA	To meet the performance
	MV	MVA	requirement & ratings of
			STATCOM. The
			transformer shall be suitable
			for 100% reactive loading
1.2	Voltage ratio (Line to Line)		400 / XX (*)
1.3	Single / Three Phase Design		Single phase
1.4	Applicable Standard		IEC 60076
1.5	Rated Frequency	Hz	50
1.6	Cooling & Percentage Rating at different		ONAN/ONAF/(OFAF or
	cooling		ODAF): 60% / 80%/100%
			OR
			ONAN/ONAF1/ONAF2:
			60% /80%/100%
			OR
			OFAF (with 5 x 25% unit
			cooler if required)
1.7	Impedance at 75 Deg C		
	HV–MV		To suit the design
			requirements.
1.8	Tolerance on Impedance (HV-MV)	%	As per IEC
1.9	Service		Outdoor
1.10	Duty		Continuous Reactive
			loading
1.11	Overload Capacity		IEC-60076-7
1.12	Temperature rise over 50deg C ambient		
	Temp		
i)	Top oil measured by thermometer	⁰ C	45

The Technical Parameters of Transformer shall be as below

Sl. No.	Description	Unit	<b>Technical Parameters</b>
ii)	Average winding measured by resistance Method	⁰ C	50
1.13	Windings		
i)	System Fault level		
1)	HV	kA	63
	MV	kA	To suit the design
			requirements.
ii)	Lightning Impulse withstand Voltage		<b>1</b>
	HV	kVp	1300
	MV	kVp	*
	Neutral	kVp	170
iii)	Switching Impulse withstand Voltage	-	
-	HV	kVp	1050
iv)	One Minute Power Frequency withstand	-	
	Voltage		
	HV	kVrms	570
	MV	kVrms	*
	Neutral	kVrms	70
v)	Neutral Grounding		Solidly grounded
vi)	Insulation		
	HV		Graded
	MV		Uniform
vii)	Tan delta of winding	%	< 0.5
1.14	Vector Group (3 – ph)		YNd*
	(unless specified differently elsewhere)		
1.15	Tap Changer		Not Applicable
1.16	Bushing		
i)	Rated voltage		
	HV	kV	420
	MV	kV	*
	Neutral	kV	36
ii)	Rated current (Min.)		
	HV	A	*
	MV	A	*
	Neutral	A	*
iii)	Lightning Impulse withstand Voltage		
	HV	kVp	1425
	MV	kVp	*
	Neutral	kVp	170

# Specific Technical Requirement for STATCOM

Sl. No.	Description	Unit	<b>Technical Parameters</b>
iv)	Switching Impulse withstand Voltage		
	HV	kVp	1050
v)	One Minute Power Frequency withstand		
	Voltage		
	HV	kVrms	695
	MV	kVrms	*
	Neutral	kVrms	77
vi)	Minimum total creepage distances		
	HV	mm/kV	31mm / kV
	MV	mm/kV	31mm / kV
	Neutral	mm/kV	31mm / kV
vii)	Tan delta of bushings		
	HV	%	Refer Note 2
	MV	%	Refer Note 2
viii)	Max Partial discharge level at Um		
	HV	pC	10
	MV	pC	10
	Neutral		-
1.17	Max Partial discharge level at 1.58 * Ur $/\sqrt{3}$	pC	100
1.18	Max Noise level at rated voltage and at principal tap at no load and all cooling Active	dB	80
1.19	Maximum Permissible Losses of		
	Transformers		
i)	Max. No Load Loss at rated voltage and	kW	To suit the design
	Frequency		requirements.
ii)	Max. Load Loss at maximum continuous current and at 75 ^o C	kW	To suit the design requirements.
iii)	Max. Auxiliary Loss at rated voltage and Frequency	kW	To suit the design requirements.

#### Specific Technical Requirement for STATCOM

#### Notes:

- 1. No external or internal Transformers / Reactors are to be used to achieve the specified HV/MV impedances.
- The criteria for Transformer losses shall be "Copper Loss (Load Loss) > Iron Loss (No Load Loss) > Cooler Loss (Auxiliary Loss)".

# 4. (*) marked parameters shall be decided based on STATCOM manufacturer's requirement

#### 8.10. STATCOM Station MV Switchgear

The MV Switchgear shall be designed with the aim to achieve operation according to the overall performance requirements of the STATCOM Station.

#### 8.10.1. MV Circuit Breaker

The MV Circuit Breaker shall comply with the IEC and all other relevant Standards, and as specified in this specification. They shall satisfy the General Technical Requirements and shall be designed to operate in the environmental conditions specified in this specification.

The Circuit Breaker offered should be of SF6 type /Vacuum type only and of class C2, M2 as per IEC

- i) The circuit breaker shall be complete with terminal connectors, operating mechanism, control cabinets, piping, interpole cable, cable accessories like glands, terminal blocks, marking ferrules, lugs, pressure gauges, density monitors (with graduated scale), galvanised support structure for CB and control cabinets, their foundation bolts and all other circuit breaker accessories required for carrying out all the functions the CB is required to perform.
- ii) All necessary parts to provide a complete and operable circuit breaker installation such as main equipment, terminals, control parts, connectors and other devices whether specifically called for herein or not shall be provided.
- iii) The support structure of circuit breaker shall be hot dip galvanised. Exposed hardware items shall be hot dip galvanised or Electro-galvanised.
- iv) MV Circuit Breaker shall be equipped with controlled switching with consequent optimization of switching behavior, when used in:
  - Switching of Capacitor Bank
  - Switching of shunt Reactor Bank
- v) Reactor Switching Duty test shall be conducted on MV Circuit Breaker in line with latest edition of IEC 62271-110.

- vi) Type Tested for Back-to-Back Capacitor Bank Switching as per latest edition of IEC 62271-100.
- vii) Routine tests as per IEC: 62271-100 shall be performed on all circuit breakers.
- viii) The medium voltage circuit breakers in any of the branches shall be designed to switch off metallic three phase short circuits limited only by the transformer impedance of the STATCOM System (Coupling transformer) with the initial short circuit current and DC component according to IEC 60909-0. Thereby the worst case time constant where the maximum short circuit peak and DC component occur shall be considered. The network shall be considered to deliver the maximum short circuit power of the substation.

#### 8.10.2. MV Isolator and Earth Switch

The isolators and earth switches shall comply with the IEC and all other relevant Standards, and as specified in this specification. They shall satisfy the General Technical Requirements and shall be designed to operate in the environmental conditions specified in this specification.

- i) The isolators and accessories shall conform in general to IEC-62271 series as per relevance (or IS:9921) except to the extent explicitly modified in specification.
- ii) Earth switches shall be provided on isolators wherever called for.
- iii) Switches shall be motor operated with local & remote operation feature and local manual operation feature. Remote operation of Earth Switch is not required.
- iv) Disconnections and earth switches shall electrically and mechanically be interlocked. Castle Key interlocking facilities shall be provided to mechanically interlock the earth switch and Isolator to the doors of valve rooms.

#### 8.10.3. Instrument Transformers for STATCOM Station

The instrument transformers shall comply with the relevant IEC Standards. They shall satisfy the general Technical Requirement specified in specification and shall be designed to operate in the environmental conditions specified in this Specification. The instrument transformers provided for control, metering and protective relaying functions shall have voltage & current ratings, accuracy ratings and burden capabilities adequate to provide their designated functions within the overall accuracy requirement of the systems.

#### **Voltage Transformers**

Voltage transformers shall comply with the relevant IEC standards IEC 61869 (Part-1, Part-3 and Part-5).

# Current Transformers

Current transformers shall comply with 61869 (Part-1 and Part-2). Type tests and routine tests as per relevant IEC.

#### 8.10.4. Surge Arrester

TSP shall install the surge arresters necessary for the protection of the equipment associated with STATCOM Station in accordance with the requirements as per insulation coordination study. The surge arresters shall give consistent protection to their associated equipment against overvoltages produced by lightning or switching surges, internal or external station faults, and other system disturbances.

The surge arresters shall be rated such that they are able to discharge a specified maximum energy due to the application of lightning, switching surges, temporary over voltages and faults as determined by insulation coordination studies, without coming into the temperature region where thermal runaway could result upon subsequent application of maximum transient and steady state voltage conditions.

The arrester housing shall be porcelain/composite type. The end fittings shall be made of non-magnetic and corrosion proof material.

Internal components shall be designed to eliminate internal corona and also to ensure minimal capacitive coupling with any conducting layer of pollutant on the outside of the porcelain housing Particular attention shall be given to the high discharge currents which some of the arresters may experience in service due to discharge of stored energy of the ac filter and reactive compensating equipment, tripping of STATCOM etc.

# 8.11. STATCOM Station Auxiliary Power Supply

The auxiliary supply of STATCOM Station shall conform with the system requirements relating to reliability, availability, and redundancy, performing continuously to help ensure that the complete STATCOM Station operates as per the requirements. STATCOM station Auxiliary supply including all necessary switchgear (viz. AC/DC, lighting boards etc.) shall be completely separate from the main substation auxiliary supply, all loads of STATCOM station shall be fed from this supply. The auxiliary supply provides power to the controllers, cooling system, station supplies, and various other essential and non-essential loads. With the exception of the cooling system, all other essential loads are also connected to the DC system of the STATCOM Station.

The auxiliary supply system shall be able to provide a stable supply for the STATCOM Station during system faults such as single-phase faults, phase-to-phase faults, and three-phase faults and LVRT (Low Voltage Ride Through) to allow continuous operation of the STATCOM Station during these transient events.

The auxiliary supply system of each STATCOM Station shall consist of two main incomers and one emergency incomer from DG set. The two main incomers shall be required to be paired to act redundantly to help ensure a certain degree of reliability and availability. One of the main incomer shall be supplied from 33kV tertiary winding of ICT at the main substation. The other main incomer can be supplied from any one of the following three options:

- Supplied from Tertiary/Yoke winding of STATCOM coupling Transformer.
- Supplied from MV Bus Bar of STATCOM Station.
- Supplied from Power PT on HV side of coupling Transformer.

Wherever the Voltage variation on the incomer is very high, a solid state AVR (Automatic Voltage Regulator) shall be provided to control the auxiliary supply voltage.

All MV incomers shall be provided with suitable CB, disconnector, instrument Transformer etc. along with necessary protection system.

#### 8.12. Fire Protection System for STATCOM Station:

Necessary fire protection for STATCOM units, Coupling Transformer, MSC, MCR and Harmonic filter (if any) shall be required. Fire-fighting system shall conform to CEA (Measures Relating to Safety & Electric Supply) Regulations.

Suitable fire detection system using smoke detectors and/or heat detectors shall be provided in STATCOM Station for all room and areas. These smoke fire detection system shall be connected to a separate Fire annunciation system clearly identifying the zone.

The hydrant system shall be extended from fire fighting system of the substation in the yard. Suitable no. of hydrant shall be provided for protection of STATCOM Station equipment in the yard namely Coupling Transformer, MSCs, MSRs and Harmonic Filter (if required) etc. as applicable for the station. Further suitable nos. of hydrant shall also be provided for STATCOM Station building.

If HVW (High Velocity Water) Spray system is provided for transformers and reactors of main substation, the same may be extended for coupling transformer.

#### 8.13. Air-conditioning and ventilation system for STATCOM station

The STATCOM Station shall be provided with Air conditioning system as per requirement.

#### 1) AC System (Except Valve Hall):

Air condition system shall be provided for the following rooms in the STATCOM Building:

- a. Control and Relay room
- b. Battery room
- c. Conference Room
- d. Store cum workshop
- e. Cooling system room
- f. Lobby

Capacity and quantity of the AC units shall be decided based on heat load calculation and redundancy requirement.

#### 2) Air-Conditioning System for Valve hall:

Air-Conditioning shall be provided for each Valve room for maintaining the following inside conditions round the year:

Dry Bulb Temperature (DBT): 35 °C (Maximum)

Relative Humidity (RH) - 60% (Maximum)

The system shall be designed for an outside ambient temperature of 50 °C. Based on the above system design & parameters for valve room the AC system shall comprise of "AHU & Air-cooled DX Condensing units" with one Main & one Standby unit for each room. The system shall be designed for 24 Hours, 365 Days of the year operation to maintain the inside temperatures of the Valve Hall for proper operation of the critical equipment. The air-cooled condensing unit shall be designed for continuous duty.

#### 9. Engineering studies

The TSP shall carry out studies as brought out in this section with a model of the STATCOM in PSSE and PSCAD and documentation of the same shall be preserved and to be submitted to CEA/CTU, as per their request. The objective of these studies is to verify the steady state requirement of reactive power under normal and contingent operating conditions for peak and light loads conditions in the network.

The studies shall have to be carried out for

- Peak Load

- Light Load
- Contingency Conditions

The load flow and dynamic file available with CTU shall be provided to the TSP in PSSE version 34 format. If data is not available typical data shall be assumed by TSP.

The studies should demonstrate that the STATCOM system meets all system and equipment specified performance criteria as per the specification. Engineering studies should include, but not be limited to, the studies described in subsequent subsections.

#### 9.1. System dynamic performance studies

Dynamic performance studies should verify that the STATCOM system controls the system's dynamic performance during system disturbances. Dynamic performance studies include the following:

- a. Studies verifying that the STATCOM provides adequate dynamic control to meet the system and STATCOM system performance criteria for the system conditions.
- b. Study of response time and of the STATCOM system's behavior and contribution to the system's recovery from faults.
- c. Studies to verify the operation of any supplementary controls designed to damp power oscillations following system disturbances.
- d. Studies to evaluate the interaction of the STATCOM controls with the other nearby control systems, including High Voltage Direct Current (HVDC) controls, generator controls, and controls of other Flexible AC Transmission System (FACTS) devices.

In addition to the above, relevant studies shall include the cases stated as mentioned in Annexure-I

#### 9.2. Harmonic performance

The studies should evaluate resultant maximum harmonic levels at the STATCOM system Point of Common Coupling (PCC), and determine maximum stresses on all STATCOM system components. The study report should include the following:

- a. Evaluation of specified system and operating conditions (refer to Clause 5) under all possible STATCOM operating conditions.
- b. Evaluation within maximum ranges of STATCOM system component tolerances (worst performance values may not occur at detuning extremes).
- c. Evaluation with maximum system voltage unbalance (refers to item 8 and item 9 in Table 3 of Clause 5).

- d. Evaluation of worst case resonance condition between STATCOM system and overall system.
- e. Evaluation of possible resonant overvoltages.
- f. Transformer saturation induced harmonics for component rating calculation only.
- g. Evaluation of impact considering single phase auto reclose deadtime.

#### 9.3. Electromagnetic transients, control performance, and overvoltage studies

Transient overvoltage studies should be performed with the actual controls modeled to verify that the STATCOM system equipment is adequately protected against overvoltages and overcurrents (including excessive valve recovery voltages) from power system transients resulting from switching, fault clearing events, and credible STATCOM system misoperations. Evaluation shall include the following:

- a. Study of start-up, including transformer energization, shutdown, switching coordination, and other local area network switching events
- b. Study of STATCOM system protection and protection coordination
- c. Faults on the HV and MV bus (single line-to-ground, phase-to-phase, and three-phase)
- d. Faults across the VSC, capacitors, and other equipment if used
- e. Control interaction

#### 9.4. Insulation coordination study

Overall insulation coordination should be verified by considering the results of studies (dynamic overvoltages, and fault and switching transients), including the impacts of lightning surges on the STATCOM equipment. This study should determine and verify insulation levels, clearances, and arrester placement and ratings.

#### 9.5. Other Studies

- a) Grounding Study
- b) Protection coordination
- c) PLC/radio interference
- d) Magnetic field strength
- e) Other studies as applicable

#### 9.6. Software simulation models

The TSP shall provide the latest following PSCAD and PSSE simulation model(s) and parameters to CEA/CTU/GRID-INDIA alongwith detailed documentation for the

purpose of future simulation to adequately represent and model the proposed STATCOM system in the respective software:

- a. **Stability model**. TSP should provide a detailed STATCOM system dynamics model for use in (PSCAD and PSSE) powerflow and stability simulation software. The model detail should be appropriate and complete for positive-sequence power system simulation and analysis that is typically performed with powerflow and transient stability programs. All appropriate control features for such analysis will be modeled, and necessary documentation on the theory and use of model should be provided. Stability model should be non-proprietary and freely available for distribution.
- **b. Transients model**. TSP should provide a detailed STATCOM transients model for use in PSCAD. The model detail should be appropriate and complete for transient response calculation of the STATCOM system. All appropriate control features for such analysis will be modeled, and necessary documentation on the theory and use of model should be provided.

#### **10.** Factory tests of controls

The integrated nature of the performance of the STATCOM in an electrical grid requires the following tests:

- **a.** The TSP should perform factory simulator system tests for integrated control and protection system to ensure the proper operation of the same. The control system should be connected to a digital simulator with adequate representation of the electrical network for various conditions. The STATCOM system controller needs to be representative of control functions, including basic controllers but inclusive of supplementary controls, firing controls, and protective functions integrated into the controllers.
- **b.** The simulator should provide an accurate network representation including network harmonic behavior, as well as synchronous condensers, power stations, generators (with AVRs), and pump storage schemes, existing HVDC, SVCs and STATCOMs, future SVCs and STATCOMs, FSC (fixed series capacitors), and shunt reactors/capacitors/filters.

STATCOM system control function type tests on a simulator should include the following:

- Verification of each control function.
- Verification of control linearity.
- Verification of control redundancy.
- Verification of the monitoring system.

- Verification of the protection system with reference to integrated protective functions included in the Controllers and firing controllers.
- Verification of overall system performance for minor and major system disturbances.
- Verification of processor loading of all digital controllers.
- Verification of STATCOM system parallel operation with other controls in the system and control Stability.
- Verification of control equipment performance for auxiliary power supply voltage (AC and DC) and frequency variations (AC).
- Routine production tests of all control functions, and separately of all protection functions.

#### 11. VISUAL MONITORING SYSTEM FOR WATCH AND WARD OF STATCOM STATION

Visual monitoring system (VMS) for effective watch and ward of STACOM station premises covering the areas of entire switchyard, STATCOM building, Coupling Transformer, Cooling Towers and main gate, shall be provided. The TSP shall design, supply, erect, test and commission the complete system including cameras, Digital video recorder system, mounting arrangement for cameras, cables, LAN Switches, UPS and any other items/accessories required to complete the system.

Features of VMS system shall be as those specified for main substation.

The number of cameras and their locations shall be decided in such a way that any location covered in the area can be scanned. The cameras shall be located in such a way to monitor at least:

- a) Coupling Transformer, Mechanically Switched Reactors (if any) and Mechanically Switched Capacitors (if any), AC filter banks (if any).
- b) STATCOM Valve hall, Cooling System, Electrical and Mechanical Auxiliary area.
- c) Entrance to STATCOM Station.
- d) All other Major Equipments (such as CB, CT, VT, SA etc.)

The cameras can be mounted on structures, buildings or any other suitable mounting arrangement.

#### 12. Spares, Special Tools and Tackles

Considering high technology proprietary equipment of the STATCOM TSP shall ensure necessary spares are procured to maintain the necessary reliability and availability of STATCOM station. Further all necessary special tools and tackles required for erection, testing, commissioning and maintenance of equipment shall also be taken.

#### Annexure-I

#### **Contingency Cases for Fatehgarh-III STATCOM**

### A) N-1 Contingency Contingency at 765 kV level

- 1. Three Phase Fault close to 765 kV bus of Fatehgarh-III S/s (Section-2) followed by tripping of one circuit of Fatehgarh-III S/s (Section-2) –Beawar 765 kV D/c line (1st) (fault persist for 100 ms)
- 2. Single Phase to Ground Fault close to 765 kV bus of Fatehgarh-III S/s (Section-2) followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Fatehgarh-III S/s (Section-2) –Beawar 765 kV D/c line (1st)
- 3. Three Phase Fault close to 765 kV bus of Beawar S/s followed by tripping of one circuit of Fatehgarh-III S/s (Section-2) –Beawar 765 kV D/c line (1st) (fault persist for 100 ms)
- 4. Single Phase to Ground Fault close to 765 kV bus of Beawar S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Fatehgarh-III S/s (Section-2) –Beawar 765 kV D/c line (1st)
- 5. Three Phase Fault close to 765 kV bus of Beawar S/s followed by tripping of one circuit of Beawar–Dausa 765 kV D/c line (fault persist for 100 ms)
- 6. Single Phase to Ground Fault close to 765 kV bus of Beawar S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Beawar–Dausa 765 kV D/c line
- Three Phase Fault close to 765 kV bus of Dausa S/s followed by tripping of one circuit of Beawar–Dausa 765 kV D/c line (fault persist for 100 ms)
- 8. Single Phase to Ground Fault close to 765 kV bus of Dausa S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Beawar–Dausa 765 kV D/c line
- 9. Three Phase Fault close to 765 kV bus of Beawar S/s followed by tripping of one circuit of Beawar–Ajmer 765 kV D/c line (fault persist for 100 ms)
- Single Phase to Ground Fault close to 765 kV bus of Beawar S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Beawar–Ajmer 765 kV D/c line

- 11. Three Phase Fault close to 765 kV bus of Ajmer S/s followed by tripping of one circuit of Beawar–Ajmer 765 kV D/c line (fault persist for 100 ms)
- 12. Single Phase to Ground Fault close to 765 kV bus of Ajmer S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Beawar–Ajmer 765 kV D/c line
- 13. Three Phase Fault close to 765 kV bus of Beawar S/s followed by tripping of one circuit of Beawar– Chittorgarh 765 kV D/c line (fault persist for 100 ms)
- 14. Single Phase to Ground Fault close to 765 kV bus of Beawar S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Beawar– Chittorgarh 765 kV D/c line
- 15. Three Phase Fault close to 765 kV bus of Chittorgarh S/s followed by tripping of one circuit of Beawar– Chittorgarh 765 kV D/c line (fault persist for 100 ms)
- 16. Single Phase to Ground Fault close to 765 kV bus of Chittorgarh S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Beawar– Chittorgarh 765 kV D/c line
- 17. Three Phase Fault close to 765 kV bus of Bhadla-III S/s followed by tripping of one circuit of Ramgarh- Bhadla-III 765 kV D/c line (fault persist for 100 ms)
- 18. Single Phase to Ground Fault close to 765 kV bus of Bhadla-III S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Ramgarh- Bhadla-III 765 kV D/c line
- 19. Three Phase Fault close to 765 kV bus of Ramgarh S/s followed by tripping of one circuit of Ramgarh- Bhadla-III 765 kV D/c line (fault persist for 100 ms)
- 20. Single Phase to Ground Fault close to 765 kV bus of Ramgarh S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Ramgarh- Bhadla-III 765 kV D/c line
- 21. Three Phase Fault close to 765 kV bus of Bhadla-III S/s followed by tripping of one circuit of Bhadla-III -Sikar-II 765 kV D/c line (fault persist for 100 ms)
- 22. Single Phase to Ground Fault close to 765 kV bus of Bhadla-III S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Bhadla-III -Sikar-II 765 kV D/c line

- 23. Three Phase Fault close to 765 kV bus of Sikar-II S/s followed by tripping of one circuit of Bhadla-III -Sikar-II 765 kV D/c line (fault persist for 100 ms)
- 24. Single Phase to Ground Fault close to 765 kV bus of Sikar-II S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Bhadla-III -Sikar-II 765 kV D/c line

#### **Contingency at 400 kV level**

- 25. Three Phase Fault close to 400 kV bus of Fatehgarh-III S/s (Section-2) followed by tripping of one circuit of Fatehgarh-III S/s (Section-2) –Fatehgarh-IV (Section-1) 400 kV D/c line (fault persist for 100 ms)
- 26. Single Phase to Ground Fault close to 400 kV bus of Fatehgarh-III S/s (Section-2) followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Fatehgarh-III S/s (Section-2) –Fatehgarh-IV (Section-1) 400 kV D/c line
- 27. Three Phase Fault close to 400 kV bus of Fatehgarh-IV S/s (Section-1) followed by tripping of one circuit of Fatehgarh-III S/s (Section-2) –Fatehgarh-IV (Section-1) 400 kV D/c line (fault persist for 100 ms)
- 28. Single Phase to Ground Fault close to 400 kV bus of Fatehgarh-IV S/s (Section-1) followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Fatehgarh-III S/s (Section-2) –Fatehgarh-IV (Section-1) 400 kV D/c line
- 29. Three Phase Fault close to 400 kV bus of Fatehgarh-III S/s (Section-2) followed by tripping of one circuit of Fatehgarh-III S/s (Section-2) –Bhadla-III 400 kV D/c line (fault persist for 100 ms)
- 30. Single Phase to Ground Fault close to 400 kV bus of Fatehgarh-III S/s (Section-2) followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Fatehgarh-III S/s (Section-2) –Bhadla-III 400 kV D/c line
- 31. Three Phase Fault close to 400 kV bus of Bhadla-III S/s (Section-2) followed by tripping of one circuit of Fatehgarh-III S/s (Section-2) –Bhadla-III 400 kV D/c line (fault persist for 100 ms)
- 32. Single Phase to Ground Fault close to 400 kV bus of Bhadla-III S/s (Section-2) followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Fatehgarh-III S/s (Section-2) –Bhadla-III 400 kV D/c line

- 33. Three Phase Fault close to 400 kV bus of Beawar S/s followed by tripping of Beawar– Merta 400 kV line (fault persist for 100 ms)
- 34. Single Phase to Ground Fault close to 400 kV bus of Beawar S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Beawar–Merta 400 kV line
- 35. Three Phase Fault close to 400 kV bus of Merta S/s followed by tripping of Beawar– Merta 400 kV line (fault persist for 100 ms)
- 36. Single Phase to Ground Fault close to 400 kV bus of Merta S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Beawar–Merta 400 kV line
- 37. Three Phase Fault close to 400 kV bus of Beawar S/s followed by tripping of Beawar– Kota 400 kV line (fault persist for 100 ms)
- 38. Single Phase to Ground Fault close to 400 kV bus of Beawar S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Beawar–Kota 400 kV line
- Three Phase Fault close to 400 kV bus of Kota S/s followed by tripping of Beawar–Kota 400 kV line (fault persist for 100 ms)
- 40. Single Phase to Ground Fault close to 400 kV bus of Kota S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Beawar–Kota 400 kV line
- 41. Three Phase Fault close to 400 kV bus of Bhadla-III S/s followed by tripping of one ckt of Bhadla-III–Fatehgarh-II 400 kV D/c line (fault persist for 100 ms)
- 42. Single Phase to Ground Fault close to 400 kV bus of Bhadla-III S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Bhadla-III–Fatehgarh-II 400 kV D/c line
- 43. Three Phase Fault close to 400 kV bus Fatehgarh-II S/s followed by tripping of one ckt of Bhadla-III–Fatehgarh-II 400 kV D/c line (fault persist for 100 ms)
- 44. Single Phase to Ground Fault close to 400 kV bus of Fatehgarh-II S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Bhadla-III–Fatehgarh-II 400 kV D/c line

#### Contingency at 220kV level

- 45. Three phase fault close to 220KV Fatehgarh-III S/s (Section-2) bus with Tripping of 220KV ABC RE Solar (400MW) Fatehgarh-III S/s (Section-2) line
- 46. Three phase fault close to 400KV Fatehgarh-III S/s (Section-2) bus, with Tripping of 400 kV Azure Power (500MW+500MW) Fatehgarh-III S/s (Section-2) line
- 47. Three phase fault close to 220KV Fatehgarh-III S/s (Section-2) bus with Tripping of 220kV Adani Renewable Energy Holding Four Ltd. (300MW) Fatehgarh-III S/s (Section-2) line
- 48. Three phase fault close to 400KV Fatehgarh-III S/s (Section-2) bus with Tripping of 400 kV Adani Renewable Energy Holding Four Ltd. (900MW) Fatehgarh-III S/s (Section-2) line
- 49. Three phase fault close to 220KV Fathegarh-IV S/s (Section-1) bus with Tripping of 220kV ABC RE Solar (380MW) Fathegarh-IV S/s (Section-1) line

### B) N-1-1 Contingency Contingency at 765 kV level

- Case 1 & 2 (consider as separate cases) + Single Phase Fault close to 765 kV bus of Fatehgarh-III S/s (Section-2) followed by single pole opening (100 ms) of the faulted phase (2nd ckt of Fatehgarh-III S/s (Section-2) –Beawar 765 kV D/c line) and successful re-closure (dead time 1 second)
- Case 3 & 4 (consider as separate cases) + Single Phase Fault close to 765 kV bus of Beawar S/s followed by single pole opening (100 ms) of the faulted phase (2nd ckt of Fatehgarh-III S/s (Section-2) –Beawar 765 kV D/c line)and successful re-closure (dead time 1 second)
- 3. Case 5 & 6 (consider as separate cases) + Single Phase Fault close to 765 kV bus of Beawar S/s followed by single pole opening (100 ms) of the faulted phase (2nd ckt of Beawar–Dausa 765 kV D/c) line and successful re-closure (dead time 1 second)
- Case 7 & 8 (consider as separate cases) + Single Phase Fault close to 765 kV bus of Dausa S/s followed by single pole opening (100 ms) of the faulted phase (2nd ckt of Beawar–Dausa 765 kV D/c) and successful re-closure (dead time 1 second)
- Case 9 & 10 (consider as separate cases) + Single Phase Fault close to 765 kV bus of Beawar S/s followed by single pole opening (100 ms) of the faulted phase (2nd ckt of Beawar–Ajmer 765 kV D/c line) and successful re-closure (dead time 1 second)
- Case 11 & 12 (consider as separate cases) + Single Phase Fault close to 765 kV bus of Ajmer S/s followed by single pole opening (100 ms) of the faulted phase (2nd ckt of Beawar–Ajmer 765 kV D/c line) and successful re-closure (dead time 1 second)

#### Specific Technical Requirement for STATCOM

7.	Case 13 & 14 (consider as separate cases) + Single Phase Fault close to 765 kV bus of Beawar S/s followed by single pole opening (100 ms) of the faulted phase (2 nd ckt of Beawar–Chittorgarh 765 kV D/c line) and successful re-closure (dead time 1 second)
8.	Case 15 & 16 (consider as separate cases) + Single Phase Fault close to 765 kV bus of Chittorgarh S/s followed by single pole opening (100 ms) of the faulted phase (2 nd ckt of Beawar– Chittorgarh 765 kV D/c line) and successful re-closure (dead time 1 second)
9.	Case 17 & 18 (consider as separate cases) + Single Phase Fault close to 765 kV bus of Bhadla-III S/s followed by single pole opening (100 ms) of the faulted phase (2 nd ckt of Ramgarh- Bhadla-III 765 kV D/c line) and successful re-closure (dead time 1 second)
10.	Case 19 & 20 (consider as separate cases) + Single Phase Fault close to 765 kV bus of Ramgarh S/s followed by single pole opening (100 ms) of the faulted phase (2 nd ckt of Ramgarh- Bhadla-III 765 kV D/c line) and successful re-closure (dead time 1 second)
11.	Case 21 & 22 (consider as separate cases) + Single Phase Fault close to 765 kV bus of Bhadla-III S/s followed by single pole opening (100 ms) of the faulted phase (2 nd ckt of Bhadla-III -Sikar-II 765 kV D/c line) and successful re-closure (dead time 1 second)
12.	Case 23 & 24 (consider as separate cases) + Single Phase Fault close to 765 kV bus of Sikar-II S/s followed by single pole opening (100 ms) of the faulted phase (2 nd ckt of Bhadla-III -Sikar-II 765 kV D/c line) and successful re-closure (dead time 1 second)
	Contingency at 400 kV level
1.	Case 25 & 26 (consider as separate cases) + Single Phase Fault close to 400 kV bus of Fatehgarh-III S/s (Section-2) followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. 2 nd circuit of Fatehgarh-III S/s (Section-2) –Fatehgarh-IV

Case 27 & 28 (consider as separate cases)+ Single Phase Fault close to 400 kV bus of Fatehgarh-IV (Section-1) followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. 2nd circuit of Fatehgarh-III S/s (Section-2) –Fatehgarh-IV (Section-1)

(Section-1)

- 3. Case 29 & 30 (consider as separate cases)+ Single Phase Fault close to 400 kV bus of Fatehgarh-III S/s (Section-2) followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. 2nd circuit of Fatehgarh-III S/s (Section-2) –Bhadla-III 400 kV D/c line
- 4. Case 31 & 32 (consider as separate cases)+ Single Phase Fault close to 400 kV bus of Bhadla-III S/s followed by single pole opening (100 ms) of the faulted phase and

unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. 2nd circuit of Fatehgarh-III S/s (Section-2) –Bhadla-III 400 kV D/c line

- 5. Case 41 & 42 (consider as separate cases)+ Single Phase Fault close to 400 kV bus of Bhadla-III S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. 2nd circuit of Bhadla-III–Fatehgarh-II 400 kV D/c line
- 6. Case 43 & 44 (consider as separate cases)+ Single Phase Fault close to 400 kV bus of Fatehgarh -II S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. 2nd circuit of Bhadla-III–Fatehgarh-II 400 kV D/c line

Amendment –XXII dated 13.03.2023 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI.	Clause	Existing Provis	sions	N	ew / Revised	Clause
No	No.					
1.	2.7.1 of	The Bidders sho	idders should submit the Bids online through the electronic		ne Bidders sh	ould submit the Bids online through the electronic
	RFP	bidding platform	before the Bid Deadline i.e. on or before 1100 hours	bi	dding platform	before the Bid Deadline i.e. on or before 1100 hours
			023. In addition to the online submission, the Bidder		ST) on <u><b>03.04.2</b></u>	<b>023</b> . In addition to the online submission, the Bidder
			Offer will be required to submit original hard copies			I Offer will be required to submit original hard copies
			nnexure 4 (if applicable), Annexure 6 (if applicable)			Annexure 4 (if applicable), Annexure 6 (if applicable)
			4 before issuance of Lol			4 before issuance of Lol
2.	2.7.2 of	Important timelin	es are mentioned below:	Im	nportant timelir	nes are mentioned below:
	RFP					
		Date	Event		Date	Event
		13.03.2023	Submission of Bid (Online submission of Bid		03.04.2023	Submission of Bid (Online submission of Bid
			through electronic bidding portal)			through electronic bidding portal)
		13.03.2023	Opening of Technical Bid		03.04.2023	Opening of Technical Bid
		21.03.2023	Shortlisting and announcement of Qualified		11.04.2023	Shortlisting and announcement of Qualified
			Bidders on bidding portal			Bidders on bidding portal
		23.03.2023	Opening of Financial Bid - Initial Offer		12.04.2023	Opening of Financial Bid - Initial Offer
		24.03.2023	Electronic reverse auction (Financial Bid – Final		13.04.2023	Electronic reverse auction (Financial Bid – Final
			Offer) for the Qualified Bidders.			Offer) for the Qualified Bidders.
		29.03.2023	Submission of original hard copies of Annexure		18.04.2023	Submission of original hard copies of Annexure
			3, Annexure 4, Annexure 6, as applicable and			3, Annexure 4, Annexure 6, as applicable and
			Annexure 14 by the bidder with lowest Final			Annexure 14 by the bidder with lowest Final
			Offer			Offer
		03.04.2023	Selection of Successful Bidder and issue of LOI		21.04.2023	Selection of Successful Bidder and issue of LOI
		13.04.2023	Signing of RFP Project Documents and transfer		01.05.2023	Signing of RFP Project Documents and transfer
			of Beawar Transmission Limited			of Beawar Transmission Limited

SI.	Clause	Existing Provisions	New / Revised Clause
No	No.		
3.	2.13.1 of		
	RFP		
		Opening of Envelope (Technical Bid): 1130 hours (IST) on	Opening of Envelope (Technical Bid): 1130 hours (IST) on 03.04.2023
		<u>13.03.2023</u>	
		Opening of Initial Offer: Initial Offer shall be opened by the Bid	Opening of Initial Offer: Initial Offer shall be opened by the Bid
		Opening Committee in presence of the Bid Evaluation Committee at	Opening Committee in presence of the Bid Evaluation Committee at
		1130 hours (IST) on <u>23.03.2023</u> in the office of CEA.	1130 hours (IST) on <u>12.04.2023</u> in the office of CEA.

Amendment –XXIII dated 03.04.2023 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI. No	Clause No.	Existing Provis	ions	N	ew / Revised	Clause
1.	2.7.1 of	The Bidders sho	ould submit the Bids online through the electronic	Tł	ne Bidders sh	ould submit the Bids online through the electronic
	RFP	bidding platform	before the Bid Deadline i.e. on or before 1100 hours	bi	dding platform	before the Bid Deadline i.e. on or before 1100 hours
		(IST) on 03.04.2	023. In addition to the online submission, the Bidder	(1	ST) on <u><b>24.04.2</b></u>	<b>2023</b> . In addition to the online submission, the Bidder
		with lowest Final	Offer will be required to submit original hard copies			I Offer will be required to submit original hard copies
		of Annexure 3, A	nnexure 4 (if applicable), Annexure 6 (if applicable)	of	Annexure 3, A	Annexure 4 (if applicable), Annexure 6 (if applicable)
		and Annexure 14	before issuance of Lol	ar	nd Annexure 1	4 before issuance of Lol
2.	2.7.2 of	Important timelin	es are mentioned below:	Im	nportant timelir	nes are mentioned below:
	RFP					
		Date	Event		Date	Event
		03.04.2023	Submission of Bid (Online submission of Bid		24.04.2023	Submission of Bid (Online submission of Bid
			through electronic bidding portal)			through electronic bidding portal)
		03.04.2023	Opening of Technical Bid		24.04.2023	Opening of Technical Bid
		11.04.2023	Shortlisting and announcement of Qualified		02.05.2023	Shortlisting and announcement of Qualified
			Bidders on bidding portal			Bidders on bidding portal
		12.04.2023	Opening of Financial Bid - Initial Offer		03.05.2023	Opening of Financial Bid - Initial Offer
		13.04.2023	Electronic reverse auction (Financial Bid – Final		04.05.2023	Electronic reverse auction (Financial Bid – Final
			Offer) for the Qualified Bidders.			Offer) for the Qualified Bidders.
		18.04.2023	Submission of original hard copies of Annexure		10.05.2023	Submission of original hard copies of Annexure
			3, Annexure 4, Annexure 6, as applicable and			3, Annexure 4, Annexure 6, as applicable and
			Annexure 14 by the bidder with lowest Final			Annexure 14 by the bidder with lowest Final
			Offer			Offer
		21.04.2023	Selection of Successful Bidder and issue of LOI		12.05.2023	Selection of Successful Bidder and issue of LOI
		01.05.2023	Signing of RFP Project Documents and transfer		22.05.2023	Signing of RFP Project Documents and transfer
			of Beawar Transmission Limited			of Beawar Transmission Limited

SI.	Clause	Existing Provisions	New / Revised Clause
No	No.		
3.	2.13.1 of		
	RFP		
		Opening of Envelope (Technical Bid): 1130 hours (IST) on	Opening of Envelope (Technical Bid): 1130 hours (IST) on 24.04.2023
		<u>03.04.2023</u>	
		Opening of Initial Offer: Initial Offer shall be opened by the Bid	Opening of Initial Offer: Initial Offer shall be opened by the Bid
		Opening Committee in presence of the Bid Evaluation Committee at	Opening Committee in presence of the Bid Evaluation Committee at
		1130 hours (IST) on <u>12.04.2023</u> in the office of CEA.	1130 hours (IST) on <u>03.05.2023</u> in the office of CEA.

Amendment –XXIV dated 24.04.2023 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI. No	Clause No.	Existing Provis	ions	N	ew / Revised (	Clause
1.	2.7.1 of	The Bidders sho	ould submit the Bids online through the electronic	Tł	ne Bidders sh	ould submit the Bids online through the electronic
	RFP	bidding platform	before the Bid Deadline i.e. on or before 1100 hours	bi	dding platform	before the Bid Deadline i.e. on or before 1100 hours
		(IST) on 24.04.2	<u>023</u> . In addition to the online submission, the Bidder	(15	ST) on <u><b>15.05.2</b></u>	2023. In addition to the online submission, the Bidder
		with lowest Final	Offer will be required to submit original hard copies			I Offer will be required to submit original hard copies
		of Annexure 3, A	nnexure 4 (if applicable), Annexure 6 (if applicable)	of	Annexure 3, A	Annexure 4 (if applicable), Annexure 6 (if applicable)
		and Annexure 14	before issuance of Lol	ar	nd Annexure 1	4 before issuance of Lol
2.	2.7.2 of	Important timelin	es are mentioned below:	Im	nportant timelir	nes are mentioned below:
	RFP					
		Date	Event		Date	Event
		24.04.2023	Submission of Bid (Online submission of Bid		15.05.2023	Submission of Bid (Online submission of Bid
			through electronic bidding portal)			through electronic bidding portal)
		24.04.2023	Opening of Technical Bid		15.05.2023	Opening of Technical Bid
		02.05.2023	Shortlisting and announcement of Qualified		23.05.2023	Shortlisting and announcement of Qualified
			Bidders on bidding portal			Bidders on bidding portal
		03.05.2023	Opening of Financial Bid - Initial Offer		24.05.2023	Opening of Financial Bid - Initial Offer
		04.05.2023	Electronic reverse auction (Financial Bid – Final		25.05.2023	Electronic reverse auction (Financial Bid – Final
			Offer) for the Qualified Bidders.			Offer) for the Qualified Bidders.
		10.05.2023	Submission of original hard copies of Annexure		30.05.2023	Submission of original hard copies of Annexure
			3, Annexure 4, Annexure 6, as applicable and			3, Annexure 4, Annexure 6, as applicable and
			Annexure 14 by the bidder with lowest Final			Annexure 14 by the bidder with lowest Final
			Offer			Offer
		12.05.2023	Selection of Successful Bidder and issue of LOI		02.06.2023	Selection of Successful Bidder and issue of LOI
		22.05.2023	Signing of RFP Project Documents and transfer		12.06.2023	Signing of RFP Project Documents and transfer
			of Beawar Transmission Limited			of Beawar Transmission Limited

SI.	Clause	Existing Provisions	New / Revised Clause
No	No.		
3.	2.13.1 of		
	RFP		
		Opening of Envelope (Technical Bid): 1130 hours (IST) on	Opening of Envelope (Technical Bid): 1130 hours (IST) on <b>15.05.2023</b>
		<u>24.04.2023</u>	
		Opening of Initial Offer: Initial Offer shall be opened by the Bid	Opening of Initial Offer: Initial Offer shall be opened by the Bid
		Opening Committee in presence of the Bid Evaluation Committee at	Opening Committee in presence of the Bid Evaluation Committee at
		1130 hours (IST) on <u>03.05.2023</u> in the office of CEA.	1130 hours (IST) on <u>24.05.2023</u> in the office of CEA.

Amendment –XXV dated 15.05.2023 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI. No	Clause No.		Existing Provisions			New / Revised Clause			
1.	RFP & TSA	Scope	of the Project		Scope of the Project				
		Sr. No.	Scope of the Transmission Scheme	Scheduled COD in months from Effective Date	Sr. No.	Scope of the Transmission Scheme	Scheduled COD in months from Effective Date		
		1.	Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus Reactor 765/400kV 1500 MVA ICTs: 2 nos. (7x500 MVA, including one spare unit) 330 MVAr, 765 kV bus reactor- 2 nos. (7x110 MVAr, including one spare unit) 765kV ICT bays – 2 nos. 400 kV ICT bays – 2 nos. 765 kV line bays – 6 nos. 400kV line bay- 2 nos. 765kV reactor bay- 2 nos. 125 MVAr, 420kV bus reactor – 2 nos. 420 kV reactor bay – 2 nos.	18	1.	Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus Reactor 765/400kV 1500 MVA ICTs: 2 nos. (7x500 MVA, including one spare unit) 330 MVAr, 765 kV bus reactor- 2 nos. (7x110 MVAr, including one spare unit) 765kV ICT bays – 2 nos. 400 kV ICT bays – 2 nos. 765 kV line bays – 6 nos. 400kV line bay- 2 nos. 765kV reactor bay- 2 nos. 125 MVAr, 420kV bus reactor – 2 nos. 420 kV reactor bay – 2 nos.	18		
			Future provisions: Space for			Future provisions: Space for			

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SI. No	Clause No.	Existing Provisions				New / Revised Clause			
			765/400kV ICTs along with bays: 2 nos. 765kV line bay along with switchable line reactor: 8nos. 765kV Bus Reactor along with bays: 2nos				765/400kV ICTs along with bays: 2 nos. 765kV line bay along with switchable line reactor: 8nos. 765kV Bus Reactor along with bays:		
			<ul> <li>400/220 kV ICTs along with bays: 2nos.</li> <li>400 kV line bays along with switchable line reactor: 4 nos.</li> <li>400kV Bus Reactor along with bays: 1no.</li> <li>220 kV line bays: 4nos.</li> </ul>				2nos 400/220 kV ICTs along with bays: 2nos. 400 kV line bays along with switchable line reactor: 4 nos. 400kV Bus Reactor along with bays:		
		2.	LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar				1no. 220 kV line bays: 4nos.		
		3. 4.	LILO of 400kV Kota –Merta line at Beawar Fatehgarh-3– Beawar 765 kV D/c along			2.	LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar		
			with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3-			3.	LILO of 400kV Kota –Merta line at Beawar		
			Beawar 765 kV D/c line.			4.	Fatehgarh-3– Beawar 765 kV D/c along with 330 MVAr Switchable line reactor		
			Switching equipment for 765 kV 330 MVAR switchable line reactor –4 nos. 765 kV, 330 MVAr Switchable line reactor-				for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line.		
		<u>5.</u>	4 nos. <u>+ 2x300MVAr STATCOM, 4x125 MVAr</u> <u>MSC, 2x125 MVAr MSR at Fatehgarh- 3</u> <u>PS along with 2 nos. of 400 kV bays at</u>	<u>18</u>			Switching equipment for 765 kV 330 MVAR switchable line reactor –4 nos. 765 kV, 330 MVAr Switchable line reactor- 4 nos.		
		Note:	Fatehgarh-3 PS			<u>5.</u>	<u>± 2x300MVAr STATCOM, 4x125 MVAr</u> <u>MSC, 2x125 MVAr MSR at Fatehgarh-</u> <u>3 PS along with 2 nos. of 400 kV bays</u>	<u>24</u>	
		(i) F	OWERGRID shall provide space for 2 nos. of	765 kV line bays					

SI.	Clause		Existing Provisions			New / Revis	ed Clause	
No	No.							
•		at Eatebra	rh-3 S/s for Fatehgarh-3– Beawar 765 kV D/c	line		Fatehgarh-3 PS		[
		•	765kV switchable line reactors.		lote:	Tatengam-5 F 5		
		•	STATCOM should be placed in each 400 kV		010.			
		· · /	atehgarh-3 PS (Phase-III Part E1).	(i	) POW	RGRID shall provide spa	ace for 2 nos. of	765 kV line bays at
			ID shall provide space at Fatehgarh-3 S/s			arh-3 S/s for Fatehgarh		•
			along with MSC & MSR and associated 400kV bay			5kV switchable line reac		5
			-	(i	i) ±300	IVAr STATCOM should	d be placed in	each 400 kV bus
					sectio	of Fatehgarh-3 PS (Pha	se-III Part E1).	
				(i	ii) POW	RGRID shall provide	space at Fat	tehgarh-3 S/s for
					STAT	OM along with MSC & N	ISR and associa	ated 400kV bays.
2.	2.7.1 of		ould submit the Bids online through the electro			should submit the B		•
	RFP	• .	before the Bid Deadline i.e. on or before 1100 ho		bidding platform before the Bid Deadline i.e. on or before 1100 hours			
		. ,	<b>2023</b> . In addition to the online submission, the Bic	•	(IST) on <u><b>30.05.2023</b></u> . In addition to the online submission, the Bidder with lowest Final Offer will be required to submit original hard copies of			
			Offer will be required to submit original hard copie			•		, i
			nexure 4 (if applicable), Annexure 6 (if applicable)			Annexure 4 (if applicat	ole), Annexure 6	(if applicable) and
3.	2.7.2 of		ore issuance of Lol			before issuance of Lol		
з.	2.7.2 01 RFP	Important timelin	es are mentioned below:	I	пропалі і	elines are mentioned be	elow.	
		Date	Event		Dat		Event	
		15.05.2023	Submission of Bid (Online submission of Bid		30.05.2	23 Submission of Bid	(Online submis	ssion of Bid
			through electronic bidding portal)			through electronic b	bidding portal)	
		15.05.2023	Opening of Technical Bid		30.05.2	23 Opening of Technic	al Bid	
		23.05.2023	Shortlisting and announcement of Qualified		07.06.2	23 Shortlisting and a	announcement	of Qualified
			Bidders on bidding portal			Bidders on bidding		
		24.05.2023	Opening of Financial Bid - Initial Offer		08.06.2	1 5		
		25.05.2023	Electronic reverse auction (Financial Bid -		09.06.2			
			Final Offer) for the Qualified Bidders.			Final Offer) for the		
		30.05.2023	Submission of original hard copies of Annexure		14.06.2	23 Submission of origi	nal hard copies	of Annexure

SI. No	Clause No.		Existing Provisions		New / Revised Clause	
		02.06.2023	<ul> <li>3, Annexure 4, Annexure 6, as applicable and Annexure 14 by the bidder with lowest Final Offer</li> <li>Selection of Successful Bidder and issue of LOI</li> <li>Signing of RFP Project Documents and transfer of Beawar Transmission Limited</li> </ul>		19.06.2023 30.06.2023	3, Annexure 4, Annexure 6, as applicable and Annexure 14 by the bidder with lowest Final OfferSelection of Successful Bidder and issue of LOISigning of RFP Project Documents and transfer of Beawar Transmission Limited
4.	2.13.1 of RFP	Opening of Init	elope (Technical Bid): 1130 hours (IST) on <u>15.05.2</u> ial Offer: Initial Offer shall be opened by the ittee in presence of the Bid Evaluation Committe ) on <u>24.05.2023</u> in the office of CEA.	2023 ( Bid ee at (	Dpening of Initia	elope (Technical Bid): 1130 hours (IST) on <u>30.05.2023</u> al Offer: Initial Offer shall be opened by the Bid Opening resence of the Bid Evaluation Committee at 1130 hours 2023 in the office of CEA.
5.	Clause 1 of specific technic al specific ation of STATC OM of RfP & TSA.	VSC based conv or minimize ac fi to the xx kV b	ing block of the STATCOM should be single p vertor valve (multi-level) operating in a way to elim lter requirement to High pass filter only and conne us through air core reactors. <u>The STATCOM</u> pultiple identical STATCOM units (minimum	hase inate ected may	. Introduction The main build pased converto ninimize ac filte	

SI.	Clause	Existing Provisions	New / Revised Clause
No	No.		
6.	Clause	B.3.1 AC & DC power supplies	B.3.1 AC & DC power supplies
	B.3.1		
	of		
	specific		
	technic	i) For LT Supply at each new Substation, two (2) nos. of LT	i) For LT Supply at each new Substation, two (2) nos. of auxiliary
	al	Transformers (minimum 800kVA for substations with highest	Transformers (minimum 800kV for substation with highest
	require	voltage rating as 765kV and minimum 630kVA for substations	voltage rating as 765kV and minimum 630kVA for substations
	ment of	with highest voltage rating as 400kV) shall be provided out of	with highest voltage rating as 400kV) fed from independent
	s/s of	which one shall be connected with SEB/DISCOM supply and	sources shall be provided as per the CEA (Technical
	RFP &	other one shall be connected to tertiary of Transformer.	Standards for Connectivity to the Grid) Regulations, 2007.
	TSA		
		ii) 2 sets of 220V battery banks for control & protection and 2 sets of 48V battery banks for PLCC/ communication equipment shall be provided at each new Substation. Each battery bank shall have a float-cum-boost charger. Battery shall be of VRLA type. At new substation, sizing of 220 V battery and battery charger shall be done based on the number of bays specified (including future bays) as per CEA Regulations and relevant IS. 2 sets of 48 V battery banks for PLCC and communication equipment shall be provided at each new Substation with at least 10-hour battery backup and extended backup, if required.	ii) 2 sets of 220V battery banks for control & protection and 2 sets of 48V battery banks for PLCC/ communication equipment shall be provided at each new Substation. Each battery bank shall have a float-cum-boost charger. At new substation, sizing of 220 V battery and battery charger shall be done based on the number of bays specified (including future bays) as per CEA Regulations and relevant IS. 2 sets of 48 V battery banks for PLCC and communication equipment shall be provided at each new Substation with at least 10-hour battery backup and extended backup, if required. <u>48 V can be achieved from 220 V battery</u> <u>bank also, if desired, without compromising backup time.</u>
7.	Clause	8. STATCOM Station Main Components	8. STATCOM Station Main Components
	8.1.2 of		
	specific		

SI.	Clause	Existing Provisions	New / Revised Clause
No	No.		
•			
	technic al	8.1.2 Semiconductor Switches:	8.1.2 Semiconductor Switches:
	specific	8.1.2 Semiconductor Switches.	8.1.2 Semiconductor Switches.
	ation of	The electronic switches should be designed with the aim to achieve	The electronic switches should be designed with the aim to achieve
	STATC	operation according to the overall performance requirements of the	operation according to the overall performance requirements of the
	OM of	STATCOM Station. The valve shall be designed with individual	STATCOM Station. The valve shall be designed with individual
	RfP &	semiconductor switches applied in a conservative manner with regard	semiconductor switches applied in a conservative manner with regard to
	TSA.	to their basic design parameters. The semiconductor switch shall meet	their basic design parameters. The semiconductor switch shall meet the
		the requirements of IEC 60747 except where otherwise specified	requirements of IEC 60747 except where otherwise specified herein.
		herein. The proposed semiconductor switch shall be of a type	
		which is in, or ready for, commercial operation with characteristics fully proven by recorded years of operation in	
		other installations.	
		<u></u>	
8.	Clause	8.1.3. Sub module for Multi-Module Topology	8.1.3. Sub module for Multi-Module Topology
	8.1.3 of		
	specific		
	technic	<b>.</b>	
	al	Sub module shall be designed to guarantee high maintainability	Deleted.
	specific ation of	with self-sealing type hydraulic valves and electrical plugs for ease of installation or un-installation.	
	STATC		
	OM of		
	RfP &		
	TSA		
9.	Clause	8.2.2 Operator Interface	8.2.2 Operator Interface
	8.2.2 of		
	specific		
	technic	t) <b><u>As the substation</u></b> where STATCOM Station shall be installed, will	f) As Fatehgarh-3 substation where STATCOM Station shall be

SI. No	Clause No.		Existing Provisions		New / Revised Clause
	NO.				
	al specific ation of STATC OM of RfP & TSA		be equipped with Sub-station Automation System (SAS) conforming to IEC 61850, it is required that STATCOM Station control and monitoring shall be integrated with SAS already provided at main 400 kV Sub-station by the TSP. It is proposed to connect STATCOM Station SCADA with SAS through a Gateway and the database, configuration etc. of main substation SAS shall be upgraded to incorporate STATCOM Station events, alarms, Controls (both switchgear and control functions of STATCOM Station can be effectively monitored and controlled from main substation SAS and shall be monitored from Load Dispatch Center (NRLDC).		installed, will be equipped with Sub-station Automation System (SAS) conforming to IEC 61850, it is required that STATCOM Station control and monitoring shall be integrated with SAS already provided at main 400 kV Sub-station by the TSP. It is proposed to connect STATCOM Station SCADA with SAS through a Gateway and the database, configuration etc. of main substation SAS shall be upgraded to incorporate STATCOM Station events, alarms, Controls (both switchgear and control functions of STATCOM Station like setting of parameters etc.) so that STATCOM Station can be effectively monitored and controlled from main substation SAS and shall be monitored from Load Dispatch Center (NRLDC).
10.	Clause 8.7 of	8.7	7 Air Core Reactors	8.7	7 Air Core Reactors
	specific				
	technic				
	al	e.	The reactor shall be designed to withstand overloading due to over	e.	The reactor shall be designed to withstand overloading due to over
	specific		voltage as specified and shall also be subjected to excitation by		voltage as specified and shall also be subjected to excitation by
	ation of		harmonics; the reactor must be able to withstand such events		harmonics; the reactor must be able to withstand such events
	STATC OM of	f	without deterioration in normal life. All internal (with in a reactor coil) current carrying	f.	without deterioration in normal life. Deleted
	RfP &		connections shall be welded/Brazed or compressed joint.	и. g.	Deleted
	TSA.	g.		h.	
		h.	Lifting lugs shall be provided for handling of the reactor.	i.	Deleted
		i.	The reactor shall be vertically mounted.	j.	The reactors shall be subjected to type and routine tests in
		j.	The reactors shall be subjected to type and routine tests in		accordance with the latest issue of IEC-60076 as appropriate to the
			accordance with the latest issue of IEC-60076 as appropriate to the type of reactor provided.		type of reactor provided.

51. No	Clause No.		Existing F	Provisions		New / Revised Clause									
1.	Annexu	B.5.0 E	EXTENSION OF EXISTING	SUBSTATION		B.5.0 EX	TENSION OF EXISTING SUE	BSTATION							
	re C: SPECI	The fe	llouing drouings/datails of	wisting substation is atte											
	FIC		llowing drawings/details of e P documents for further engi	•	ached with	The following drawings/details of existing substation is attached with RFP documents for further engineering by the bidder:									
	TECH			neening by the bluder.				j by the bluder.							
	NIC AL	SI.	Drawing Title	Drawing No./Details	Rev.	SI.	Drawing Title	Drawing No./Details	Rev.						
	REQUI	No.		Ū	No.	No.									
	RE	Α.	765kV Fatehgarh-3 (AIS)	S/S		Α.	765kV Fatehgarh-3 (AIS) S/S								
	MENT S FOR	1.0	Single Line Diagram	C/ENGG/SS/FATEH GARH-3/SLD/01	<u>01</u>	1.0	Single Line Diagram	C/ENGG/SS/FATEH GARH-3/SLD/01	<u>02</u>						
	SUBST AT ION	2.0	General Arrangement	C/ENGG/SS/FATEH GARH-3/GA/01	<u>00</u>	2.0	General Arrangement	C/ENGG/SS/FATEH GARH-3/GA/01	<u>01</u>						
	of RFP &	3.0	Earthmat Layout	KPTL/PGCIL/WO-SS- 033/02E/RGH-II/009	01	3.0	Earthmat Layout	KPTL/PGCIL/WO-SS- 033/02E/RGH-II/009	01						
	Schedu le: 1 of TSA	4.0	Visual Monitoring System	The drawings are yet to be finalized by developer.	-	4.0	Visual Monitoring System	The drawings are yet to be finalized by developer.	-						
		5.0	Bus Bar Protection (400 kV System)	The drawings are yet to be finalized by developer.	-	5.0	Bus Bar Protection (400 kV System)	The drawings are yet to be finalized by developer.	-						
		6.0	Substation Automation System (SAS)	GE Make, KZ3DSA1	С	6.0	Substation Automation System (SAS)	GE Make, KZ3DSA1	С						

# Amendment –XXVI dated 30.05.2023 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI.	Clause	Existing Provis	sions	N	ew / Revised	Clause
No	No.					
1.	2.7.1 of	The Bidders sh	ould submit the Bids online through the electronic	; T	he Bidders sh	ould submit the Bids online through the electronic
	RFP	bidding platform	before the Bid Deadline i.e., on or before 1100 hours	s bi	idding platform	before the Bid Deadline i.e. on or before 1100 hours
		(IST) on <u>30.05.2</u>	023. In addition to the online submission, the Bidde	· (I	ST) on <u>13.06.2</u>	<b>023</b> . In addition to the online submission, the Bidder
		with lowest Fina	Offer will be required to submit original hard copies	w	ith lowest Fina	Offer will be required to submit original hard copies
		of Annexure 3, A	Annexure 4 (if applicable), Annexure 6 (if applicable)	of	f Annexure 3, A	Annexure 4 (if applicable), Annexure 6 (if applicable)
		and Annexure 1	4 before issuance of Lol	a	nd Annexure 1	4 before issuance of Lol
2.	2.7.2 of	Important timelin	es are mentioned below:	In	nportant timelir	es are mentioned below:
	RFP					
		Date	Event		Date	Event
		30.05.2023	Submission of Bid (Online submission of Bid		13.06.2023	Submission of Bid (Online submission of Bid
			through electronic bidding portal)			through electronic bidding portal)
		30.05.2023	Opening of Technical Bid		13.06.2023	Opening of Technical Bid
		07.06.2023	Shortlisting and announcement of Qualified		21.06.2023	Shortlisting and announcement of Qualified
			Bidders on bidding portal			Bidders on bidding portal
		08.06.2023	Opening of Financial Bid - Initial Offer		22.06.2023	Opening of Financial Bid - Initial Offer
		09.06.2023	Electronic reverse auction (Financial Bid – Final		23.06.2023	Electronic reverse auction (Financial Bid – Final
			Offer) for the Qualified Bidders.			Offer) for the Qualified Bidders.
		14.06.2023	Submission of original hard copies of Annexure		28.06.2023	Submission of original hard copies of Annexure
		3, Annexure 4, Annexure 6, as applicable and				3, Annexure 4, Annexure 6, as applicable and
			Annexure 14 by the bidder with lowest Final			Annexure 14 by the bidder with lowest Final
			Offer			Offer
		19.06.2023	Selection of Successful Bidder and issue of LOI		03.07.2023	Selection of Successful Bidder and issue of LOI

SI. No	Clause No.	Existing Provis	sions	New / Revised Clause							
		30.06.2023 Signing of RFP Project Documents and transfer of Beawar Transmission Limited			13.07.2023	Signing of RFP Project Documents and transfer of Beawar Transmission Limited					
3.	2.13.1 of RFP	 Opening of En <u>30.05.2023</u>	velope (Technical Bid): 1130 hours (IST) on	Opening of Envelope (Technical Bid): 1130 hours (IST) on 13.06.2023							
		Opening Commi	al Offer: Initial Offer shall be opened by the Bid ttee in presence of the Bid Evaluation Committee at ) on <u>08.06.2023</u> in the office of CEA.	Op	ening of Initiation	al Offer: Initial Offer shall be opened by the Bid ttee in presence of the Bid Evaluation Committee at ) on <b>22.06.2023</b> in the office of CEA.					

# Amendment –XXVII dated 13.06.2023 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI.	Clause	Existing Provis	sions	N	ew / Revised	Clause
No	No.	_				
1.	2.7.1 of	The Bidders sh	ould submit the Bids online through the electronic	T	he Bidders sh	ould submit the Bids online through the electronic
	RFP	bidding platform	before the Bid Deadline i.e., on or before 1100 hours	bi	dding platform	before the Bid Deadline i.e. on or before 1100 hours
		(IST) on <u>13.06.2</u>	023. In addition to the online submission, the Bidder	(	ST) on <u><b>27.06.2</b></u>	<b>023</b> . In addition to the online submission, the Bidder
		with lowest Fina	Offer will be required to submit original hard copies	W	ith lowest Fina	Offer will be required to submit original hard copies
		of Annexure 3, A	Annexure 4 (if applicable), Annexure 6 (if applicable)	of	⁴ Annexure 3, A	Annexure 4 (if applicable), Annexure 6 (if applicable)
		and Annexure 14	4 before issuance of Lol	ar	nd Annexure 1	4 before issuance of Lol
2.	2.7.2 of	Important timelin	es are mentioned below:	In	nportant timelir	es are mentioned below:
	RFP					
		Date	Event		Date	Event
		13.06.2023	Submission of Bid (Online submission of Bid		27.06.2023	Submission of Bid (Online submission of Bid
			through electronic bidding portal)			through electronic bidding portal)
		13.06.2023	Opening of Technical Bid		27.06.2023	Opening of Technical Bid
		21.06.2023	Shortlisting and announcement of Qualified		05.07.2023	Shortlisting and announcement of Qualified
			Bidders on bidding portal			Bidders on bidding portal
		22.06.2023	Opening of Financial Bid - Initial Offer		06.07.2023	Opening of Financial Bid - Initial Offer
		23.06.2023	Electronic reverse auction (Financial Bid – Final		07.07.2023	Electronic reverse auction (Financial Bid – Final
			Offer) for the Qualified Bidders.			Offer) for the Qualified Bidders.
		28.06.2023	Submission of original hard copies of Annexure		12.07.2023	Submission of original hard copies of Annexure
		3, Annexure 4, Annexure 6, as applicable and				3, Annexure 4, Annexure 6, as applicable and
			Annexure 14 by the bidder with lowest Final			Annexure 14 by the bidder with lowest Final
			Offer			Offer
		03.07.2023	Selection of Successful Bidder and issue of LOI		17.07.2023	Selection of Successful Bidder and issue of LOI

SI. No	Clause No.	Existing Provis	sions	New / Revised Clause           27.07.2023         Signing of RFP Project Documents and transfer of Beawar Transmission Limited					
		13.07.2023	Signing of RFP Project Documents and transfer of Beawar Transmission Limited		27.07.2023				
3.	2.13.1 of RFP	 Opening of En <u>13.06.2023</u> 	velope (Technical Bid): 1130 hours (IST) on	 Opening of Envelope (Technical Bid): 1130 hours (IST) of <u>27.06.2023</u>					
		Opening Commi	al Offer: Initial Offer shall be opened by the Bid ttee in presence of the Bid Evaluation Committee at ) on <b>22.06.2023</b> in the office of CEA.	Ope	ening Commi	ial Offer: Initial Offer shall be opened by the Bid ittee in presence of the Bid Evaluation Committee at ) on <u>06.07.2023</u> in the office of CEA.			

Amendment –XXVIII dated 16.06.2023 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI.	Clause	Existing P	Provisions			lew / Re	evised Clause							
No.	No.													
1.	RFP	2.6 Project	Schedule				2.6 Project Schedule							
			Elements of the Project are rec	•	commissioned	progressively as	2.		Elements of the Project are re	•	commissioned	progressively as		
		pe	r the schedule given in the follo	owing table;				per	the schedule given in the follo	owing table;				
					Percentage	Element(s)					Percentage			
					of Quoted	which are pre-					of Quoted	Element(s) which		
					Transmission	required for					Transmission	are pre-required		
				COD in	Charges	declaring the				COD in	Charges	for declaring the		
		SI. No.	Name of the Transmission	months	recoverable	commercial		SI. No.	Name of the Transmission		recoverable	commercial		
			Element	from Effective	on Scheduled	operation (COD) of the			Element	from Effective	on Scheduled	operation (COD) of the respective		
				Date	COD of the	respective				Date	COD of the	Element		
				Duto	Element of	Element				Duto	Element of	Lionion		
					the Project						the Project			
		1.	Establishment of		<u>17.59%</u>	All elements of		1.	Establishment of		<u>15.81 %</u>	All elements of		
			2x1500MVA 765/400kV			scheme are			2x1500MVA 765/400kV			scheme marked		
			Substation at suitable			required to be			Substation at suitable			at S. No. 1, 2, 3		
			location near Beawar along			commissioned			location near Beawar			and 4 are required		
			with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr			simultaneously as their			along with 2x330 MVAr 765kV Bus Reactor &			to be commissioned		
			420kV Bus Reactor			utilization is			2x125 MVAr 420kV Bus			simultaneously		
						dependent on			Reactor			as their utilization		
			Future provisions: Space			commissioning		2.	LILO of both circuit of		<u>14.10 %</u>	is dependent on		
			<u>for</u>	18		of each other.			Ajmer-Chittorgarh 765 kV	18		commissioning of		
			765/400kV ICTs along with						D/c at Beawar	months		each other.		
			<u>bays: 2 nos.</u>					3.	LILO of 400kV Kota –Merta		<u>1.84 %</u>			
									line at Beawar					

SI.	Clause	Existing Provisions	New / Revised Clause	645
No.	No.	765kV line bay along with switchable line reactor: 6nos.         765kV Bus Reactor along with bays: 2 nos.         400/220 kV ICTs along with bays: 2nos.         400 kV line bays along with switchable line reactor: 4 nos.         400 kV line bays along with switchable line reactor: 4 nos.         20 kV line bays: 1nos.         220 kV line bays: 4nos.         2.       LILO of both circuit of Ajmer- Chittorgarh 765 kV D/c at Beawar         3.       LILO of 400kV Kota –Merta line at Beawar         4.       Fatehgarh-3 PS – Beawar 765 kV D/c along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3 – Beawar 765 kV D/c line         Scheduled COD for overall Project: 18 months from Effective Date.	4.       Fatehgarh-3 PS – Beawar       56.92 %         765 kV D/c along with 330       MVAr       Switchable       line         reactor for each circuit at       each end of Fatehgarh-3–       Beawar 765 kV D/c line       11.33 %         5.       ± 2x300MVAr STATCOM, 24       11.33 %         4x125 MVAr MSC, 2x125       months       11.33 %         MVAr MSR at Fatehgarh3       PS along with 2 nos. of 400 kV bays at Fatehgarh-3 PS       100 kV bays at Fatehgarh-3 PS         Scheduled COD for overall Project: 24 months from Effect	

SI. No.	Clause No.	Existing	Provisions				New	w / Re	evised Clause			646
2.	RFP Documents	ANNEXU	RE 8 -UNDERTAKING AND DET	AILS OF EG		IENT	ANN	NEXI	JRE 8 -UNDERTAKING AND	D DETAILS (	OF EQUITY IN	/ESTMENT
			onfirm that our Bid meets the Sch roject as specified below	eduled COD					onfirm that our Bid meets the the Project as specified below		COD of each t	ransmission Element
		SI. No.	Name of the Transmission Element	Scheduled COD in months from Effective Date	Percentage of Quoted Transmission Charges recoverable on Scheduled COD of the Element of the Project	Element(s) which are pre- required for declaring the commercial operation (COD) of the respective Element	SI.	No.	Name of the Transmission Element	COD in	Scheduled COD of the Element of	Element(s) which are pre-required for declaring the commercial operation (COD) of the respective Element
		1.	Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus Reactor Future provisions: Space for 765/400kV ICTs along with bays: 2 nos. 765kV line bay along with switchable line reactor: 6nos. 765kV Bus Reactor along with bays: 2 nos. 400/220 kV ICTs along with bays: 2nos.	18	<u>17.59%</u>	All elements of scheme are required to be commissioned simultaneously as their utilization is dependent on commissioning of each other.		2. 3. 4.	Establishmentof2x1500MVA765/400kVSubstationatsuitablelocationnearBeawaralongwith2x330MVAr765kVBusReactor&2x125MVAr420kVBusReactorLILOofbothcircuitofbothAjmer-Chittorgarh765kVD/cD/cat BeawarLILOof400kVKotaMVArSwitchableIneat BeawarFatehgarh-3PS765kVD/calongwith330MVArSwitchableInereactorforeach circuitatatcontractorforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforforfor <td></td> <td><u>14.10 %</u></td> <td>All elements of scheme marked at S. No. 1, 2, 3 and 4 are required to be commissioned simultaneously as their utilization is dependent on commissioning of each other.</td>		<u>14.10 %</u>	All elements of scheme marked at S. No. 1, 2, 3 and 4 are required to be commissioned simultaneously as their utilization is dependent on commissioning of each other.

Clause	Existing	Provisions	New / F	evised Clause			617		
No.									047
			15.59%         1.25%         65.57%         65.57%         om the Effective Date		Schedu	4x125 MVAr MSC, 2x125 MVAr MSR at Fatehgarh3 PS along with 2 nos. of 400 kV bays at Fatehgarh- 3 PS	24 months	<u>11.33 %</u>	<u>e Date</u>
		No.         2.           2.         3.           4.	No.       400 kV line bays along with switchable line reactor: 4 nos. 400kV Bus Reactor along with bays: 1nos. 220 kV line bays: 4nos.         2.       LILO of both circuit of Ajmer- Chittorgarh 765 kV D/c at Beawar         3.       LILO of 400kV Kota –Merta line at Beawar         4.       Fatehgarh-3 PS – Beawar 765 kV D/c along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line	No.       400 kV line bays along with switchable line reactor: 4 nos. 400kV Bus Reactor along with bays: 1nos. 220 kV line bays: 4nos.         2.       LILO of both circuit of Ajmer- Chittorgarh 765 kV D/c at Beawar       15.59%         3.       LILO of 400kV Kota –Merta line at Beawar       1.25%         4.       Fatehgarh-3 PS – Beawar 765 kV D/c along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3 – Beawar 765 kV D/c line       65.57%	No.       400 kV line bays along with switchable line reactor: 4 nos. 400kV Bus Reactor along with bays: 1nos. 220 kV line bays: 4nos.         2.       LILO of both circuit of Ajmer- Chittorgarh 765 kV D/c at Beawar       15.59%         3.       LILO of 400kV Kota –Merta line at Beawar       1.25%         4.       Fatehgarh-3 PS – Beawar 765 kV D/c along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line       65.57%	No.       400 kV line bays along with switchable line reactor: 4 nos. 400kV Bus Reactor along with bays: 1nos. 220 kV line bays: 4nos. 220 kV line bays: 4nos. 23 LILO of both circuit of Ajmer- Chittorgarh 765 kV D/c at Beawar       15.59%       5.         3.       LILO of 400kV Kota –Merta line at Beawar       1.25%	No.       add the second	No.       each end of Fatehgarh-3- Beawar 765 kV D/c time         2.       LILO of both circuit of Ajmer- Chittorgarh 765 kV D/c at Beawar       15.59%         3.       LILO of 400kV KotaMerta line at Beawar       1.25%         4.       Fatehgarh-3 PS - Beawar 765 kV D/c along with 30 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3 - Beawar 765 kV D/c line       65.57%         65.57%       65.57%	No.     and the switchable line reactor: 4       1005.     1005.       400kV Bus Reactor along with bays: 1nos. 220 kV line bays: 4nos.       2.     LILCO of both circuit of Ajmer- Chittorgarh 765 kV D/c at Beawar       3.     LILCO of both victa -Merta line at Beawar       3.     LILCO of 400kV Kota -Merta line at Beawar       4.     Fatehgarh-3 PS - Beawar 765 kV D/c along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3 - Beawar 765 kV D/c line

SI. Clause No. No.	Existing	Provisions				ľ	New / R	evised Clause			648
3. Schedule: 2 of the	Schedule	d COD				5	Schedu	led COD			
TSA document	SI. No.	Name of the Transmission Element	Scheduled COD in months from Effective Date	Percentage of Quoted Transmission Charges recoverable on Scheduled COD of the Element of the Project	Element(s) which are pre- required for declaring the commercial operation (COD) of the respective Element		SI. No.	Name of the Transmission Element	COD in	Percentage of Quoted Transmission Charges recoverable on Scheduled COD of the Element of the Project	for declaring the commercial operation (COD) of the respective Element
	1.	Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus Reactor Future provisions: Space for 765/400kV ICTs along with bays: 2 nos. 765kV line bay along with switchable line reactor: 6nos. 765kV Bus Reactor along with bays: 2 nos. 400/220 kV ICTs along with bays: 2nos. 400/220 kV ICTs along with bays: 2nos.	18		All elements of scheme are required to be commissioned simultaneously as their utilization is dependent on commissioning of each other.		1. 2. 3. 4. 5.	Establishmentof2x1500MVA765/400kVSubstationatsuitablelocationnearBeawaralongwith2x330MVAr765kVBusReactor2x125MVAr420kVBusReactorLILOofbothcircuitofbothAjmer-Chittorgarh765 kVD/cat BeawarLILOof 400kVKota-Mertalineat BeawarFatehgarh-3PSFatehgarh-3PSReactorlinereactorfor each circuit ateachend ofFatehgarh-3-Beawar 765 kVD/c line±±2x300MVArSTATCOM,4x125MVArMSC,2x125	18 months 24 months	<u>14.10 %</u>	All elements of scheme marked at S. No. 1, 2, 3 and 4 are required to be commissioned simultaneously as their utilization is dependent on commissioning of each other.

SI. No.	Clause No.	Existing	Provisions		New / Revised Clause	649
			400kV Bus Reactor along with bays: 1nos. 220 kV line bays: 4nos.		PS along with 2 nos. of 400 kV bays at Fatehgarh- 3 PS	
		2.     LILO of both circuit of Ajmer- Chittorgarh 765 kV D/c at     15.59%       Beawar     15.59%		Scheduled COD for the Project is: 24 months fro	m Effective Date.	
		3.	LILO of 400kV Kota –Merta line at Beawar	<u>1.25%</u>		
		4.	Fatehgarh-3 PS – Beawar 765 kV D/c along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line	<u>65.57%</u>		
		<u>Schedul</u>	ed COD for the Project is: 18 months fr	om Effective Date.		

SI. No.	Clause No.	Existing Provisions			New / Revised Clause 650					
4.	Schedule: 5 of the	Quoted T	ransmission Charges		Quoted	Quoted Transmission Charges				
	TSA document	SI. No.	Name of the Transmission Element	Percentage of Quoted Transmission Charges recoverable on Scheduled COD of the Element of the Project	SI. No.	Name of the Transmission Element	Percentage of Quoted Transmission Charges recoverable on Scheduled COD of the Element of the Project			
		1.	Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus Reactor	<u>17.59%</u>	1.	Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus Reactor	<u>15.81 %</u>			
			Future provisions: Space for		2.	LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar	<u>14.10 %</u>			
			765/400kV ICTs along with bays: 2 nos. 765kV line bay along with switchable line		3.	LILO of 400kV Kota –Merta line at Beawar	<u>1.84 %</u>			
			reactor: 6nos. 765kV Bus Reactor along with bays: 2 nos. 400/220 kV ICTs along with bays: 2nos.		4.	Fatehgarh-3 PS – Beawar 765 kV D/c along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line	<u>56.92 %</u>			
			400 kV line bays along with switchable line reactor: 4 nos. 400kV Bus Reactor along with bays: 1nos.		5.	± 2x300MVAr STATCOM, 4x125 MVAr MSC, 2x125 MVAr MSR at Fatehgarh3 PS along with 2 nos. of 400 kV bays at Fatehgarh-3 PS	<u>11.33 %</u>			
		2.	220 kV line bays: 4nos. LILO of both circuit of Ajmer-Chittorgarh 765	<u>15.59%</u>						
			kV D/c at Beawar	4.05%						
		3.	LILO of 400kV Kota –Merta line at Beawar	<u>1.25%</u>						
		4.	Fatehgarh-3 PS – Beawar 765 kV D/c along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line	<u>65.57%</u>						

Amendment –XXIX dated 22.06.2023 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI.	Clause	Existing Provisions	New / Revised Clause
No	No.		
•	Dava	Establishment an antion and maintenance of the Desiret on build.	Establishment execution and maintenence of the Derivation build
1.	Para	Establishment, operation and maintenance of the Project on build,	Establishment, operation and maintenance of the Project on build,
	1.6.1.1	own, operate and transfer basis and completion of all the activities	own, operate and transfer basis and completion of all the activities for
	of RFP	for the Project, including survey, detailed project report formulation,	the Project, including survey, detailed project report formulation,
		arranging finance, project management, necessary Consents,	arranging finance, project management, necessary Consents,
		Clearances and Permits (way leave, environment & forest, civil	Clearances and Permits (way leave, environment & forest, civil
		aviation, railway/ road/ river/ canal/ power crossing/ PTCC, etc.),	aviation, railway/ road/ river/ canal/ power crossing/ PTCC etc.). land
		land compensation, design, engineering, equipment, material,	compensation, design, engineering, equipment, material,
		construction, erection, testing & commissioning. Further, the actual	construction, erection, testing & commissioning. Further, the actual
		location of substations, switching stations or HVDC terminal or	location of Greenfield substations (Switching Stations or HVDC
		inverter stations in the scope of TSP shall not be beyond 3 Km	Terminal or Inverter Stations) for a generation pooling substation
		radius of the location proposed by the BPC in the survey report.	and for load serving substations in the scope of TSP shall not be
			beyond 3 Km radius of the location proposed by the BPC in the
			survey report. However, actual location of any Greenfield
			Intermediate Substations in the scope of TSP shall not be beyond
			10 Km radius of the location proposed by the BPC in the Survey
			Report.
2.	Para	The TSP shall be responsible for	The TSP shall be responsible for
	5.1.4 (a)		
	of TSA	(a) [To be deleted by the BPC in case no land acquisition is	(a) [To be deleted by the BPC in case no land acquisition is
		involved in the Project and replaced by "deleted"] acquisition	involved in the Project and replaced by "deleted"] acquisition
		of land for location specific substations, switching stations or	of land for location specific substations, switching stations or
		HVDC terminal or inverter stations. Also, the actual location	HVDC terminal or inverter stations. Also, <u>the actual location</u>
		of substations, switching stations or HVDC terminal or	of Greenfield substations (Switching Stations or HVDC
		inverter stations shall not be beyond 3 Km radius of the	Terminal or Inverter Stations) for a generation pooling
		location proposed by the BPC in the survey report;	substation and for load serving substations in the scope

SI. No	Clause No.	Existing Provisions	New / Revised Clause
			of TSP shall not be beyond 3 Km radius of the location proposed by the BPC in the survey report. However, actual location of any Greenfield Intermediate Substations in the scope of TSP shall not be beyond 10 Km radius of the location proposed by the BPC in the Survey Report.

# Amendment –XXX dated 27.06.2023 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI.	Clause	Existing Provis	sions	Ne	ew / Revised (	Clause	
No	No.	_					
1.	2.7.1 of	The Bidders sh	ould submit the Bids online through the electronic	Bids online through the electronic The Bidders should submit the Bids online through the electronic			
	RFP	bidding platform	before the Bid Deadline i.e., on or before 1100 hours	bio	dding platform	before the Bid Deadline i.e. on or before 1100 hours	
		(IST) on <u>27.06.2</u>	023. In addition to the online submission, the Bidder	(15	ST) on <u><b>11.07.2</b></u>	<b>023</b> . In addition to the online submission, the Bidder	
		with lowest Fina	I Offer will be required to submit original hard copies	wi	ith lowest Fina	Offer will be required to submit original hard copies	
		of Annexure 3, A	Annexure 4 (if applicable), Annexure 6 (if applicable)	of	Annexure 3, A	Annexure 4 (if applicable), Annexure 6 (if applicable)	
		and Annexure 1	4 before issuance of Lol	ar	nd Annexure 14	4 before issuance of Lol	
2.	2.7.2 of	Important timelin	es are mentioned below:	Im	nportant timelin	es are mentioned below:	
	RFP						
		Date	Event		Date	Event	
		27.06.2023	Submission of Bid (Online submission of Bid		11.07.2023	Submission of Bid (Online submission of Bid	
			through electronic bidding portal)			through electronic bidding portal)	
		27.06.2023	Opening of Technical Bid		11.07.2023	Opening of Technical Bid	
		05.07.2023	Shortlisting and announcement of Qualified		19.07.2023	Shortlisting and announcement of Qualified	
			Bidders on bidding portal			Bidders on bidding portal	
		06.07.2023	Opening of Financial Bid - Initial Offer		20.07.2023	Opening of Financial Bid - Initial Offer	
		07.07.2023	Electronic reverse auction (Financial Bid – Final		21.07.2023	Electronic reverse auction (Financial Bid – Final	
			Offer) for the Qualified Bidders.			Offer) for the Qualified Bidders.	
		12.07.2023	Submission of original hard copies of Annexure		26.07.2023	Submission of original hard copies of Annexure	
			3, Annexure 4, Annexure 6, as applicable and			3, Annexure 4, Annexure 6, as applicable and	
			Annexure 14 by the bidder with lowest Final			Annexure 14 by the bidder with lowest Final	
			Offer			Offer	
		17.07.2023	Selection of Successful Bidder and issue of LOI		31.07.2023	Selection of Successful Bidder and issue of LOI	

SI. No	Clause No.	Existing Provisions			New / Revised Clause			
		27.07.2023	Signing of RFP Project Documents and transfer of Beawar Transmission Limited		10.08.2023	Signing of RFP Project Documents and transfer of Beawar Transmission Limited		
3.	2.13.1 of RFP				 Opening of Envelope (Technical Bid): 1130 hours (IST) on <u>11.07.2023</u>			

# Amendment –XXXI dated 10.07.2023 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process

SI.	Clause	Existing Provis	sions	Ne	w / Revised (	Clause		
No	No.							
1.	2.7.1 of	The Bidders she	ould submit the Bids online through the electronic	Th	The Bidders should submit the Bids online through the electronic			
	RFP	bidding platform	before the Bid Deadline i.e., on or before 1100 hours	bid	ding platform	before the Bid Deadline i.e., on or before 1100 hours		
		(IST) on <u>11.07.2</u>	023. In addition to the online submission, the Bidder	(IS	ST) on <u><b>25.07.2</b></u>	<b>023</b> . In addition to the online submission, the Bidder		
		with lowest Final	Offer will be required to submit original hard copies		th lowest Final	Offer will be required to submit original hard copies		
			nexure 4 (if applicable), Annexure 6 (if applicable)			Annexure 4 (if applicable), Annexure 6 (if applicable)		
		and Annexure 14	4 before issuance of Lol	an	d Annexure 14	4 before issuance of Lol		
2.	2.7.2 of			Im	portant timelines are mentioned below:			
	RFP			.				
		Date	Event		Date	Event		
		11.07.2023	Submission of Bid (Online submission of Bid		25.07.2023	Submission of Bid (Online submission of Bid		
			through electronic bidding portal)			through electronic bidding portal)		
		11.07.2023	Opening of Technical Bid		25.07.2023	Opening of Technical Bid		
		19.07.2023	Shortlisting and announcement of Qualified		02.08.2023	Shortlisting and announcement of Qualified		
			Bidders on bidding portal			Bidders on bidding portal		
		20.07.2023	Opening of Financial Bid - Initial Offer		03.08.2023	Opening of Financial Bid - Initial Offer		
		21.07.2023	Electronic reverse auction (Financial Bid – Final		04.08.2023	Electronic reverse auction (Financial Bid – Final		
			Offer) for the Qualified Bidders.			Offer) for the Qualified Bidders.		
		26.07.2023	Submission of original hard copies of Annexure		09.08.2023	Submission of original hard copies of Annexure		
			3, Annexure 4, Annexure 6, as applicable and			3, Annexure 4, Annexure 6, as applicable and		
			Annexure 14 by the bidder with lowest Final			Annexure 14 by the bidder with lowest Final		
			Offer			Offer		
		31.07.2023	Selection of Successful Bidder and issue of LOI		14.08.2023	Selection of Successful Bidder and issue of LOI		

# 656

SI. No	Clause No.	Existing Prov	isions		New / I	Revised	Clause		
		10.08.2023	Signing of RFP Project Docume of Beawar Transmission Limited		24.0	08.2023	Signing of RFP Project Docume of Beawar Transmission Limited		
3.	2.13.1 of RFP	<ul> <li>Opening of Envelope (Technical Bid): 1130 hours (IST) on 11.07.2023</li> <li>Opening of Initial Offer: Initial Offer shall be opened by the Bid Opening Committee in presence of the Bid Evaluation Committee at 1130 hours (IST) on 20.07.2023 in the office of CEA.</li> </ul>							
4.	RFP & TSA	Scope of the Project				Scope of the Project			
		Sr. Scop No.	e of the Transmission Scheme	Scheduled COD in months from Effective Date	Sr. No.	Scope	of the Transmission Scheme	Scheduled COD in months from Effective Date	
		765/4 locatio MVAr	lishment of 2x1500MVA 00kV Substation at suitable on near Beawar along with 2x330 765kV Bus Reactor & 2x125 420kV Bus Reactor	18	1.	765/40 locatio MVAr	ishment of 2x1500MVA 00kV Substation at suitable n near Beawar along with 2x330 765kV Bus Reactor & 2x125 420kV Bus Reactor	18	
			garh-3– Beawar 765 kV D/c along 30 MVAr Switchable line reactor	_	4.		arh-3– Beawar 765 kV D/c along 30 MVAr Switchable line reactor		

· · · · · · · · · · · · · · · · · · ·										-
			for each circuit at each end o				for each circuit at each end			
			Fatehgarh-3– Beawar 765 kV D/c line				Fatehgarh-3– Beawar 765 kV D/c	line.		
			Switching equipment for 765 kV 330	C			Switching equipment for 765 kV	330		
			MVAR switchable line reactor -4 nos	5.			MVAR switchable line reactor -4	nos.		
			765 kV, 330 MVAr Switchable line	e			765 kV, 330 MVAr Switchable	line		
			reactor- 4 nos.				reactor- 4 nos.			
		5.	± 2x300MVAr STATCOM, 4x125 MVA	r 2	24	5.	± 2x300MVAr STATCOM, 4x125 M	MVAr	24	
			MSC, 2x125 MVAr MSR at Fatehgarh3	3			MSC, 2x125 MVAr MSR at Fatehg	garh3		
			PS along with 2 nos. of 400 kV bays a	t			PS along with 2 nos. of 400 kV ba	ys at		
			Fatehgarh-3 PS				Fatehgarh-3 PS			
		Note:				Note:				
		(i)	POWERGRID shall provide space for 2			(i)	POWERGRID to provide space fo			
			bays at Fatehgarh-3 S/s for Fatehgarl				reactors at Fatehgarh-3 S/s (for 7			
			D/c line along with 765kV switchable l				Beawar D/c line) for which no cost			
		(ii)	±300 MVAr STATCOM should be placed		00 kV bus		nos. 765 KV line bays at			
			section of Fatehgarh-3 PS (Phase-III Pa	,			interconnection of Fatehgarh-3-		5 kV D/c line	3
		(iii)	POWERGRID shall provide space at	0			is under the scope of M/s POWER			
			STATCOM along with MSC & MSR a	nd associa	ated 400kV	(ii)	±300 MVAr STATCOM should be pl		h 400 kV bu	3
			bays				section of Fatehgarh-3 PS (Phase-II	,		
						(iii)	POWERGRID shall provide space	-	•	
							STATCOM along with MSC & MS	R and asso	ociated 400k	V
							bays			
5.		5. Powe	er System Characteristic			5. Pow	er System Characteristic			
	<b>5</b> of									
	specific	S.	Power System Characteristic	Value	unit	S.	Power System Characteristic	Value	unit	
	technica	No.				No.				
	specifica	19	1) Maximum three-phase fault			19	1) Maximum three-phase fault			
	tion of		current				current			
	STATC		a) for performance requirements	1 a) 63	kA		a) for performance	1 a) 63	kA	
	OM of		b) for rating of STATCOM	1 b) 63	kA for1s		requirements			
	RfP		2) X/R (Positive/Negative Seq)	<u>2) 33.9</u>			b) for rating of STATCOM	1 b) 63	kA for1s	
									Page 3 of 5	

# 658

			$(\mathbf{x}) \mathbf{y} (\mathbf{p}) (\mathbf{z}_{1}, \mathbf{y}_{2}, \mathbf{Q}_{2}, \mathbf{y})$				$(\mathbf{A}) \times (\mathbf{B}) = \mathbf{A} + A$	0) 04 5	
			3) X/R (Zero Seq)	<u>3) 8.9</u>			2) X/R (Positive/Negative Seq) *	<u>2) 34.5</u>	
			4) Clearing time – normal	4) 0.10	S		3) X/R (Zero Seq) *	<u>3) 8.9</u>	
			5) Clearing time – backup	5) 0.75	S		4) Clearing time – normal	4) 0.10	S
							5) Clearing time – backup	5) 0.75	S
		20	Maximum three-phase fault current	63	kA		*Values calculated as per PSS/E		
		21	Existing three-phase fault current	<u>16.8</u>			study file		
		22	Minimum three-phase fault current		<u>kA</u>	20	Maximum three-phase fault current		kA
			-for performance requirements	<u>10.7</u>		21	Three-phase fault current	<u>12.7</u>	<u>kA</u>
			-for safe operation	<u>10.7</u>			(Maximum)*		
		23	Maximum single-phase fault current	63	kA		*Values calculated as per PSS/E		
		24	Existing single-phase fault current	<u>12.4</u>			<u>study file</u>		
		25.	Minimum single-phase fault	<u>6.5</u>	<u>kA</u>	22	Minimum three-phase fault		
			<u>current</u>				<u>current</u>		
							-for performance requirements	<u>10.2</u>	<u>kA</u>
							-for safe operation	<u>10.2</u>	<u>kA</u>
						23	Maximum single-phase fault	63	kA
							current		
						24.	Single-phase fault current	<u>8.8</u>	<u>kA</u>
							(Maximum)*		
							*Values calculated as per PSS/E		
							study file		
						25.	Minimum single-phase fault	6.2	kA
							current		
6.	Clause	8.1.6.	Tests on STATCOM Unit Valve:			8.1.6.	Tests on STATCOM Unit Valve:	1	
	8.1.6. of	All ap	plicable tests i.e., Operational Type Te	ests (exce	pt Short-	All ap	olicable tests i.e., Operational Type	Tests <del>,</del> Die	electric Type
	specific	-	it test), Dielectric Type Tests & Test for				Test for valve insensitivity to electron		
	technica		omagnetic disturbance shall be done as		•	-	ction tests shall be done as per latest	0	_
			2927. Partial Discharge test shall be d	•				-	
	specifica		of each sub module without DC Capa		_				
	tion of		routine/production tests specified in I						
	STATC		• • • • • • • • • • • • • • • • • • •		•				
	OM of								
	RfP								
	1								Page 4 of 5

7.	Clause	(vi) TSP shall supply, install & commission required no. of Phasor	(vi) TSP shall supply, install & commission required no. of Phasor
	C.4.0 (v)	Measurement Units (PMUs) for all 400kV and above voltage line	Measurement Units (PMUs) for all 400kV and above voltage line
	of	bays (under the scope of this project) at Beawar S/s, these PMUs	including STATCOM bays (under the scope of this project) at
	specific	shall support latest IEEE C-37.118 protocols	Beawar S/s, these PMUs shall support latest IEEE C-37.118
	technica		protocols
	1		
	require		
	ments		
	for		
	commun		
	ication		



### Annexure-7

Date: 17.08.2023

#### CERTIFICATE BY BID EVALUATION COMMITTEE

Subject: Selection of Successful Bidder as Transmission Service Provider to establish Transmission System for "Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase – III Part F" through tariff based competitive bidding process.

It is certified that:

- a. The entire bid process has been carried out in accordance with the "Tariff based Competitive Bidding Guidelines for Transmission Service" and "Guidelines for encouraging competition in development of the Transmission Projects" issued by Ministry of Power, Govt. of India under Section 63 of the Electricity Act, 2003 as amended from time to time.
- b. M/s Sterlite Grid 27 Limited, with the lowest annual transmission charges of Rs. 2,749.39 Million, emerged as the successful Bidder after the conclusion of electronic reverse auction.
- c. The transmission charges of Rs. 2,749.39 Million discovered after electronic reverse auction is acceptable.

(Umesh Kumar Madan) Regional Head Delhi, SBI Capital Markets Chairman, BEC

(Santosh Kumar) SE, NRPC Member, BEC

(Manjari Chaturvedi) Director (PSPA-I), CEA Member, BEC

-HAT ALL

(Bhanwar Singh Meena) Director (PSETD), CEA Member, BEC

(Saurabh Rastogi) Chairman, SPV Convener – Member, BEC





Ref No.: RECPDCL/TBCB/Rajasthan Part-F/2022-23/1635

M/s Sterlite Grid 27 Limited

DLF Cyber Park Tower-B, 9TH Floor, Udyog Vihar Phase-1, Sector-20, Gurugram-122008. **Annexure-8** 

#### Kind Attention: Mr. Nitin Mahajan

Sub: Establishment of "Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part-F" through Tariff Based Competitive Bidding Process (TBCB) – Letter of Intent.

Dear Sir,

We refer to:

- 1. The Request for Proposal (RfP) dated 10.02.2022 comprising RfP, Draft Transmission Service Agreement & Share Purchase Agreement and Survey Report issued dated 06.06.2022, & 04.11.2022 and amendment to the survey report dated 23.03.2023 issued to M/s Sterlite Grid 27 Limited as regards participation in the Global Invitation for Bids for establishment of "Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part-F" through Tariff Based Competitive Bidding process including all correspondence/clarifications/amendments/Errata/corrigendum issued by REC Power Development and Consultancy Limited in regard thereto (hereinafter collectively referred to as the 'Final RFP') till the submission Bid Deadline and as listed below:
- (i) Amendment-I dated 18.04.2022
- (ii) Amendment-II dated 10.05.2022
- (iii) Amendment-III and Clarifications dated 30.05.2022
- (iv) Amendment-IV dated 06.06.2022
- (v) Amendment-V dated 22.06.2022
- (vi) Amendment-VI dated 04.07.2022
- (vii) Amendment-VII dated 04.08.2022
- (viii) Amendment-VIII & Clarifications dated 05.08.2022
- (ix) Amendment-IX and Clarifications dated 11.08.2022
- (x) Amendment-X and Clarifications dated 17.08.2022
- (xi) Amendment-XI dated 24.08.2022
- (xii) Amendment-XII dated 09.09.2022
- (xiii) Amendment-XIII and Clarifications dated 21.09.2022
- (xiv) Amendment-XIV dated 30.09.2022
- (xv) Amendment-XV dated 14.10.2022
- (xvi) Amendment-XVI dated 14.11.2022
- (xvii) Amendment-XVII dated 14.12.2022
- (xviii) Amendment-XVIII dated 28.12.2022
- (xix) Amendment-XIX dated 09.01.2023
- (xx) Amendment-XX dated 30.01.2023
- (xxi) Amendment-XXI dated 20.02.2023
- (xxii) Amendment-XXII dated 13.03.2023
- (xxiii) Amendment-XXIII dated 03.04.2023
- (xxiv) Amendment-XXIV dated 24.04.2023
- (xxv) Amendment-XXV and Clarifications dated 15.05.2023
- (xxvi) Amendment-XXVI dated 30.05.2023
- (xxvii) Amendment-XXVII dated 13.06.2023
- (xxviii) Amendment-XXVIII dated 16.06.2023

unconditions Accepted nent and З 0

D- Block, BC Headquarter, Plot No. I-4, Sector 29, Sun Brun, (Haryana) -122001, True C E-mail: co@recpdcl.in | @Tel.: 01224-4441300 | @ www.recpdcl.in | CIN No. RECPORT 040101DL2007G01165779 | GST No. 06AADCR/3998K

Dhound

(xxix) Amendment-XXIX dated 22.06.2023

(xxx) Amendment-XXX dated 27.06.2023

(xxxi) Amendment-XXXI and Clarifications dated 10.07.2023.

(xxxii) Additional clarification dated 17.07.2023

(xxxiii) Additional Clarifications dated 22.07.2023

- 2. The offer of M/s Sterlite Grid 27 Limited by way of a Technical Bid pursuant to (1) above submitted on 25.07.2023 in response to the Final RFP.
- 3. An Initial Price Offer of M/s Sterlite Grid 27 Limited as submitted on 25.07.2023 in response to the Final RFP.
- 4. The final offer of M/s Sterlite Grid 27 Limited, discovered during e-Reverse Auction, conducted on 11.08.2023 in response to the Final RFP.
- 5. The Technical Bid as in (2) above, the Initial Price Offer as in (3) above and the Final Offer as in (4) above hereinafter collectively referred to as the 'Bid'.

We are pleased to inform you that your proposal and offer received by way of the 'Bid' has been accepted and M/s Sterlite Grid 27 Limited is here by declared as Successful Bidder as per clause 3.6.1 of the Final RFP for the above project and consequently, this Letter of Intent (hereinafter referred to as the 'Lol') is being issued in 2 copies, One original plus One copy.

This Lol is based on the Final RFP and is further contingent upon you satisfying the following conditions:

- (a) Acknowledging its issuance and unconditionally accepting its contents and recording 'Accepted unconditionally' under the signature and stamp of your authorized signatory on each page of the duplicate copy of this letter attached herewith and returning the same to REC Power Development and Consultancy Limited within 7 (Seven) days from the date of issuance of Lol:
- (b) Completion of various activities as stipulated in the RFP including in particular Clause 2.15.2, Clause 2.15.3 and Clause 2.15.4 of the Final RFP within the timelines as prescribed therein.
- (c) Provide the Contract Performance Guarantee of Rs. 57.60 Crore (Rupees Fifty-Seven Crore & Sixty Lakhs Only) within 10 (Ten) days from issue of this Lol, in favour of the Central "Transmission Utility of India Limited, as per the provisions of Clause 2.12.

It may be noted that REC Power Development and Consultancy Limited has the rights available to them under the Final RFP, including rights under clause 2.15.5 and 3.6.3 thereof, upon your failure to comply with the aforementioned conditions.

As you are aware, the issuance and contents of this Lol are based on the Bid submitted by you as per the Final RFP including the Transmission Charges and other details regarding the Scheduled COD as contained therein. The Quoted Transmission Charges as submitted by you and the Scheduled COD of transmission elements as agreed by you in your Bid, as per Annexure 21 and Format-1 of Annexure-8 respectively of the Final RFP is enclosed herewith as Schedule-A and incorporated herein by way of reference.

Accepted Unconditionally Miric Mayar Grid 2 opment and Gurugra 03

Page 2 of 4

Further, please note that relationship of M/s Sterlite Grid 27 Limited with the Central Transmission Utility of India Limited will be governed solely on the basis of the Final RFP.

You are requested to unconditionally accept the Lol, and record on one copy of the Lol, 'Accepted unconditionally', under the signature of the authorized signatory of your Company and return such copy to us within 7 (Seven) days of issue of Lol.

Your's faithfully

Gurugram

(PS Hariha ran) Chief General Manager and Pech

e

#### Enclosures:

 Schedule A: Quoted Transmission Charges and the scheduled COD of transmission element submitted in your Bid, as per Annexure 21 and Format-1 of Annexure 8 respectively of the Final RfP.

#### Copy for kind information to:

- The Secretary, Central Electricity Regulatory Commission, 3 & 4 Floor, Chandra Lok Building, Janpath, New Delhi-110001.
- 2. The Chairperson, Central Electricity Authority, Sewa Bhawan, R K Puram, New Delhi-110086.
- The Joint Secretary (Transmission), Ministry of Power, Shram Shakli Bhawan, Rafi Marg, New Delhi- 110 004.
- 4. The Director (Transmission), Ministry of Power, Govt, of India, Shram Shakti Bhawan, Raft Marg, New Delhi 1 10001
- The Chief Engineer (PSP & PA -I) Central Electricity Authority, Sewa Bhawan, R.K. Puram, New Delhi – 110066.
- 6. The Chief Operating Officer Central Transmission Utility of India Limited, Power Grid Corporation of India Ltd., " Saudamini", Plot No 2 Sector – 29, Gurgaon – 122001.

Accepted Unconditionally Mayor Grid 23 *

Page 3 of 4

#### ANNEXURE 21 - FORMAT FOR FINANCIAL BID

#### **Quoted Annual Transmission Charges: 2749.39 Million**

#### Notes

- 1. The Bidders are required to ensure compliance with the provisions of Clause 2.5.3 of this RFP.
- 2. Quotes to be in Rupees Millions and shall be up to two (2) decimal points.
- 3. The contents of this format shall be clearly typed.
- 4. The Financial Bid shall be digitally signed by the authorized signatory in whose name power of attorney as per Clause 2.5.2 is issued.

Ensure only one value for annual Transmission Charges is quoted. The same charge shall be payable every year to TSP for the term of TSA

Accepted Unconditionally Mayor Corid 22 ×





Page 4 of 4



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2 9 AUG 2023 सक्षम अधिकारी

श्रीमती लता सांगळे

MANAGER

(TRADE FINANCE)

This stamp paper is an integral part of Bank Guarantee / Bank Guarantee Amendment-1637623860000472 15 SEP 2023 executed by uson.

Bank Guarantee 



#### FOR STATE BANK OF INDIA

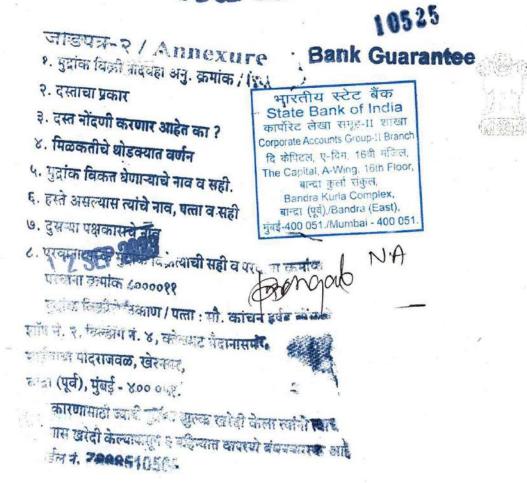
CAG-BKC Br. MUMBAI, Br. CODE : 163 ANDRA KURLA COMPLEX, MUMBAL

GER

TRADE FINANCE)

Surekha Gavit SS. No. G-8845

1 2 SEP 2023



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Surekina Cavit

#### **BANK GUARANTEE**

To,

ED (BCD,REGULATORY & LEGAL ), CENTRAL TRANSMISSION UTILITY OF INDIA LIMITED, "SAUDAMINI" 1ST FLOOR ,PLOT NO -2, SECTOR-29,GURUGRAM , HARYANA-122001

In consideration of the Sterlite Grid 27 Limited (Registered Office: Survey No. 99, Madhuban Dam Road, Village Rakholi, Silvassa Dadra & Nagar Haveli – 396230, India) agreeing to undertake the obligations under the Transmission Service Agreement dated 20th September 2023 and the other RFP Project Documents and the Nodal Agency and REC Power Development and Consultancy Limited, agreeing to execute the RFP Project Documents with the Selected Bidder, regarding setting up the Project, The State Bank of India, a bank constituted under the State Bank of India Act 1955 and having its Corporate Office at State Bank Bhavan, Madame Cama Road, Nariman Point, Mumbai and among other places a branch office at Corporate Accounts Group BKC Branch, The Capital, A Wing, 16th floor, Bandra Kurla Complex, Bandra East, Mumbai - 400051 (hereinafter referred to as "Guarantor Bank") hereby agrees unequivocally, irrevocably and unconditionally to pay to Central Transmission Utility of India Limited (being the Nodal Agency) at "Saudamini", 1st Floor, Plot No.2, Sector-29, Gurugram-122001, Haryana forthwith on demand in writing from the Nodal Agency or any Officer authorized by it in this behalf, any amount up to and not exceeding Rupees Fifty Seven Crores Sixty Lakhs (Rs. 57.60 Crore) Only on behalf of M/s Sterlite Grid 27 Limited.

This guarantee shall be valid and binding on the Guarantor Bank up to and including **31**st **December 2025** and shall not be terminable by notice or any change in the constitution of the Bank or the term of the Transmission Service Agreement or by any other reasons whatsoever and our liability hereunder shall not be impaired or discharged by any extension of time or variations or alternations made, given, or agreed with or without our knowledge or consent, by or between parties to the respective agreement.

Our liability under this Guarantee is restricted to Rupees Fifty Seven Crores Sixty Lakhs (Rs. 57.60 Crore) Only. Our Guarantee shall remain in force until 31st December 2025. The Nodal Agency shall be entitled to invoke this Guarantee up to three hundred sixty five (365) days of the last date of the validity of this Guarantee.

The Guarantor Bank hereby expressly agrees that it shall not require any proof in addition to the written demand from **Central Transmission Utility of India Limited** (in its roles as the Nodal Agency), made in any format, raised at the above mentioned address of the Guarantor Bank, in order to make the said payment to Nodal Agency.



#### FOR STATE BANK OF INDIA

DY MANAGER (TRADE FINANCE) (TRADE FINANCE) CAG-BKC Br. MUMBAI, Br. CODE : 16376 BANDRA KURLA COMPLEX, MUMBAL POWER



জিরা বাচননা সমু Shreddha Prabhu S S No. P12087 The Guarantor Bank shall make payment hereunder on first demand without restriction or conditions and notwithstanding any objection by **Sterlite Grid 27 Limited**, **Beawar Transmission Limited** and/or any other person. The Guarantor Bank shall not require Nodal Agency to justify the invocation of this BANK GUARANTEE, nor shall the Guarantor Bank have any recourse against Nodal Agency in respect of any payment made hereunder.

This BANK GUARANTEE shall be interpreted in accordance with the laws of India.

The Guarantor Bank represents that this BANK GUARANTEE has been established in such form and with such content that it is fully enforceable in accordance with its terms as against the Guarantor Bank in the manner provided herein.

This BANK GUARANTEE shall not be affected in any manner by reason of merger, amalgamation, restructuring, liquidation, winding up, dissolution or any other change in the constitution of the Guarantor Bank.

This BANK GUARANTEE shall be a primary obligation of the Guarantor Bank and accordingly Nodal Agency shall not be obliged before enforcing this BANK GUARANTEE to take any action in any court or arbitral proceedings against **Beawar Transmission Limited** or the Selected Bidder, as the case may be, to make any claim against or any demand on **Beawar Transmission Limited** or the Selected Bidder, as the case may be, or to give any notice to **Beawar Transmission Limited** or the Selected Bidder, as the case may be, or to enforce any security held by the Nodal Agency or to exercise, levy or enforce any distress, diligence or other process against **Beawar Transmission Limited** or the Selected Bidder, as the case may be.

The Guarantor Bank acknowledges that this BANK GUARANTEE is not personal to Nodal Agency and may be assigned in whole or in part (whether absolutely or by way of security) by Nodal Agency to any entity to whom the Nodal Agency is entitled to assign its rights and obligations under the Transmission Service Agreement.

The Guarantor Bank hereby agrees and acknowledges that Nodal Agency shall have a right to invoke this Bank Guarantee either in part or in full, as it may deem fit.

Notwithstanding anything contained hereinabove, our liability under this Guarantee is restricted to **Rupees Fifty Seven Crores Sixty Lakhs (Rs. 57.60 Crore) Only** and it shall remain in force until **31**st **December 2025,** with an additional claim period of three hundred sixty five (365) days thereafter. This BANK GUARANTEE shall be extended from time to time for such period, as may be desired by **Sterlite Grid 27 Limited**. We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only if Nodal Agency serves upon us a written claim or demand.





DY. MANAGER TRADEFINANCE) CAG-BKC Br. MUMBAI, Br. CODE : 16376 ANDRA KURLA COMPLEX, MUMBAI-400051 Surekha Gavit



Surekha Gavit SS. No. G-8845



## Annexure-10

Ref No.: REC PDCL/Fin/Beawar/2023/ 10 46

Dated: 11.09.2023

To,

M/s Sterlite Grid 27 Limitod DLF Cyber Park Tower-B, 9TH Floor, Udyog Vihar Phase-1, Sector-20, Gurugram-122008.

(Kind Attn: Mr. Nitin Mahajan)

## Subject: Payment of Acquisition Price towards handing over of BEAWAR TRANSMISSION LIMITED.

Sir,

This is to inform that the acquisition price of Beawar Transmission Limited is **Rs 18,94,91,543/- (Rupees Eighteen Crore Ninety Four Lakhs Ninety One Thousand Five Hundred Forty Three Only)** as per the breakup given below:

S No	Particulars	Amount ( INR)
1	Professional Fee of BPC #	17,70,00,000
2	Reimbursement of cost incurred by BPC #	1,16,20,791
3	Interest Cost	7,66,305
4	Share Capital of Beawar TL	5,00,000
5	Audit Fees FY 22-23	59,000
	Acquisition Value	18,99,46,046
Le	ss: TDS liability (Q2 &Q3) discharged from bank account of Beawar TL	4,54,553
	Net Amount Payable by Bidder	18,94,91,543

# including GST



ZAMM

# 670

Kindly credit the above total amount i.e. **Rs 18,94,91,543**/-in the below mentioned Bank Account of REC Power Development and Consultancy Limited. TDS will be deposited by RECPDCL on behalf and under TAN of Beawar Transmission Limited.

The acquisition price may be credited to our account through RTGS as per the following:

Bank Name, Address & Branch	IDFC First Bank Limited SOODH & BIRLA TOWERS, 4TH FLOOR EAST TOWER & LGF WEST TOWER, BARAKHAMBA ROAD, NEW DELHI -110001
Bank Account Name	<b>REC Power Development &amp; Consultancy Limited</b>
Bank Account No	10000697415
Bank IFSC Code No	IDFB0020101

Thanking You,

Yours faithfully

(Arvind Kumar) GM (F&A)





## Annexure-11

Ref. No.: RECPDCL/ISTS/Raj Ph III Part F/TBCB/2023-24/ 19 67

Date: 20.09.2023

M/s Sterlite Grid 27 Limited DLF Cyber Park Tower-B 9th Floor, Udyog Vihar Phase-1, Sector-20, Gurugram-122008

#### Kind Attention: Mr. Nitin Mahajan,

# Sub: Establishment of "Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through tariff based competitive bidding process.

Ref No.: RECPDCL/TBCB/Rajasthan Part-F/2022-23/1635 dated 25.08.2023.

Dear Sir,

This is in reference to above referred Letter of Intent dated 25th August, 2023 issued to M/s Sterlite Grid 27 Limited for Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F.

To complete the activities mentioned under Clause 2.15.2, Clause 2.15.3 and Clause 2.15.4 of the Final Request for Proposal (RFP) document, validity of above referred Lol is extended from 04th September, 2023 to 27th September, 2023.

Thanking You,

Yours Faithfully,

Chief General Manager (Tech)



### Annexure-12

#### SHARE PURCHASE AGREEMENT

#### BETWEEN

# REC POWER DEVELOPMENT AND CONSULTANCY LIMITED (FORMERLY KNOWN AS REC POWER DISTRIBUTION COMPANY LIMITED)

AND

#### **BEAWAR TRANSMISSION LIMITED**

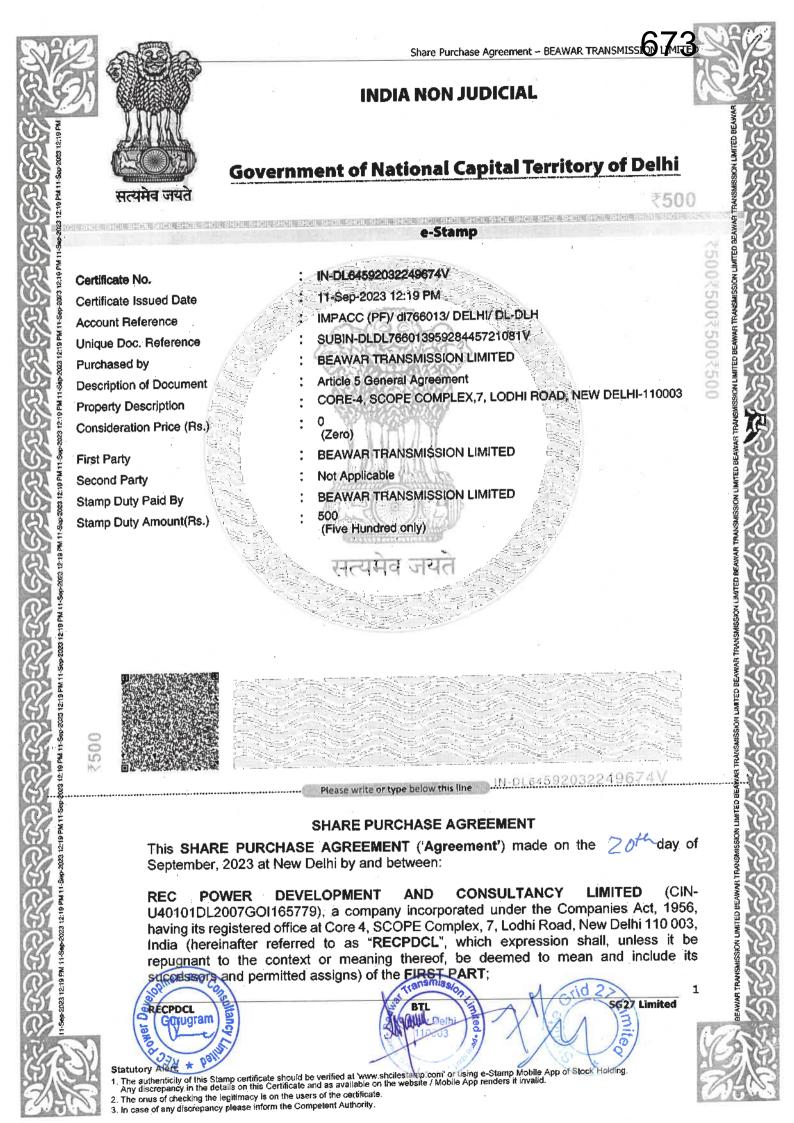
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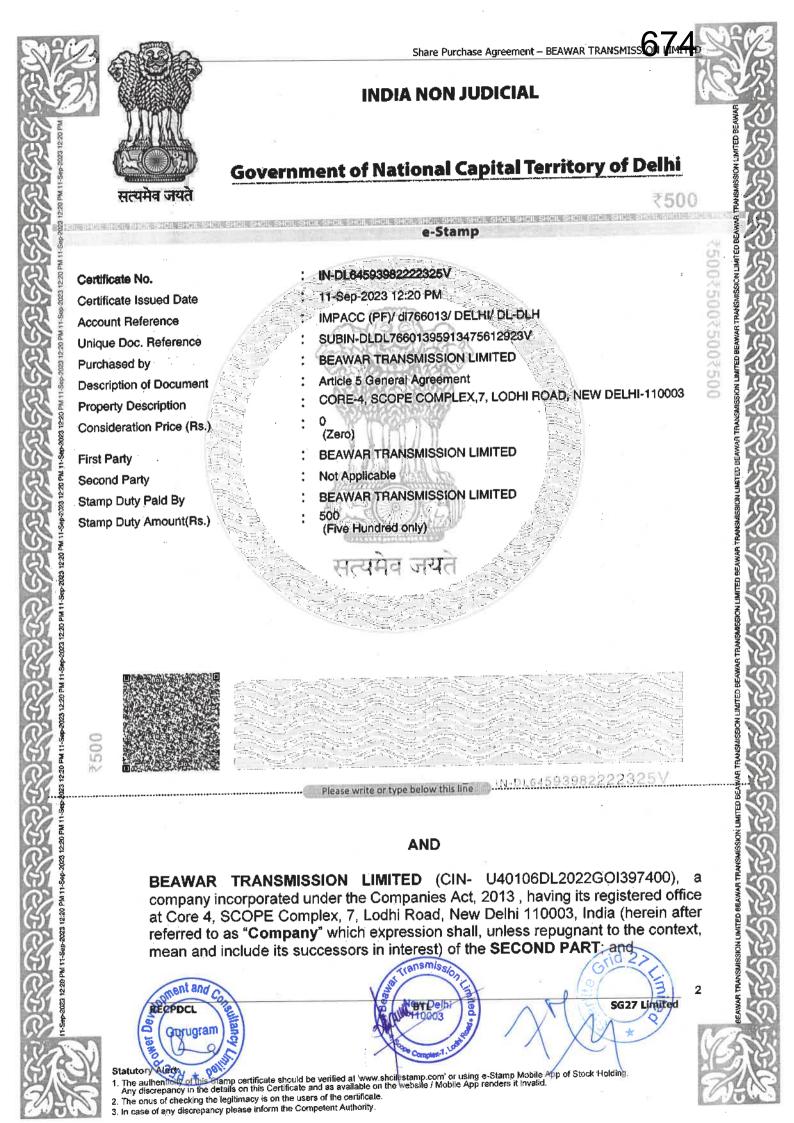
#### STERLITE GRID 27 LIMITED

Dated: 20th September, 2023









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BEAVIAR

### INDIA NON JUDICIAL

## **Government of National Capital Territory of Delhi**

#### e-Stamp

Certificate No. Certificate Issued Date Account Reference Unique Doc. Reference Purchased by Description of Document Property Description Consideration Price (Rs.)

First Party Second Party Stamp Duty Paid By Stamp Duty Amount(Rs.) IMPACC (IV)/ dl775803/ DELHI/ DL-DLH
SUBIN-DLDL77580396030954958099V
BEAWAR TRANSMISSION LIMITED
Article 5 General Agreement
CORE-4, SCOPE COMPLEX,7, LODHI ROAD, NEW DELHI-110003

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BEAWAR TRANSMISSION LIMITED

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- Not Applicable
- BEAWAR TRANSMISSION LIMITED

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(Two Hundred only)

Please write or type below this line

#### AND

**STERLITE GRID 27 LIMITED** (CIN-U40200DN2019PLC005576), a company incorporated under the Companies Act, 2013 and having its registered office at Survey No. 99, Madhuban Dam Road, Village Rakholi, NA SILVASSA Dadra & Nagar Haveli DN 396230 and corporate office at DLF Cyber Park, Tower-B, 9th Floor Udyog Vihar Phase-III, Sector-20, Gurugram, HR 122008 (hereinafter referred to as **"Selected Bidder"** which expression shall, unless repugnant to the context or meaning thereof, be deemed to mean and include its successors and permitted assigns) of the THIRD PART.



The assemblicity of this Stamp certificate should be verified at 'www shcilestamp.com' or using e Stamp Mobile App of Stock Holding. Any discrepancy in the details on this Certificate and as available on the website / Mobile App renders it invalid. The onus of checking the legitimacy is on the users of the certificate.

3. In case of any discrepancy please inform the Competent Authority.



#### WHEREAS:

- A. The Government of India, Ministry of Power, vide its notification no. 15/3/2018-Trans-Pt(1) dated 06th December, 2021 has notified REC Power Development and Consultancy Limited to be the Bid Process Coordinator (BPC) for the purpose of selection of Bidder as Transmission Service Provider (TSP) to establish Transmission System for **"Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F" through** tariff based competitive bidding process (hereinafter referred to as the "Project").
- B. In accordance with the Bidding Guidelines, the BPC had initiated a competitive bidding process through issue of RFP for selecting a Successful Bidder to build, own, operate and transfer the Project comprising of the Elements mentioned in Schedule 2 of the TSA. BPC had initiated this process in accordance with and on the terms and conditions mentioned in the RFP Project Documents (as defined hereinafter).
- C. BPC has incorporated the Company and has undertaken the preliminary studies, obtained certain approvals, etc. regarding the Project on behalf of the Company
- D. REC PDCL along with the Nominees hold one hundred per cent (100%) of the total issued and paid up equity share capital of the Company.
- E. Pursuant to the said Bid Process, Sterlite Grid 27 Limited has been identified as the Selected Bidder vide Letter of Intent dated 25th August 2023 issued by the BPC in favor of the Selected Bidder.
- F. As envisaged in the RFP, the Shares Seller (as defined hereinafter) has agreed to sell the Sale Shares (as defined hereinafter) to the Selected Bidder and the Selected Bidder has agreed to purchase the Sale Shares from the Shares Seller, subject to and on the terms and conditions set forth in this Agreement.

NOW THEREFORE, IN CONSIDERATION OF THE MUTUAL COVENANTS AND AGREEMENTS SET FORTH IN THIS AGREEMENT AND FOR OTHER GOOD AND VALUABLE CONSIDERATION, THE PARTIES HEREBY AGREE AS FOLLOWS:



#### 1. DEFINITIONS

- 1.1 Capitalised terms in this Agreement, unless defined in this Agreement shall, in so far as the context admits, have the same meaning in this Agreement as has been ascribed to them in the TSA.
- 1.2 Additionally, the following terms shall have the meaning hereinafter respectively assigned to them herein below:
  - (i) "Acquisition Price" shall mean INR 18,94,91,543 (Rupees Eighteen Crores Ninety Four Lakhs Ninety One Thousand Five Hundred Forty Three Only ), which is the aggregate consideration payable by the Selected Bidder towards purchase of the Sale Shares at par and for taking over of all assets and liabilities of the Company as on the Closing Date subject to adjustment as per the audited accounts of the Company as on the Closing Date;
  - (ii) "Agreement" or "the Agreement" or "this Agreement" shall mean this Share Purchase Agreement and shall include the recitals and/or annexures attached hereto, and the contracts, certificates, disclosures and other documents to be executed and delivered pursuant hereto, if any, and any amendments made to this Agreement by the Parties in writing;
  - (iii) **"Bid Process"** shall mean the competitive bidding process initiated by the BPC, by issuance of RFP for selecting a Successful Bidder to build, own, operate and transfer the Project in accordance with and on the terms and conditions mentioned in the RFP Project Documents;
  - (iv) "Board" shall mean the board of directors of the Company;
  - (v) "Closing Date" shall mean a mutually agreed date between the Parties falling within the period as mentioned in clause 2.15.2 of RFP or on failure of such mutual agreement between the Parties shall be the date falling on the last date of such period;
  - (vi) "Encumbrance" shall mean any mortgage, pledge, lien, charge, security assignment, hypothecation, trust, encumbrance or any other agreement having the effect of creating security interest;
  - (vii) "Letter of Intent" shall have the meaning ascribed thereto under the Bid Documents;
  - (viii) "Nominees" shall mean the Persons, who are named in Annexure A of this Agreement, holding the Sale Shares as nominees of REC PDCL;
  - (ix) "Party" shall mean REC PDCL, Company and the Selected Bidder, referred to individually, and "Parties" shall mean REC PDCL, Company and the Selected Bidder collectively referred to, as relevant;



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SG27 Limited

- (x) "Person" shall include an individual, an association, a corporation, a partnership, a joint venture, a trust, an unincorporated organisation, a joint stock company or other entity or organisation, including a government or political subdivision, or an agency or instrumentality thereof, and/or any other legal entity;
- (xi) "RFP Project Documents" shall mean the following documents, referred to collectively:
  - a. Transmission Service Agreement; and
  - b. this Agreement.
- (xii) "Representations and Warranties" shall mean the representations and warranties mentioned in Clause 4 hereto;
- (xiii) "RoC" shall mean the Registrar of Companies;
- (xiv) "Sale Shares" shall mean 50,000 shares, representing one hundred percent (100%) of the total issued, subscribed and fully paid-up equity share capital of the Company held by the Shares Seller and Nominees as more particularly described in Annexure A attached hereto;
- (xv) "Shares" shall mean the fully paid-up equity shares of Company, of face value Rs. 10 each;
- (xvi) "Shares Seller" shall mean REC PDCL; and
- (xvii) "Transmission Service Agreement" or "TSA" means the agreement titled 'Transmission Service Agreement' to be executed on 20th September, 2023 between Central Transmission Utility of India Limited (CTUIL) and Beawar Transmission Limited, pursuant to which the TSP shall build, own, operate and transfer the Project and make available the assets of the Project on a commercial basis.

#### 1.3 Interpretation Clause

Unless the context otherwise requires, the provisions of the TSA relating to the interpretation of the TSA shall apply to this Agreement as if they were set out in full in this Agreement and to this end are incorporated herein by reference.



#### 2. TRANSFER OF SHARES

- 2.1 Subject to the terms and conditions of this Agreement, the Shares Seller agrees to sell and transfer to the Selected Bidder and the Selected Bidder hereby agrees to purchase from the Shares Seller, the Sale Shares free from Encumbrances together with all assets and liabilities of the Company with rights and benefits attached thereto in consideration of the Acquisition Price and the covenants, undertakings and the agreements of the Selected Bidder contained in this Agreement.
- 2.2 The Shares Seller hereby undertakes to cause the Nominees to transfer part of the Sale Shares held by them as nominees of the Shares Seller to the Nominees of Selected Bidder and execute any documents required to deliver good title to the Sale Shares to the Selected Bidder.

#### 3. CLOSING

- 3.1 Prior to the Closing Date, the Selected Bidder shall provide to the Shares Seller, valid share transfer forms duly stamped with requisite amount of stamp duty payable on the transfer of the Sale Shares ("Share Transfer Forms").
- 3.2 On the Closing Date, the Shares Seller shall hand over to the Selected Bidder or its authorised representative, the original share certificates representing the Sale Shares ("**Sale Share Certificates**") executed by the Shares Seller and the Nominees, simultaneously against the Selected Bidder handing over to the Shares Seller, demand drafts drawn in favour of the Shares Seller or by confirmation of RTGS transfer in favour of the Shares Seller, for the Acquisition Price payable to it.

Provided that prior to the handing over of the Sale Share Certificates to the Selected Bidder as mentioned above, the Selected Bidder shall provide satisfactory evidence to REC PDCL that on the Closing Date, the Selected Bidder has furnished the Contract Performance Guarantee to Central Transmission Utility of India Limited (CTUIL) and is in a position to comply with all other requirements of Clause 2.15.2 of the RFP.

- 3.3 The Selected Bidder shall immediately upon receiving the Sale Share Certificates and the Share Transfer Forms, duly execute the Share Transfer Forms and duly lodge the Share Transfer Forms and the Share Certificates with the Company along with the names of its nominees to be appointed on the Board of the Company and the address within the jurisdiction of the RoC of New Delhi and Haryana, which would be the new registered office of the Company. The Company shall, upon receipt of the said documents from the Selected Bidder, do the following:
  - (i) Immediately on the Closing Date convene a meeting of the Board, wherein the Board shall pass the following necessary resolutions:



- (a) approving the transfer of the Shares constituting the Sale Shares from the Shares Seller and the Nominees to the name of the Sterlite Grid 27 Limited and its nominees and transfer of all assets and liabilities of the Company as on Closing Date;
- (b) approving the Sterlite Grid 27 Limited and its nominees as the members of the Company and entering the name of the Sterlite Grid 27 Limited and its nominees in the register of members.
- (c) changing the address of the registered office of the Company to the new address (YC Co Working Space, 3rd Floor, Plot No. 94, Dwarka Sec. 13, Opp. Metro, Near Radisson Blu, South West Delhi, New Delhi-110078) as provided by the Selected Bidder as per clause 3.3 above.
- (d) appointing the nominees of the Selected Bidder on the Board and accepting the resignations of the other existing Directors on the Board and the Chair of the meeting which was taken by one of the existing Directors shall be vacated and appointment of a new Chairman who shall be one of the newly appointed Director, for the rest of the meeting.

Immediately pursuant to the acceptance of resignation of the existing Directors and appointment of new Chairman, the newly constituted Board of Directors shall continue with the meeting and pass the following resolution:

- (e) terminating all the authorizations granted regarding the business and/or operations of the Company or the operations of the bank accounts of the Company, with prospective effect; and
- (f) acknowledging and accepting the terms and conditions as contained in the executed copies of the RFP Project Documents and to abide by the provisions contained therein.
- (ii) Enter the name of the Sterlite Grid 27 Limited and its nominees as the legal and beneficial owner of the Sale Shares, free of all Encumbrances, in the register of members of the Company;
- (iii) Make the necessary endorsements on the Sale Share Certificates, indicating the name of the Sterlite Grid 27 Limited and its nominees as the legal and beneficial owner of the Sale Shares evidenced there under;
- (iv) Return the original Sale Share Certificates, duly endorsed in the name of the Sterlite Grid 27 Limited and its nominees, to the Sterlite Grid 27 Limited and its nominees, as the case may be or its authorized representative;

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SG27 Limited



- (v) Handover all the statutory registers and records, if any, of the Company to the Selected Bidder.
- (vi) Handover certified true copies of the Board resolution passed by the Company as per (i) (a) to (i) (f) of Clause 3.3 (i) to the Central Transmission Utility of India Limited (CTUIL).
- 3.4 The Parties to this Agreement agree to take all measures that may be required to ensure that all the events contemplated in the **Clauses 3.1 to 3.3** above on the Closing Date are completed on the same day.

Notwithstanding the provisions of **Clause 3.3** hereto, all proceedings to be taken and all documents to be executed and delivered by the Parties at the Closing Date shall be deemed to have been taken and executed simultaneously and no proceedings shall be deemed to have been taken nor documents executed or delivered until all have been taken, executed and delivered.

- 3.5 The Selected Bidder hereby acknowledges and agrees that after the date of acquisition of one hundred percent (100%) of the Shares of the Company by the Selected Bidder as per Clause 3.3, (a) the authority of the BPC in respect of the Bid Process shall forthwith cease and any actions to be taken thereafter regarding the Bid Process will be undertaken by the Central Transmission Utility of India Limited (CTUIL) themselves, (b) all rights and obligations of the BPC shall cease forthwith, (c) all other rights and obligations of the Company shall be of the TSP and (d) any decisions taken by the BPC on behalf of the Company prior to the date of acquisition, shall continue to be binding on the Company and/or Central Transmission Utility of India Limited (CTUIL) as the case may be.
- 3.6 This Agreement shall be effective from the date of its signing by the Parties and shall remain in force until all the obligations of the respective Parties under Clause 3.3 hereto are fulfilled.

#### 4. REPRESENTATIONS AND WARRANTIES

- 4.1 The Selected Bidder hereby represents and warrants to the Shares Seller that:
  - 4.1.1 The Selected Bidder has full legal right, power and authority to enter into, execute and deliver this Agreement and to perform the obligations, undertakings and transactions set forth herein, and this Agreement has been duly and validly executed and delivered by the Selected Bidder and constitutes its legal, valid and binding obligations, enforceable against it in accordance with its terms;



- 4.1.2 The execution, delivery and performance of this Agreement by the Selected Bidder will not violate or contravene any provision of the Memorandum of Association or Articles of the Selected Bidder, (ii) will not violate or contravene any law, statute, rule, regulation, licensing requirement, order, writ, injunction or decree of any court, governmental instrumentality or other regulatory, governmental or public body, agency or authority by which the Selected Bidder is bound or by which any of its and/or their properties or assets are bound, and (iii) except to the extent that the same have been duly and properly completed or obtained, will not require any filing with, or permit, consent or approval of or license from, or the giving of any notice to, any court, governmental instrumentality or other regulatory, governmental or public body, agency or authority, joint venture party, or any other entity or person whatsoever; and
- 4.1.3 The Selected Bidder is not restricted in any manner whatsoever, including without limitation, on account of any judicial or governmental order, action or proceeding, or any contractual obligation assumed by the Selected Bidder, from purchasing the Sale Shares from the Shares Seller in the manner provided for in this Agreement.
- 4.2 The Shares Seller hereby represents and warrants to the Selected Bidder that;
  - 4.2.1 The Shares Seller and the Nominees are the legal and beneficial owners of the Sale Shares, free and clear of any Encumbrance and the delivery to the Selected Bidder of the Sale Shares pursuant to the provisions of this Agreement will transfer to the Selected Bidder a good title to the Sale Shares.
  - 4.2.2 The Shares Seller has full legal right, power and authority to enter into, execute and deliver this Agreement and to perform the obligations, undertakings and transactions set forth herein. The execution, delivery and performance of this Agreement will not violate the Memorandum and Articles of Association of the Shares Seller or contravene any contract by which it is bound.
  - 4.2.3 The Shares Seller has obtained requisite authorizations to sell and transfer the Sale Shares to the Selected Bidder. The Shares Seller also represent that it is not prevented from transferring and selling the Sale Shares. Also, to the best of its knowledge, the Sale Shares are not the subject matter of any claim or pending proceeding or threatened by any legal proceeding made by any third party.
- 4.3 Except as specified in Clause 4.2 above, the Shares Seller shall not be deemed to have, made any representation or warranty whatsoever, whether express or implied, in relation to the Sale Shares or Company, including but not limited to any implied warranty or representation as to the business or affairs of Company.





- 4.4 The Representations and Warranties are given as at the date of this Agreement except that where a Representation and Warranty is expressed to be made as at another date, the Representation and Warranty is given with respect to that date only.
- 4.5 Each Representation and Warranty is to be construed independently of the others and is not limited by reference to any other Warranty. The Representations, Warranties and undertakings contained in this **Clause 4** hereto or in any document delivered pursuant to or in connection with this Agreement are continuing in nature and shall survive the Closing Date for a period of one (1) year.
- 4.6 The Parties represent to each other that all Representations and Warranties provided herein by the respective Party shall be true as of Closing Date.

#### 5. OBLIGATIONS OF THE SELECTED BIDDER

The Selected Bidder agrees that the Shares Seller shall not be liable in any manner, nor shall it assume any responsibility or liability whatsoever, in respect of the business of the Company and its operations or activities, arising after the Closing Date, to any Person or any authority, central, state, local or municipal or otherwise and the same shall be the sole responsibility of the Selected Bidder.

#### 6. MISCELLANEOUS

#### 6.1 NOTICES

- a) All notices to be given under this Agreement shall be in writing and in the English language.
- b) All notices must be delivered personally or by registered or certified mail or by recognised courier to the addresses below:

Selected Bidder:	Sterlite Grid 27 Limited, DLF Cyber Park, Tower-B, 9th Floor, Udyog Vihar, Phase III, Sector-20,Gurugram,Haryana- 122008
REC PDCL:	REC Power Development and Consultancy Limited Core-4, SCOPE Complex, 7, Lodhi Road, New Delhi-110003
Company:	BEAWAR TRANSMISSION LIMITED Core-4, SCOPE Complex, 7, Lodhi Road, New Delhi-110003

Any Party may by notice of at least fifteen (15) days to the other Parties change the address and / or addresses to which such notices and communications to it are to be delivered or mailed.



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#### **RESOLUTION OF DISPUTES** 6.2

- 6.2.1 If any dispute arises between the Parties, in connection with the validity, interpretation, implementation or alleged breach of any provision of this Agreement ("Dispute"), the disputing Parties hereto shall endeavor to settle such Dispute amicably. The attempt to bring about an amicable settlement shall be considered to have failed if not resolved within sixty (60) days from the date of the Dispute.
- 6.2.2 If the Parties are unable to amicably settle the Dispute in accordance with Clause 6.2.1 within the period specified therein, any of the Parties shall be entitled to within thirty (30) days after expiry of the aforesaid period, refer the Dispute to the Chief Executive Officer/Director of REC PDCL and Chief Executive/ Managing Director of the Selected Bidder for resolution of the said Dispute. The attempt to bring about such resolution shall be considered to have failed if not resolved within thirty (30) days from the date of receipt of a written notification in this regard.
- 6.2.3 In the event the Dispute is not settled in accordance with Clause 6.2.2 above, any Party to the Dispute shall be entitled to serve a notice invoking this Clause and making a reference to a sole arbitrator. If the Parties to the Dispute cannot agree as to the appointment of the sole arbitrator within thirty (30) days of receipt of the notice of the Party making the reference, then the Shares Seller along with the Company shall appoint one arbitrator and the Selected Bidder shall appoint one arbitrator and the two arbitrators, so appointed shall appoint a third arbitrator. However, after the Closing Date, in such an event the Shares Seller shall appoint one arbitrator and the Selected Bidder along with the Company shall appoint one arbitrator and the two arbitrators, so appointed shall appoint the third arbitrator.
- 6.2.4 The place of the arbitration shall be New Delhi. The Arbitration proceedings shall be governed by the Arbitration and Conciliation Act, 1996.
- 6.2.5 The proceedings of arbitration shall be in English language.
- 6.2.6 The arbitrator's award shall be substantiated in writing. The arbitrators shall also decide on the costs of the arbitration proceedings. In case the arbitrators have not decided on the costs of the arbitration proceedings, each Party to the Dispute shall bear its own costs, in relation to the arbitration proceedings.

#### 6.3 AUTHORISED PERSON

RECPOCE

For the purposes of this Agreement, the Selected Bidder is represented by Shri Tatimakula Amarendranath Reddy, pursuant to an authorization granted to Shri Tatimakula Amarendranath Reddy and authorised representatives spinent and Committees thereof) resolutions.



Further, Shri Tatimakula Amarendranath Reddy is also authorized by such resolutions to take any decision which may be required to be taken, do all acts and execute all documents which are or may be required by the Selected Bidder for the proper and effective fulfillment of the rights and obligations under this Agreement. Any action taken or document executed by Shri Tatimakula Amarendranath Reddy shall be deemed to be acts done or documents executed by the Selected Bidder and shall be binding on the Selected Bidder.

#### 6.4 RESERVATION OF RIGHTS

No forbearance, indulgence or relaxation or inaction by any Party at any time to require performance of any of the provisions of this Agreement shall in any way affect, diminish or prejudice the right of such Party to require performance of that provision, and any waiver or acquiescence by any Party of any breach of any of the provisions of this Agreement shall not be construed as a waiver or acquiescence of any continuing or succeeding breach of such provisions, a waiver of any right under or arising out of this Agreement or acquiescence to or recognition of rights other than that expressly stipulated in this Agreement.

#### 6.5 CUMULATIVE RIGHTS

All remedies of either Party under this Agreement whether provided herein or conferred by statute, civil law, common law, custom or trade usage, are cumulative and not alternative and may be enforced successively or concurrently.

#### 6.6 PARTIAL INVALIDITY

If any provision of this Agreement or the application thereof to any person or circumstance shall be invalid or unenforceable to any extent, the remainder of this Agreement and the application of such provision to persons or circumstances other than those as to which it is held invalid or unenforceable shall not be affected thereby, and each provision of this Agreement shall be valid and enforceable to the fullest extent permitted by law. Any invalid or unenforceable provision of this Agreement shall be replaced with a provision, which is valid and enforceable and most nearly reflects the original intent of the unenforceable provision.



#### 6.7 TERMINATION

If (i) the Closing does not occur on the Closing Date for any reason whatsoever, or (ii) the Letter of Intent is withdrawn or terminated for any reason, or (iii) due to termination of the TSA by the Central Transmission Utility of India Limited (CTUIL) in accordance with Article 3.3.2 or Article 13 of the TSA thereof, REC PDCL shall have a right to terminate this Agreement forthwith by giving a written notice to the other Parties hereto.

#### 6.8 AMENDMENTS

No modification or amendment of this Agreement and no waiver of any of the terms or conditions hereof shall be valid or binding unless made in writing and duly executed by all the Parties.

#### 6.9 ASSIGNMENT

This Agreement and the rights and liabilities hereunder shall bind and inure to the benefit of the respective successors of the Parties hereto, but no Party hereto shall assign or transfer its rights and liabilities hereunder to any other Person without the prior written consent of the other Parties, which will not be unreasonably withheld.

#### 6.10 ENTIRE AGREEMENT

This Agreement constitutes the entire Agreement between the Parties with respect to the subject matter herein and supersedes and cancels any prior oral or written agreement, representation, understanding, arrangement, communication or expression of intent relating to the subject matter of this Agreement.

#### 6.11 COSTS

Each of the Parties hereto shall pay their own costs and expenses relating to the negotiation, preparation and execution of this Agreement and the transactions contemplated by this Agreement.

The Selected Bidder shall be liable to bear and pay the costs in respect of this Agreement and transfer of Sale Shares.

#### 6.12 RELATIONSHIP

None of the provisions of this Agreement shall be deemed to constitute a partnership between the Parties hereto and no Party shall have any authority to bind the other Party otherwise than under this Agreement or shall be deemed to be the agent of the other in any way.



#### 6.13 GOVERNING LAW AND JURISDICTION

This Agreement shall be governed by and construed in accordance with the laws of India and shall be subject to the exclusive jurisdiction of the courts of Delhi.

#### 6.14 COUNTERPARTS

This Agreement may be executed in counterparts by the Parties and each fully executed counterpart shall be deemed to be original.

#### 6.15 CONFIDENTIALITY

The Parties undertake to hold in confidence and not to disclose the terms and conditions of the transaction contemplated hereby to third parties, except:

- (a) to their professional advisors;
- (b) to their officers, employees, agents or representatives, who need to have access to such information for the proper performance of their activities;
- (c) disclosures required under Law;

without the prior written consent of the other Parties.

Provided that the Central Transmission Utility of India Limited (CTUIL) and REC PDCL may at any time, disclose the terms and conditions of transactions contemplated hereby to any person, to the extent stipulated under the law or the Bidding Guidelines.

#### 6.16 INDEMNIFICATION

The Parties hereby agree that transfer of Sale Shares to the Selected Bidder shall vest all the rights, privileges, licenses, responsibilities, liabilities and other obligations pertaining to the Company in the Selected Bidder.

- The Selected Bidder hereby agrees that the Selected Bidder shall not be entitled to any claims or initiate any legal proceedings by itself or through the Transmission Service Provider against the Shares Seller, its directors, officers, employees and the subscribers including the members of any committees appointed by them in respect of any actions or decisions taken by any of them up to the Closing Date in furtherance of the Project referred to in recital A of this Agreement.
- Further, the Selected Bidder hereby indemnifies and holds harmless at all times the Shares Seller against all past, present and future third party claims and liabilities arising out of actions or decisions taken by any of the persons or bodies referred to in Clause 6.3 up to the Closing Date in furtherance of the Project referred to above or otherwise concerning the



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Company. All such actions shall be defended by the Selected Bidder either itself or through the TSP at its own cost.

 The Parties hereby agree that the provisions of this clause shall survive the termination of this Agreement.

#### 6.17 SURVIVAL

The provisions of Clause 1 (Definitions and Interpretation), Clause 4 (Representations and Warranties), Clause 6.2 (Resolution of Disputes), Clause 6.7 (Termination), Clause 6.15 (Confidentiality), Clause 6.16 (Indemnification) and other representations, warranties, covenants and provisions contained herein that by their nature are intended to survive, shall survive the termination of this Agreement

#### 6.18 FORCE MAJEURE

No party shall be liable for its inability or delay in performing any of its obligations hereunder if such delay is caused by circumstances beyond the reasonable control of the party including delay caused through flood, riot, Act of God, lighting civil commotion, storm, tempest and earthquake.

#### IN WITNESS WHEREOF, THE PARTIES HERETO HAVE CAUSED THIS AGREEMENT TO BE DULY EXECUTED AND DELIVERED AS OF THE DAY AND YEAR FIRST ABOVE WRITTEN



SIGNED AND DELIVERED by the within named REC POWER DEVELOPMENT AND CONSULTANCY LIMITED by the hand of Sh. Rajesh Kumar, CEO

(Authorised pursuant to the resolution passed by its Board of Directors in its meeting held on 28th August, 2023)

#### IN THE PRESENCE OF:

WITNESS: (Name and address)

(1) ANIL KUMAR YADAV Managev, RECPDCL. Dujhg. (2) DHRUVA NATH JHA Project Engg.

SIGNED AND DELIVERED by the within BEAWAR TRANSMISSION named LIMITED by the hand of Sh. Jatin Kumar Navak, Director

(Authorised pursuant to the resolution passed by its Board of Directors in its meeting held on September, 2023)

WITNESS: (Name and address)

(1) ArankKushuaha AKASM KUSHWAHA S.P.F.

(2) (Jobily Deven KSHITIZ DEVEN Profiled Engli







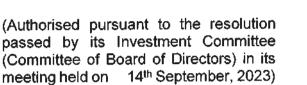
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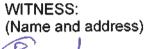
(Core-4, SCOPE Complex, 7, Lodhi Road, New Delhi-110003)



(Core-4, SCOPE Complex, 7, Lodhi Road, New Delhi-110003)

(Core-4, SCOPE Complex, 7, Lodhi Road, New Delhi-110003) SIGNED AND DELIVERED by The within named **STERLITE GRID 27 LIMITED** by the hand of Sh. Tatimakula Amarendranath Reddy





Panel

Prodect Sand DIF Cyber Park, 9th floor Tower B, Sector-20 Guragram 1220018

Kapil benal Just DLP Cybel Pair, 9th Floor Tower B, Schor 20, Culgaron-122008

DLF Cyber Park, Tower-B, 9th Floor, Udyog Vihar, Phase-III, Sector-20, Gurugram- 122008 HR

DLF Cyber Park, Tower-B, 9th Floor, Udyog Vihar, Phase-III, Sector-20, Gurugram- 122008 HR



# ANNEXURE A

# DESCRIPTION OF THE SALE SHARES

S. NO.	NAME OF THE SHAREHOLDER	NUMBER OF EQUITY SHARES HELD	PERCENTAGE OF THE TOTAL PAID UP EQUITY CAPITAL
1.	REC POWER DEVELOPMENT AND CONSULTANCY LIMITED through its Chief Executive Officer	49,994	99.988
2.	Shri Thangarajan Subash Chandira Bosh*	1	0.002
3.	Shri Sahab Narain *	1	0.002
4	Shri Puthiyarkattu Shivaraman Hariharan*	1	0.002
5.	Shri Rajendra Kumar Gupta*	1	0.002
6.	Shri Mohan Lal Kumawat*	1	0.002
7.	Shri Subhash Chandra Garg *	1	0.002
	Total	50,000	100.000

* Held as nominee of REC PDCL.



Annexure-13

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# TRANSMISSION SERVICE AGREEMENT

# FOR

# DEVELOPMENT AND OPERATION OF INTER-STATE TRANSMISSION SYSTEM

# FOR TRANSMISSION OF ELECTRICITY THROUGH TARIFF BASED COMPETITIVE BIDDING FOR

# TRANSMISSION SYSTEM FOR EVACUATION OF POWER FROM REZ IN RAJASTHAN (20GW) UNDER PHASE-III PART F

# **BETWEEN THE**

# CENTRAL TRANSMISSION UTILITY OF INDIA LIMITED

# (NODAL AGENCY)

# AND

# **Beawar Transmission Limited**

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#### **BETWEEN:**

The **Central Transmission Utility of India Limited,** "Saudamini",1st Floor, Plot No. 2, Sector-29, Gurugram-122001, Haryana acting as a Nodal Agency (referred to as the "Nodal Agency"), which expression shall unless repugnant to the context or meaning thereof include its successors, and permitted assigns) as Party of the one part;

#### AND

**Beawar Transmission Limited**, incorporated under the Companies Act, 2013, having its registered office at Core-4, Scope Complex 7, Lodhi Road Delhi, South Delhi, Delhi 110003 (herein after referred to as "Transmission Service Provider" or "TSP" or "ISTS Licensee", which expression shall unless repugnant to the context or meaning thereof include its successors, and permitted assigne) as Party of the other part:

and permitted assigns) as Party of the other part;



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# ("Nodal Agency" and "TSP" are individually referred to as "Party" and collectively as the "Parties")

#### AND WHEREAS:

- A) In accordance with the Bidding Guidelines, the Bid Process Coordinator (hereinafter referred to as BPC) had initiated a competitive e-reverse bidding process through issue of RFP for selecting a Successful Bidder to build, own, operate and transfer the Project comprising of the Elements mentioned in Schedule 1 (hereinafter referred to as the Project)
- B) Pursuant to the said e-reverse bidding process, the BPC has identified the Successful Bidder, who will be responsible to set up the Project on build, own, operate and transfer basis to provide Transmission Service in accordance with the terms of this Agreement and the Transmission License.
- C) The Selected Bidder have submitted the Contract Performance Guarantee and acquired one hundred percent (100%) of the equity shareholding of Beawar Transmission Limited, along with all its related assets and liabilities in terms of the provisions of the Share Purchase Agreement.
- D) The TSP has agreed to make an application for a Transmission License to the Commission for setting up the Project on build, own, operate and transfer basis.
- E) The TSP has further agreed to make an application to the Commission for the adoption of the Transmission Charges under Section 63 of the Electricity Act, 2003, along with a certification from the Bid Evaluation Committee in accordance with the Bidding Guidelines issued by Ministry of Power, Government of India.
- F) The TSP has agreed to execute the agreement(s) required, if any, under Sharing Regulations within fifteen (15) days from the date of grant of Transmission License from the Commission.
- G) The TSP agrees to the terms and conditions laid down under Sharing Regulations, for making available the ISTS and charge the Transmission Charges in accordance with the terms and conditions of Sharing Regulations.
- H) The billing, collection and disbursement of the Transmission Charges by the CTU to the ISTS Licensee shall be governed as per Sharing Regulations

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I) The terms and conditions stipulated in the Transmission License issued by the Commission to the TSP shall be applicable to this Agreement and the TSP agrees to comply with these terms and conditions. In case of inconsistency between the Transmission License terms & conditions and the conditions of this Agreement, the conditions stipulated in the Transmission License granted by the Commission shall prevail.

NOW, THEREFORE, IN CONSIDERATION OF THE PREMISES AND MUTUAL AGREEMENTS, COVENANTS AND CONDITIONS SET FORTH HEREIN, IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES HERETO AS FOLLOWS:



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# **ARTICLE: 1**

# 1 DEFINITIONS AND INTERPRETATIONS

#### 1.1 Definitions:

1.1.1 The words / expressions used in this Agreement, unless as defined below or repugnant to the context, shall have the same meaning as assigned to them by the Electricity Act, 2003 and the rules or regulations framed there under including those issued / framed by the Commission (as defined hereunder), as amended or re-enacted from time to time or the General Clauses Act, failing which it shall bear its ordinary English meaning.

The words/expressions when used in this Agreement shall have the respective meanings as specified below:

"Acquisition Price" shall have the same meaning as defined in the Share Purchase Agreement;

"Act" or "Electricity Act" or "Electricity Act 2003" shall mean the Electricity Act, 2003 and any amendments made to the same or any succeeding enactment thereof;

"Affiliate" shall mean a company that either directly or indirectly

- i. controls or
- ii. is controlled by or
- iii. is under common control with

a Bidding Company (in the case of a single company) or a Member (in the case of a Consortium) and "**control**" means ownership by one entity of at least twenty-six percent (26%) of the voting rights of the other entity;

"Availability" in relation to the Project or in relation to any Element of the Project, for a given period shall mean the time in hours during that period the Project is capable to transmit electricity at its Rated Voltage and shall be expressed in percentage of total hours in the given period and shall be calculated as per the procedure contained in Appendix –II to Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2019, attached herewith in Schedule 6;

"Bid" shall mean technical bid and financial bid submitted by the Bidder, in response to the RFP, in accordance with the terms and conditions of



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**"Bid Deadline"** shall mean the last date and time for submission of the Bid in response to RFP, as specified in the RFP;

**"Bidding Company"** shall refer to such single company that has made a Response to RFP for the Project;

"Bidding Consortium / Consortium" shall refer to a group of companies that has collectively made a Response to RFP for the Project;

"Bid Documents" or "Bidding Documents" shall mean the RFP, along with all attachments thereto or clarifications thereof;

"Bidding Guidelines" shall mean the "Tariff Based Competitive Bidding Guidelines for Transmission Service" and "Guidelines for Encouraging Competition in Development of Transmission Projects" issued by Government of India, Ministry of Power under Section – 63 of the Electricity Act as amended from time to time;

"Bid Process Coordinator" or "BPC" shall mean a person or its authorized representative as notified by the Government of India, responsible for carrying out the process for selection of Bidder who will acquire Transmission Service Provider;

"Bill" shall mean any bill raised by the CTU on the DICs to recover the Transmission Charges pursuant to the Sharing Regulations;

"Business Day" shall mean a day other than Sunday or a statutory holiday, on which the banks remain open for business in the State in which the Nodal Agency's registered office is located and the concerned TSP are located;

**"CEA"** shall mean the Central Electricity Authority constituted under Section -70 of the Electricity Act;

"Change in law" shall have the meaning ascribed thereto in Article 12;

"Commercial Operation Date" or "COD" shall mean the date as per Article 6.2;

**"Commission"** or **"CERC**" shall mean the Central Electricity Regulatory Commission referred to in sub-section (1) of Section 76 of the Electricity Act, 2003 or its successors and assigns;

"Competent Court of Law" shall mean the Supreme Court or any High Court, or any tribunal or any similar judicial or quasi-judicial body in India that has jurisdiction to adjudicate upon issues relating to the Project;

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"Connection Agreement" shall mean the agreement between the CTU or STU or any other concerned parties and the TSP, setting out the terms relating to the connection of the Project to the Inter-connection Facilities and use of the Inter State Transmission System as per the provisions of the IEGC, as the case may be;

"Consultation Period" shall mean the period of sixty (60) days or such longer period as the Parties may agree, commencing from the date of issue of a TSP's Preliminary Notice or a Nodal Agency's Preliminary Termination Notice, as provided in Article 13 of this Agreement, for consultation between the Parties to mitigate the consequence of the relevant event having regard to all the circumstances;

"Consents, Clearances and Permits" shall mean all authorizations, licenses, approvals, registrations, permits, waivers, privileges, acknowledgements, agreements, or concessions required to be obtained from or provided by any concerned authority for the development, execution and operation of Project including without any limitation for the construction, ownership, operation and maintenance of the Transmission Lines and/or sub-stations;

"Construction Period" shall mean the period from (and including) the Effective Date of the Transmission Service Agreement up to (but not including) the COD of the Element of the Project in relation to an Element and up to (but not including) the COD of the COD of the Project in relation to the Project;

"Contractors" shall mean the engineering, procurement, construction, operation & maintenance contractors, surveyors, advisors, consultants, designers, suppliers to the TSP and each of their respective subcontractors (and each of their respective successors and permitted assigns) in their respective capacities as such;

"Contract Performance Guarantee" shall mean the irrevocable unconditional bank guarantee, submitted and to be submitted by the TSP or by the Selected Bidder on behalf of the TSP to the Nodal Agency from a bank mentioned in Annexure 17 of the RFP, in the form attached here to as Schedule 8, in accordance with Article 3 of this Agreement and which shall include the additional bank guarantee furnished by the TSP under this Agreement;

"Contract Year", for the purpose of payment of Transmission Charges, shall mean the period beginning on the COD, and ending on the impediately succeeding March 31 and thereafter each period of 12

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months beginning on April 1 and ending on March 31 provided that the last Contract Year shall end on the last day of the term of the TSA;

"CTU" or "Central Transmission Utility" shall have same meaning as defined in the Electricity Act, 2003;

"Day" shall mean a day starting at 0000 hours and ending at 2400 hours;

"D/C" shall mean Double Circuit;

"Designated ISTS Customers" or "DICs" shall have the meaning as ascribed in the Sharing Regulations;

"**Dispute**" shall mean any dispute or difference of any kind between the Parties, in connection with or arising out of this Agreement including any issue on the interpretation and scope of the terms of this Agreement as provided in Article 16;

**"Effective Date"** for the purposes of this Agreement, shall have the same meaning as per Article 2.1 of this Agreement;

**"Electrical Inspector"** shall mean a person appointed as such by the Government under sub-section (1) of Section 162 of the Electricity Act 2003 and also includes Chief Electrical Inspector;

"Electricity Rules 2005" shall mean the rules framed pursuant to the Electricity Act 2003 and as amended from time to time;

"Element" shall mean each Transmission Line or each circuit of the Transmission Lines (where there are more than one circuit) or each bay of Sub-station or switching station or HVDC terminal or inverter station of the Project, including ICTs, Reactors, SVC, FSC, etc. forming part of the ISTS, which will be owned, operated and maintained by the concerned ISTS Licensee, and which has a separate Scheduled COD as per Schedule 2 of this Agreement and has a separate percentage for recovery of Transmission Charges on achieving COD as per Schedule 5 of this Agreement;

"Event of Default" shall mean the events as defined in Article 13 of this Agreement;

"Expiry Date" shall be the date which is thirty-five (35) years from the COD of the Project;



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**"Financial Closure"** shall mean the first Business Day on which funds are made available to the TSP pursuant to the Financing Agreements;

"Financially Evaluated Entity" shall mean the company which has been evaluated for the satisfaction of the financial requirement set forth in the RFP;

"Financing Agreements" shall mean the agreements pursuant to which the TSP is to finance the Project including the loan agreements, security documents, notes, indentures, security agreements, letters of credit and other documents, as may be amended, modified, or replaced from time to time, but without in anyway increasing the liabilities of the Designated ISTS Customers / Nodal Agency;

"Financial Year" shall mean a period of twelve months at midnight Indian Standard Time (IST) between 1st April & 31st March;

"Force Majeure" and "Force Majeure Event" shall have the meaning assigned thereto in Article 11;

"GOI" shall mean Government of India;

"Grid Code" / "IEGC" shall mean the Grid Code specified by the Central Commission under Clause (h) of sub-section (1) of Section 79 of the Electricity Act;

**"Independent Engineer"** shall mean an agency/ company, appointed by Nodal Agency in accordance with the Guidelines for Encouraging Competition in Development of Transmission Projects.

"Indian Governmental Instrumentality" shall mean Government of India, Government of any State in India or any ministry, department, board, authority, agency, corporation, commission under the direct or indirect control of Government of India or any State Government or both, any political sub-division of any of them including any court or Commission or tribunal or judicial or quasi-judicial body in India but excluding the CTU, TSP and the Designated ISTS Customers;

"Insurances" shall mean the insurance cover to be obtained and maintained by the TSP in accordance with Article 9 of this Agreement;

"Interconnection Facilities" shall mean the facilities as may be set up

for transmission of electricity through the use of the Project, on either one or both side of generating station's / CTU's / STU's / ISTS Licensee's /

Designated ISTS Customer's substations (as the case may be) which



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shall include, without limitation, all other transmission lines, gantries, substations and associated equipments not forming part of the Project;

**"ISTS Licensee"** shall be the TSP under this Agreement, consequent to having been awarded a Transmission License by the CERC and shall be referred to as the TSP or the ISTS Licensee, as the context may require in this Agreement;

"Law" or "Laws" in relation to this Agreement, shall mean all laws including electricity laws in force in India and any statute, ordinance, rule, regulation, notification, order or code, or any interpretation of any of them by an Indian Governmental Instrumentality having force of law and shall include all rules, regulations, decisions and orders of the Commission;

"Lead Member of the Bidding Consortium" or "Lead Member" shall mean a company who commits at least 26% equity stake in the Project, meets the technical requirement as specified in the RFP and so designated by other Member(s) in Bidding Consortium;

"Lenders" means the banks, financial institutions, multilateral funding agencies, non banking financial companies registered with the Reserve Bank of India (RBI), insurance companies registered with the Insurance Regulatory & Development Authority (IRDA), pension funds regulated by the Pension Fund Regulatory & Development Authority (PFRDA),mutual funds registered with Securities & Exchange Board of India (SEBI), etc., including their successors and assigns, who have agreed on or before COD of the Project to provide the TSP with the debt financing described in the capital structure schedule, and any successor banks or financial institutions to whom their interests under the Financing Agreements may be transferred or assigned;

Provided that, such assignment or transfer shall not relieve the TSP of its obligations to the Nodal Agency under this Agreement in any manner and shall also does not lead to an increase in the liability of the Nodal Agency;

"Lenders Representative" shall mean the person notified by the Lender(s) in writing as being the representative of the Lender(s) or the Security Trustee and such person may from time to time be replaced by the Lender(s) pursuant to the Financing Agreements by written notice to the TSP;

"Letter of Intent" or "LOI" shall have the same meaning as in the RFR

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"Member in a Bidding Consortium / Member" shall mean each company in the Bidding Consortium;

"Month" shall mean a period of thirty (30) days from (and excluding) the date of the event;

"Monthly Transmission Charges" for any Element of the Project, after COD of the Element till COD of the Project, and for the Project after COD of the Project, shall mean the amount of Transmission Charges as specified in Schedule 5 of this Agreement multiplied by no. of days in the relevant month and divided by no. of days in the year;

"National Load Despatch Centre" shall mean the centre established as per sub-section (1) of Section 26 of the Electricity Act 2003;

**"Nodal Agency**" shall mean CTU, which shall execute and implement the Transmission Service Agreement (TSA);

Provided that while taking major decisions, CTU shall consult CEA on technical matters and any other matter it feels necessary.

"Notification" shall mean any notification, issued in the Gazette of India;

"Operating Period" for any Element of the Project shall mean the period from (and including) the COD of such Element of the Project, up to (and including) the Expiry Date and for the Project, shall mean the period from (and including) the COD of the Project, up to (and including) the Expiry Date;

"**Parent Company**" shall mean an entity that holds at least twenty-six percent (26%) of the paid - up equity capital directly or indirectly in the Bidding Company or in the Member in a Bidding Consortium, as the case may be;

"Preliminary Termination Notice" shall mean a Nodal Agency's Preliminary Termination Notice as defined in Article 13 of this Agreement;

**"Project"** shall mean Transmission System for Evacuation of Power from REZ in Rajasthan (20GW) under Phase-III Part F, as detailed in Schedule 1 of this Agreement;

"**Project Assets**" shall mean all physical and other assets relating to and forming part of the Project including:

(a) rights over the Site for substations, ROW for transmission lines;

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(b) tangible & intangible assets such as civil works and equipment including foundations, embankments, pavements, electrical systems, communication systems, relief centres, administrative offices, Substations, software, tower and sub-stations designs etc;

(c) project facilities situated on the Site;

(d) all rights of the TSP under the project agreements;

(e) financial assets, such as receivables, security deposits etc;

(f) insurance proceeds; and

(g) Applicable Permits and authorisations relating to or in respect of the Transmission System;"

**"Project Execution Plan"** shall mean the plan referred to in Article 3.1.3(c) hereof;

"Prudent Utility Practices" shall mean the practices, methods and standards that are generally accepted internationally from time to time by electric transmission utilities for the purpose of ensuring the safe, efficient and economic design, construction, commissioning, operation, repair and maintenance of the Project and which practices, methods and standards shall be adjusted as necessary, to take account of:

- (i) operation, repair and maintenance guidelines given by the manufacturers to be incorporated in the Project,
- (ii) the requirements of Law, and
- (iii) the physical conditions at the Site;
- (iv) the safety of operating personnel and human beings;

"Rated Voltage" shall mean voltage at which the Transmission System is designed to operate or such lower voltage at which the line is charged, for the time being, in consultation with the Central Transmission Utility;

**Rebate**" shall have the meaning as ascribed to in Article 10.3 of this greement;

**"RFP"** shall mean Request for Proposal dated February 10, 2022 along with all schedules, annexures and RFP Project Documents attached thereto, issued by the BPC for tariff based competitive bidding process for

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selection of Bidder as TSP to execute the Project, including any modifications, amendments or alterations thereto;

"RFP Project Documents" shall mean the following documents to be entered into in respect of the Project, by the Parties to the respective agreements:

- a. Transmission Service Agreement,
- b. Share Purchase Agreement,
- c. Agreement(s) required under Sharing Regulations and
- d. Any other agreement as may be required;

**"RLDC"** shall mean the relevant Regional Load Dispatch Centre as defined in the Electricity Act, 2003, in the region(s) in which the Project is located;

"**RPC**" shall mean the relevant Regional Power Committee established by the Government of India for the specific Region(s) in accordance with the Electricity Act, 2003 for facilitating integrated operation of the Power System in that Region;

"Scheduled COD" in relation to an Element(s) shall mean the date(s) as mentioned in Schedule 2 as against such Element(s) and in relation to the Project, shall mean the date as mentioned in Schedule 2 as against such Project, subject to the provisions of Article 4.4 of this Agreement, or such date as may be mutually agreed among the Parties;

"Scheduled Outage" shall mean the final outage plan as approved by the RPC as per the provisions of the Grid Code;

"Selected Bid" shall mean the technical Bid and the Final Offer of the Selected Bidder submitted during e-reverse bidding, which shall be downloaded and attached in Schedule 7 on or prior to the Effective Date;

"Share Purchase Agreement" shall mean the agreement amongst REC Power Development and Consultancy Limited, Beawar Transmission Limited and the Successful Bidder for the purchase of one hundred (100%) per cent of the shareholding of the Beawar Transmission Limited for the Acquisition Price, by the Successful Bidder on the terms and conditions as contained therein;



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"Sharing Regulations" shall mean the Central Electricity Regulatory Commission (Sharing of Inter-State Transmission Charges and Losses) Regulations, 2020 and as amended from time to time;

**"Site"** in relation to a substation, switching station or HVDC terminal or inverter station, shall mean the land and other places upon which such station / terminal is to be established;

"SLDC" shall mean the State Load Despatch Centre established as per sub-section (1) of Section 31 of the Electricity Act 2003;

"STU" or "State Transmission Utility" shall be the Board or the Government company, specified as such by the State Government under sub-section (1) of Section 39 of the Electricity Act 2003;

"Successful Bidder" or "Selected Bidder" shall mean the Bidder selected pursuant to the RFP and who has to acquire one hundred percent (100%) equity shares of Beawar Transmission Limited, along with all its related assets and liabilities, which will be responsible as the TSP to establish the Project on build, own, operate and transfer basis as per the terms of the TSA and other RFP Project Documents;

**"TSP's Preliminary Notice"** shall mean a notice issued by the TSP in pursuant to the provisions of Article 13.3 of this Agreement;

**"Target Availability"** shall have the meaning as ascribed hereto in Article 8.2 of this Agreement;

"Technically Evaluated Entity" shall mean the company which has been evaluated for the satisfaction of the technical requirement set forth in RFP;

"**Termination Notice**" shall mean a Nodal Agency's Termination Notice given by the Nodal Agency to the TSP pursuant to the provisions of Articles 3.3.2, 3.3.4, 4.4.2, 5.8, 13.2 and 13.3 of this Agreement for the termination of this Agreement;

"**Term of Agreement**" for the purposes of this Agreement shall have the meaning ascribed thereto in Article 2.2 of this Agreement;

**Transmission Charges**" shall mean the Final Offer of the Selected Bidder during the e-reverse bidding and adopted by the Commission, payable to the TSP as per Sharing Regulations;

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"Transmission License" shall mean the license granted by the Commission in terms of the relevant regulations for grant of such license issued under the Electricity Act;

"Transmission Service" shall mean making the Project available as per the terms and conditions of this Agreement and Sharing Regulations;

"Unscheduled Outage" shall mean an interruption resulting in reduction of the Availability of the Element(s) / Project (as the case may be) that is not a result of a Scheduled Outage or a Force Majeure Event.

"Ultimate Parent Company" shall mean an entity which owns at least twenty six percent (26%) equity in the Bidding Company or Member of a Consortium, (as the case may be) and in the Technically Evaluated Entity and / or Financially Evaluated Entity (as the case may be) and such Bidding Company or Member of a Consortium, (as the case may be) and the Technically Evaluated Entity and / or Financially Evaluated Entity (as the case may be) shall be under the direct control or indirectly under the common control of such entity;

#### 1.2 Interpretation:

Save where the contrary is indicated, any reference in this Agreement to:

"Agreement" shall be construed as including a reference to its Schedules, Appendices and Annexures;

"Rupee", "Rupees" and "Rs." shall denote lawful currency of India;

"crore" shall mean a reference to ten million (10,000,000) and a "lakh" shall mean a reference to one tenth of a million (1,00,000);

"encumbrance" shall be construed as a reference to a mortgage, charge, pledge, lien or other encumbrance securing any obligation of any person or any other type of preferential arrangement (including, without limitation, title transfer and retention arrangements) having a similar effect;

"holding company" of a company or corporation shall be construed as a reference to any company or corporation of which the other company or corporation is a subsidiary;

"indebtedness" shall be construed so as to include any obligation (whether incurred as principal or surety) for the payment or repayment of money, whether present or future, actual or contingent;

"person" shall have the meaning as defined in Section 2 (49) of the Act; mission /



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"subsidiary" of a company or corporation (the holding company) shall be construed as a reference to any company or corporation:

- (i) which is controlled, directly or indirectly, by the holding company, or
- (ii) more than half of the issued share capital of which is beneficially owned, directly or indirectly, by the holding company, or
- (iii) which is a subsidiary of another subsidiary of the holding company,

for these purposes, a company or corporation shall be treated as being controlled by another if that other company or corporation is able to direct its affairs and/or to control the composition of its board of directors or equivalent body;

"winding-up", "dissolution", "insolvency", or "reorganization" in the context of a company or corporation shall have the same meaning as defined in the Companies Act, 1956/ Companies Act, 2013 (as the case may be).

- 1.2.1 Words importing the singular shall include the plural and vice versa.
- 1.2.2 This Agreement itself or any other agreement or document shall be construed as a reference to this or to such other agreement or document as it may have been, or may from time to time be, amended, varied, novated, replaced or supplemented.
- 1.2.3 A Law shall be construed as a reference to such Law including its amendments or re-enactments from time to time.
- A time of day shall, save as otherwise provided in any agreement or 1.2.4 document be construed as a reference to Indian Standard Time.
- 1.2.5 Different parts of this Agreement are to be taken as mutually explanatory and supplementary to each other and if there is any inconsistency between or among the parts of this Agreement, they shall be interpreted in a harmonious manner so as to give effect to each part.

The tables of contents and any headings or sub-headings in this Agreement have been inserted for ease of reference only and shall not affect the interpretation of this Agreement. Gurugran 0

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- 1.2.7 All interest payable under this Agreement shall accrue from day to day and be calculated on the basis of a year of three hundred and sixty-five (365) days.
- 1.2.8 The words "hereof" or "herein", if and when used in this Agreement shall mean a reference to this Agreement.
- 1.2.9 The contents of Schedule 7 shall be referred to for ascertaining accuracy and correctness of the representations made by the Selected Bidder in Article 17.2.1 hereof.



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# **ARTICLE: 2**

# 2 EFFECTIVENESS AND TERM OF AGREEMENT

#### 2.1 Effective Date:

This Agreement shall be effective from later of the dates of the following events:

- a. The Selected Bidder, on behalf of the TSP, has provided the Contract Performance Guarantee, as per terms of Article 3.1 of this Agreement; and
- b. The Selected Bidder has acquired for the Acquisition Price, one hundred percent (100%) of the equity shareholding of REC Power Development and Consultancy Limited in Beawar Transmission Limited along with all its related assets and liabilities as per the provisions of the Share Purchase Agreement. and
- c. The Agreement is executed and delivered by the Parties;

#### 2.2 Term and Termination:

- 2.2.1 Subject to Article 2.2.3 and Article 2.4, this Agreement shall continue to be effective in relation to the Project until the Expiry Date, when it shall automatically terminate.
- 2.2.2 Post the Expiry Date of this Agreement, the TSP shall ensure transfer of Project Assets to CTU or its successors or an agency as decided by the Central Government at zero cost and free from any encumbrance and liability. The transfer shall be completed within 90 days of expiry of this Agreement failing which CTU shall be entitled to take over the Project Assets Suo moto.
- 2.2.3 This Agreement shall terminate before the Expiry Date in accordance with Article 13 or Article 3.3.2 or Article 3.3.4.

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#### 2.3 Conditions prior to the expiry of the Transmission License

- 2.3.1 In order to continue the Project beyond the expiry of the Transmission License, the TSP shall be obligated to make an application to the Commission at least two (2) years before the date of expiry of the Transmission License, seeking the Commission's approval for the extension of the term of the Transmission License up to the Expiry Date.
- 2.3.2 The TSP shall timely comply with all the requirements that may be laid down by the Commission for extension of the term of the Transmission License beyond the initial term of twenty-five (25) years & upto the Expiry Date and the TSP shall keep the Nodal Agency fully informed about the progress on its application for extension of the term of the Transmission License.

#### 2.4 Survival:

The expiry or termination of this Agreement shall not affect any accrued rights, obligations/ roles and liabilities of the Parties under this Agreement, including the right to receive liquidated damages as per the terms of this Agreement, nor shall it effect the survival of any continuing obligations/ roles for which this Agreement provides, either expressly or by necessary implication, which are to survive after the Expiry Date or termination including those under Articles 3.3.3, 3.3.5, Article 9.3 (Application of Insurance Proceeds), Article 11 (Force Majeure), Article 13 (Events of Default and Termination), Article 14 (Liability & Indemnification), Article 16 (Governing Law & Dispute Resolution), Article 19 (Miscellaneous).

## 2.5 Applicability of the provisions of this Agreement

- 2.5.1 For the purpose of Availability, Target Availability and the computation of Availability, Incentive, Penalty, the provisions provided in this Agreement shall apply and any future modifications in the relevant Rules and Regulations shall not be applicable for this Project.
- 2.5.2 For the purposes of this Agreement for ISTS systems developed under the tariff based competitive bidding framework, the provisions relating to the definitions (Availability and COD), Article 3 (Contract Performance Guarantee and Conditions Subsequent), Article 5 (Construction of the Project), Article 6 (Connection and Commissioning of the Project), Article 8 (Target Availability and calculation of Availability), Article 11 (Force Majeure), Article 12 (Change in Law), Article 13 (Event of Default),



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Article 14 (Indemnification), Article 15 (Assignment and Charges), Articles 16.1, 16.2 and 16.4 (Governing Laws and Dispute Resolution) and Article 17 (representation and warranties of the ISTS Licensee) of this agreement shall supersede the corresponding provisions under Sharing Regulations.

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# **ARTICLE: 3**

#### 3 CONDITIONS SUBSEQUENT

#### Satisfaction of conditions subsequent by the TSP 3.1

- Within ten (10) days from the date of issue of Letter of Intent, the 3.1.1 Selected Bidder, shall:
  - Provide the Contract Performance Guarantee, and a.
  - Acquire, for the Acquisition Price, one hundred percent (100%) b. equity shareholding of Beawar Transmission Limited from REC Power Development and Consultancy Limited, who shall sell to the Selected Bidder, the equity shareholding of Beawar Transmission Limited, along with all its related assets and liabilities.
  - Execute this Agreement; C.

The TSP shall, within five (5) working days from the date of acquisition of SPV by the Selected Bidder, undertake to apply to the Commission for the grant of Transmission License and for the adoption of tariff as required under section-63 of the Electricity Act.

The Selected Bidder, on behalf of the TSP, will provide to the Central Transmission Utility of India Limited (being the Nodal Agency) the Contract Performance Guarantee for an amount of Rs. 57.60 Crore (Rupees Fifty-Seven Crore Sixty Lakhs Only).

- The Contract Performance Guarantee shall be initially valid for a period 3.1.2 up to three (3) months after the Scheduled COD of the Project and shall be extended from time to time to be valid for a period up to three (3) months after the COD of the Project. In case the validity of the Contract Performance Guarantee is expiring before the validity specified in this Article, the TSP shall, at least thirty (30) days before the expiry of the Contract Performance Guarantee, replace the Contract Performance Guarantee with another Contract Performance Guarantee or extend the validity of the existing Contract Performance Guarantee until the validity period specified in this Article.
- The TSP agrees and undertakes to duly perform and complete the 3.1.3 following activities within six (6) months from the Effective Date (except for c) below), unless such completion is affected due to any Force

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Majeure Event, or if any of the activities is specifically waived in writing by the Nodal Agency:

- a. To obtain the Transmission License for the Project from the Commission:
- b. To obtain the order for adoption of Transmission Charges by the Commission, as required under Section 63 of the Electricity Act 2003;
- c. To submit to the Nodal Agency, CEA & Independent Engineer, the Project Execution Plan, immediately after award of contract(s) and maximum within one hundred and twenty (120) days from the Effective Date. Also, an approved copy each of Manufacturing Quality Plan (MQP) and Field Quality Plan (FQP) would be submitted to Independent Engineer & Nodal Agency in the same time period. The TSP's Project Execution Plan should be in conformity with the Scheduled COD as specified in Schedule 2 of this Agreement, and shall bring out clearly the organization structure, time plan and methodology for executing the Project, award of major contracts, designing, engineering, procurement, shipping, construction, testing and commissioning to commercial operation;
- d. To submit to the Nodal Agency, CEA & Independent Engineer a detailed bar (GANTT) chart of the Project outlining each activity (taking longer than one Month), linkages as well as durations;
- e. To submit to the Nodal Agency, CEA & Independent Engineer specifications of conductor meeting the functional detailed specifications specified in RFP;
- f. To achieve Financial Closure:
- q. To provide an irrevocable letter to the Lenders duly accepting and acknowledging the rights provided to the Lenders under the provisions of Article 15.3 of this Agreement and all other RFP Project Documents:
- h. To award the Engineering, Procurement and Construction contract ("EPC contract") for the design and construction of the Project and shall have given to such Contractor an irrevocable notice to proceed; and
  - To sign the Agreement(s) required, if any, under Sharing Regulations.



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# 3.2 Recognition of Lenders' Rights by the Nodal Agency

3.2.1 The Nodal Agency hereby accepts and acknowledges the rights provided to the Lenders as per Article 15.3 of this Agreement and all other RFP Project Documents.

#### 3.3 Consequences of non-fulfilment of conditions subsequent

- If any of the conditions specified in Article 3.1.3 is not duly fulfilled by the 3.3.1 TSP even within three (3) Months after the time specified therein, then on and from the expiry of such period and until the TSP has satisfied all the conditions specified in Article 3.1.3, the TSP shall, on a monthly basis, be liable to furnish to Central Transmission Utility of India Limited (being the Nodal Agency) additional Contract Performance Guarantee of Rupees Five Crore Seventy-Six Lakh Only (Rs. 5.76 Crore) within two (2) Business Days of expiry of every such Month. Such additional Contract Performance Guarantee shall be provided to Central Transmission Utility of India Limited (being the Nodal Agency) in the manner provided in Article 3.1.1 and shall become part of the Contract Performance Guarantee and all the provisions of this Agreement shall be construed accordingly. Central Transmission Utility of India Limited (being the Nodal Agency) shall be entitled to hold and / or invoke the Contract Performance Guarantee, including such additional Contract Performance Guarantee, in accordance with the provisions of this Agreement.
- 3.3.2 Subject to Article 3.3.4, if:
  - (i) the fulfilment of any of the conditions specified in Article 3.1.3 is delayed beyond nine (9) Months from the Effective Date and the TSP fails to furnish additional Contract Performance Guarantee to the Nodal Agency in accordance with Article 3.3.1 hereof; or
  - (ii) the TSP furnishes additional Performance Guarantee to the Nodal Agency in accordance with Article 3.3.1 hereof but fails to fulfil the conditions specified in Article 3.1.3 within a period of twelve (12) months from the Effective Date,

the Nodal Agency shall have the right to terminate this Agreement, by giving a Termination Notice to the TSP, in writing, of at least seven (7) days, with a copy to CEA and the Lenders' Representative in order to enable the Lenders to exercise right of substitution in accordance with



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Article 15.3 of this Agreement.

3.3.3 If the Nodal Agency elects to terminate this Agreement as per the provisions of Article 3.3.2, the TSP shall be liable to pay to the Nodal Agency an amount of Rs. 57.60 Crore (Rupees Fifty-Seven Crore Sixty Lakhs Only) as liquidated damages. The Nodal Agency shall be entitled to recover this amount of damages by invoking the Contract Performance Guarantee to the extent of liquidated damages, which shall be required by the Nodal Agency, and the balance shall be returned to TSP, if any.

It is clarified for removal of doubt that this Article shall survive the termination of this Agreement.

3.3.4 In case of inability of the TSP to fulfil the conditions specified in Article 3.1.3 due to any Force Majeure Event, the time period for fulfilment of the condition subsequent as mentioned in Article 3.1.3, may be extended for a period of such Force Majeure Event. Alternatively, if deemed necessary, this Agreement may be terminated by the Nodal Agency by giving a Termination Notice to the TSP, in writing, of at least seven (7) days, with a copy to CEA and the Lenders' Representative in order to enable the Lenders to exercise right of substitution in accordance with Article 15.3 of this Agreement and the Contract Performance Guarantee shall be returned as per the provisions of Article 6.5.1.

Provided, that due to the provisions of this Article 3.3.4, any increase in the time period for completion of conditions subsequent mentioned under Article 3.1.3, shall lead to an equal increase in the time period for the Scheduled COD. If the Scheduled COD is extended beyond a period of one hundred eighty (180) days due to the provisions of this Article 3.3.4, the TSP will be allowed to recover the interest cost during construction corresponding to the period exceeding one hundred eighty (180) days by adjustment in the Transmission Charges in accordance with Schedule 9.

3.3.5 Upon termination of this Agreement as per Articles 3.3.2 and 3.3.4, the Nodal Agency may take steps to bid out the Project again.

The Nodal agency, on the failure of the TSP to fulfil its obligations, if it considers that there are sufficient grounds for so doing, apart from invoking the Contract Performance Guarantee under para 3.3.3 may also initiate proceedings for blacklisting the TSP as per provisions of Article

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3.3.6

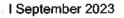
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#### 3.4 Progress Reports

The TSP shall notify the Nodal Agency and CEA in writing at least once a Month on the progress made in satisfying the conditions subsequent in Articles 3.1.3.



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# **ARTICLE: 4**

# 4 DEVELOPMENT OF THE PROJECT

## 4.1 TSP's obligations in development of the Project:

Subject to the terms and conditions of this Agreement, the TSP at its own cost and expense shall observe, comply with, perform, undertake and be responsible:

- a. for procuring and maintaining in full force and effect all Consents, Clearances and Permits, required in accordance with Law for development of the Project;
- b. for financing, constructing, owning and commissioning each of the Element of the Project for the scope of work set out in Schedule 1 of this Agreement in accordance with:
  - i. the Electricity Act and the Rules made thereof;
  - ii. the Grid Code;

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- iii. the CEA Regulations applicable, and as amended from time to time, for Transmission Lines and sub-stations:
  - the Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2007;
  - Central Electricity Authority (Technical Standards for construction of Electrical Plants and Electric Lines) Regulation, 2010;
  - Central Electricity Authority (Grid Standard) Regulations, 2010;
  - Central Electricity Authority (Safety requirements for construction, operation and maintenance of Electrical Plants and Electrical Lines) Regulation, 2011;
  - Central Electricity Authority (Measures relating to Safety and Electricity Supply) Regulation, 2010;
  - Central Electricity Authority (Technical Standards for Communication System in Power System Operation) Regulations, 2020.

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- laid down the security Guidelines bv iv. Safetv/ Government;
- v. Prudent Utility Practices, relevant Indian Standards and the Law:

not later than the Scheduled COD as per Schedule 2 of this Agreement:

- for entering into a Connection Agreement with the concerned Ċ. parties in accordance with the Grid Code.
- for owning the Project throughout the term of this Agreement d. free and clear of any encumbrances except those expressly permitted under Article 15 of this Agreement;
- to co-ordinate and liaise with concerned agencies and provide e. on a timely basis relevant information with regard to the specifications of the Project that may be required for interconnecting the Project with the Interconnection Facilities;
- for providing all assistance to the Arbitrators as they may f. require for the performance of their duties and responsibilities;
- to provide to the Nodal Agency and CEA, on a monthly basis, g. progress reports with regard to the Project and its execution (in accordance with prescribed form) to enable the CEA to monitor and co-ordinate the development of the Project matching with the Interconnection Facilities:
- to comply with Ministry of Power order no. 25-11/6/2018 PG h. dated 02.07.2020 as well as other Guidelines issued by Govt. of India pertaining to this:
- to procure the products associated with the Transmission i. System as per provisions of Public Procurement (Preference to Make in India) orders issued by Ministry of Power vide orders No. 11/5/2018 - Coord. dated 28.07.2020 for transmission sector, as amended from time to time read with Department for Promotion of Industry and Internal Trade (DPIIT) orders in this regard (Procuring Entity as defined in above orders shall deemed to have included Selected Bidder and/ or TSP).

Also, to comply with Department of Expenditure, Ministry of Finance vide Order (Public Procurement No 1) bearing File



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6/18/2019-PPD dated 23.07.2020. Order (Public No. Procurement No 2) bearing File No. 6/18/2019-PPD dated 23.07.2020 and Order (Public Procurement No. 3) bearing File No. 6/18/2019-PPD, dated 24.07.2020, as amended from time to time, regarding public procurement from a bidder of a country, which shares land border with India;

- to submit to Nodal Agency information in the prescribed format j. [To be devised by Nodal Agency] for ensuring compliance to Article 4.1 i) above.
- to comply with all its obligations undertaken in this Agreement. k.

#### 4.2 **Roles of the Nodal Agency in implementation of the Project:**

- Subject to the terms and conditions of this Agreement, the Nodal Agency 4.2.1 shall be the holder and administrator of this Agreement and shall inter alia:
  - appoint an Independent Engineer within 90 days of the а. Effective Date
  - b. provide letters of recommendation to the concerned Indian Governmental Instrumentality, as may be requested by the TSP from time to time, for obtaining the Consents, Clearances and Permits required for the Project;
  - coordinate among TSP and upstream/downstream entities in C. respect of Interconnection Facilities; and
  - d. monitor the implementation of the Agreement and take appropriate action for breach thereof including revocation of guarantees, cancellation of Agreement, blacklisting etc
  - provide all assistance to the Arbitrators as required for the e. performance of their duties and responsibilities; and
  - perform any other responsibility (ies) as specified in this f. Agreement.

#### Time for Commencement and Completion: 4.3



The TSP shall take all necessary steps to commence work on the Project from the Effective Date of the Agreement and shall achieve Scheduled COD of the Project in accordance with the time schedule specified in Schedule 2 of this Agreement;

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The COD of each Element of the Project shall occur no later than b. the Scheduled COD or within such extended time to which the TSP shall be entitled under Article 4.4 hereto.

#### 4.4 Extension of time:

- In the event that the TSP is unable to perform its obligations for the 4.4.1 reasons solely attributable to the Nodal Agency, the Scheduled COD shall be extended, by a 'day to day' basis, subject to the provisions of Article 13.
- In the event that an Element or the Project cannot be commissioned by 4.4.2 its Scheduled COD on account of any Force Majeure Event as per Article 11, the Scheduled COD shall be extended, by a 'day to day' basis for a period of such Force Majeure Event. Alternatively, if deemed necessary, the Nodal Agency may terminate the Agreement as per the provisions of Article 13.4 by giving a Termination Notice to the TSP, in writing, of at least seven (7) days, with a copy to CEA and the Lenders' Representative in order to enable the Lenders to exercise right of substitution in accordance with Article 15.3 of this Agreement.
- If the Parties have not agreed, within thirty (30) days after the affected 4.4.3 Party's performance has ceased to be affected by the relevant circumstance, on how long the Scheduled COD should be deferred by, any Party may raise the Dispute to be resolved in accordance with Article 16.

#### 4.5 Metering Arrangements:

The TSP shall comply with all the provisions of the IEGC and the Central 4.5.1 Electricity Authority (Installation and Operation of Meters) Regulations, 2006 as amended from time to time, with regard to the metering arrangements for the Project. The TSP shall fully cooperate with the CTU / STU / RLDC and extend all necessary assistance in taking meter readings.

#### Interconnection Facilities: 4.6

- Subject to the terms and conditions of this Agreement, the TSP shall be 4.6.1 responsible for connecting the Project with the interconnection point(s) specified in Schedule 1 of this Agreement. The Interconnection Facilities shall be developed as per the scope of work and responsibilities Transmission assigned in Schedule 1 of this Agreement. The Nodal Agency shall be responsible for coordinating to make available the Interconnection New Delhi Facilities.
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### **Transmission Service Agreement**

4.6.2 In order to remove any doubts, it is made clear that the obligation of the TSP within the scope of the project is to construct the Project as per Schedule-1 of this Agreement and in particular to connect it to the Interconnection Facilities as specified in this Agreement.

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# 5 CONSTRUCTION OF THE PROJECT

### 5.1 TSP's Construction Responsibilities:

- 5.1.1 The TSP, at its own cost and expense, shall be responsible for designing, constructing, erecting, testing and commissioning each Element of the Project by the Scheduled COD in accordance with the Regulations and other applicable Laws specified in Article 4.1 of this Agreement.
- 5.1.2 The TSP acknowledges and agrees that it shall not be relieved from any of its obligations under this Agreement or be entitled to any extension of time or any compensation whatsoever by reason of the unsuitability of the Site or Transmission Line route(s).
- 5.1.3 The TSP shall be responsible for obtaining all Consents, Clearances and Permits related but not limited to road / rail / river / canal / power line / crossings, Power and Telecom Coordination Committee (PTCC), defence, civil aviation, right of way / way-leaves and environmental & forest clearances from relevant authorities required for developing, financing, constructing, maintaining/ renewing all such Consents, Clearances and Permits in order to carry out its obligations under this Agreement in general and shall furnish to the Nodal Agency such copy/ies of each Consents, Clearances and Permits, on demand. Nodal Agency shall provide letters of recommendation to the concerned Indian Governmental Instrumentality, as may be requested by the TSP from time to time, for obtaining the Consents, Clearances and Permits required for the Project.
- 5.1.4 The TSP shall be responsible for:





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- (a) acquisition of land for location specific substations, switching stations or HVDC terminal or inverter stations. Also, the actual location of Greenfield substations (Switching Stations or HVDC Terminal or Inverter Stations) for a generation pooling substation and for load serving substations in the scope of TSP shall not be beyond 3 Km radius of the location proposed by the BPC in the survey report. However, actual location of any Greenfield Intermediate Substations in the scope of TSP shall not be beyond 10 Km radius of the location proposed by the BPC in the Survey Report.
- (b) final selection of Site including its geo-technical investigation;
- (c) survey and geo-technical investigation of line route in order to determine the final route of the Transmission Lines;
- (d) seeking access to the Site and other places where the Project is being executed, at its own risk and costs, including payment of any crop, tree compensation or any other compensation as may be required.
- 5.1.5 In case the Project involves any resettlement and rehabilitation, the resettlement and rehabilitation package will be implemented by the State Government authorities, for which the costs are to be borne by the TSP and no changes would be allowed in the Transmission Charges on account of any variation in the resettlement and rehabilitation cost. The TSP provide assistance on best endeavour basis. shall in implementation of the resettlement and rehabilitation package, if execution of such package is in the interest of expeditious implementation of the Project and is beneficial to the Project affected persons.

### 5.2 Appointing Contractors:

- 5.2.1 The TSP shall conform to the requirements as provided in this Agreement while appointing Contractor(s) for procurement of goods & services.
  - The appointment of such Contractor(s) shall neither relieve the TSP of any of its obligations under this Agreement nor make the Nodal Agency hable for the performance of such Contractor(s).

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### 5.3 Monthly Progress Reporting:

The TSP shall provide to the CEA, Nodal Agency & Independent Engineer, on a monthly basis, progress reports along with likely completion date of each Element with regard to the Project and its execution (in accordance with prescribed form). The Nodal Agency/ CEA shall monitor the development of the Project for its timely completion for improving and augmenting the electricity system as a part of its statutory responsibility.

### 5.4 Quality of Workmanship:

The TSP shall ensure that the Project is designed, built and completed in a good workmanship using sound engineering and construction practices, and using only materials and equipment that are new and manufactured as per the MQP and following approved FQP for erection, testing & commissioning and complying with Indian /International Standards such that, the useful life of the Project will be at least thirty-five (35) years from the COD of the Project.

The TSP shall ensure that all major substation equipment / component (e.g. transformers, reactors, Circuit Breakers, Instrument Transformers (IT), Surge Arresters (SA), Protection relays, clamps & connectors etc.), equipment in terminal stations of HVDC installations including Thyristor/ IGBT valves, Converter Transformers, smoothing reactors, Transformer bushings and wall bushings, GIS bus ducts, towers and gantry structures and transmission towers or poles and line materials (conductors, earthwire, OPGW, insulator, accessories for conductors, OPGW & earthwires, hardware fittings for insulators, aviation lights etc.), facilities and system shall be designed, constructed and tested (Type test, Routine tests, Factory Acceptance Test (FAT)) in accordance with relevant CEA Regulations and Indian Standards. In case Indian Standards for any particular equipment/ system/ process is not available, IEC/ IEEE or equivalent International Standards and Codes shall be followed.



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### 5.5 Progress Monitoring & Quality Assurance:

- 5.5.1 The Project Execution Plan submitted by the TSP in accordance with Article 3.1.3 c) shall comprise of detailed schedule of all the equipments/items /materials required for the Project, right from procurement of raw material till the dispatch from works and receipt at the site. Further, it should also include various stages of the construction schedule up to the commissioning of the Project.
- 5.5.2 Nodal Agency, CEA & Independent Engineer shall have access at all reasonable times to the Site and to the Manufacturer's works and to all such places where the Project is being executed.
- 5.5.3 Independent Engineer shall ensure conformity of the conductor specifications with the functional specifications specified in RFP.
- 5.5.4 The Independent Engineer shall monitor the following during construction of the Project:
  - a) Quality of equipments, material, foundation, structures and workmanship etc. as laid down in Article 5.4 and 6.1.4 of the TSA. Specifically, quality of Sub-station equipments, transmission line material and workmanship etc. would be checked in accordance with the Article 5.4.
  - b) Progress in the activities specified in Condition Subsequent
  - c) Verification of readiness of the elements including the statutory clearances & completion of civil works, fixing of all components and finalisation of punch points (if any) prior to charging of the elements
  - d) Progress of construction of substation and Transmission Lines
- 5.5.5 The progress shall be reviewed by the Independent Engineer against the Project Execution Plan. The Independent Engineer shall prepare its report on monthly basis and submit the same to Nodal Agency highlighting the progress achieved till the end of respective month vis-à-vis milestone activities, areas of concern, if any, which may result in delay in the timely completion of the Project. Based on the progress, Nodal Agency and/ or CEA shall issue written instructions to the TSP to take corrective measures, as may be prudent for the timely completion of the Project. In case of any deficiency, the Nodal Agency would be at liberty to take action in accordance with the procedure of this Agreement.

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5.5.6 For any delay in commissioning any critical Element(s), as identified in Schedule 1 & Schedule 2 of this Agreement, beyond a period of 45 days shall lead to a sequestration of 10% of the Contract Performance Guarantee.

### 5.6 Site regulations and Construction Documents

The TSP shall abide by the Safety Rules and Procedures as mentioned in Schedule 3 of this Agreement

The TSP shall retain at the Site and make available for inspection at all reasonable times, copies of the Consents, Clearances and Permits, construction drawings and other documents related to construction.

### 5.7 Supervision of work:

The TSP shall provide all necessary superintendence for execution of the Project and its supervisory personnel shall be available to provide full-time superintendence for execution of the Project. The TSP shall provide skilled personnel who are experienced in their respective fields.

### 5.8 Remedial Measures:

The TSP shall take all necessary actions for remedying the shortfall in achievement of timely progress in execution of the Project, if any, as intimated by the Independent Engineer and/ or CEA and/ or the Nodal Agency. However, such intimation by the Independent Engineer and/ or CEA and/ or the Nodal Agency and the subsequent effect of such remedial measures carried out by the TSP shall not relieve the TSP of its obligations in the Agreement. Independent Engineer and/ or CEA and/ or CEA and/ or the Nodal Agency may carry out random inspections during the Project execution, as and when deemed necessary by it. If the shortfalls as intimated to the TSP are not remedied to the satisfaction of the CEA and/ or the Nodal Agency, this Agreement may be terminated by the Nodal Agency by giving a Termination Notice to the TSP, in writing, of at least seven (7) days, with a copy to CEA and the Lenders' Representative in order to enable the Lenders to exercise right of substitution in accordance with Article 15.3 of this Agreement.



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#### CONNECTION AND COMMISSIONING OF THE PROJECT 6

#### 6.1 Connection with the Inter-Connection Facilities:

- The TSP shall give the RLDC(s), CTU, / STU, as the case may be, and 6.1.1 any other agencies as required, at least sixty (60) days advance written notice of the date on which it intends to connect an Element of the Project, which date shall not be earlier than its Scheduled COD or Schedule COD extended as per Article 4.4.1 & 4.4.2 of this Agreement, unless mutually agreed to by Parties. Further, any preponing of COD of any element prior to Scheduled COD must be approved by the Nodal Agency.
- The RLDC / SLDC (as the case may be) or the CTU / STU (as the case 6.1.2 may be), for reasonable cause, including non-availability of Interconnection Facilities as per Article 4.2, can defer the connection for up to fifteen (15) days from the date notified by the TSP pursuant to Article 6.1.1, if it notifies to the TSP in writing, before the date of connection, of the reason for the deferral and when the connection is to be rescheduled. However, no such deferment on one or more occasions would be for more than an aggregate period of thirty (30) days. Further, the Scheduled COD would be extended as required, for all such deferments on "day to day" basis.
- 6.1.3 Subject to Articles 6.1.1 and 6.1.2, any Element of Project may be connected with the Interconnection Facilities when:
  - it has been completed in accordance with this Agreement and a. the Connection Agreement;
  - it meets the Grid Code, Central Electricity Authority (Technical b. Standards for Connectivity to the Grid) Regulations, 2007 as amended from time to time and all other Indian legal requirements, and
  - The TSP has obtained the approval in writing of the Electrical C. Inspector certifying that the Element is ready from the point of view of safety of supply and can be connected with the Interconnection Facilities.

It has satisfactorily met all the testing requirements as per d.

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### Articles 6.1.4

Site Acceptance Test (SAT)/ pre-commissioning tests of all major 6.1.4 substation equipment, component, system, facilities shall be successfully carried out before commissioning. The Type tests, FAT and SAT reports should be available at the substation / terminal station of HVDC installations for ready reference of operation and maintenance staff and has to be made available to the Independent Engineer appointed for quality monitoring or their authorised representatives, as and when they wish to examine the same.

#### 6.2 **Commercial Operation:**

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An Element of the Project shall be declared to have achieved COD 6.2.1 twenty-four (24) hours following the connection of the Element with the Interconnection Facilities pursuant to Article 6.1 or seven (7) days after the date on which it is declared by the TSP to be ready for charging but is not able to be charged for reasons not attributable to the TSP subject to Article 6.1.2.

> Provided that an Element shall be declared to have achieved COD only after all the Element(s), if any, which are pre-required to have achieved COD as defined in Schedule 2 of this Agreement, have been declared to have achieved their respective COD.

Once any Element of the Project has been declared to have achieved 6.2.2 deemed COD as per Article 6.2.1 above, such Element of the Project shall be deemed to have Availability equal to the Target Availability till the actual charging of the Element and to this extent, TSP shall be eligible for the Monthly Transmission Charges applicable for such Element

### **Compensation for Direct Non Natural Force Majeure Event or Indirect** 6.3 Non Natural Force Majeure Event or Natural Force Majeure Event (affecting the Nodal Agency)

If the TSP is otherwise ready to connect the Element(s) of the Project 6.3.1 and has given due notice, as per provisions of Article 6.1.1, to the concerned agencies of the date of intention to connect the Element(s) of (BINSMISSIO the Project, where such date is not before the Scheduled COD, but is not able to connect the Element(s) of the Project by the said date specified in New Delhi 110003 the notice, due to Direct Non Natural Force Majeure Event or Indirect

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Non Natural Force Majeure Event or Natural Force Majeure Event affecting the Nodal Agency, provided such Direct Non Natural Force Majeure Event or Indirect Non Natural Force Majeure Event or Natural Force Majeure Event affecting the Nodal Agency has continued for a period of more than three (3) continuous or non-continuous Months, the TSP shall, until the effects of the Direct Non Natural Force Majeure Event or of Indirect Non Natural Force Majeure Event or Natural Force Majeure Event affecting the Nodal Agency no longer prevent the TSP from connecting the Element(s) of the Project, be deemed to have achieved COD relevant to that date and to this extent, be deemed to have been providing Transmission Service with effect from the date notified, and shall be treated as follows:

- In case of delay due to Direct Non Natural Force Majeure Event, a. TSP is entitled for Transmission Charges calculated on Target Availability for the period of such events in excess of three (3) continuous or non continuous Months in the manner provided in (c) below.
- In case of delay due to Indirect Non Natural Force Majeure Event b. or Natural Force Majeure Event affecting the Nodal Agency, TSP is entitled for payment for debt service which is due under the Financing Agreements, subject to a maximum of Transmission Charges calculated on Target Availability, for the period of such events in excess of three (3) continuous or non continuous Months in the manner provided in (c) below.
- In case of delay due to Direct Non Natural Force Majeure Event or Ç. Indirect Non Natural Force Majeure Event or Natural Force Majeure Event affecting the Nodal Agency, the TSP is entitled for payments mentioned in (a) and (b) above, after commencement of Transmission Service, in the form of an increase in Transmission Charges. These amounts shall be paid from the date, being the later of a) the date of cessation of such Indirect Non Natural Force Majeure Event or Natural Force Majeure Event affecting the Nodal Agency and b) the completion of sixty (60) days from the receipt of the Financing Agreements by the Nodal Agency from the TSP.



Provided such increase in Transmission Charges shall be so as to put the TSP in the same economic position as the TSP would have been in case the TSP had been paid amounts mentioned in (a) and (b) above in a situation where the Force Majeure Event

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had not occurred.

For the avoidance of doubt, it is clarified that the charges payable under this Article 6.3.1 shall be recovered as per Sharing Regulations.

#### Liquidated Damages for Delay in achieving COD of Project: 6.4

- If the TSP fails to achieve COD of any Element of the Project or the 6.4.1 Project, by the Element's / Project's Scheduled COD or such Scheduled COD as extended under Articles 4.4.1 and 4.4.3, then the TSP shall pay Nodal Agency, a sum equivalent to 3.33% of Monthly to the Transmission Charges applicable for the Element of the Project [in case where no Elements have been defined, to be on the Project as a whole] / Project, for each day of delay up to sixty (60) days of delay and beyond that time limit, at the rate of five percent (5%) of the Monthly Transmission Charges applicable to such Element / Project, as liquidated damages for such delay and not as penalty, without prejudice to any rights of the Nodal Agency under the Agreement.
- The TSP's maximum liability under this Article 6.4 shall be limited to the 6.4.2 amount of liquidated damages calculated in accordance with Article 6.4.1 for and up to six (6) months of delay for the Element or the Project.

Provided that, in case of failure of the TSP to achieve COD of the Element of the Project even after the expiry of six (6) months from its Scheduled COD, the provisions of Article 13 shall apply.

- The TSP shall make payment to the Nodal Agency of the liquidated 6.4.3 damages calculated pursuant to Article 6.4.1 within ten (10) days of the earlier of:
  - the date on which the applicable Element achieves COD; or а.
  - the date of termination of this Agreement. **b**.

The payment of such damages shall not relieve the TSP from its obligations to complete the Project or from any other obligation and liabilities under the Agreement.

If the TSP fails to pay the amount of liquidated damages to the Nodal 6.4.4 Agency within the said period of ten (10) days, the Nodal Agency shall (ansmissio) be entitled to recover the said amount of the liquidated damages by invoking the Contract Performance Guarantee. If the then existing

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Contract Performance Guarantee is for an amount which is less than the amount of the liquidated damages payable by the TSP to the Nodal Agency under this Article 6.3 and the TSP fails to make payment of the balance amount of the liquidated damages not covered by the Contract Performance Guarantee, then such balance amount shall be deducted from the Transmission Charges payable to the TSP. The right of the Nodal Agency to encash the Contract Performance Guarantee is without prejudice to the other rights of the Nodal Agency under this Agreement.

6.4.5 For avoidance of doubt, it is clarified that amount payable by TSP under this Article is over and above the penalty payable by TSP under Article 5.5.6 of this Agreement.

### 6.5 Return of Contract Performance Guarantee

- The Contract Performance Guarantee as submitted by TSP in 6.5.1 accordance with Article 3.1.1 shall be released by the Nodal Agency within three (3) months from the COD of the Project. In the event of delay in achieving Scheduled COD of any of the Elements by the TSP (otherwise than due to reasons as mentioned in Article 3.1.3 or Article 11) and consequent part invocation of the Contract Performance Guarantee by the Nodal Agency, Nodal Agency shall release the Contract Performance Guarantee, if any remaining unadjusted, after the satisfactory completion by the TSP of all the requirements regarding achieving the Scheduled COD of the remaining Elements of the Project. It is clarified that the Nodal Agency shall also return / release the Contract Performance Guarantee in the event of (i) applicability of Article 3.3.2 to the extent the Contract Performance Guarantee is valid for an amount in excess of Rs. 57.60 Crore (Rupees Fifty-Seven Crore Sixty Lakhs Only), or (ii) termination of this Agreement by the Nodal Agency as mentioned under Article 3.3.4 of this Agreement.
- 6.5.2 The release of the Contract Performance Guarantee shall be without prejudice to other rights of the Nodal Agency under this Agreement.



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# 7 OPERATION AND MAINTENANCE OF THE PROJECT

# 7.1 Operation and Maintenance of the Project:

The TSP shall be responsible for ensuring that the Project is operated and maintained in accordance with the regulations made by the Commission and CEA from time to time and provisions of the Act.



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# 8 AVAILABILITY OF THE PROJECT

### 8.1 Calculation of Availability of the Project:

Calculation of Availability for the Elements and for the Project, as the case may be, shall be as per Appendix –II to Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2019, as applicable on the Bid Deadline and as appended in Schedule 6 of this Agreement.

### 8.2 Target Availability:

The Target Availability of each Element and the Project shall be 98%.

Payment of monthly Transmission charges based on actual availability will be calculated as per para 1.2 of Schedule 4 of this Agreement.

If the availability of any Element or the Project is below the Target Availability, for six consecutive months in a Contract Year, the DIC(s) or the Nodal Agency may issue a show cause notice to the TSP, asking them to show cause as to why the Transmission Service Agreement be not terminated, and if no satisfactory cause is shown it may terminate the Agreement. If the Nodal Agency is of the opinion that the transmission system is of critical importance, it may carry out or cause to carry the operation and maintenance of transmission system at the risk and cost of TSP.



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### Transmission Service Agreement

# **ARTICLE: 9**

#### INSURANCES 9

#### 9.1 Insurance:

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- The TSP shall effect and maintain or cause to be effected and 9.1.1 maintained during the Construction Period and the Operating Period, adequate Insurances against such risks, with such deductibles including but not limited to any third party liability and endorsements and cobeneficiary/insured, as may be necessary under
  - any of the Financing Agreements, a.
  - b. the Laws, and
  - in accordance with Prudent Utility Practices. C.

The Insurances shall be taken effective from a date prior to the date of the Financial Closure till the Expiry Date.

#### Evidence of Insurance cover: 9.2

The TSP shall furnish to the Nodal Agency copies of certificates and 9.2.1 policies of the Insurances, as and when the Nodal Agency may seek from the TSP as per the terms of Article 9.1

#### Application of Insurance Proceeds: 9.3

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- Save as expressly provided in this Agreement, the policies of Insurances 9.3.1 and the Financing Agreements, the proceeds of any insurance claim made due to loss or damage to the Project or any part of the Project shall be first applied to reinstatement, replacement or renewal of such loss or damage.
- If a Natural Force Majeure Event renders the Project no longer 9.3.2 economically and technically viable and the insurers under the Insurances make payment on a "total loss" or equivalent basis, the portion of the proceeds of such Insurance available to the TSP (after uansmias/o making admissible payments to the Lenders as per the Financing Agreements) shall be allocated only to the TSP. Nodal Agency and / or

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concerned Designated ISTS Customers shall have no claim on such proceeds of the Insurance.

9.3.3 Subject to the requirements of the Lenders under the Financing Agreements, any dispute or difference between the Parties as to whether the Project is no longer economically and technically viable due to a Force Majeure Event or whether that event was adequately covered in accordance with this Agreement by the Insurances shall be determined in accordance with Article 16.

### 9.4 Effect on liability of the Nodal Agency / Designated ISTS Customers

9.4.1 The Nodal Agency and / or the Designated ISTS Customers shall have no financial obligations or liability whatsoever towards the TSP in respect of this Article 9.



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#### BILLING AND PAYMENT OF TRANSMISSION CHARGES 10

Subject to provisions of this Article 10, the Monthly Transmission Charges 10.1 shall be paid to the TSP, in Indian Rupees, on monthly basis as per the provisions of the Sharing Regulations, from the date on which an Element(s) has achieved COD until the Expiry Date of this Agreement, unless terminated earlier and in line with the provisions of Schedule 4 of this Agreement.

#### **Calculation of Monthly Transmission Charges:** 10.2

The Monthly Transmission Charges for each Contract Year including Incentive & Penalty payment shall be calculated in accordance with the provisions of Schedule 4 of this Agreement.

#### **Rebate & Late Payment Surcharge:** 10.3

The rebate and late payment surcharge shall be governed as per Sharing Regulations.

#### Disputed Bills, Default in payment by the Designated ISTS 10.4 **Customers & Annual Reconciliation:**

Any Disputed Bill, Default in payment by the Designated ISTS Customers & Annual Reconciliation shall be governed as per Sharing Regulations.



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# 11 FORCE MAJEURE

### 11.1 Definitions

11.1.1 The following terms shall have the meanings given hereunder.

### 11.2 Affected Party

- 11.2.1 An Affected Party means any Party whose performance has been affected by an event of Force Majeure.
- 11.2.2 Any event of Force Majeure shall be deemed to be an event of Force Majeure affecting the TSP only if the Force Majeure event affects and results in, late delivery of machinery and equipment for the Project or construction, completion, commissioning of the Project by Scheduled COD and/or operation thereafter;

### 11.3 Force Majeure

A 'Force Majeure' means any event or circumstance or combination of events and circumstances including those stated below that wholly or partly prevents or unavoidably delays an Affected Party in the performance of its obligations/ roles under this Agreement, but only if and to the extent that such events or circumstances are not within the reasonable control, directly or indirectly, of the Affected Party and could not have been avoided if the Affected Party had taken reasonable care or complied with Prudent Utility Practices:

### (a) Natural Force Majeure Events:

- i. act of God, including, but not limited to drought, fire and explosion (to the extent originating from a source external to the Site), earthquake, volcanic eruption, landslide, flood, cyclone, typhoon, tornado, or exceptionally adverse weather conditions, which are in excess of the statistical measures for the last hundred (100) years; and
- ii. epidemic/ pandemic notified by Indian Governmental Instrumentality.

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### (b) Non-Natural Force Majeure Events :

- i. Direct Non-Natural Force Majeure Events
  - Nationalization or compulsory acquisition by any Indian Governmental Instrumentality of any material assets or rights of the Affected Party; or
  - the unlawful, unreasonable or discriminatory revocation of, or refusal to renew, any Consents, Clearances and Permits required by the Affected Party to perform their obligations/ roles under the RFP Project Documents or any unlawful, unreasonable or discriminatory refusal to grant any other Consents, Clearances and Permits required for the development/ operation of the Project, provided that a Competent Court of Law declares the revocation or refusal to be unlawful, unreasonable and discriminatory and strikes the same down; or
  - any other unlawful, unreasonable or discriminatory action on the part of an Indian Governmental Instrumentality which is directed against the Project, provided that a Competent Court of Law declares the action to be unlawful, unreasonable and discriminatory and strikes the same down.
- ii. Indirect Non Natural Force Majeure Events
  - act of war (whether declared or undeclared), invasion, armed conflict or act of foreign enemy, blockade, embargo, revolution, riot, insurrection, terrorist or military action; or
  - radio active contamination or ionising radiation originating from a source in India or resulting from any other Indirect Non Natural Force Majeure Event mentioned above, excluding circumstances where the source or cause of contamination or radiation is brought or has been brought into or near the Site by the Affected Party or those employed or engaged by the Affected Party; or
  - industry-wide strikes and labour disturbances, having a nationwide impact in India.



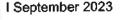
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#### 11.4 **Force Majeure Exclusions**

- Force Majeure shall not include (i) any event or circumstance which is 11.4.1 within the reasonable control of the Parties and (ii) the following conditions, except to the extent that they are consequences of an event of Force Maieure:
  - (a) Unavailability, late delivery, or changes in cost of the machinery, equipment, materials, spare parts etc. for the Project;
  - (b) Delay in the performance of any Contractors or their agents;
  - (c) Non-performance resulting from normal wear and tear typically experienced in transmission materials and equipment;
  - (d) Strikes or labour disturbance at the facilities of the Affected Party;
  - (e) Insufficiency of finances or funds or the Agreement becoming onerous to perform; and
  - (f) Non-performance caused by, or connected with, the Affected Party's:
    - negligent or intentional acts, errors or omissions; i.
    - ii. failure to comply with an Indian Law; or
    - iii. breach of, or default under this Agreement or any Project Documents.
  - (g) Any error or omission in the survey report provided by BPC during the bidding process.

#### 11.5 Notification of Force Majeure Event

11.5.1 The Affected Party shall give notice to the other Party of any event of Force Majeure as soon as reasonably practicable, but not later than seven (7) days after the date on which such Party knew or should reasonably have known of the commencement of the event of Force If an event of Force Majeure results in a breakdown of Maieure. communications rendering it unreasonable to give notice within the applicable time limit specified herein, then the Party claiming Force Majeure shall give such notice as soon as reasonably practicable after reinstatement of communications, but not later than one (1) day after

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such reinstatement.

Provided that, such notice shall be a pre-condition to the Affected Party's entitlement to claim relief under this Agreement. Such notice shall include full particulars of the event of Force Majeure, its effects on the Party claiming relief and the remedial measures proposed. The Affected Party shall give the other Party regular reports on the progress of those remedial measures and such other information as the other Party may reasonably request about the Force Majeure.

11.5.2 The Affected Party shall give notice to the other Party of (i) the cessation of the relevant event of Force Majeure; and (ii) the cessation of the effects of such event of Force Majeure on the performance of its rights or obligations/ roles under this Agreement, as soon as practicable after becoming aware of each of these cessations.

### 11.6 Duty to perform and duty to mitigate

To the extent not prevented by a Force Majeure Event, the Affected Party shall continue to perform its obligations/ roles as provided in this Agreement. The Affected Party shall use its reasonable efforts to mitigate the effect of any event of Force Majeure as soon as practicable.

### 11.7 Available Relief for a Force Majeure Event

Subject to this Article 11,

- (a) no Party shall be in breach of its obligations/ roles pursuant to this Agreement to the extent that the performance of its obligations/ roles was prevented, hindered or delayed due to a Force Majeure Event;
- (b) each Party shall be entitled to claim relief for a Force Majeure Event affecting its performance in relation to its obligations/ roles under Articles 3.3.4, 4.4.2 and 6.3.1 of this Agreement.
- (c) For the avoidance of doubt, it is clarified that the computation of Availability of the Element(s) under outage due to Force Majeure Event, as per Article 11.3 affecting the TSP shall be as per Appendix –II to Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2019 as on Bid Deadline. For the event(s) for which the Element(s) is/are deemed to be available as per Appendix –II to Central Electricity Regulatory Commission (Terms)



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and Conditions of Tariff) Regulations, 2019, then the Transmission Charges, as applicable to such Element(s), shall be payable as per Schedule 4, for the duration of such event(s).

- (d) For so long as the TSP is claiming relief due to any Force Majeure Event under this Agreement, the Nodal Agency may, if it so desires, from time to time on one (1) day notice, inspect the Project and the TSP shall provide the Nodal Agency's personnel with access to the Project to carry out such inspections.
- (e) For avoidance of doubt, the TSP acknowledges that for extension of Scheduled COD a period up to one hundred eighty (180) days due to Force Majeure event, no compensation on the grounds such as interest cost, incident expenditure, opportunity cost will be made to the TSP. However, if Scheduled COD is extended beyond a period of one hundred eighty (180) days due to Force Majeure event, the TSP will be allowed to recover the interest cost during construction corresponding to the period exceeding one hundred eighty (180) days by adjustment in the Transmission Charges in accordance with Schedule 9.



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#### **CHANGE IN LAW** 12

#### 12.1 Change in Law

- Change in Law means the occurrence of any of the following after the 12.1.1 Bid Deadline resulting into any additional recurring / non-recurring expenditure by the TSP or any savings of the TSP:
  - the enactment, coming into effect, adoption, promulgation, amendment, modification or repeal (without re-enactment or consolidation) in India, of any Law, including rules and regulations framed pursuant to such Law, subject to the provisions under Article 12.1.2;
  - a change in the interpretation or application of any Law by any Indian Governmental Instrumentality having the legal power to interpret or apply such Law, or any Competent Court of Law;
  - the imposition of a requirement for obtaining any Consents, Clearances and Permits which was not required earlier;
  - a change in the terms and conditions prescribed for obtaining any Consents, Clearances and Permits or the inclusion of any new terms or conditions for obtaining such Consents, Clearances and Permits:
  - any change in the licensing regulations of the Commission, under which the Transmission License for the Project was granted if made applicable by such Commission to the TSP;
  - change in wind zone; or
  - any change in tax or introduction of any tax made applicable for providing Transmission Service by the TSP as per the terms of this Agreement.
- Notwithstanding anything contained in this Agreement, Change in Law 12.1.2 shall not cover any change:
  - a) Taxes on corporate income; and



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b) Withholding tax on income or dividends distributed to the shareholders of the TSP.

#### 12.2 **Relief for Change in Law**

- 12.2.1 During Construction Period, the impact of increase/decrease in the cost of the Project on the Transmission Charges shall be governed by the formula given in Schedule 9 of this Agreement.
- 12.2.2 During the Operation Period:

During the operation period, if as a result of Change in Law, the TSP suffers or is benefited from a change in costs or revenue, the aggregate financial effect of which exceeds 0.30% (zero point three percent) of the Annual Transmission Charges in aggregate for a Contract Year, the TSP may notify so to the Nodal Agency and propose amendments to this Agreement so as to place the TSP in the same financial position as it would have enjoyed had there been no such Change in Law resulting in change in costs or revenue as aforesaid.

12.2.3 For any claims made under Articles 12.2.1 and 12.2.2 above, the TSP shall provide to the Nodal Agency documentary proof of such increase / decrease in cost of the Project / revenue for establishing the impact of such Change in Law.

> In cases where Change in Law results in decrease of cost and it comes to the notice of Nodal Agency that TSP has not informed Nodal Agency about such decrease in cost, Nodal Agency may initiate appropriate claim.



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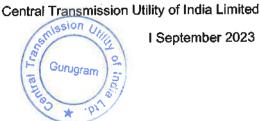
#### Notification of Change in Law: 12.3

- If the TSP is affected by a Change in Law in accordance with Article 12.1 12.3.1 and wishes to claim relief for such Change in Law under this Article 12, it shall give notice to Nodal Agency of such Change in Law as soon as reasonably practicable after becoming aware of the same.
- The TSP shall also be obliged to serve a notice to the Nodal Agency 12.3.2 even when it is beneficially affected by a Change in Law.
- Any notice served pursuant to Articles 12.3.1 and 12.3.2 shall provide, 12.3.3 amongst other things, precise details of the Change in Law and its estimated impact on the TSP.

#### Payment on account of Change in Law 12.4

The payment for Change in Law shall be through a separate Bill. 12.4.1 However, in case of any change in Monthly Transmission Charges by reason of Change in Law, as determined in accordance with this Agreement, the Bills to be raised by the Nodal Agency after such change in Transmission Charges shall appropriately reflect the changed Monthly Transmission Charges.





# 13 EVENTS OF DEFAULT AND TERMINATION

### 13.1 TSP's Event of Default

The occurrence and continuation of any of the following events shall constitute a TSP Event of Default, unless any such TSP Event of Default occurs as a result of any non-fulfilment of its obligations as prescribed under this Agreement by the Nodal Agency or a Force Majeure Event:

- a. After having taken up the construction of the Project, the abandonment by the TSP or the TSP's Contractors of the construction of the Project for a continuous period of two (2) months and such default is not rectified within thirty (30) days from the receipt of notice from the Nodal Agency in this regard;
- b. The failure to commission any Element of the Project by the date falling six (6) months after its Scheduled COD unless extended by Nodal Agency as per provisions of this Agreement;
- c. If the TSP:
  - assigns, mortgages or charges or purports to assign, mortgage or charge any of its assets or rights related to the Project in contravention of the provisions of this Agreement; or
  - ii. transfers or novates any of its obligations pursuant to this Agreement, in a manner contrary to the provisions of this Agreement;

Except where such transfer is in pursuance of a Law and

- it does not affect the ability of the transferee to perform, and such transferee has the financial and technical capability to perform, its obligations under this Agreement;
- is to a transferee who assumes such obligations under the Project and this Agreement remains effective with respect to the transferee;

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- i. The TSP becomes voluntarily or involuntarily the subject of any bankruptcy or insolvency or winding up proceedings and such proceedings remain uncontested for a period of thirty (30) days; or
- ii. any winding up or bankruptcy or insolvency order is passed against the TSP; or
- the TSP goes into liquidation or dissolution or a receiver or any similar officer is appointed over all or substantially all of its assets or official liquidator is appointed to manage its affairs, pursuant to Law,

Provided that a dissolution or liquidation of the TSP will not be a TSP's Event of Default, where such dissolution or liquidation of the TSP is for the purpose of a merger, consolidation or reorganization with the prior approval of the Commission as per the provisions of Central Electricity Regulatory Commission (Procedure, terms and Conditions for grant of Transmission License and other related matters) Regulations, 2006 or as amended from time to time; or

- e. Failure on the part of the TSP to comply with the provisions of Article 19.1 of this Agreement; or
- f. the TSP repudiates this Agreement and does not rectify such breach even within a period of thirty (30) days from a notice from the Nodal Agency in this regard; or
- g. after Commercial Operation Date of the Project, the TSP fails to achieve monthly Target Availability of 98%, for a period of six (6) consecutive months or within a non-consecutive period of six (6) months within any continuous aggregate period of eighteen(18) months except where the Availability is affected by Force Majeure Events as per Article 11; or
- h. any of the representations and warranties made by the TSP in Article 17 of this Agreement being found to be untrue or inaccurate. Further, in addition to the above, any of the undertakings submitted by the Selected Bidder at the time of submission of the Bid being found to be breached or inaccurate, including but not limited to undertakings from its



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Parent Company / Affiliates related to the minimum equity obligation; or

- i. the TSP fails to complete / fulfil all the activities / conditions within the specified period as per Article 3; or
- j. except for the reasons solely attributable to Nodal Agency, the TSP is in material breach of any of its obligations under this Agreement and such material breach is not rectified by the TSP within thirty (30) days of receipt of notice in this regard from the Nodal Agency; or
- k. the TSP fails to take the possession of the land required for location specific substations, switching stations or HVDC terminal or inverter stations and / or fails to pay the requisite price to the parties and / or any State Government authority from whom the land is acquired, within twelve (12) months from the Effective Date.

# 13.2 <u>Termination Procedure for TSP Event of Default</u>

- a. Upon the occurrence and continuance of any TSP's Event of Default under Article 13.1 the Nodal Agency may serve notice on the TSP, with a copy to the CEA and the Lenders' Representative, of their intention to terminate this Agreement (a "Nodal Agency's Preliminary Termination Notice"), which shall specify in reasonable detail, the circumstances giving rise to such Nodal Agency's Preliminary Termination Notice.
- b. Following the issue of a Nodal Agency's Preliminary Termination Notice, the Consultation Period shall apply and would be for the Parties to discuss as to what steps shall be taken with a view to mitigate the consequences of the relevant Event of Default having regard to all the circumstances.
- c. During the Consultation Period, the Parties shall, save as otherwise provided in this Agreement, continue to perform their respective obligations/ roles under this Agreement, and the TSP shall not remove any material, equipment or any part of the Project, without prior consent of the Nodal Agency.

Following the expiry of the Consultation Period, unless the Parties shall have otherwise agreed to the contrary or the circumstances



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giving rise to Nodal Agency's Preliminary Termination Notice shall have ceased to exist or shall have been remedied, this Agreement may be terminated by the Nodal Agency by giving a Termination Notice to the TSP, in writing, of at least seven (7) days, with a copy to CEA and the Lenders' Representative in order to enable the Lenders to exercise right of substitution in accordance with Article 15.3 of this Agreement.

Further, the Nodal Agency may also initiate proceedings to blacklist the TSP & its Affiliates from participation in any RFP issued by BPCs for a period of 5 years.

#### Procedure for Nodal Agency's non-fulfilment of Role 13.3

- Upon the Nodal Agency not being able to fulfil its role under а. Article 4.2, the TSP may serve notice on the Nodal Agency, with a copy to CEA and the Lenders' Representative (a "TSP's Preliminary Notice"), which notice shall specify in reasonable detail the circumstances giving rise to such non-fulfilment of role by the Nodal Agency.
- Following the issue of a TSP's Preliminary Notice, the b. Consultation Period shall apply.
- The Consultation Period would be for the Parties to discuss as to C. what steps shall be taken with a view to mitigate the consequences of the relevant non-fulfilment of role by the Nodal Agency including giving time extension to TSP, having regard to all the circumstances.
- During the Consultation Period, both Parties shall, save as d. otherwise provided in this Agreement, continue to perform their respective obligations/ roles under this Agreement.

#### **Termination due to Force Majeure** 13.4

In case the Parties could not reach an agreement pursuant to Articles 13.4.1 3.3.4 and 4.4.2 of this Agreement and the Force Majeure Event or its effects continue to be present, the Nodal Agency shall have the right to cause termination of the Agreement. In case of such termination, the Contract Performance Guarantee shall be returned to the TSP as per the provisions of Article 6.5.1.

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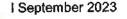


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13.4.2 In case of termination of this Agreement, the TSP shall provide to the Nodal Agency the full names and addresses of its Contractors as well as complete designs, design drawings, manufacturing drawings, material specifications and technical information, as required by the Nodal Agency within thirty (30) days of Termination Notice.

# 13.5 Termination or amendment due to non-requirement of any Element or Project during construction

- 13.5.1 In case any Element or Project, which is under construction, is no longer required due to any reason whatsoever, the Nodal Agency may issue a notice to this effect to the TSP.
- 13.5.2 Nodal agency may also issue notice to the TSP seeking their response to the proposed termination/ amendment (as the case may be) of the Agreement. The Nodal Agency shall issue copy of such notice to Lenders. In the notice, Nodal Agency shall also include an assessment of the physical progress made by TSP in the Element/ Project (as the case may be) that is no longer required.
- 13.5.3 The TSP shall neither carry out further investment nor carry out any work on the Element/ Project (as the case may be) that is no longer required after delivery of the notice.
- 13.5.4 After taking into account the comments of the TSP, the Nodal Agency may terminate the Agreement or amend it if both Parties agree to the amendment.

# 13.6 Revocation of the Transmission License

13.6.1 The Commission may, as per the provisions of the Electricity Act, 2003, revoke the Transmission License of the ISTS Licensee. Further, in such a case, the Agreement shall be deemed to have been terminated.

# 13.7 Termination Payment

13.7.1 If Agreement is terminated on account of Force Majeure Events, non-requirement of any Element or Project during Construction, Nodal Agency's non-fulfilment of Role & TSP's Event of Default, the TSP shall be entitled for Termination Payment equivalent to valuation of Project Assets. Upon payment, the Nodal Agency shall take over the Project Assets.

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# 14 LIABILITY AND INDEMNIFICATION

### 14.1 Indemnity

- 14.1.1 The TSP shall indemnify, defend and hold the Nodal Agency harmless against:
  - (a) any and all third party claims, actions, suits or proceedings against the Nodal Agency for any loss of or damage to property of such third party, or death or injury to such third party, arising out of a breach by the TSP of any of its obligations under this Agreement, except to the extent that any such claim, action, suit or proceeding has arisen due to a negligent act or omission, breach of this Agreement or non-fulfilment of statutory duty on the part of Nodal Agency; and
  - (b) any and all losses, damages, costs and expenses including legal costs, fines, penalties and interest actually suffered or incurred by the Nodal Agency from third party claims arising by reason of:
    - i. a breach by the TSP of any of its obligations under this Agreement, (provided that this Article 14 shall not apply to such breaches by the TSP, for which specific remedies have been provided for under this Agreement) except to the extent that any such losses, damages, costs and expenses including legal costs, fines, penalties and interest (together to constitute "Indemnifiable Losses") has arisen due to a negligent act or omission, breach of this Agreement or non-fulfilment of statutory duty on the part of the Nodal Agency, or
    - ii. any of the representations and warranties of the TSP under this Agreement being found to be inaccurate or untrue.
- 14.1.2 The Nodal Agency shall, in accordance with the Regulations framed by CERC in this regard, indemnify, defend and hold the TSP harmless against:
  - (a) any and all third party claims, actions, suits or proceedings against



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the TSP, for any loss of or damage to property of such third party, or death or injury to such third party, arising out of any material breach by the Nodal Agency of any of their roles under this Agreement, except to the extent that any such claim, action, suit or proceeding has arisen due to a negligent act or omission, breach of this Agreement or breach of statutory duty on the part of the TSP, its Contractors, servants or agents; and

- (b) any and all losses, damages, costs and expenses including legal costs, fines, penalties and interest ('Indemnifiable Losses') actually suffered or incurred by the TSP from third party claims arising by reason of:
  - i. any material breach by the Nodal Agency of any of its roles under this Agreement (provided that, this Article 14 shall not apply to such breaches by the Nodal Agency, for which specific remedies have been provided for under this Agreement), except to the extent that any such Indemnifiable Losses have arisen due to a negligent act or omission, breach of this Agreement or breach of statutory duty on the part of the TSP, its Contractors, servants or agents or
  - ii. any of the representations and warranties of the Nodal Agency under this Agreement being found to be inaccurate or untrue.

### 14.2 Patent Indemnity:

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New Delhi 110003 (a) The TSP shall, subject to the Nodal Agency's compliance with Article 14.2.1 (b), indemnify and hold harmless the Nodal Agency and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of whatsoever nature, including attorney's fees and expenses, which the Nodal Agency may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright or other intellectual property right registered or otherwise existing at the date of the Agreement by reason of the setting up of the Project by the TSP.

Such indemnity shall not cover any use of the Project or any part

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thereof other than for the purpose indicated by or to be reasonably inferred from the Agreement, any infringement resulting from the misuse of the Project or any part thereof, or any products produced in association or combination with any other equipment, plant or materials not supplied by the TSP, pursuant to the Agreement.

- (b) If any proceedings are brought or any claim is made against the Nodal Agency arising out of the matters referred to in Article 14.2.1(a), the Nodal Agency shall promptly give the TSP a notice thereof, and the TSP shall at its own expense take necessary steps and attend such proceedings or claim and any negotiations for the settlement of any such proceedings or claim. The TSP shall promptly notify the Nodal Agency of all actions taken in such proceedings or claims.
- (c) If the TSP fails to notify the Nodal Agency within twenty-eight (28) days after receipt of such notice from the Nodal Agency under Article 14.2.1(b) above, that it intends to attend any such proceedings or claim, then the Nodal Agency shall be free to attend the same on their own behalf at the cost of the TSP. Unless the TSP has so failed to notify the Nodal Agency within the twenty eight (28) days period, the Nodal Agency shall make no admission that may be prejudicial to the defence of any such proceedings or claims.
- (d) The Nodal Agency shall, at the TSP's request, afford all available assistance to the TSP in attending to such proceedings or claim, and shall be reimbursed by the TSP for all reasonable expenses incurred in so doing.
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New Delhi 110093 (a) The Nodal Agency, in accordance with the Regulations framed by CERC in this regard, subject to the TSP's compliance with Article 14.2.2(b) shall indemnify and hold harmless the TSP and its employees, officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs and expenses of whatsoever nature, including attorney's fees and expenses, which the TSP may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright or other intellectual property

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right registered or otherwise existing at the date of the Agreement by reason of the setting up of the Project by the TSP.

- (b) If any proceedings are brought or any claim is made against the TSP arising out of the matters referred to in Article 14.2.2 (a) the TSP shall promptly give the Nodal Agency a notice thereof, and the Nodal Agency shall at its own expense take necessary steps and attend such proceedings or claim and any negotiations for the settlement of any such proceedings or claim. The Nodal Agency shall promptly notify the TSP of all actions taken in such proceedings or claims.
- If the Nodal Agency fails to notify the TSP within twenty-eight (28) (c) days after receipt of such notice from the TSP under Article 14.2.2(b) above, that it intends to attend any such proceedings or claim, then the TSP shall be free to attend the same on its own behalf at the cost of the Nodal Agency. Unless the Nodal Agency has so failed to notify the TSP within the twenty (28) days period, the TSP shall make no admission that may be prejudicial to the defence of any such proceedings or claim.
- The TSP shall, at the Nodal Agency request, afford all available (d) assistance to the Nodal Agency in attending to such proceedings or claim, and shall be reimbursed by the Nodal Agency for all reasonable expenses incurred in so doing.

#### Monetary Limitation of liability 14.3

A Party ("Indemnifying Party") shall be liable to indemnify the other Party 14.3.1 ("Indemnified Party") under this Article 14 for any indemnity claims made in a Contract Year only up to an amount of Rupees Three Crore Eighty-Four Lakh Only (Rs. 3.84 Crore).

#### Procedure for claiming indemnity 14.4

Where the Indemnified Party is entitled to indemnification from the 14.4.1 Indemnifying Party pursuant to Articles 14.1 or 14.2 the Indemnified Party shall promptly notify the Indemnifying Party of such claim, proceeding, action or suit referred to in Articles 14.1 or 14.2 in respect of which it is entitled to be indemnified. Such notice shall be given as soon as reasonably practicable after the Indemnified Party becomes aware of such claim, proceeding, action or suit. The Indemnifying Party shall be

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liable to settle the indemnification claim within thirty (30) days of receipt of the above notice.

Provided however that, if:

- i. the Parties choose to contest, defend or litigate such claim, action, suit or proceedings in accordance with Article 14.4.3 below; and
- ii. the claim amount is not required to be paid/deposited to such third party pending the resolution of the Dispute,

the Indemnifying Party shall become liable to pay the claim amount to the Indemnified Party or to the third party, as the case may be, promptly following the resolution of the Dispute, if such Dispute is not settled in favour of the Indemnified Party.

- The Indemnified Party may contest, defend and litigate a claim, action, 14.4.2 suit or proceeding for which it is entitled to be indemnified under Articles 14.1 or 14.2 and the Indemnifying Party shall reimburse to the Indemnified Party all reasonable costs and expenses incurred by the Indemnified Party. However, such Indemnified Party shall not settle or compromise such claim, action, suit or proceedings without first getting the consent of the Indemnifying Party, which consent shall not be unreasonably withheld or delayed.
- An Indemnifying Party may, at its own expense, assume control of the 14.4.3 defence of any proceedings brought against the Indemnified Party if it acknowledges its obligation to indemnify such Indemnified Party, gives such Indemnified Party prompt notice of its intention to assume control of the defence, and employs an independent legal counsel at its own cost that is reasonably satisfactory to the Indemnified Party.

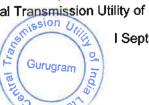
#### 14.5 Limitation on Liability

Except as expressly provided in this Agreement, neither the TSP nor the 14.5.1 Nodal Agency nor their respective officers, directors, agents, employees or Affiliates (including, officers, directors, agents or employees of such Affiliates), shall be liable or responsible to the other Party or its Affiliates including its officers, directors, agents, employees, successors, insurers or permitted assigns for incidental, indirect or consequential, punitive or exemplary damages, connected with or resulting from performance or non-performance of this Agreement, or anything done in connection

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herewith, including claims in the nature of lost revenues, income or profits (other than payments expressly required and properly due under this Agreement), any increased expense of, reduction in or loss of transmission capacity or equipment used therefore, irrespective of whether such claims are based upon breach of warranty, tort (including negligence, whether of the Nodal Agency, the TSP or others), strict liability, contract, breach of statutory duty, operation of law or otherwise.

14.5.2 The Nodal Agency shall have no recourse against any officer, director or shareholder of the TSP or any Affiliate of the TSP or any of its officers, directors or shareholders for such claims excluded under this Article. The TSP shall also have no recourse against any officer, director or shareholder of the Nodal Agency, or any Affiliate of the Nodal Agency or any of its officers, directors or shareholders for such claims excluded under this Article.

#### 14.6 Duty to Mitigate

The party entitled to the benefit of an indemnity under this Article 14 shall take all reasonable measures to mitigate any loss or damage which has occurred. If the Party fails to take such measures, the other Party's liabilities shall be correspondingly reduced.



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# **ARTICLE: 15**

## 15 ASSIGNMENTS AND CHARGES

#### 15.1 Assignments:

15.1.1 This Agreement shall be binding upon, and inure to the benefit of the Parties and their respective successors and permitted assigns. This Agreement shall not be assigned by any Party, except as provided in Article 15.3.

#### 15.2 Permitted Charges:

- 15.2.1 Neither Party shall create or permit to subsist any encumbrance over all or any of its rights and benefits under this Agreement.
- 15.2.2 However, the TSP may create any encumbrance over all or part of the receivables, or the Project Assets of the Project in favour of the Lenders or the Lenders' Representative on their behalf, as security for amounts payable under the Financing Agreements and any other amounts agreed by the Parties.

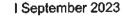
Provided that:

- i. the Lenders or the Lenders' Representative on their behalf shall have entered into the Financing Agreements and agreed in writing to the provisions of this Agreement; and
- ii. any encumbrance granted by the TSP in accordance with this Article 15.2.2 shall contain provisions pursuant to which the Lenders or the Lender's Representative on their behalf agrees unconditionally with the TSP to release from such encumbrances upon payment by the TSP to the Lenders of all amounts due under the Financing Agreements.
- 15.2.3 Article 15.2.1 does not apply to:
  - a. liens arising by operation of law (or by an agreement evidencing the same) in the ordinary course of the TSP developing and operating the Project;

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- b. pledges of goods, the related documents of title and / or other related documents, arising or created in the ordinary course of the TSP developing and operating the Project; or
- c. security arising out of retention of title provisions in relation to goods acquired in the ordinary course of the TSP developing and operating the Project.

#### 15.3 Substitution Rights of the Lenders

- 15.3.1 The TSP would need to operate and maintain the Project under the provisions of this Agreement and cannot assign the Transmission License or transfer the Project or part thereof to any person by sale, lease, exchange or otherwise, without the prior approval of the Nodal Agency.
- 15.3.2 However, in the case of default by the TSP in debt repayments or in the case of default by the TSP as per Article 13 of this Agreement during the debt repayments, the Commission may, on an application from the Lenders, assign the Transmission License to the nominee of the Lenders subject to the fulfilment of the qualification requirements and provisions of the Central Electricity Regulatory Commission (Procedure, terms and Conditions for grant of Transmission License and other related matters) Regulations, 2006 and as amended from time to time.



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# ARTICLE: 16

# 16 GOVERNING LAW AND DISPUTE RESOLUTION

#### 16.1 Governing Law:

This Agreement shall be governed by and construed in accordance with the Laws of India. Any legal proceedings in respect of any matters, claims or disputes under this Agreement shall be under the jurisdiction of appropriate courts in Delhi.

#### 16.2 Amicable Settlement:

- 16.2.1 Either Party is entitled to raise any claim, dispute or difference of whatever nature arising under, out of or in connection with this Agreement, including its existence or validity or termination or whether during the execution of the Project or after its completion and whether prior to or after the abandonment of the Project or termination or breach of the Agreement by giving a written notice to the other Party, which shall contain:
  - (i) a description of the Dispute;
  - (ii) the grounds for such Dispute; and
  - (iii) all written material in support of its claim.
- 16.2.2 The other Party shall, within thirty (30) days of issue of notice issued under Article 16.2.1, furnish:
  - (i) counter-claim and defences, if any, regarding the Dispute; and
  - (ii) all written material in support of its defences and counter-claim.
- 16.2.3 Within thirty (30) days of issue of notice by the Party pursuant to Article 16.2.1, if the other Party does not furnish any counter claim or defense under Article 16.2.2, or thirty (30) days from the date of furnishing counter claims or defence by the other Party, both the Parties to the Dispute shall meet to settle such Dispute amicably. If the Parties fail to resolve the Dispute amicably within thirty (30) days from the later of the dates mentioned in this Article 16.2.3, the Dispute shall be referred for dispute resolution in accordance with Article 16.3.

#### 16.3 Dispute Resolution:



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All Disputes shall be adjudicated by the Commission.

#### 16.4 Parties to Perform Obligations:

Notwithstanding the existence of any Dispute and difference referred to the Commission as provided in Article 16.3 and save as the Commission may otherwise direct by a final or interim order, the Parties hereto shall continue to perform their respective obligations/ roles (which are not in dispute) under this Agreement.



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## ARTICLE: 17

#### REPRESENTATION AND WARRANTIES 17

#### **Representation and warranties of the Nodal Agency** 17.1

- The Nodal Agency hereby represents and warrants to and agrees with 17.1.1 the TSP as follows and acknowledges and confirms that the TSP is relying on such representations and warranties in connection with the transactions described in this Agreement:
  - It has all requisite powers and authority to execute and a. consummate this Agreement;
  - This Agreement is enforceable against the Nodal Agency in b. accordance with its terms:
  - The consummation of the transactions contemplated by this C. Agreement on the part of Nodal Agency will not violate any provision of nor constitute a default under, nor give rise to a power to cancel any charter, mortgage, deed of trust or lien, lease, agreement, license, permit, evidence of indebtedness, restriction, or other contract to which the Nodal Agency is a Party or to which the Nodal Agency is bound, which violation, default or power has not been waived;

#### **Representation and Warranties of the TSP:** 17.2

- The TSP hereby represents and warrants to and agrees with the Nodal 17.2.1 Agency as follows and acknowledges and confirms that the Nodal Agency is relying on such representations and warranties in connection with the transactions described in this Agreement:
  - a. It has all requisite powers and has been duly authorized to execute and consummate this Agreement;
  - b. This Agreement is enforceable against it, in accordance with its terms:
  - c. The consummation of the transactions contemplated by this Agreement on the part of the TSP will not violate any provision of nor constitute a default under, nor give rise to a power to cancel any charter, mortgage, deed of trust or lien, lease, agreement, license, permit, evidence of indebtedness, restriction, or other contract to



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which the TSP is a Party or to which the TSP is bound which violation, default or power has not been waived;

- d. The TSP is not insolvent and no insolvency proceedings have been instituted, nor threatened or pending by or against the TSP;
- e. There are no actions, suits, claims, proceedings or investigations pending or, to the best of the TSP's knowledge, threatened in writing against the TSP at law, in equity, or otherwise, and whether civil or criminal in nature, before or by, any court, commission, arbitrator or governmental agency or authority, and there are no outstanding judgments, decrees or orders of any such courts, commission, arbitrator or governmental agencies or authorities, which materially adversely affect its ability to execute the Project or to comply with its obligations under this Agreement.
- 17.2.2 The TSP makes all the representations and warranties above to be valid as on the Effective Date of this Agreement.



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#### **ARTICLE: 18**

#### 18 INDEPENDENT ENGINEER

#### 18.1 Appointment of Independent Engineer

The Nodal Agency shall appoint an agency/ company as Independent Engineer as per framework provided in the Guidelines for Encouraging Competition in Development of Transmission Projects for selection of Independent Engineer.

#### 18.2 Roles and functions of Independent Engineer

The role and functions of the Independent Engineer shall include the following:

- a. Progress Monitoring as required under this Agreement;
- b. Ensuring Quality as required under this Agreement;
- c. determining, as required under the Agreement, the costs of any works or services and/or their reasonableness during construction phase;
- d. determining, as required under the Agreement, the period or any extension thereof, for performing any duty or obligation during construction phase;
- e. determining, as required under the Agreement, the valuation of the Project Assets.
- f. Assisting the Parties in resolution of Disputes and
- g. Undertaking all other duties and functions in accordance with the Agreement.

#### 18.3 Remuneration of Independent Engineer

The fee and charges of the Independent Engineer shall be paid by the Nodal Agency as per terms & conditions of appointment.

#### 18.4 Termination of appointment

18.4.1 The Nodal Agency may, in its discretion, terminate the appointment of the Independent Engineer at any time, but only after appointment of another Independent Engineer.



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18.4.2 If the TSP has reason to believe that the Independent Engineer is not discharging its duties and functions in a fair, efficient and diligent manner, it may make a written representation to the Nodal Agency and seek termination of the appointment of the Independent Engineer. Upon receipt of such representation, the Nodal Agency shall hold a tripartite meeting with the TSP and Independent Engineer for an amicable resolution, and the decision of Nodal agency is final. In the event that the appointment of the Independent Engineer is terminated hereunder, the Nodal Agency shall appoint forthwith another Independent Engineer.

#### 18.5 Authorised signatories

The Nodal Agency shall require the Independent Engineer to designate and notify to the Nodal Agency up to 2 (two) persons employed in its firm to sign for and on behalf of the Independent Engineer, and any communication or document required to be signed by the Independent Engineer shall be valid and effective only if signed by any of the designated persons; provided that the Independent Engineer may, by notice in writing, substitute any of the designated persons by any of its employees.



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# **ARTICLE: 19**

# 19 MISCELLANEOUS PROVISIONS

#### **19.1 Equity Lock-in Commitment:**

19.1.1 The aggregate equity share holding of the Selected Bidder in the issued and paid up equity share capital of Beawar Transmission Limited shall not be less than Fifty-one percent (51%) up to a period of one (1) year after COD of the Project.

> Provided that, in case the Lead Member or Bidding Company is holding equity through Affiliate/s, Ultimate Parent Company or Parent Company, such restriction as specified above shall apply to such entities.

> Provided further, that in case the Selected Bidder is a Bidding Consortium, the Lead Member shall continue to hold equity of at least twenty-six percent (26%) upto a period of one (1) year after COD of the Project and any Member of such Bidding Consortium shall be allowed to divest its equity as long as the other remaining Members (which shall always include the Lead Member) hold the minimum equity specified above.

- 19.1.2 If equity is held by the Affiliates, Parent Company or Ultimate Parent Company of the Selected Bidder, then, subject to the second proviso to Article 19.1.1, such Affiliate, Parent Company or Ultimate Parent Company shall be eligible to transfer its shareholding in Beawar Transmission Limited to another Affiliate or to the Parent Company / Ultimate Parent Company of the Selected Bidder. If any such shareholding entity, qualifying as an Affiliate / Parent Company / Ultimate Parent Company, is likely to cease to meet the criteria to qualify as an Affiliate / Parent Company / Ultimate Parent Company, the shares held by such entity shall be transferred to another Affiliate / Parent Company / Ultimate Parent Company of the Selected Bidder.
- 19.1.3 Subject to Article 19.1.1, all transfer(s) of shareholding of Beawar Transmission Limited by any of the entities referred to in Article 19.1.1 and 19.1.2 above, shall be after prior written intimation to the Nodal Agency.
- 19.1.4 For computation of effective Equity holding, the Equity holding of the Selected Bidder or its Ultimate Parent Company in such Affiliate(s) or Parent Company and the equity holding of such Affiliate(s) or Ultimate



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Parent Company in Beawar Transmission Limited shall be computed in accordance with the example given below:

If the Parent Company or the Ultimate Parent Company of the Selected Bidder A directly holds thirty percent (30%) of the equity in Beawar Transmission Limited, then holding of Selected Bidder A in Beawar Transmission Limited shall be thirty percent (30%);

If Selected Bidder A holds thirty percent (30%) equity of the Affiliate and the Affiliate holds fifty percent (50%) equity in Beawar Transmission Limited, then, for the purposes of ascertaining the minimum equity/equity lock-in requirements specified above, the effective holding of Bidder A in Beawar Transmission Limited shall be fifteen percent (15%), (i.e., 30% x 50%)

- 19.1.5 The provisions as contained in this Article 19.1 shall override the terms of the consortium agreement submitted as part of the Bid.
- 19.1.6 The TSP shall be responsible to report to Nodal Agency, within thirty (30) days from the occurrence of any event that would result in any change in its equity holding structure from that which existed as on the date of signing of the Share Purchase Agreement. In such cases, the Nodal Agency would reserve the right to ascertain the equity holding structure and to call for all such required documents / information / clarifications as may be required.

#### 19.2 Commitment of maintaining Qualification Requirement

- 19.2.1 The Selected Bidder will be required to continue to maintain compliance with the Qualification Requirements, as stipulated in RFP Document, till the COD of the Project. Where the Technically Evaluated Entity and/or the Financially Evaluated Entity is not the Bidding Company or a Member in a Bidding Consortium, as the case may be, the Bidding Company or Member shall continue to be an Affiliate of the Technically Evaluated Entity and/or Financially Evaluated Entity till the COD of the Project.
- 19.2.2 Failure to comply with the aforesaid provisions shall be dealt in the same manner as TSP's Event of Default as under Article 13 of this Agreement.

#### 19.3 Language:

19.3.1 All agreements, correspondence and communications between the Parties relating to this Agreement and all other documentation to be prepared and supplied under the Agreement shall be written in English,

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and the Agreement shall be construed and interpreted in accordance with English language.

19.3.2 If any of the agreements, correspondence, communications or documents are prepared in any language other than English, the English translation of such agreements, correspondence, communications or documents shall prevail in matters of interpretation.

#### 19.4 Affirmation

The TSP and the Nodal Agency, each affirm that:

- 1. neither it nor its respective directors, employees, or agents has paid or undertaken to pay or shall in the future pay any unlawful commission, bribe, pay-off or kick-back; and
- 2. it has not in any other manner paid any sums, whether in Indian currency or foreign currency and whether in India or abroad to the other Party to procure this Agreement, and the TSP and the Nodal Agency hereby undertake not to engage in any similar acts during the Term of Agreement.

#### 19.5 Severability

The invalidity or enforceability, for any reason, of any part of this Agreement shall not prejudice or affect the validity or enforceability of the remainder of this Agreement, unless the part held invalid or unenforceable is fundamental to this Agreement.

#### 19.6 Counterparts

This Agreement may be executed in one or more counterparts, each of which shall be deemed an original and all of which collectively shall be deemed one and the same Agreement.

#### 19.7 Breach of Obligations/ Roles

The Parties acknowledge that a breach of any of the obligations/ roles contained herein would result in injuries. The Parties further acknowledge that the amount of the liquidated damages or the method of calculating the liquidated damages specified in this Agreement is a genuine and reasonable pre-estimate of the damages that may be suffered by the non-defaulting Party in each case specified under this Agreement.



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#### 19.8 **Restriction of Shareholders / Owners Liability**

- 19.8.1 Parties expressly agree and acknowledge that none of the shareholders of the Parties hereto shall be liable to the other Parties for any of the contractual obligations of the concerned Party under this Agreement.
- Further, the financial liabilities of the shareholder(s) of each Party to this 19.8.2 Agreement shall be restricted to the extent provided in the Indian Companies Act, 1956 / Companies Act, 2013 (as the case may be).

#### 19.9 Taxes and Duties:

- The TSP shall bear and promptly pay all statutory taxes, duties, levies 19.9.1 and cess, assessed/levied on the TSP, its Contractors or their employees that are required to be paid by the TSP as per the Law in relation to the execution of the Project and for providing Transmission Service as per the terms of this Agreement.
- The Nodal Agency shall be indemnified and held harmless by the TSP 19.9.2 against any claims that may be made against the Nodal Agency in relation to the matters set out in Article 19.9.1.
- 19.9.3 The Nodal Agency shall not be liable for any payment of, taxes, duties, levies, cess whatsoever for discharging any obligation of the TSP by the Nodal Agency on behalf of TSP or its personnel, provided the TSP has consented in writing to the Nodal Agency for such work, for which consent shall not be unreasonably withheld.

#### 19.10 No Consequential or Indirect Losses

The liability of the TSP shall be limited to that explicitly provided in this Agreement.

Provided that, notwithstanding anything contained in this Agreement, under no event shall the Nodal Agency or the TSP claim from one another any indirect or consequential losses or damages.

#### **Discretion:** 19.11

Except where this Agreement expressly requires a Party to act fairly or reasonably, a Party may exercise any discretion given to it under this Agreement in any way it deems fit.



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#### 19.12 Confidentiality

- 19.12.1 The Parties undertake to hold in confidence this Agreement and RFP Project Documents and not to disclose the terms and conditions of the transaction contemplated hereby to third parties, except:
  - (a) to their professional advisors;
  - (b) to their officers, contractors, employees, agents or representatives, financiers, who need to have access to such information for the proper performance of their activities; or
  - (c) disclosures required under Law,

without the prior written consent of the other Parties.

Provided that, the TSP agrees and acknowledges that the Nodal Agency, may, at any time, disclose the terms and conditions of the Agreement and the RFP Project Documents to any person, to the extent stipulated under the Law and the Competitive Bidding Guidelines.

#### **19.13** Order of priority in application:

Save as provided in Article 2.5, in case of inconsistencies between the terms and conditions stipulated in Transmission License issued by the Commission to the TSP, agreement(s) executed between the Parties, applicable Law including rules and regulations framed thereunder, the order of priority as between them shall be the order in which they are placed below:

- terms and conditions of Transmission License;
- applicable Law, rules and regulations framed thereunder;
- this Agreement;
- Agreement(s), if any, under Sharing Regulations.

#### 19.14 Independent Entity:

- 19.14.1 The TSP shall be an independent entity performing its obligations pursuant to the Agreement.
- 19.14.2 Subject to the provisions of the Agreement, the TSP shall be solely responsible for the manner in which its obligations under this Agreement are to be performed. All employees and representatives of the TSP or



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Contractors engaged by the TSP in connection with the performance of the Agreement shall be under the complete control of the TSP and shall not be deemed to be employees, representatives, Contractors of the Nodal Agency and nothing contained in the Agreement or in any agreement or contract awarded by the TSP shall be construed to create any contractual relationship between any such employees, representatives or Contractors and the Nodal Agency.

#### 19.15 Amendments:

19.15.1 This Agreement may only be amended or supplemented by a written agreement between the Parties.

#### 19.16 Waiver:

- 19.16.1 No waiver by either Party of any default or breach by the other Party in the performance of any of the provisions of this Agreement shall be effective unless in writing duly executed by an authorised representative of such Party.
- 19.16.2 Neither the failure by either Party to insist on any occasion upon the performance of the terms, conditions and provisions of this Agreement nor time or other indulgence granted by one Party to the other Parties shall act as a waiver of such breach or acceptance of any variation or the relinquishment of any such right or any other right under this Agreement, which shall remain in full force and effect.

#### 19.17 Relationship of the Parties:

This Agreement shall not be interpreted or construed to create an association, joint venture, or partnership or agency or any such other relationship between the Parties or to impose any partnership obligation or liability upon either Party and neither Party shall have any right, power or authority to enter into any agreement or undertaking for, or act on behalf of, or to act as or be an agent or representative of, or to otherwise bind, the other Party.

#### 19.18 Entirety:

19.18.1 This Agreement along with its sections, schedules and appendices is intended by the Parties as the final expression of their agreement and is intended also as a complete and exclusive statement of the terms of their agreement.





19.18.2 Except as provided in this Agreement, all prior written or oral understandings, offers or other communications of every kind pertaining to this Agreement or the provision of Transmission Service under this Agreement to the Nodal Agency by the TSP shall stand superseded and abrogated.

#### 19.19 Notices:

- 19.19.1 All notices or other communications which are required to be given under this Agreement shall be in writing and in the English language
- 19.19.2 If to the TSP, all notices or communications must be delivered personally or by registered post or facsimile or any other mode duly acknowledged to the addressee below:

Address	:
Attention	:
Email	:
Fax. No.	:
Telephone No.	:

19.19.3 If to the Nodal Agency, all notices or communications must be delivered personally or by registered post or facsimile or any other mode duly acknowledged to the addresses below:

#### (i) CENTRAL TRANSMISSION UTILITY OF INDIA LIMITED

Address	: Plot No.2, Sector – 29, Gurugram, Haryana- 122001, India
Attention	: Mr. Vikram Singh Bhal, ED
Email	: vsbhal@powergrid.in
Fax. No.	:
Telephone No.	: 9910378068

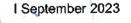
19.19.4 All notices or communications given by facsimile shall be confirmed by sending a copy of the same via post office in an envelope properly addressed to the appropriate Party for delivery by registered mail. All notices shall be deemed validly delivered upon receipt evidenced by an acknowledgement of the recipient, unless the Party delivering the notice can prove in case of delivery through the registered post that the recipient refused to acknowledge the receipt of the notice despite efforts of the postal authorities.

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19.19.5 Any Party may by notice of at least fifteen (15) days to the other Party change the address and/or addresses to which such notices and communications to it are to be delivered or mailed.

#### **19.20** Fraudulent and Corrupt Practices

- 19.20.1 The TSP and its respective officers, employees, agents and advisers shall observe the highest standard of ethics during the subsistence of this Agreement. Notwithstanding anything to the contrary contained in the Agreement, the Nodal Agency may terminate the Agreement without being liable in any manner whatsoever to the TSP, if it determines that the TSP has, directly or indirectly or through an agent, engaged in corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice in the Bid process. In such an event, the Nodal Agency shall forfeit the Contract Performance Guarantee of the TSP, without prejudice to any other right or remedy that may be available to the Nodal Agency hereunder or subsistence otherwise.
- 19.20.2 Without prejudice to the rights of the Nodal Agency under Clause 19.20.1 hereinabove and the rights and remedies which the Nodal Agency may have under this Agreement, if a TSP is found by the Nodal Agency to have directly or indirectly or through an agent, engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice during the Bid process, or after the issue of Letter of Intent (hereinafter referred to as Lol) or after the execution of the agreement(s) required under Sharing Regulations, the Nodal Agency may terminate the Agreement without being liable in any manner whatsoever to the TSP. Further, the TSP & its Affiliates shall not be eligible to participate in any tender or RFP issued by any BPC for an indefinite period from the date such TSP is found by the Nodal Agency to have directly or indirectly or through an agent, engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practices, as the case may be.
- 19.20.3 For the purposes of this Clause 19.20, the following terms shall have the meaning hereinafter respectively assigned to them:

(a) "corrupt practice" means (i) the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence the actions of any person connected with the Bid process (for avoidance of doubt, offering of employment to or employing or engaging in any manner whatsoever, directly or indirectly, any official of the BPC who is or has been associated or dealt in any manner, directly or indirectly with



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the Bid process or the LoI or has dealt with matters concerning the RFP Project Documents or arising there from, before or after the execution thereof, at any time prior to the expiry of one year from the date such official resigns or retires from or otherwise ceases to be in the service of the BPC, shall be deemed to constitute influencing the actions of a person connected with the Bid Process); or (ii) engaging in any manner whatsoever, whether during the Bid Process or after the issue of the LoI or after the execution of the RFP Project Documents, as the case may be, any person in respect of any matter relating to the Project or the LoI or the RFP Project Documents, who at any time has been or is a legal, financial or technical adviser of the BPC in relation to any matter concerning the Project;

(b)"**fraudulent practice**" means a misrepresentation or omission of facts or suppression of facts or disclosure of incomplete facts, in order to influence the Bid process;

(c) "**coercive practice**" means impairing or harming, or threatening to impair or harm, directly or indirectly, any person or property to influence any person's participation or action in the Bid process;

(d) "undesirable practice" means (i) establishing contact with any person connected with or employed or engaged by the BPC with the objective of canvassing, lobbying or in any manner influencing or attempting to influence the Bid process; or (ii) having a Conflict of Interest; and

(e) "**restrictive practice**" means forming a cartel or arriving at any understanding or arrangement among Bidders with the objective of restricting or manipulating a full and fair competition in the Bid process;

#### 19.21 Compliance with Law:

Despite anything contained in this Agreement but without prejudice to Article 12, if any provision of this Agreement shall be in deviation or inconsistent with or repugnant to the provisions contained in the Electricity Act, 2003, or any rules and regulations made there under, such provision shall be deemed to be amended to the extent required to bring it into compliance with the aforesaid relevant provisions as amended from time to time.

IN WITNESS WHEREOF, THE PARTIES HAVE CAUSED THIS AGREEMENT TO BE EXECUTED BY THEIR DULY AUTHORISED REPRESENTATIVES AS OF THE DATE AND PLACE SET FORTH ABOVE.

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For and on behalf of TSP

[Signature, Name, Designation and Address]

For and on behalf of .....[Insert name of the Nodal Agency]

[Signature, Name, Designation and Active Director (A Government of India Enterprises) (A Government of India Enterprises)

#### WITNESSES:

2.

1.

1. For and on behalf of

: BPC



[Insert, Name, Designation and Address of the Witness]

- 2. For and on behalf of
  - : Nodal Agency

Kamel Kuma Ju'

[Signature]



# KAMAL KUMAR JATA, GM (CTUIL)

#### [Insert Name, Designation and Address of the Witness]

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# **SCHEDULES**

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# Schedule: 1

# **Project Description and Scope of Project**

SI. No.	Scope of the Transmission Scheme	Scheduled COD in months from Effective Date
1	Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus Reactor 765/400kV 1500 MVA ICTs: 2 nos. (7x500 MVA, including one spare unit) 330 MVAr, 765 kV bus reactor-2 nos. (7x110 MVAr, including one spare unit) 765kV ICT bays – 2 nos. (7x110 MVAr, including one spare unit) 765kV ICT bays – 2 nos. 765 kV line bays – 6 nos. 400kV line bays – 6 nos. 400kV line bay- 2 nos. 765kV reactor bay- 2 nos. 125 MVAr, 420kV bus reactor – 2 nos. 420 kV reactor bay – 2 nos. <b>Future provisions: Space for</b> 765/400kV ICTs along with bays: 2 nos. 765kV line bay along with switchable line reactor: 8 nos. 765kV Bus Reactor along with bays: 2 nos. 400/220 kV ICTs along with bays: 2 nos. 400 kV line bays along with bays: 2 nos. 400 kV line bays along with bays: 2 nos. 400 kV line bays along with bays: 2 nos. 400 kV line bays along with bays: 2 nos.	18
2	220 kV line bays: 4nos. LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar	
3	LILO of 400kV Kota –Merta line at Beawar	
4	Fatehgarh-3– Beawar 765 kV D/c along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line	
	Switching equipment for 765 kV 330 MVAR switchable line	

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SI. No.	Scope of the Transmission Scheme	Scheduled COD in months from Effective Date
	reactor –4 nos. 765 kV, 330 MVAr Switchable line reactor- 4 nos.	
5.	± 2x300MVAr STATCOM, 4x125 MVAr MSC, 2x125 MVAr MSR at Fatehgarh- 3 PS along with 2 nos. of 400 kV bays at Fatehgarh-3 PS	24

Note:

- (i) POWERGRID to provide space for 765kV switchable line reactors at Fatehgarh-3 S/s (for 765kV Fatehgarh-3 PS – Beawar D/c line) for which no cost is envisaged. Two (02) nos. 765 KV line bays at Fatehgarh-III PS for interconnection of Fatehgarh-3– Beawar 765 kV D/c line is under the scope of M/s POWERGRID.
- (ii) ±300 MVAr STATCOM should be placed in each 400 kV bus section of Fatehgarh-3 PS (Phase-III Part E1).
- (iii) POWERGRID shall provide space at Fatehgarh-3 S/s for STATCOM along with MSC & MSR and associated 400kV bays.

#### Project Description

In order to integrate and evacuate power from additional potential of renewable energy zones (20 GW) in Rajasthan (Fatehgarh: 9.1GW, Bhadla: 8GW, Ramgarh: 2.9GW) over and above 17 GW Solar Energy Zones (SEZ), various transmission alternatives were evolved & discussed with stakeholders and deliberated in the 3rd NRPC-TP meeting held on 19th February, 2021. Based on the discussions, hybrid (EHVAC & HVDC) transmission system was agreed in above meeting for evacuation of power from additional 20 GW REZ in Rajasthan (Phase-III).

As part of Phase-III system, Fatehgarh-4 & Bhadla-3 Pooling stations (new) are to be established which will be interconnected with Fatehgarh-3 & Fatehgarh-2 PS respectively. Further, renewable sources in Ramgarh complex are also proposed to be pooled at Ramgarh PS which shall be interconnected with Bhadla-3 PS. In view of integration & evacuation of additional 20 GW RE in Rajasthan with reliability as well as taking care of RE variability, under Phase-III System, Hybrid transmission system comprising EHV AC (765kV) & HVDC corridors are planned towards Delhi & Southern UP.

The subject transmission scheme involves establishment of 765/400kV Substation at suitable location near Beawar, implementation of Fatehgarh-3– Beawar 765 kV D/c line, LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar and LILO of 400kV Kota

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-Merta line at Beawar S/s which shall facilitate evacuation of RE power from Fatehgarh complex to Beawar and onward dispersal of power beyond Beawar to various beneficiaries.

Above transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III was also agreed in 49th Northern Region Power Committee (NRPC) meeting held on 27th September 2021 & 5th National Committee on Transmission (NCT) held on 25th August, 2021 and 2nd September, 2021. Further, Ministry of Power, Government of India, vide its Gazette Notification CG-DL-E-08122021-231686 (No. 4661) dated 06.12.2021 declared establishment of Ramgarh PS along with its interconnections through tariff based competitive bidding process route as part of "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III".

Subsequently, due to many issues related to reactive power management in Western Rajasthan i.e. oscillations, abrupt voltage variations, low voltages in peak solar generation period & high voltage in off solar generation period, it was proposed to implement ± 2x300MVAr STATCOM, 4x125 MVAr MSC, 2x125 MVAr MSR at Ramgarh PS to support the grid. Above STATCOM was already approved as part of Phase-III scheme in 5th NCT meeting held on 25.08.2021 & 02.09.2021. Implementation of above STATCOM was agreed in 11th NCT meeting held on 28.12.2022 and 17.01.2023. During above meeting, it was also agreed that STACOM may be implemented as part of "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III Part-C1". Implementation time of STATCOM was also agreed as 24 months in 12th NCT meeting held on 24.03.2023.

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#### SPECIFIC TECHNICAL REQUIREMENTS FOR TRANSMISSION LINE

- A.1.0 The design, routing and construction of transmission lines shall be in accordance with Chapter V, Part A of CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations 2010, as amended from time to time.
- A.2.0 Selection of tower type shall be made as per CEA Regulations, however in case lattice type towers are used, the following shall also be applicable:
- A.2.1 Steel section of grade E 250 and/or grade E 350 as per IS 2062, only are permitted for use in towers, extensions, gantry structures and stub setting templates. For towers in snowbound areas, steel sections shall conform to Grade-C of IS-2062.
- A.2.2 Towers shall be designed as per IS-802:2015, however the drag coefficient of the tower shall be as follows: -

Solidity Ratio	Drag Coefficient
Upto 0.05	3.6
0.1	3.4
0.2	2.9
0.3	2.5
0.4	2.2
0.5 and above	2.0

- A.3.0 Transmission Service Provider (TSP) shall adopt any additional loading/design criteria for ensuring reliability of the line, if so desired and /or deemed necessary.
- A.4.0 Transmission line shall be designed considering wind zones as specified in wind map given in National Building Code 2016, Vol.1. The developer shall also make his own assessment of local wind conditions and frequent occurrences of high intensity winds (HIW) due to thunderstorms, dust-storms, downburst etc. along the line route and wherever required, higher wind zone than that given in wind map shall be considered for tower design for ensuring reliability of line. Further, for transmission line sections passing within a distance of 50 km from the boundary of two wind zones, higher of the two wind zones shall be considered for design of towers located in such sections.
- A.5.0 765 kV towers, triple and quadruple circuit towers and towers with more than two sub-conductors per phase up to 400 kV shall be designed for reliability level
   2. However, tall river crossing towers and special towers shall be designed for reliability level 3.



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- A.6.0 A) For power line crossing of 400 kV or above voltage level (if crossing over the existing line), large angle & dead end towers (i.e. D/DD/QD) shall be used on either side of power line crossing.
  - B) For power line crossing of 132kV and 220kV (or 230kV) voltage level, angle towers(B/C/D/DB/DC/DD/QB/QC/QD) shall be used on either side of power line crossing depending upon the merit of the prevailing site condition and line deviation requirement.
  - C) For power line crossing of 66 kV and below voltage level, suspension/tension towers shall be provided on either side of power line crossing depending upon the merit of the prevailing site condition and line deviation requirement.
  - D) For crossing of railways, national highways and state highways, rules/regulations of appropriate authorities shall be followed.
- A.7.0 The relevant conductor configuration shall be as follows: -Type of conductor: ACSR / AAAC / AL59

Transmission line	ACSR Conductor specified	Equivalent AAAC conductor based on 53.5% conductivity of Al Alloy	Equivalent AL59 conductor based on 59% conductivity of AL Alloy*	Sub- conductor Spacing
765kV D/C (Hexa Zebra) transmission lines	54/3.18 mm-Al + 7/3.18 mm- Steel, 428 sq mm, Aluminium area, 28.62 mm diameter Maximum DC Resistance at 20°C (Ω/km): 0.06868	28.71 mm diameter; 487.5 sq.mm Aluminium alloy area Maximum DC	Aluminium alloy area Maximum DC Resistance at	
400kV D/C (Twin Moose) transmission lines	Moose: Stranding 54/3.53mm-Al + 7/3.53 mm-	Stranding details: 61/3.55mm 31.95mm	Stranding details: 61/3.31 mm 29.79 mm	

#### **Basic parameters:**

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Transmission line	ACSR Conductor specified	Equivalent AAAC conductor based on 53.5% conductivity of Al Alloy	Equivalent AL59 conductor based on 59% conductivity of AL Alloy*	Sub- conductor Spacing
	Steel, 31.77 mm	diameter;	diameter;	450 mm
	diameter	604 sq. mm	525 sq. mm	
	528.5 sq. mm,		Aluminium alloy	
	Aluminium area,	area Maximum DC	area Maximum DC	
	Maximum DC	Resistance at	Resistance at	
	Resistance at	20°C (Ω/km):	20°C (Ω/km):	
	20°C (Ω/km):	0.05506	0.0566	
	0.05552	Minimum UTS:	Minimum UTS:	
	Minimum UTS: 161.20 kN	159.80 kN	124.70 kN	

Note:

- 1. *To select any size above the minimum, the sizes mentioned in the Indian standard i.e IS-398(part-6) should be followed.
- 2. The transmission lines shall have to be designed for a maximum operatingconductor temperature of 85 deg C.
- A.8.0 The required phase to phase spacing and horizontal spacing for 765kV and 400kV line shall be governed by the tower design as well as minimum live metal clearances for 765kV and 400kV voltage level under different insulator swing angles. However, the phase to phase spacing for 765kV and 400kV lines shall not be less than 15m and 8m respectively.
- A.9.0 All electrical clearances including minimum live metal clearance, ground clearance and minimum mid span separation between earth wire and conductor shall be as per Central Electricity Authority (Measures Relating to Safety & Electric Supply) Regulations as amended from time to time and IS: 5613. Since these clearances for 765kV are not included in CEA Regulation/ Indian Standard, following values shall be considered:

#### Minimum live metal clearances for 765 kV line:

- a) (i) Under stationary conditions:
  - From tower body: For 765 kV D/C: 6.1 m For 765 kV S/C: 5.6 m
  - (ii) Under Swing conditions

Wind Pressure Condition	Minimum Electrical Clearance
a) Swing angle (25°)	4.4 mtrs
b) Swing angle (55°)	1.3mtrs

b) Minimum ground clearance: 18 m

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c) Minimum mid span separation between earthwire and conductor: 9.0 m

#### Minimum live metal clearances for 400 kV line:

a) (i) Under stationary conditions:

From tower body: 3.05m

Wind Pressure Condition	Minimum Electrical Clearance
a) Swing angle (22°)	3.05 mtrs
b) Swing angle (44°)	1.86 mtrs

b) Minimum ground clearance: 8.84 m

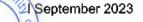
- c) Minimum mid span separation between earthwire and conductor: 9.0 m
- A.10.0 Shielding angle shall not exceed 10 deg for 765kV D/C and 20 deg for 400kV transmission line.
- A.11.0 The Fault current for design of line shall be 50kA for 1 sec for 765kV and 63kA for 1 sec for 400kV.
- A.12.0 In case of 765kV & 400kV voltage class lines, at least one out of two earth wires shall be OPGW and second earth wire, if not OPGW, shall be either of galvanized standard steel (GSS) or AACSR or any other suitable conductor type depending upon span length and other technical consideration.
- A.13.0 Each tower shall be earthed such that tower footing impedance does not exceed 10 ohms. Pipe type or Counterpoise type earthing shall be provided in accordance with relevant IS. Additional earthing shall be provided on every 7 to 8 kms distance at tension tower for direct earthing of both shield wires. If site condition demands, multiple earthing or use of earthing enhancement compound shall be used.
- A14.0 Pile type foundation shall be used for towers located in river or creek bed or on bank of river having scourable strata or in areas where river flow or change in river course is anticipated, based on detailed soil investigation and previous years' maximum flooddischarge of the river, maximum velocity of water, highest flood level, scour depth & anticipated change in course of river based on river morphology data of at least past 20 years to ensure availability and reliability of the transmission line.
- A.15.0 Transmission line route shall be finalized, in consultation with appropriate authorities so as to avoid the habitant zones of endangered species and other protected species. Bird diverters, wherever required, shall be provided on the line.
- A.16.0 The raised chimney foundation is to be provided in areas prone to flooding/water stagnation like paddy field /agricultural field & undulated areas to avoid direct contact of water with steel part of tower. The top of the chimney of foundation should be at least above HFL (High Flood Level) or the historical



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water stagnation/ logging level (based on locally available data) or above High Tide Level or 500 mm above Natural Ground level (whichever is higher).

A.17.0 Routing of transmission line through protected areas of India shall be avoided to the extent possible. In case, it is not possible to avoid protected areas, the towers of the transmission line upto 400 kV level which are installed in protected areas shall be designed for Multicircuit (4 circuits) configuration of same voltage level considering reliability level of at least two (2). The top two circuits of these multi-circuit towers shall be used for stringing of the transmission line under present scope and the bottom two circuits shall be made available for stringing of any future transmission line of any transmission service providers / State transmission utilities/Central transmission utilities passing through the same protected area. Further, the configuration and coordinates of such transmission towers shall be submitted to CEA, CTU & BPC by the TSP.



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The proposed 765/400/220kV substation near **Beawar** shall be conventional AIS type generally conforming to the requirements of CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations 2010, as amended from time to time.

Extension of 765kV **Fatehgarh-3** substation shall be conventional AIS type generally conforming to the requirements of CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations 2010, as amended from time to time.

#### B.1.0 Salient features of Substation Equipment and Facilities

The design and specification of substation equipment are to be governed by the following factors:

#### **B.1.1** Insulation Coordination

The system design parameters for substations/switchyards shall be as given below:

SI No	Description of parameters	765/400kV Beawar s/s		Extn. of 765kV Fatehgarh-3 s/s	
	-	765 kV System	400 kV System	765 kV System	
1.	System operating voltage	765kV	400kV	765kV	
2.	Maximum voltage of the system (rms)	800kV	420kV	800kV	
3.	Rated frequency	50Hz	50Hz	50Hz	
4,	No. of phase	3	3	3	
5.	Rated Insulation levels				
i)	Impulse withstand voltage for (1.2/50 micro sec.) - - for equipment other than Transformer and Reactor	2100kVp	1425kVp	2100kVp	
	- for Insulator String	2100kVp	1550kVp	2100kVp	
ii)	Switching impulse withstand voltage (250/2500 micro sec.) dry and wet	1550kVp	1050kVp	1550kVp	
iii)	One-minute power frequency dry withstand voltage (rms)	830kV	630kV	830kV	
6.	Corona extinction voltage	508 kV	320kV	508 kV	

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SI No	Description of parameters	765/400kV Beawar s/s		Extn. of 765kV Fatehgarh-3 s/s	
		765 kV System	400 kV System	765 kV System	
7.	Max. radio interference voltage for frequency between 0.5 MHz and 2 MHz		1000 micro- volts at 266kV rms	2500 micro- volts at 508 kV rms	
8.	Minimum creepage distance for insulator string/ longrod insulators/ outdoor bushings		13020 mm (31mm/kV)	24800 mm (31mm/kV)	
9.	Minimum creepage distance for switchyard equipment	20000 (25mm/kV)	10500mm (25mm/kV)	20000 (25mm/kV)	
10.	Max. fault current	50 kA	63 kA	50 kA	
11.	Duration of fault	1 sec	1 Sec	1 sec	

#### B.1.2 Switching Scheme

The switching schemes, as mentioned below, shall be adopted at various voltage levels of substation/switchyard:

Substation	765kV side	400kV side	220kV side (Future)
765/400/220kV Beawar s/s	One & Half breaker (AIS)	One & Half breaker (AIS)	Double Main & Transfer (AIS)
765kV Fatehgarh-3 s/s	One & Half breaker (AIS)		

#### Notes: -

- i) At 765kV & 400kV voltage level, each circuit of a double circuit transmission line (originating from same substation) shall be terminated in different diameters.
- ii) Transformers and bus reactors of same HV rating shall be placed in different diameters (i.e. transformers of same HV rating shall not be in the same diameter and similarly, bus reactors of same HV rating shall also not be in the same diameter).
- *iii)* TSP shall also keep space provision for future 220kV Bus Coupler bay and 220kV Transfer Bus Coupler bay.
- iv) Connection arrangement of Switchable Line reactors shall be such that it can be used as Line rector as well as Bus reactor with suitable NGR bypass arrangement.

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 v) 765kV, 1-phase circuit breaker is under present scope of work for utilizing existing 110 MVAR (supplied with bus reactor) spare Reactor for switchable line reactor of Beawar 765kV D/C line (at Fatehgarh-3).

#### B.2.0 Substation Equipment and facilities (Voltage level as applicable):

The switchgear shall be designed and specified to withstand operating conditions and duty requirements. All equipment shall be designed considering the following capacity.

SI. No		765/400kV Beawar		Extn. of 765kV Fatehgarh-3 s/s
		765kV	400kV	765kV
1.	Bus Bar	4000 A	4000 A	4000 A
2.	Line bay	3150 A	3150 A	3150 A
3.	ICT bay	3150 A	3150 A	3150 A
4.	Bus Reactor bay	3150 A	3150 A	3150 A
5.	Switched Line Reactor Bay	3150 A		3150 A

#### B.2.1 $(765/\sqrt{3})/(400/\sqrt{3})/33$ kV, Single Phase Autotransformer

500 MVA,  $(765/\sqrt{3})/(400/\sqrt{3})/33$ kV, 1-phase Transformer (including arrangement for 3-phase bank formation of 1500 MVA) shall conform to CEA's "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV and above)" as amended upto date available on CEA website

Spare 1-phase Transformer unit shall be placed and connected in such a way that in case of fault in any unit of any of the transformer banks (including for future transformer banks) can be replaced by spare unit without physically moving it.

#### **B.2.2** (765/ $\sqrt{3}$ ) kV, Single Phase Shunt Reactor

110 MVAR, 765/ $\sqrt{3}$  kV, 1-Phase **Reactor** (including arrangement for 3-phase bank formation of 330 MVAR) shall conform to CEA's "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV and above)" as amended upto date available on CEA website

Spare 1-phase Shunt Reactor unit shall be placed and connected in such a way that the spare unit can be utilized for all the bus and line reactor banks (including for future reactor banks) without its physical movement.



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#### Neutral Grounding Reactor (NGR) and Surge Arrester for 765 kV Line Reactors (as applicable)

The neutral of the line reactors (wherever provided) shall be grounded through adequately rated Neutral Grounding Reactors (NGR) to facilitate single phase auto-reclosure, provided that the NGR shall be provided with bypass arrangement through a breaker so that the line reactor can be used as Bus reactor as and when required. The neutral of bus reactor shall be solidly grounded. The ohmic value of NGR for each circuit at both ends of 765kV D/c Fatehgarh-3- Beawar S/s shall be 450 ohms.

NGR shall be oil filled or dry type air core for outdoor application. NGR shall conform to CEA's "Standard specifications and technical parameters of transformers and reactors (66kV and above)". Technical parameters of NGR shall be as specified in Annexure-A of abovementioned document.

The surge arresters (rated voltage of arrester in co-ordination with ohmic value of NGR shall be decided by the TSP) shall be provided & physically located between the neutral of shunt reactor (brought out at 145kV class bushing) and neutral grounding reactor. The surge arresters shall be of heavy duty station class gapless Metal oxide (ZnO) type conforming in general to IEC-60099-4. Arresters shall be hermetically sealed units, of self-supporting construction, suitable for mounting on structures.

#### B.2.3 420kV, 3-phase, Shunt Reactor

125 MVAR, 420kV, 3-Phase Reactor shall conform to CEA's "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV and above)" available on CEA website.

#### 765kV and 400kV AIS Substation equipment (as applicable) **B.2.4**

#### B.2.4.1 Circuit Breakers (AIS)

The circuit breakers and accessories shall conform to IEC: 62271-100, IEC: 62271-1 and shall be of SF6 Type. The circuit breakers shall be of class C2-M2 (as per IEC) with regard to restrike probability during capacitive current breaking and mechanical endurance. The rated break time shall not exceed 40ms for 765kV & 400kV circuit breakers. The Circuit breakers controlling 765kV lines shall be provided either with pre-insertion closing resistor of about 450 ohms maximum with 9 ms insertion time or with Controlled Switching Device. The Circuit breakers controlling 400kV lines of more than 200 km length shall be provided either with pre insertion closing resistor of about 400 ohms maximum with 8 ms insertion time or with Controlled Switching Device (CSD). 765kV and 400kV Circuit breakers shall be provided with single phase and three phase auto reclosing. The short line fault capacity shall be same as the rated capacity and this is proposed to be achieved without use of opening resistors. The controlled switching device shall be provided in Circuit breakers of switchable

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line reactor and in Main & Tie circuit breakers of line with non-switchable line reactors and Bus reactors and 765/400kV Transformers.

#### **B.2.4.2** Isolators (AIS)

The isolators shall comply to IEC 62271-102 in general.765kV Isolator design shall be double break or vertical break or knee-type. 400kV shall be double break type. All Isolators and earth switches shall be motor operated. Earth switches shall be provided at various locations to facilitate maintenance. Isolator rated for 765kV and 400kV shall be of extended mechanical endurance class - M2 and suitable for bus transfer current switching duty as per IEC-62271-102. Main blades and earth blades shall be interlocked and interlock shall be fail safe type. 765kV & 400kV earth switches for line isolator shall be suitable for induced current switching duty as defined for Class-B.

#### **B.2.4.3 Current Transformers (AIS)**

Current Transformers shall comply with IEC 61869 in general. All ratios shall be obtained by secondary taps only. Generally, Current Transformers (CT) for 765kV & 400kV shall have six cores (four for protection and two for metering). The burden and knee point voltage shall be in accordance with the requirements of the system including possible feeds for telemetry. Accuracy class for protection core shall be PX and for metering core it shall be 0.2S. The rated burden of cores shall be closer to the maximum burden requirement of metering & protection system (not more than 20VA for metering core) for better sensitivity and accuracy. The instrument security factor shall be less than 5 for CTs upto 400kV and less than 10 for CTs of 765kV voltage class.

#### **B.2.4.4** Capacitive Voltage Transformers (AIS)

Capacitive Voltage transformers shall comply with IEC 61869 in general. These shall have three secondaries out of which two shall be used for protection and one for metering. Accuracy class for protection cores shall be 3P and for metering core shall be 0.2. The Capacitive voltage transformers on lines shall be suitable for Carrier Coupling. The Capacitance of CVT for 400kV shall be of 4400/8800 pF depending on PLCC requirements whereas the Capacitance of CVT for 765kV shall be 8800 pF. The rated burden of cores shall be closer to the maximum burden requirement of metering & protection system (not more than 50VA for metering core) for better sensitivity and accuracy.

#### **B.2.4.5 Surge Arresters (AIS)**

624kV & 336kV Station High (SH) duty gapless type Surge arresters with thermal energy (Wth) of minimum 13 kJ/kV and 12 kJ/kV conforming to IEC 60099-4 in general shall be provided for 765 kV and 400 kV systems respectively. Other characteristics of Surge arrester shall be chosen in accordance with system requirements. Surge arresters shall be provided near line entrances, Transformers & Reactor so as to achieve proper insulation

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coordination. Surge Arresters shall be provided with porcelain/ polymer housing fitted with pressure relief devices. A leakage current monitor with surge counter shall be provided with each surge arrester.

#### B.2.5 Protection Relaying & Control System

The protective relaying system proposed to be provided for transmission lines, auto-transformers, reactors and bus bars to minimize the damage to the equipment in the events of faults and abnormal conditions, is dealt in this section. All main protective relays shall be numerical type with IEC 61850 communication interface and should have interoperability during integration of numerical relays to communicate over IEC61850 protocol with RTU/SAS/IEDs of different OEMs All numerical relays shall have built in disturbance recording feature.

The protection circuits and relays of transformer and reactor shall be electrically and physically segregated into two groups each being independent and capable of providing uninterrupted protection even in the event of one of the protection groups failing, to obtain redundancy, and to take protection systems out for maintenance while the equipment remains in service.

#### a. Transmission Lines Protection

765kV and 400kV lines shall have Main-I numerical three zone distance protection scheme with carrier aided inter-tripping feature. 765kV and 400kV lines shall also have Main-II numerical distance protection scheme like Main-I but from different make that of Main-I. The Main-I and Main-II protection relays of same make may be provided only if they are of different hardware & manufacturing platform or different principle of operation.

However, Line Current Differential relay (with back up distance protection feature) as Main–I and Main-II shall be considered at both ends for short lines (line length below 30kM) having Fiber Optic communication link. Differential relay at remote end shall be provided by the TSP. Associated power & control cabling and integration with SAS at remote end shall be provided by respective bay owner.

In case of loop in loop out of transmission lines, the existing protection scheme shall be studied and suitable up-gradation (if required) shall be carried out. Further, all 765kV and 400kV lines shall be provided with single and three phase auto-reclosing facility to allow reclosing of circuit breakers in case of transient faults. These lines shall also be provided with distance to fault locators to identify the location of fault on transmission lines.

All 765kV and 400kV lines shall also be provided with two stages over voltage protection. Over voltage protection & distance to fault locator may be provided as in-built feature of Main-I & Main-II protection relays. Auto reclose as built-in function of Bay Control Unit (BCU) is also acceptable.

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The Main-I and Main-II protection relays shall be fed from separate DC sources and shall be mounted in separate panels.

For 765kV and 400kV transmission lines, directional IDMT earth fault relay should be provided as standalone unit or in-built feature of Main-I and Main -II feature.

#### b. Auto Transformer Protection

These shall have the following protections:

- Numerical Differential protection i)
- ii) Numerical Restricted earth fault protection
- iii) Numerical Back-up Over-current and earth fault protection on HV & MV side
- iv) Numerical Over fluxing protection on HV & MV side
- v) Numerical Overload alarm

Further, Numerical Back-up Over-current and earth fault protection on HV & MV side of autotransformer shall not be combined with other protective functions in the main relays and shall be independent relays. Besides these, power transformers shall also be provided with Buchholz relay, protection against high oil and winding temperature and pressure relief device etc.

Suitable monitoring, control (operation of associated circuit breaker & isolator) and protection for LT auxiliary transformer connected to tertiary winding of autotransformer for the purpose of auxiliary supply shall be provided. The Over current and other necessary protection shall be provided for the auxiliary transformer. These protection and control may be provided as built in feature either in the bay controller to be provided for the auxiliary system or in the control & protection IEDs to be provided for autotransformer.

#### c. 765kV & 400kV Reactor Protection

Reactor shall be provided with the following protections:

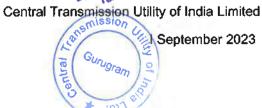
- i) Numerical Differential protection.
- Numerical Restricted earth fault protection ii)
- Numerical Back-up impedance protection iii)

Besides these, reactors shall also be provided with Buchholz relay, MOG with low oil level alarm, protection against oil and winding temperatures & pressure relief device, etc.

#### d. Bus Bar Protection

The high-speed low impedance type bus bar differential protection, which is essential to minimize the damage and maintain system stability at the time of bus bar faults, shall be provided for 765kV and 400kV buses. Duplicated bus bar





protection is envisaged for 765kV & 400kV bus-bar protection. Bus bar protection scheme shall be such that it operates selectively for each bus and incorporate necessary features required for ensuring security. The scheme shall have complete bus bar protection for present as well as future bays envisaged i.e. input / output modules for future bays shall also be provided.

Bus Bar protection system for new substation shall be de-centralized (distributed) type.

In case, the bus section is provided, then each side of bus section shall have separate set of bus bar protection schemes.

For existing substations, the existing bus bar protection shall be augmented as per requirement.

#### e. Local Breaker Back up Protection

This shall be provided for each 765kV and 400kV circuit breakers and will be connected to de-energize the affected stuck breaker from both sides.

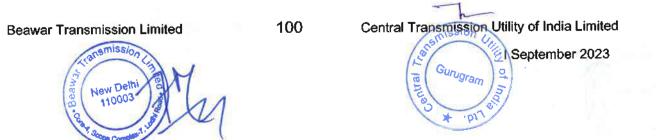
Notes:

- 1. LBB & REF relays shall be provided separately from transformer differential relay.
- 2. LBB relay may also be provided as built-in protection function of distributed bus bar protection scheme; however, in such case separate LBB relay shall be provided for tie bays (in case of One and Half breaker scheme).
- 3. Over fluxing & overload protection can be provided as built-in feature of differential relay.
- 4. In 765kV & 400kV switchyard, if spare bay of half diameter is identified as future, Tie CB relay panel shall be with Auto-reclosure feature.

#### B.2.6 Substation Automation System

a) For all the new substations, state of art Substation Automation System (SAS) conforming to IEC-61850 shall be provided. The distributed architecture shall be used for Substation Automation system, where the controls shall be provided through Bay control units. The Bay control unit is to be provided bay wise for voltage level 220kV and above. All bay control units as well as protection units are normally connected through an Optical fiber high speed network. The control and monitoring of circuit breaker, dis-connector, re-setting of relays etc. can be done from Human Machine Interface (HMI) from the control room.

The functions of control, annunciation, disturbance recording, event logging and measurement of electrical parameters shall be integrated in Substation Automation System.



At new substations, the Substation Automation System (SAS) shall be suitable for operation and monitoring of the complete substation including proposed future bays/elements.

In existing substations with Substation automation system (SAS), augmentation of existing SAS shall be done for bays under present scope.

In existing Substations where Substation automation is not provided, control functions shall be done through control panels.

Necessary gateway & moderns (as required) shall be provided to send data to RLDC/SLDC as per their requirement. Any augmentation work at RLDC/SLDC is excluded from TSP's scope. However, all the configuration work at substation end required to send data to RLDC/SLDC shall be in the scope of TSP.

### b) Time synchronisation equipment

Time synchronization equipment complete in all respect including antenna, cable, processing equipment required to receive time signal through GPS or from National Physical Laboratory (NPL) through INSAT shall be provided at new substations. This equipment shall be used to synchronize SAS & IEDs etc.

### **B.3.0** Substation Support facilities

Certain facilities required for operation & maintenance of substations as described below shall be provided at new substation. In existing substation, these facilities have already been provided and would be extended/ augmented as per requirement.

## B.3.1 AC & DC power supplies

For catering the requirements of three phase & single-phase AC supply and DC supply for various substation equipment (for present and future scope), the following arrangement is envisaged: -

 For LT Supply at each new Substation, two (2) nos. of auxiliary Transformers (minimum 800kV for substation with highest voltage rating as 765kV and minimum 630kVA for substations with highest voltage rating as 400kV) fed from independent sources shall be provided as per the CEA (Technical Standards for Connectivity to the Grid) Regulations, 2007.

Metering arrangement with Special Energy Meters (SEMs) shall be provided by TSP at 33kV tertiary of Transformer for drawing auxiliary supply at new substation. Such SEMs shall be provided by CTU at the cost of the TSP. Accounting of such energy drawn by the TSP shall be done by RLDC/RPC as part of Regional Energy Accounting.

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Additionally, Active Energy Meters may be provided at the same point in the 33kV tertiary of Transformer by local SEB/DISCOM for energy accounting.

- ii) 2 sets of 220V battery banks for control & protection and 2 sets of 48V battery banks for PLCC/ communication equipment shall be provided at each new Substation. Each battery bank shall have a float-cum-boost charger. At new substation, sizing of 220 V battery and battery charger shall be done based on the number of bays specified (including future bays) as per CEA Regulations and relevant IS. 2 sets of 48 V battery banks for PLCC and communication equipment shall be provided each new substation with at least 10-hour battery backup and extended backup, if required. 48 V can be achieved from 220 V battery bank also, if desired, without compromising backup time.
- iii) Suitable AC & DC distribution boards and associated LT Switchgear shall be provided at new substation.

For new substation, following switch boards shall be considered with duplicate supply with bus coupler/ sectionalizer and duplicate outgoing feeders except for Emergency lighting distribution board which shall have only one incoming feeder:

- (a) 415V Main Switch board 1 nos.
- (b) AC distribution board -1 nos.
- (c) Main lighting distribution board 1 no.
- (d) Emergency lighting distribution board 1 no.
- (e) 220 Volt DC distribution board 2 nos.
- (f) 48 Volt DC distribution board -2 nos.

Sizing of LT Switchgear shall be suitable to cater the requirement for all present and future bays. AC & DC distribution boards shall have modules for all the feeders (including future as specified).

- iv) At new Substation, one no. of DG set (minimum 500 kVA for substations with highest voltage rating as 765kV and minimum 250kVA for substations with highest voltage rating as 400kV) shall be provided for emergency applications.
- v) For substation extensions, existing facilities shall be augmented as required.

## B.3.2 Fire Fighting System

Fire-fighting system for substation including transformer & reactor shall conform to CEA (Measures Relating to Safety & Electric Supply) Regulations.



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Further, adequate water hydrants and portable fire extinguishers shall be provided in the substations. The main header of firefighting system shall be suitable for extension to bays covered under the future scope; necessary piping interface in this regard shall be provided.

At existing substations, the fire-fighting systems as available shall be extended to meet the additional requirements.

### B.3.3 Oil evacuating, filtering, testing & filling apparatus

To monitor the quality of oil for satisfactory performance of transformers, shunt reactors and for periodical maintenance necessary oil evacuating, filtering, testing and filling apparatus would be provided at new substations. Oil storage tanks of adequate capacities for storage of transformer oil would be provided.

### B.3.4 Illumination

Normal & emergency AC & DC illumination shall be provided adequately in the control room & other buildings of the substation. The switchyard shall also be provided with adequate illumination.

Lighting of the entire control room building, fire-fighting pump house, other building (if any) and switchyard shall be done by LED based low power consumption luminaires.

### B.3.5 Control Room

For new substation, substation control room shall be provided to house substation work stations for station level control (SAS) alongwith its peripheral and recording equipment, AC & DC distribution boards, DC batteries & associated battery chargers, Fire Protection panels, Telecommunication panels & other panels as per requirements. Air conditioning shall be provided in the building as functional requirements. Main cable trenches from the control room shall have adequate space provision for laying of cables from control room for all the future bays also.

At existing substations, the adequacy of size of control room shall be ascertained and the same shall be augmented as per requirement.

### B.3.6 Control Concept

All the EHV circuit breakers in substation/switching stations shall be controlled and synchronized from the switchyard control room/remote control center. Each breaker would have two sets of trip circuits which would be connected to separate DC supplies for greater reliability. All the isolators shall have control from remote/local whereas the earth switches shall have local control only.



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### Visual monitoring system (VMS) for watch and ward of substation **B.3.7** premises:

Visual monitoring system for effective watch and ward of substation premises shall cover all the transformers and reactors, all other major AIS Equipment (such as CB, isolators, CT, CVT, SA etc. as applicable), GIS bays, panel room, all the gates of switchyard and all entry and exit points of control room building and accordingly the location of cameras shall be decided. The camera shall be high definition color CCD camera with night vision feature. The VMS data partly/completely shall be recorded (minimum for 15 days) at least @25fps (or better) and stored on network video recorder. The system shall use video signals from various cameras installed at different locations, process them for viewing on workstations/monitors in the control room and simultaneously record all the cameras.

Mouse/keyboard controllers shall be used for pan, tilt, zoom and other functions of the desired camera. The Visual Monitoring System shall have provision of WAN connectivity for remote monitoring.

All camera recordings shall have Camera ID & location/area of recording as well conform equipment should generally to The date/time stamp. as Electromagnetic compatibility requirement for outdoor equipment in EHV substation.

At existing substations, the visual monitoring system if available shall be augmented as per existing or better specification as required.

### **General Facilities B.4**

- Line Gantry/Towers are envisaged for bays under present scope only. a) However, for adjacent future line bay, tower shall be designed for extension (considering Quad conductors for 765kV & 400kV future lines) wherever applicable.
- Bay extension works at existing substation shall be executed by TSP in b) accordance with the requirement/provisions mentioned above. However, interface points shall be considered keeping in view the existing design/arrangement at the substation.
- TSP has to arrange for construction power and water on its own. c)
- All outdoor steel structures including anchor/foundation bolts shall be fully d) galvanized. The weight of the zinc coating shall be at least 610 gm/sq.m, however, for coastal/creek regions it shall be at least 900 gm/sq.m.
- In 765kV & 400kV switchyard, if spare bay of half diameter is identified as e) future, all the equipment for Tie & Future bay shall be designed considering the current rating of line bay i.e. 3150A.
- Boundary wall shall be brick masonry wall with RCC frame or Stone f) masonry wall or Precast RCC wall under present scope along the property line of complete substation area including future switchyard area to prevent encroachment and unauthorized access. Minimum height of the boundary

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wall shall be of 1.8 m from finished ground level (FGL) as per CEA Measures Relating to Safety and Electric Supply Regulations.

### **B.5** EXTENSION OF EXISTING SUBSTATION

The following drawings/details of existing substation is attached with the RFP documents for further engineering by the bidder:

SI. No.	Drawing Title	Drawing No./Details	Rev. No.
Α.	765kV Fatehgarh-3 (AIS) S/S		
1.0	Single Line Diagram	C/ENGG/SS/FATEHGARH- 3/SLD/01	02
2.0	General Arrangement	C/ENGG/SS/FATEHGARH- 3/GA/01	01
3.0	Earthmat Layout	KPTL/PGCIL/WO-SS- 033/02E/RGH-II/009	01
4.0	Visual Monitoring System	The drawings are yet to be finalized by developer.	-
5.0	Bus Bar Protection (400 kV System)	The drawings are yet to be finalized by developer.	-
6.0	3	GE Make, KZ3DSA1	С

Bidder is also advised to visit the substation sites and acquaint themselves with the topography, infrastructure such as requirement of roads, cable trench, drainage etc. and also the design philosophy.

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# SPECIFIC TECHNICAL REQUIREMENTS FOR COMMUNICATION

The communication requirement shall be in accordance to CEA (Technical Standards for Communication System in Power System Operations) Regulations, 2020, CERC (Communication System for inter-State transmission of electricity) Regulations, 2017, and CEA (Cyber Security in Power Sector) Guidelines, 2021, all above documents as amended from time to time.

The protections for transmission line and the line compensating equipment shall have hundred percent back up communication channels i.e. two channels for tele-protection in addition to one channel for speech plus data for each direction

In order to meet the requirement for grid management and operation of substations, Transmission Service Provider (TSP) shall provide the following:

# C.1.0 LILO of both circuits of Ajmer – Chittorgarh 765kV D/c at Beawar

On LILO of both circuits of Ajmer – Chittorgarh 765kV D/c at Beawar, TSP to supply, install & commission OPGW and earthwire as per Tower Configurations:

- (i) For Multi Circuit Tower Configuration: Two (2) no. OPGW cable containing 24 Fibres (24F) on both the Earthwire peaks
- (ii) For Double Circuit Tower configuration (for both Loop In and Loop Out portion): One (1) no. OPGW cable containing 24 Fibres (24F) to be installed on one earthwire peak & conventional earthwire on other earthwire peak for both Loop In and Loop Out Lines.

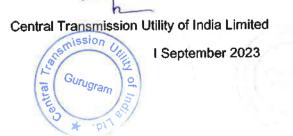
The TSP shall install OPGW cables from Gantry of Beawar S/s up to the LILO tower with all associated hardware including Vibration Dampers, LILO Tower, mid-way & gantry Joint Boxes (called **OPGW Hardware** hereafter) and finally terminate in Joint Boxes at Beawar. If repeater required to meet the link budget requirement of Ajmer – Beawar & Beawar – Chittorgarh link the same shall be provided by TSP.

TSP shall finalize the location of repeater station depending upon the actual site conditions. Further TSP shall comply to the requirements mentioned as per **Appendix-F.1**.

Maintenance of OPGW Cable and OPGW Hardware shall be responsibility of TSP.



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## C.2.0 LILO of Kota – Merta 400 kV at Beawar

On LILO of Kota – Merta 400 kV line at Beawar, TSP shall supply, install & commission Two (2) no. OPGW cable containing 24 Fibres (24F) on both the E/W peaks of tower.

The TSP shall install OPGW cables from gantry of Beawar S/s up to the LILO tower with all associated hardware including Vibration Dampers, LILO tower, mid-way & gantry Joint Boxes (called **OPGW Hardware** hereafter) and finally terminate in Joint Boxes at Beawar. If repeater required to meet the link budget requirement of Kota – Beawa r & Beawar – Merta link the same shall be provided by TSP.

TSP shall finalize the location of repeater station depending upon the actual site conditions. Further TSP shall comply to the requirements mentioned as per **Appendix-F.1**.

Maintenance of OPGW Cable and **OPGW Hardware** shall be responsibility of TSP.

### C.3.0 Fatehgarh-3 – Beawar 765 kV D/c line

On Fatehgarh-3 – Beawar 765 kV D/c line, TSP shall supply, install & commission One (1) no. OPGW cable containing 24 Fibres (24F) on one E/W peak and conventional earth wire on other E/W peak.

The TSP shall install this OPGW from gantry of Fatehgarh -3 up to the gantry of Beawar S/s with all associated hardware including Vibration Dampers, mid-way & gantry Joint Boxes (called **OPGW Hardware** hereafter) and finally terminate in Joint Boxes at end Substations. Repeater/s are required to meet link budget requirement of Fatehgarh-3 – Beawar link.

TSP shall finalize the location of repeater station depending upon the actual site conditions. Further TSP shall comply to the requirements mentioned as per **Appendix-F.1**.

### C.4.0 Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus Reactor

- (i) TSP shall supply, install & commission 2 no. FODP (96 F) alongwith panel and approach Cable (24F each) with all associated hardware fittings from gantry tower to Control Room for all the incoming lines envisaged under the present scope.
- (ii) TSP shall supply, install & commission One or more STM-16 (FOTE) equipment alongwith panel/s supporting minimum seven (7) directions with MSP (Multiplex Section Protection – 1+1). These directions shall exclude protected (1+1) local patching among equipment (if any).

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Communication equipment shall be provided with necessary interfaces to meet the voice and data communication requirement among Beawar, Ajmer, Chittorgarh, Kota, Merta, Repeater Stations & Fatehgarh-3 S/s. TSP to also provide suitable optical interfaces/equipment at Fatehgarh-3, Ajmer, Chittorgarh, Merta, Kota Substations FOTE to meet link budget requirement for connectivity with Beawar Station if required. The suitable DC Power Supply and backup to be provided for communication equipment.

- (iii) FODP & FOTE equipment with panels shall be provided in Control Room of Beawar PS. FOTE & FODP Eq can be accommodated in same panel to optimize space.
- (iv) The new communication equipment under the present scope shall be compatible for integration with existing regional level centralized NMS. The local configuration of the new communication equipment shall be the responsibility of TSP. The configuration work in the existing centralized NMS for integration of new Communication equipment shall be done by Regional ULDC Team, however all the necessary support in this regard shall be ensured by TSP.
- (v) TSP shall supply, install & commission required no. of Phasor Measurement Units (PMUs) for all 400kV and above voltage line including STATCOM bays (under the scope of this project) at Beawar S/s, these PMUs shall support latest IEEE C-37.118 protocols. These PMUs shall be provided with GPS clock and LAN switch and shall connect with LAN switch of control room with Fibre Optic cable. These PMUs shall be connected with the FOTE at Substation for onwards data transmission to the PDC (Phasor Data Concentrator) located at respective RLDC. However, configuration work in existing PDC at RLDC for new PMU integration is not in scope of TSP (shall be done by respective RLDC), however all the necessary support in this regard shall be ensured by TSP.
- (vi) TSP shall supply, install & commission Firewall in redundant mode (1+1) in line with the specification attached at **Annexure F.1**
- (vii) The maintenance of all the communication equipment including FOTE, FODP, approach cable, PMUs, DCPS alongwith Battery Bank shall be the responsibility of TSP.

## C.5.0 PLCC & PABX:

Power line carrier communication (PLCC) equipment complete for speech, teleprotection commands and data channels shall be provided on each transmission line. The PLCC equipment shall in brief include the following: -

- Coupling device, line traps, carrier terminals, protection couplers, HF cables, PABX (if applicable) and maintenance and testing instruments.
- At new substation, a telephone exchange (PABX) of 24 lines shall be provided at as means of effective communication among various buildings of the substation, remote end substations and with control centers (RLDC/SLDC) etc.
- Coupling devices shall be suitable for phase to phase coupling for 400kV Transmission lines. The pass band of coupling devices shall have sufficient

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margin for adding communication channel in future if required. Necessary protection devices for safety of personnel and low voltage part against power frequency voltages and transient over voltage shall also be provided.

- The line traps shall be broad band tuned suitable for blocking the complete range of carrier frequencies. Line Trap shall have necessary protective devices such as lightning arresters for the protection of tuning device. Decoupling network consisting of line traps and coupling capacitors may also be required at certain substation in caseof extreme frequency congestion.
- The carrier terminals shall be of single side-band (SSB) amplitude modulation (AM) type and shall have 4 kHz band width. PLCC Carrier terminals and Protection couplers shall be considered for both ends of the line.
- PLCC equipment for all the transmission lines covered under the scheme (consisting of one set of analog PLCC channel along with circuit protection coupler and one set of Digital protection coupler for both ends) shall be provided by TSP. CVT & Wave trap for all the line bays under present scope shall be provided by TSP.
- TSP shall provide/ undertake necessary addition/ modification/ shifting/ recommissioning etc. of PLCC equipment due to LILO of transmission lines (wherever applicable). The make & model of existing PLCC system is as follows:

SI. No.	Name of the existing line	Make & Model of PLCC
1.	765kV Ajmer- Chittorgarh D/c line	Analog PLCC
		Make – ABB
		Model – ETL-81 + NSD50
ι		Digital PLCC
		Make – ABB
		Model – NSD-70D
2.	400kV Kota – Merta line	Make – ABB
		Model – ETL-41

- All other associated equipment like cabling, coupling device and HF cable shall also be provided by the TSP.

- 2 sets of 48V battery banks for PLCC and communication equipment shall be provided at each new Substation with at least 10 hours battery backup and extended backup, if required.

## C.7.0 Next Generation Firewall (NGFW) Requirement

- TSP shall provide 2 nos. Next Generation Firewalls (NGFW); one No. Main & one No. Standby having electrical ethemet interfaces/ports and placed between FOTE & SAS gateway/s at the substation. All ethernet based applications (e.g. PMU, AMR, VOIP, SAS/SCADA etc.) shall be terminated in the firewall ports directly. Each port of firewall shall work as a separate zone. Firewall shall be hardware based with functionality of Block/Allow/drop and IPSec VPN (network encryption).
- Minimum 16 Nos. of ports/interfaces shall be provided in each firewall (i.e.

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Main & Standby) TSP can use either single firewall or multiple firewalls to meet this interfaces requirement, each for main as well as standby firewall. Minimum throughput of firewall shall be 300 Mbps.

- The Firewall shall be managed/ configured as standalone at present and shall also have compatibility to manage/configure through Centralized Management Console (CMC) remotely in future.
- OEM Support on 24x7 basis for 7 years shall be provided for all the functions & features of the Firewall.
- Firewall shall be tested and certified for ISO15408 Common Criteria for least EAL4+, Further, the OEM must certify that it conforms to Secure Product Development Life Cycle requirements as per IEC62443-4-1. The firewall shall generate reports for NERC-CIP Compliance.

The specifications for the firewalls are given at Annexure-F.1 and schematic diagram showing firewall placement given at Figure F.1.



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# Appendix-F.1

### Repeater Requirements

 If the repeater location is finalized in the Control Room of a nearby substation, TSP shall provide 1 no. OPGW (48F) on a single Earthwire peak with OPGW Hardware & mid-way Joint Boxes etc. of the line crossing the main line and 1 no. Approach Cable (48F) with all associated hardware fittings, to establish connectivity between crossing point of main transmission line up to the repeater equipment in substation control room.

TSP shall co-ordinate for Space & DC power supply sharing for repeater equipment.

TSP shall provide FODP, FOTE (with STM-16 capacity) with suitable interfaces require for link budget of respective link.

OR

If the repeater location is finalized in the nearby substation premises, the TSP shall identify the Space for repeater shelter in consultation with station owner. Further TSP shall provide 1 no. OPGW (48F) on a single Earthwire peak with OPGW Hardware & mid-way Joint Boxes etc. of the line crossing the main line and 1 no. Approach Cable (48F) / UGFO (48F) with all associated hardware fittings, to establish connectivity between crossing point of main transmission line up to the substation where the repeater shelter is to be housed. TSP shall provide repeater shelter along with FODP, FOTE (with STM-16 capacity) with suitable interfaces require for link budget of respective link, reliable power supply provisioning for AC and DC supply, battery bank, Air Conditioner and other associated systems.

OR

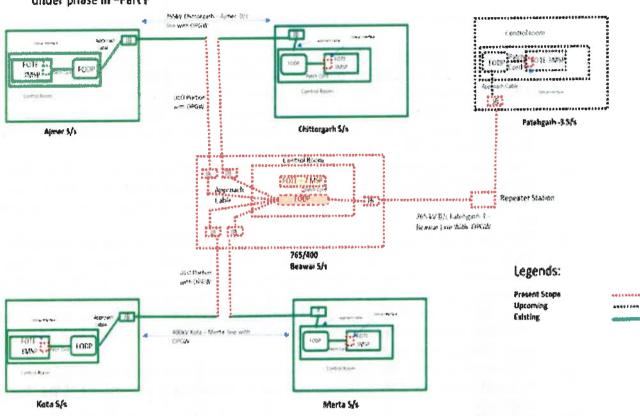
 If the repeater location is finalized on land near the transmission tower. TSP shall make the provisions for Land at nearby tower for repeater shelter. Further TSP shall provide 1 no. Approach Cable (48F) / UGFO (48F) with all associated hardware fittings to establish connectivity up to the location of repeater shelter. TSP shall provide repeater shelter along with FODP, FOTE (with STM-16 capacity) with suitable interfaces require for link budget of respective link, reliable power supply provisioning for AC and DC supply, battery bank, Air Conditioner and other associated systems

Maintenance of OPGW Cable and **OPGW Hardware**, repeater equipment & items associated with repeater shelter shall be responsibility of TSP.

Note: Existing Station owner/s to provide necessary support to integrate different equipment & applications of new extended bays with the existing substation e.g. Communication (through FOTE), PMUs, Voice etc. for smooth operation and monitoring of new added grid elements.

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Proposed Communication for Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under phase III -Part F

Figure F.1



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# Specifications of Next Generation Firewall (NGFW)

- 1. NGFW shall have following features including but not limited to:
  - Encryption through IPSec VPN (Virtual Private Network), Deep Packet Inspection (DPI), Denial of service (DoS) & Distributed Denial of Service (DDoS) prevention, Port Block/ Allow, rules/ policies for block/allow, IP (Internet Protocol) & Media Access Control (MAC) spoofing protection, threat detection, Intrusion Prevention System (IPS), Anti-Virus, Anti-Spyware, Man In The Middle (MITM) attack prevention.
- The proposed firewall shall be able to handle (alert, block or allow) unknown /unidentified applications e.g. unknown TCP & UDP packets. It shall have the provision to define application control list based on application group and/or list.
- 3. Firewall shall have feature and also have capability to update the definition/ Signatures of Anti-Virus online as well as offline. Firewall shall also be compatible to update the definitions/signatures through CMC. There shall be a defined process for security patching and firmware up-gradation. There shall be a feature to field validate firmware checksum. The same shall also be validated before using the OEM provided file/binary in the process of firmware up-gradation and security patching
- 4. Firewall shall have Management Console port to configure remotely.
- 5. Firewall shall be EMI/EMC compliant in Substation environment as per IEC 61850-3.
- 6. Firewall shall be rack mounted in existing standard equipment cabinets.
- Firewall shall have support of SCADA applications (IEC-60870-5-104), ICCP, PMU (IEEE C37.118), Sub-Station Automation System (IEC 61850), Ethernet and other substation environment protocols.
- 8. Client based Encryption/ VPN must support different Operating System platforms e.g. Windows, Linux & Mac.
- 9. The solution must have content and comprehensive file detection policies, blocking the files as function of their types, protocols and directions.
- 10. Firewall shall have logging facility as per standard logs/events format. Firewall shall have features to export the generated/stored logs/events in csv (Comma Separated Value) and also any other standard formats for offline usage, analysis and compliance.

Firewall shall have suitable memory architecture and solution to store and be enable to export all logs/events for a period of last 90 days at any given time.

- 11. Firewall shall have features and be compatible with local as well as central authentication system (RADIUS, LDAP, or TACACS+) for user account and access right management. It shall also have Role Based User management feature.
- 12. Firewall shall have the capability to configure sufficient number of VLANs.
- 13. Firewall shall have the capability to support sufficient number of sessions.
- 14. Firewall shall have provision to configure multiple IP Sec VPNs, at least 100 nos., (one-to-many or many-to-one). Shall support redundant operation with a



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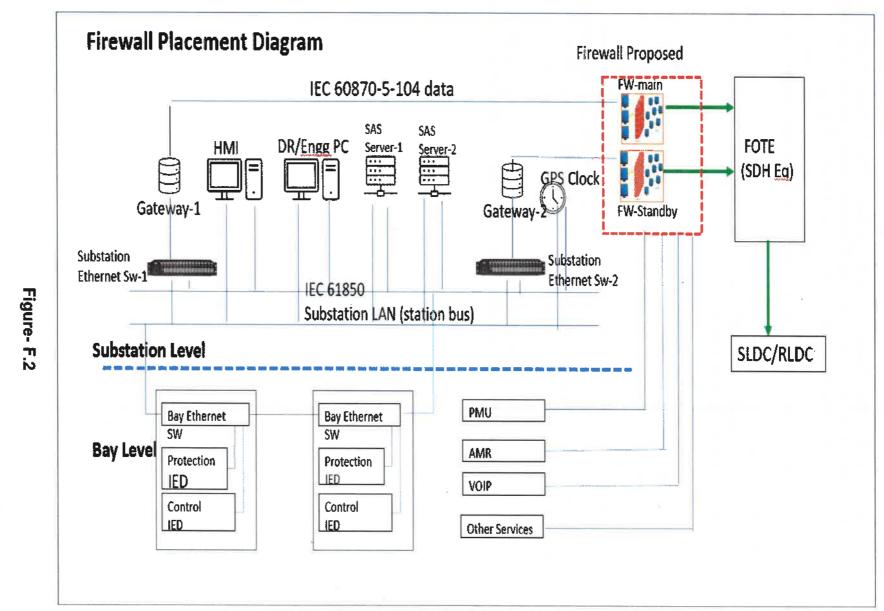
similar router after creation of all the IP Sec VPN. IPSec VPN shall support encryption protocols as AES128, AES256 and hashing algorithms as MD5 and SHA1. IPSec VPN throughput shall support at least 300 Mbps

- 15. Firewall shall be capable of SNMP v3 for monitoring from Network Management system. It shall also have SNMPv3 encrypted authentication and access security
- 16. Firewall shall support in Active/Passive or Active-Active mode with High Availability features like load balancing, failover for firewall and IPsec VPN without losing the session connectivity.
- 17. Firewall should have integrated traffic shaping (bandwidth, allocation, prioritisation, etc.) functionality
- 18. Firewall shall support simultaneous operation with both IPv4 and IPv6 traffic
- 19. Firewall shall be compatible with SNTP/NTP or any other standards for clock synchronization
- 20. Firewall shall have the features of port as well as MAC based security
- 21. Firewall shall support exporting of logs to a centralized log management system (e.g. syslog) for security event and information management.
- Firewall time shall be kept synchronised to official Indian Timekeeping agency, 22. time.nplindia.org.
- 23. Firewall product shall be provided with all applicable updates at least until 36 months since the applicable date of product shipping to the concerned utility.





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# Specific Technical Requirement for STATCOM

# Appendix 1

### Introduction: 1.

This technical specification for a Static Synchronous Compensator (STATCOM) Station consists of STATCOM, Mechanically Switched Capacitors (MSCs) and Mechanically Switched Reactors (MSRs) (to be installed at MV bus) including associated coupling Transformer (rated 400/xx kV) and other equipment connected to the 400 kV bus. MV voltage level (xx kV) of the coupling Transformer can be chosen by the TSP to optimize the offered solution which meets functional requirement of this Technical Specification.

The STATCOM station shall operate asymmetrically in the leading and lagging MVAR region as applicable to reach the dynamic range specified. The purpose of the STATCOM station is to regulate the voltage of 400 kV Bus [Point of Common Coupling (PCC)]. The Configuration and the nominal rating of the STATCOM station is specified in this document.

The main building block of the STATCOM should be single phase VSC based convertor valve (multi-level) operating in a way to eliminate or minimize ac filter requirement to High pass filter only and connected to the xx kV bus through air core reactors.

### **Definitions and Abbreviations** 1.1.

For the purpose of this specification, the following definitions / abbreviations are used:

PCC: Point of Common Coupling. The connection point between the STATCOM and the power system at which performance requirements are defined.

Reference Voltage (Vref): The Point on the voltage/current (V/I) characteristic where the static synchronous compensator (STATCOM) is at zero output (i.e. where no reactive power is absorbed from or supplied to the transmission system where the voltage is controlled)

MV: Medium Voltage.

STATCOM Unit: Static Synchronous Compensator based on Multi-

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Module technology and including air core reactors as needed, Valve cooling, switchgear and its control and protection.

STATCOM: Static Synchronous Compensator consisting of multiple STATCOM Units operating in parallel and connected to a common coupling Transformer. A static synchronous generator operated as a shunt connected compensator, whose capacitive or inductive output current can be controlled independently of the ac system voltage.

MSC: Mechanically Switched Capacitor (Including Switchgear). A shuntconnected circuit containing a mechanical power-switching device in series with a capacitor bank and a current limiting reactor.

MSR: Mechanically Switched Reactor (Including Switchgear). A shuntconnected circuit containing a mechanical power- switching device in series with a reactor.

Sub Module: Basic single power module of a Multi Module STATCOM unit Valve. It is a Part of a STATCOM unit valve comprising controllable switches and diodes connected in full bridge arrangement, together with their immediate auxiliaries, and storage capacitor, if any, where each controllable switch consists of one or more switched valve device(s) connected in series.

Valve: Electrically and mechanically combined assembly comprised of forced commutated devices (for example, IGBT) assembled in levels, complete with all connections, auxiliary components, and mechanical structures, which can be connected in series with each phase of reactor of a STATCOM unit.

Valve Section: Electrical assembly defined for test purposes, comprising one of several sub modules.

Valve Structure: Physical structure holding valve(s), which is insulated to the full system voltage above earth potential.

STATCOM Station: STATCOM Station includes 400 kV Switchgear, Coupling Transformer, STATCOM, MSCs (as applicable), MSRs (as applicable) along with its switchgears and complete integrated control and protection whose outputs are coordinated. (Complete turnkey delivery at site).

CT: Current Transformer.

VT: Voltage Transformer.

SAS: Substation Automation System.



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Response Time: the duration from a step change in control signal until the voltage changes by 90% of its final change, before any overshoot.

Settling Time: The duration from a step change in control signal input until the STATCOM output settles to within +5% of required control output.

Slope: The ratio of the voltage change to the current change over a defined controlled range of the STATCOM, normally the full (inductive plus capacitive) range at nominal voltage, expressed as percentage.

VSC: Voltage Source Convertor, A forced commutated device (for example, IGBT) based self-commutated convertor that is capable of generating ac voltage from DC capacitor.

Voltage/Current (V/I) Characteristic: The relationship between the current of the STATCOM and the voltage at its point of connection.

Lagging Operation: Inductive operation or reactive power absorption of the STATCOM similar to a shunt reactor.

Leading Operation: Inductive operation or reactive power generation of the STATCOM similar to a shunt Capacitor.

**TSP:** Transmission Service Provider

### **Relevant Standard:** 2.

STATCOM Station shall comply with the following standards (latest edition):

SI. No.	Description	Standard	
1.	Voltage sourced converter (VSC) valves for STATCOM	IEC- 62927 IEEE- 1052 IEC-60747	
2.	Control, protection & monitoring	IEC-61000 IEC-60255	
3.	<ul> <li>Valve Hall for housing the equipments as above comprising of:</li> <li>wall bushings for connection between converter phases and decoupling reactors,</li> <li>piping and tubing connections of the cooling system to converter</li> <li>connection of the control cabinet with the converter through optical fibers</li> <li>internal lighting, auxiliary power supply (AC and DC) and power socket system</li> </ul>	IEC-60255 IEC-60071 IEC-60270 IEC-60137	

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SI. No.	Description	Standard	
	- internal HVAC system		
4.	X kV, dry insulated, air core and air self-cooled decoupling reactors. Mechanically Switched Reactors, half-reactors stacked on above the other, Outdoor installation, Complete with supporting structures	IEC- 60076	
5.	Power Capacitors (MSC etc.)	IEC-60871-1	
6.	400 kV Power transformer (Coupling Transformer)	IEC-60076 IEC-60354	
7.	CT's and VT's	IEC- 61869	
8.	Dis-connectors and Earthing Switches	IEC- 62271	
9.	HV & MV Circuit Breakers	IEC- 62271	
10.	Surge Arresters	IEC- 60099	
11.	Auxiliary & grounding transformer	IEC- 60076 IEEE C57.32 IS- 5553 (Part 6)	
12.	Neutral Grounding Resistor, charging resistor	IEEE- C57.32	
13.	UPS, SMPS & Other Power supply units	IEC- 62040 IEC- 61558	
14.	Others items as per relevant standards specified elsewhere in the specification for substation works.	Y	
15.	Cyber Security	IEC-62243	

#### 3. Scope of work

The scope of work with regard to the works associated with the STATCOM comprises of ±2X300 MVAr Modular Multi-level Voltage Source Converter (MMC-VSC) based STATCOM along with 4x125 MVAr MSC (Mechanically Switched Capacitors) and 2x125 MVAr MSR (Mechanically Switched Reactors). 02 Nos. STATCOM shall be distributed in two different 400 kV bus sections of the substation. The TSP shall be responsible for complete installation of STATCOM station along with the substation works as specified in the complete scope of work.

The TSP shall also perform the system studies (steady state and dynamic) according to the requirement mentioned and documentation of the same shall be preserved by TSP & to be submitted to CEA/CTU/GRID-INDIA, as per their request.

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The switchgear for connection of STATCOM units, MSCs and MSRs provided on the secondary side of coupling transformer shall be of standard voltage rating as per IEC. The switchgear, structure, control, protection and substation automation on 400 kV side shall be as per applicable Technical Specification of the substation equipment.

Generally, the purpose of STATCOM is to improve system stability, provide damping, and to smooth out the step voltage change associated with MSCs, MSRs and external compensating equipment (i.e. any existing capacitor and reactor banks) switching and provide steady state VARs as needed to support the 400 kV bus voltage.

In order to get optimum control of MVAR, the control of MSCs and MSRs, as well as reactor banks connected on the 400 kV HV side, shall be integrated along with STATCOM control to provide steady state 400 kV bus voltage control in a smooth manner. MSRs and MSCs are to be switched to relieve the STATCOM from high level operation, reduce its continuous losses and maximize its dynamic control potential. The operating functions of the STATCOM Station shall include:

- Steady state voltage control of 400 kV bus,
- Balance steady state voltage at 400 kV bus,
- Dynamic over-voltage control,
- Transient and Dynamic stability control
- Damping of Power Oscillations

It is assumed that the arresters will limit any transient and switching surge over voltages and may also, by design, limit dynamic over voltages.

The requirement of reactive power compensation (as defined above) guaranteed by the TSP shall not be less than the levels specified considering following.

• The total cumulative Capacitive (+) and Inductive (-) MVAR rated Capacity of STATCOM Station as defined above comprising of STATCOM, MSCs (as applicable), MSRs (as applicable), coupling transformer, coupling reactor or any filter (if applicable) shall be rated at 1



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p.u. voltage, 1 p.u. frequency and 20° Celsius ambient temperature at 400 kV Bus (Referred to as "Point of Common Coupling" or PCC).

 Capacity of one or more branches of MSC, MSR in STATCOM Station can be included in the offered STATCOM with equivalent capacity. Accordingly, ratings of STATCOM Unit/Branch equipments may be designed.

Example of equivalent acceptable solutions for each STATCOM Station is given below:

- **Option 1:** ±300MVAR STATCOM, 2x125MVAr Mechanically switched Shunt Capacitor (MSC), 1x125MVAr Mechanically switched Shunt Reactor (MSR).
- **Option 2**: +425/-300MVAR STATCOM, 1x125MVAr Mechanically switched Shunt Capacitor (MSC), 1x125MVAr Mechanically switched Shunt Reactor (MSR).
- **Option 3:** +300/-425MVAR STATCOM, 2x125MVAr Mechanically switched Shunt Capacitor (MSC).
- **Option 4**: ±425MVAR STATCOM, 1x125MVAr Mechanically switched Shunt Capacitor (MSC)
- Option 5: +550/-425MVAR STATCOM
- The rated capability of STATCOM, MSC (as applicable) & MSR (as applicable) shall be at 400 kV (Referred to as "Point of Common Coupling" or PCC) and in the steady state frequency range of 48.5 Hz-50.5 Hz.
- The STATCOM Station including STATCOM Units, MSCs and MSRs shall be designed to operate continuously under the worst possible combination of steady state voltage and frequency range of 360-440 kV and 47.5 Hz – 52 Hz respectively and transient and temporary over voltages defined in Clause 6.1-f).
- The ac voltage unbalance at fundamental frequency shall be assumed equivalent to a negative phase sequence component of 1.5 % for equipment rating purposes.

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- The reactive power compensation levels shall be determined by manufacturing tolerances of the components and measurements carried out using metering accuracy instrumentation at the 400 kV feed points to the STATCOM Station.
- The reactive power capability shall also be determined by calculations based on test values of appropriate quantities at the discretion of the owner.
- In calculations of capability and availability, the owner shall assume the most unfavourable combinations of control, manufacturing and measurement tolerances.
- In case more than one STATCOM Station are installed in a particular substation, each STATCOM Station shall be connected to 400 kV bus individually with complete separate downstream system. Each individual STATCOM station shall have complete independent yet coordinated control system to avoid simultaneous tripping of both STATCOM Stations. The system shall be design in such a way that single common contingency (other than loss of 400 kV voltage, abnormal system events) will not cause tripping of both STATCOM Stations.
- Operation of STATCOM Station shall not excite any resonance condition in connected Power System.
- Control of STATCOM Station shall be designed to prevent hunting between MSRs, MSCs and STATCOM.

# 3.1 STATCOM building

The STATCOM station shall have independent building including a separate control room different from the main control room building of the Substation. The Building shall comprise of valve halls, cooling system room, control room, LT Switchgear room, Battery room, workshop, Document/Library and general facilities etc.

The STATCOM Building shall comprise of following facilities

- 1. Control & Relay Panel room
- 2. AC Distribution Board & DC Distribution Board room
- 3. Battery room



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- 4. Service Room cum workshop
- 5. Conference room
- 6. Valve hall
- 7. Cooling system room
- 8. Lobby
- Corridor with minimum width of 1600 mm 9.
- 10. Portico
- 11. **Common Toilet**
- 12. Provision of shaft for electrical, sanitary, water supply facilities
- 13. Other facilities as per functional requirement of building
- Air Handling Unit (AHU) Room 14.

## 4. Ambient Condition

STATCOM Station should be designed to perform under the ambient conditions of the site where the STATCOM is required to be installed.

## 5. Power System Characteristic

The following AC power system characteristics apply at the point of connection i.e. point of common coupling in this case (PCC). STATCOM station operation is required within the parameter value and duration given in following table:

S. No	Power System Characteristic	Value	unit
1.	Nominal ac system voltage, line-to- line	400	kV
2.	Maximum continuous ac system voltage, line-to-line	420	kV
3.	Minimum continuous ac system voltage, line-to-line	380	kV
4.	Maximum short-term ac system voltage, line-to-line	448	kV
5.	Maximum duration of item 4	10	S
6.	Minimum short-term ac system voltage, line-to-line	120	kV
. 7.	Maximum duration of item 6	5	S
8.	Continuous negative-sequence	1	%

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S. No	Power System Characteristic Value		unit
	voltage component (used for performance calculation)		
9.	Continuous negative-sequence voltage component (used for rating calculation)	1.5	%
10.	Continuous zero-sequence voltage component	1	%
11.	Nominal ac system frequency	50	Hz
12.	Maximum continuous ac system frequency	50.5	Hz
13.	Minimum continuous ac system frequency	48.5	Hz
14.	Maximum short-term ac system frequency	52	Hz
15.	Minimum short-term ac system frequency	48	Hz
16.	Basic Insulation Level (BIL)	1550	kV peak
17.	Switching impulse level (SIL)	1050	kV peak
18.	Power Frequency Withstand voltage	630	kV
19.	1) Maximum three-phase fault current		
	a) for performance requirements	1 a) 63	kA
	b) for rating of STATCOM	1 b) 63	kA for 1s
	2) X/R (Positive/Negative Seq) *	2) 34.5	
	3) X/R (Zero Seq)*	3) 8.9	
	4) Clearing time - normal	4) 0.10	S
	5) Clearing time – backup	5) 0.75	s
	*Values calculated as per PSS/E study file		
20.	Maximum three-phase fault current	63	kA
21.	Three-phase fault current (Maximum)*	12.7	kA
	*Values calculated as per PSS/E study file		
22.	Minimum three-phase fault current		

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S. No	Power System Characteristic	Value	unit
	-for performance requirements	10.2	kA
	-for safe operation	10.2	kA
23.	Maximum single-phase fault current	63	kA
24.	Single-phase fault current (Maximum)*	8.8	kA
	*Values calculated as per PSS/E study file		
25.	Minimum single-phase fault current	6.2	kA
26.	Power System Phase Rotation	CCW	

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# 6. STATCOM Station Characteristics

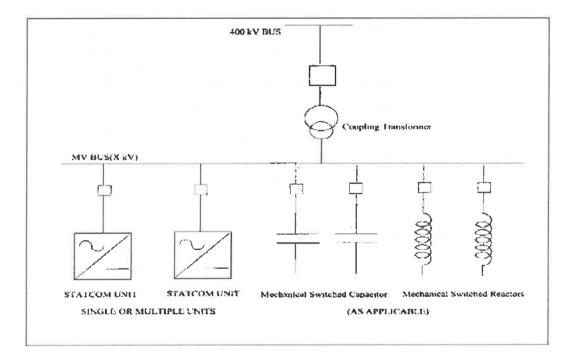


Figure-1: Conceptual Indicative Schematic diagram of STATCOM Station



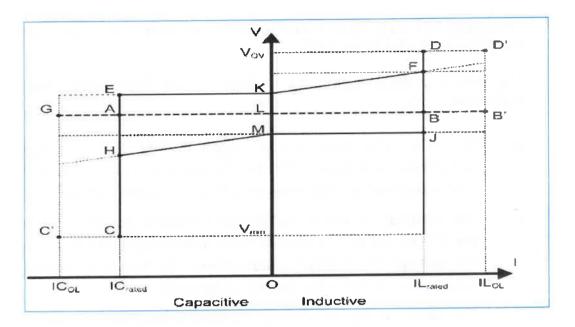


Figure-2: VI Curve of the VSC Portion

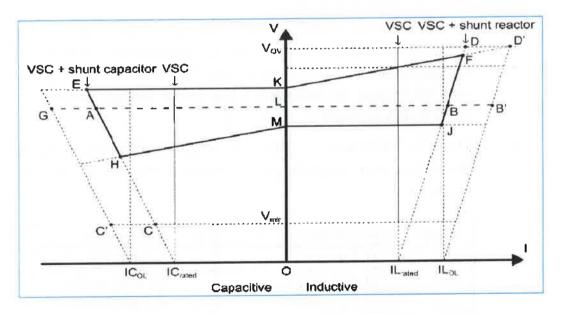
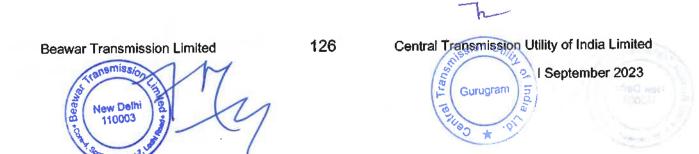


Figure-3: VI Curve of the STATCOM Station



# 6.1 STATCOM Station Ratings

The output of a STATCOM Station shall be adjusted continuously over the range illustrated in Figure-3.

The following items define the ratings of the STATCOM station equipment.

- a) The STATCOM Station should regulate the 400 kV bus voltage to a reference voltage of 400 kV (1.0 per unit, Point L Figure-3), continuously adjustable between 0.95 per unit and 1.05 per unit.
- b) The nominal capacitive and inductive reactive power output of the STATCOM should be as defined in the scope, at 1.0 p.u. ac bus voltage and nominal system frequency, and 20°C ambient temperature (Point A and point B of figure-2).
- c) The slope of the STATCOM Station characteristic should be adjustable in steps of not greater than 0.5% between 1% and 8%, on a basis of cumulative MVA capacity of STATCOM Station (A+B in Figure-2).
- d) The STATCOM Station should continue to generate reactive power during temporary under voltage down to 120 kV (0.3 p.u.) for the duration of 5 seconds (Point C); the STATCOM system may be tripped (or blocked) if the under voltage persists for more than 5 seconds.
- e) The STATCOM should continue to absorb reactive power during temporary over voltages in a controlled manner as per the following.

Temporary Overvoltage	Duration
up to 600kV (1.5 p.u.p.u.)	10 seconds
up to 704kV (1.76 p.u.p.u.)	100 milli seconds
up to 800kV (2.0 p.u.p.u.)	50 milli seconds

STATCOM Station may be tripped if the respective temporary over voltages as mentioned above persists for more than its respective mentioned duration.



- f) The STATCOM Station should be capable of repeating temporary operation as defined in any one of item (d) and (e) as above for at least 3 charging cycles in 60 minutes.
- g) The coupling transformer and all bus equipment, such as filter branches (if applicable), MSC & MSR branches etc. and the MV Bus should be rated to withstand the specified continuous and short-term operation, and to withstand or be protected against voltage and current stresses that exceed these conditions.
- h) All equipment in the STATCOM Station should be capable of sustaining, without damage, any fault limited by the maximum design short circuit level of the system and the Coupling transformer impedance.
- i) The TSP shall assume the negative sequence voltage of 1% at rated short circuit level and provide control to reduce this unbalance.
- j) The injected harmonics by STATCOM Station under the full operating range measured at 400 kV Bus (PCC) in accordance with IEEE-519-2014 and limiting values of individual harmonic distortions and total harmonic distortion shall be 0.5% and 1% respectively.
- k) The STATCOM controls should be designed to correct negative sequence voltage during steady state operation.
- I) The switching module design should include an appropriate allowance for stray capacitance and component tolerances.
- m) The STATCOM should be designed to prevent, or alternatively to withstand, false firing events, i.e., the firing of any valve at an incorrect time in the cycle or when not ordered.

# 6.2 Control Objectives

The control system shall control the STATCOM, MSCs, MSRs required under this specification, as well as all bus reactors on the 400 kV HV bus of the substation.

Operation logic for the breakers, disconnectors and earth-switches in the STATCOM Station shall also be incorporated in the control system. The control shall be programmable and shall have sufficient scope and flexibility (software programming margin of at least 20%) to permit reprogramming according to future changes/addition in the power system.



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The operator interface must be integrated in a latest version of Windows environment.

# 6.2.1 STATCOM Station Functions and Applications

## 6.2.1.1 Voltage Control mode (Automatic and Manual)

Control of the positive sequence component of the fundamental frequency voltage in steady state and dynamic operation, with slope in the range as specified at clause 6.1 c) above

## 6.2.1.2 Fixed Reactive Power Mode

In this mode, the reactive power output of the STATCOM as well as switching of MSRs and MSCs, should be manually controlled, by direct operator action. This feature is normally utilized for testing purpose.

## 6.2.1.3 Steady State Condition

The STATCOM Station shall provide necessary reactive power support to the 400 kV bus (PCC) to compensate for voltage variation under steady state.

## 6.2.1.4 Dynamic Over-voltage Control Performance

The STATCOM shall be required to provide necessary reactive power support with fast and smooth variation so that over-voltages under dynamic conditions are controlled. STATCOM shall smooth out the step caused by switching of MSCs and MSRs.

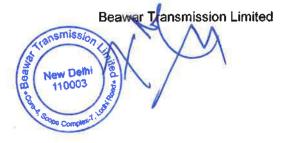
The operation of each STATCOM over its range of MVAR from full capacitive to full inductive capacity and vice-versa shall be on the basis of smooth variation

## 6.2.1.5 Transient and Dynamic Stability Performances

The STATCOM Station shall provide necessary reactive power so that transient and dynamic stability of the Owner's system are enhanced.

## 6.2.1.6 Damping of Power Oscillations

The STATCOM shall provide necessary damping to power oscillations by modulating its output in its entire range based on



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measured rate of change of power/frequency at the 400 kV bus. The damping controller would track local area oscillations as well as wide area oscillations and control would include several loops each focused on different frequency.

## 6.2.1.7 Facility for compensation of phase imbalance

Provide negative phase sequence voltage control to minimize presence of negative sequence content of the 400 kV bus voltage.

## 6.2.1.8 Start up and Initial Switching

The operation of STATCOM Station during start-up/initial switching on should not create significant energizing transients causing voltage drop, voltage distortion and swinging of transmission voltage angle at the PCC bus by more than  $\pm 5\%$ . TSP shall have to ensure this analytically during design phase and also in the field after commissioning of the facility. TSP shall prepare the design documentation and the same shall be preserved by TSP and to be submitted to CEA/CTU/GRID-INDIA, as per their request.

# 6.2.1.9 Gain Supervision and Control

To control regulator gain in order to prevent oscillations and excessive overshoot in the STATCOM response, a gain supervision function shall be implemented.

This shall be an essential function for supervision of stability of the closed loop voltage control. The function of this controller is that when the supervision of the gain in the voltage regulator detects oscillations in the voltage controller output, the gain shall gradually be reduced until stability is reached. Normally it is a changed condition in the transmission system contribution to the closed loop gain that results in the instability. The reduction in the voltage regulator gain shall only balance the external change. The control should be adaptive in order to maximize its effectiveness. Gain reductions should be indicated and the reduction of the gain shall be able to be reset to nominal value by means of commands from the operator interface or automatically. A relative gain factor shall also be able to be changed from a gain optimizer.



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### 6.2.1.10 Coordinated reactive power control of external devices

To optimize the use of dynamic vars versus steady state vars, control of externally connected shunt capacitor or reactor banks shall be implemented. Such banks will be connected locally to a HV bus or/and at MV bus. For simultaneous control with the supplementary VSC current controller, coordination for the two functions shall be provided. External devices like MSCMSR can be switched ON or OFF to position the steady state operating point of the VSC so as to extend its dynamic range.

## 6.2.1.11 Supplementary VSC current controller

To optimize the use of dynamic vars versus steady state vars, a control function that slowly reduces or offsets the STATCOM point of operation shall be implemented. By deliberately adjusting the voltage reference setting within a narrow window the STATCOM system output is pushed toward either a specific point or toward a window to preserve dynamic range. This slow operating function is meant to provide for slower controllers, such as externally connected shunt bank to operate and meet the slower long term voltage variations caused by daily or weekly load variations. Rapid changes in the system voltage that call for dynamic compensation will have priority over this type of controller.

## 6.2.1.12 Gain optimization

To provide operation at optimal regulator gain, a fully automatic optimizing function shall be implemented. This function operates by inducing a small change in the STATCOM output. The gain is adjusted based on the network response signal.

### 6.2.1.13 Control of Direct Current

During STATCOM operations, any flow of direct current to transformer MV side must be less than 25% of transformer magnetizing current. DC current flow in the transformer should be minimized by an independent control function which minimizes DC current. For presence of up to 0.2% second harmonic in 400 kV system, the STATCOM control should minimize DC current flow in the transformer.



#### 6.2.2 Under Voltage Strategy

It is essential that the STATCOM Station operates in a robust manner when transmission system under voltages appears. For transmission system voltages down to 0.3 p.u., the STATCOM units must operate unrestricted, producing its rated capacitive current. The STATCOM must be designed to operate at transmission system under voltage, even considering that severe voltage unbalances can appear. The STATCOM must not be restricted by short term negative sequence voltages up to 1.5%, appearing in conjunction with under voltages.

Transmission system under voltages below 0.3 p.u. will appear in conjunction with transmission system faults. The STATCOM must ride through during faults and post fault under voltages. The minimum trip delay for the STATCOM Station, upon complete loss of the transmission system voltage shall not be less than 5 seconds. If station AC auxiliary power distribution is affected, critical loads must be fed from DC station batteries/UPS without tripping the STATCOM Station. Adequate capacity must be kept in DC station batteries/UPS to feed critical loads for smooth operation of the STATCOM Station facility. There must be redundant station battery system with each station battery system capable of delivering 100% load.

At under voltage conditions for the transmission system voltage, special control strategies are activated which override the normal control modes presented above. Normally if the voltage is low, the output from the STATCOM will be capacitive. If the voltage in all three phases goes below a level, but not greater than 0.3 p.u.p.u., a special under voltage strategy may be activated that controls the STATCOM output to 0 Mvar. As soon as the voltage goes higher than 0.3 p.u.p.u., the under voltage strategy is deactivated and the normal control will be in operation.

The STATCOM Station must not be tripped or shutdown automatically for under voltages appearing for less than 5 seconds. STATCOM Station must continue to operate at AC system Voltage up to 0.35 p.u.p.u.voltage on 2 phases with above 0% on the third phase or above 0.3 p.u.p.u.on all three phases until the fault is cleared and line is reclosed. The reclose time shall be up to 2.6 seconds.



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### 6.2.3 Over Voltage Strategy

- 6.2.3.1 The TSP shall carry out dynamic stability study upfront in order to assess the dynamic overvoltage requirements. These studies shall include conditions with maximum and minimum short circuit system MVA conditions, single phase and three phase faults as well as stuck breaker, outage of nearby generator and also with outage of parts of the STATCOM Station. It is important that the STATCOM Station rides through temporary over voltages and not trip when it is needed the most.
- 6.2.3.2 The system should be able to withstand any 3 phase 5 cycle (100 ms) and single phase 10 cycles (200 ms) fault with consequent loss of a 400 kV double circuit line and loss of a 500 MW generator. The fault duration mentioned above correspond to time assumed for persistence of fault. For other system parameters refer clause 5 above (Power System Characteristics). In addition to above requirement, system contingency cases as provided in Annexure-I shall also be withstood.
- 6.2.3.3 The 400 kV system and equipment to which the STATCOM Station is connected is designed to withstand switching surge overvoltage up to 2.5 p.u. and power frequency over voltages up to 1.5 p.u. with initial value of the temporary overvoltage up to 2.0 p.u. for 1-2 cycles. Based on arrestor coordination and under the worst case scenario the 400 kV system phase to ground peak over voltages may be expected as follows:
  - i) 650 kVp for 3 peaks
  - ii) 575 kVp up to 5 cycles
  - iii) 530 kVp up to 1 second
  - iv) 475 kVp up to 10 seconds
  - a) The STATCOM Station shall be designed to withstand these sequential over voltages.
  - b) If the over voltages greater than 1.1 p.u. are exceeded in magnitude and duration due to any system contingencies, suitable control action shall be taken by STATCOM Station to bear this kind of contingency.
  - c) The TSP shall evolve the insulation co-ordination of the components of the STATCOM Station after studies have been conducted to determine the over- voltage profile with the STATCOM connected to the system.

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- d) The TSP shall ensure that STATCOM Station will not excite ferro-resonance and sub-synchronous oscillation in the AC system. The study report in this regard shall be preserved and to be submitted to CEA/CTU/GRID-INDIA, if required.
- e) It may also be noted that the tripping action for 400 kV lines is initiated if the overvoltage exceeds 1.12 p.u. for 10 seconds. The tripping of 400 kV lines is initiated if 1.5 p.u. voltage persists for more than 100 milli seconds. The over voltage strategy shall be coordinated with these setting such that the STATCOM Station rides through up to these levels.

# 6.2.4 STATCOM Station Over load/Over Current

The overvoltage cycles mentioned in clause 6.2.3.3 above create a corresponding current overload in the STATCOM Station components; the STATCOM Station and its components shall be designed to withstand these.

In addition to the above the STATCOM Station and its components shall be designed to withstand overloading caused due to the following eventualities

- i) Short circuits and ground faults in the 400 kV system especially those occurring near to the STATCOM Station and medium voltage bus of the STATCOM Station.
- ii) Transient overvoltage due to switching operations and atmospheric effects.
- iii) Temporary over voltages.
- iv) Short circuits in the transformer secondary circuit such as
  - Bushing terminal fault
  - Flashover across a reactor, Bus Bar and other connected components/switchgear etc.
- v) Protection system faults.

If the rated overvoltage is exceeded as a result of prolonged stressing or for other reasons, the protection specified elsewhere in the specification shall come into effect to prevent damage.



# 6.2.5 Dynamic Performance Controls of STATCOM Station

The TSP must describe in detail, the dynamic reactive power controls for enhancing stability margin and also damp oscillations of any critical frequencies. The dead band for continuous damping control must be very small so that there no discernible sustained oscillations.

# 6.2.6 **Protective Control Functions**

TSP shall provide all necessary protections including Main and Backup protections for all protective zones and equipments like transformers, STATCOM Units, MSCs (if applicable), MSRs (if applicable), MV Bus Bar etc. TSP shall provide any protective control functions to meet the performance requirement of STATCOM under the scope of the TSP.

# a) Overvoltage Protection

TSP shall provide adequate overvoltage protection as a result of any normal operation, mal-operation or system event.

# b) Over current Protection

TSP shall provide adequate over-current protection for the STATCOM Station as a result of any abnormal operation, maloperation or system event.

# c) Gate level control Supervision

TSP shall provide adequate Sub module Gate level control supervision.

# 6.2.7 STATCOM Station Response

STATCOM station response shall be such that the change in measured system voltage to small disturbance should reach 90% of the desired total change within 30 ms of the initiating a 5% step change of voltage reference. The maximum overshoot should not exceed 120% of the total change and the settling time should not exceed 100 ms, after which the voltage should be within  $\pm$ 5% of the



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final value. This response characteristic within these limits must be respected when the system three-phase fault MVA is between the minimum and maximum value defined in clause-5. The response of the system voltage using the actual controller should be validated on a real time simulator during the Factory Acceptance Test (FAT) at the manufacturer's premises. For the purpose of STATCOM Station response time measurement and signal conversion of the voltage, error should not exceed 0.3%. The voltage response acquisition circuit should have a response time no longer than 10 ms. However, time longer than 10 ms can be allowed provided the requirement of STATCOM response time is met.

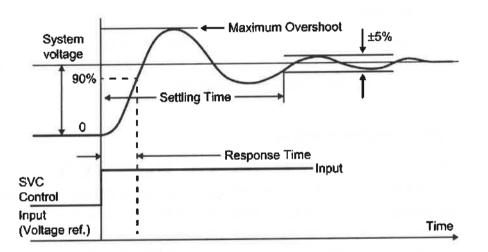


Figure-4 Response and Settling time

# 6.3 Harmonic performance and AC harmonic filter design

It is likely that with multi-level VSC based technology, no filters or only a small high-pass filter will be needed. The STATCOM shall be operable without AC filters. The STATCOM Station should be designed to eliminate the effects of any harmonic resonance between its MSRs, MSCs banks, filters branches, and the AC system. To limit the harmonic distortion imposed on the 400 kV transmission system, additional contribution of harmonic distortion from the STATCOM Station to 400 kV system (PCC) should not exceed 1% for total and 0.5% for any specific harmonic.



#### 6.3.1 Filter performance

The distortion levels as specified should be met for the following:

- a) The continuous range of all system and environmental conditions.
- b) Variation in total filter capacitance due to manufacturing tolerance, ambient temperature, aging and changes in capacitance up to alarm level.
- c) Variation in tolerance for STATCOM parameters, such as transformer winding unbalances, valve firing variations MSC and MSR unequal reactor and capacitor reactance between phases.
- d) System frequency in the range of 48.5 Hz to 50.5 Hz. Calculation should take into account all possible combinations of STATCOMs, MSCs and MSRs.

## 6.3.2 Filter component rating

The harmonic filter components (and other STATCOM components) should be rated to carry continuously the harmonic currents caused by the background harmonic distortion of the system and the harmonic currents produced by the STATCOM itself. Unless otherwise specified, harmonic currents from the system and the STATCOM of the same order should be added arithmetically. All filter harmonic currents of different order should be added quadratically (root sum of squares).

The rated voltage of capacitors should be derived from the largest arithmetic sum of the power-frequency and individual harmonic voltages obtained from stress calculations in continuous operating conditions (Note: Maximum fundamental voltage and maximum harmonic contributions may not exist at the same time for STATCOM configurations including MSRs or MSCs).

For filter capacitor voltage rating, the loss of capacitor unit or elements should be considered up to the trip level.

The rated voltage of so-called "low voltage" capacitors (e.g. in double or triple tuned filters) should be chosen such as to also withstand

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imposed transient stresses from faults, energization or other switching events.

## 6.3.3 Harmonic at PCC

The STATCOM Station contribution to the harmonic distortion levels at the STATCOM Station connection point (PCC) to the transmission system shall not exceed the limits below.

Following are the maximum limits given using denominations according to IEEE STD 519-2019. The 2nd to the 60th harmonics should be considered.

Individual harmonics voltage distortion (Dn) < or = 0.5 %

Total Harmonic voltage distortion factor (THD) < or = 1 %

## 6.3.4 Harmonic calculation:

Chapter 7.3 of CIGRE Publication 139 together with information in PSSE network files given shall be used for the Network harmonic impedance.

## 6.4 MV Switchyard

- Medium Voltage (MV) delta bus shall be grounded through a Grounding Transformer (i.e. zig-zag winding Transformer) along with suitable resistor in the neutral.
- MV Switchyard of different STATCOM Station branches shall be fenced with the fence height of 3 meter. Suitable arrangement i.e. electrified fence shall be done to prevent the encroachment of unwanted animal or other to minimize the probability of electrical faults (Ph-E, Ph-Ph). Further bus bar arrangement shall be made in a way to minimize the probability of electrical faults.
- Secondary side of the Coupling Transformer shall be provided with suitable surge capacitors to mitigate transfer surges.
- For MV bus bar, Aluminum conductor (Tube, Rectangular Hollow Section or C Section) may be used, however, suitable bus bar end cover/cap shall be provided to avoid any animal/bird entering the hollow space.



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## 6.5 Broadband Interference

## 6.5.1 Radio Interference (RI)

The TSP shall take necessary precautions in the form of shielding of valve hall and building or Containers. Further, the following requirements shall also be met:

- a) With the STATCOM Station operating at any load upto rated value and within the design range of firing angle, the radio interference level from electromagnetic or electrostatic inductions generated by the STATCOM station shall not exceed 100 microvolts/m, under fair weather conditions, at any point outside the station fence. The RI criteria shall be achieved at all frequencies within the range of 150 kHz to 300MHz and with the STATCOM operation at any level up to and including rated value, the design shall provide correcting measures, should the specified design not being realized in the final installation.
- b) Measurements of actual RI at STATCOM Station shall be made by the TSP, at points along the above defined contour and at other critical point.
- c) RIV (Radio Interference voltage) measured at a phase to ground voltage (266 kV rms) in accordance to NEMA-107 shall not be more than 500 micro-volts for 400 kV system. For other system voltages IEC/NEMA in the order of preference shall be applicable.

#### 6.5.2 Interference with Power Line carrier & open wire carrier system

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The TSP shall take the necessary precaution in the form of noise suppression techniques and filtering devices to prevent harmful interferences from STATCOM Station to Power Line Carrier Communication (PLCC) system operating on connected AC transmission network.

The frequency spectra to be protected are:

System Power Line carrier Open wire carrier Frequency spectrum 30 kHz to 500 kHz 5 kHz to 30 kHz



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## 6.6. Audible Noise

The TSP shall limit the audible noise in various areas of the STATCOM Station buildings and Containers to the following values.

Valve hall (Inside)	90 dBA
Mechanical equipment areas indoor (measured at 2 metre distance)	75 dBA
Mechanical equipment outdoor (Measured at 15 m distance)	75 dBA
Control Room Building*	60 dBA
At the limits of STATCOM STATION perimeter fence	80 dBA

*This is the background noise from the ventilation system adjacent rooms, control cubicles etc. Printers, recorders may be switched off during measurement.

## 6.7. Loss Requirements

- 6.7.1. The TSP must guarantee the total losses of STATCOM Station, be less than 1% of the reactive power output individually at its inductive limit (STATCOM+MSRs) and capacitive limit (STATCOM+MSCs) for the cumulative highest reactive power output of STATCOM Station at PCC with worse combination of manufacturing tolerances. For the purpose of total loss measurements, it should be assumed that ambient temperature is 20°C, the PCC voltage is 1 per unit, and the slope setting is 1 %. The STATCOM system may not operate at these conditions, but they provide a common base.
- 6.7.2. The total losses shall include all components, as well as different parts or subsystems of complete STATCOM Station such as coupling transformer, All VSC systems and components, MSC Capacitors and Reactors, MSR Reactors, Control and protection systems, including ancillary devices such as HMI, fault recorders, and SCADA, Auxiliary Power supply systems, cooling systems, Building ancillary services such as lighting, air conditioning, heating, and ventilation. It may be noted that for the redundant VSC valve levels and dual/redundant control and protection systems, the losses of redundant VSC valve levels and dual control and protection systems shall be considered during loss measurement.
- 6.7.3. For the dual or redundant systems design of STATCOM Station, such as dual pumps or redundant fans, dual systems losses to be excluded, if the dual system is not in service during the normal operation of the STATCOM Station. However, dual systems should be included if they are required to be in



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service under the defined operating conditions. The same methodology shall be applied for HVAC (heating ventilation and air conditioning systems).

- 6.7.4. The TSP is required to prepare documentation for the detailed calculation of total losses based on measurement during Factory Acceptance Tests of major equipment and systems mentioned above as per relevant IS/IEC/IEEE standards & same shall be preserved and to be submitted to CEA/CTU/GRID-INDIA, as per their request. Further for equipment/systems, whose loss measurement cannot be done during Factory Acceptance Test, the same can be measured at site, and a combination of calculation and measurement shall be used to derive the total losses as specified above. During Loss measurement, all fans and pumps; valve room and control room air-conditioning system shall be switched on. However, redundant fans, pumps & air-conditioners shall be kept off during loss measurement.
- 6.7.5. During the factory tests the losses for the following equipment shall be measured/ assessed as detailed below:

## **Coupling transformer:**

Losses shall be measured at factory/lab at the maximum rating, at power frequency as per relevant

IEC/IS under below conditions:

i. No load loss (Iron loss) at rated voltage and fundamental frequency.

- ii. Load loss (copper loss) at rating corresponding to maximum continuous current and at 75°C.
- iii. Transformer cooling equipment's loss (Auxiliary loss) at rated voltage and fundamental frequency.

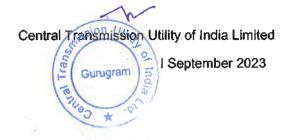
## **Reactors:**

The losses shall be measured at factory/lab at the maximum rating at power frequency as per relevant IEC/IS.

<u>VSC Valves:</u> Converter losses are composed of losses in power electronic switches [Insulated Gate Bipolar Transistor (IGBT) or equivalent], made up of conduction and switching losses, and the losses in DC capacitors, resistors, and inductors used within the converter system. Refer IEEE-1052 for calculating VSC losses.

## Capacitor:





The capacitor losses shall be measured at manufacturer's works at power frequency as well as calculated to obtain the losses in the complete bank on the basis of factory measurement.

#### Auxiliary System:

Auxiliary power losses shall be calculated from the KW and efficiency of all motors (name plate rating) of the cooling system, air conditioning, ventilation etc. The higher of the total losses for the entire auxiliary systems occurring at full capacitive capacity MVAR or full Inductive MVAR as the case may be shall be considered for arriving at the total losses.

#### Harmonic Filters, if any:

The losses shall be calculated at the maximum STATCOM Station loading at 400 kV and 50 Hz.

The calculations shall be on the basis of tested results of the components.

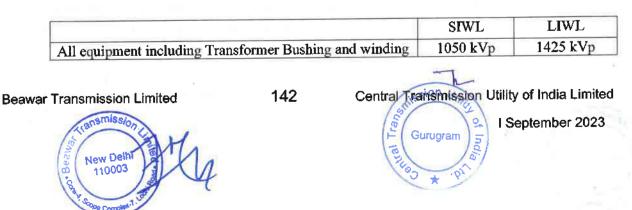
#### 6.8. Selection of Insulation levels

#### 6.8.1. Arrestors:

Protective levels of arresters connected to the 400 kV AC Bus Bars of the STATCOM Station shall be coordinated with the insulation and surge arrester Characteristics of the 400 kV AC systems to which the STATCOM Station is to be connected. The specification and characteristics of the surge arresters installed in 400 kV AC system is given in Substation specification. The front of wave (FWWL), lightning impulse (LIWL) and switching impulse (SIWL) withstand levels shall be determined by the following margins:

- a) A SIWL at least 1.15 times the switching impulse protection level.
- b) A LIWL which is an IEC standard level corresponding to the SIWL and shall be at least 1.25 times the lightning impulse protection level.
- c) A FWWL which is at least 1.25 times the front of wave protection level.

In addition to above minimum basic requirement the various insulations level of 400 kV equipment shall be as below. The STATCOM Station equipment, coupling transformers etc. shall be co- ordinated accordingly.



#### 6.8.2. Valves

The requirement of insulation levels of the valves shall be as per the design requirement.

#### 6.8.3. Air clearances

The air clearances shall be determined by the TSP based on the required withstand levels for all waveforms in order to limit the probability of flashover within the STATCOM Station to a target value of one flashover in 15 years.

## 6.8.4. Switchyard

The air clearances for switchyard equipment shall be equal to or greater than minimum values as specified in IEC-60071. Altitude correction factor (if any) shall also be considered as per IEC.

#### 6.8.5. Leakage distances

The Creepage/leakage distance across insulation shall be determined by the TSP and shall be adequate to ensure that under condition of heavy pollution, the probability of a flash over of an insulator does not exceed one in 15 years. However, the leakage distance for all AC insulators for outdoor installation shall not be less than 25 mm/kV of the maximum operating phase to earth rms voltage at the insulator. The leakage distance of equipment connected to 400 kV systems shall not be less than 10500 mm.

Specific creepage distance for outdoor bushings, insulator strings and long rod insulators shall be minimum 31mm/kV.

## 6.9. STATCOM Station availability and reliability

The following definitions apply:

## 6.9.1. Outage terms:

a) Outage

The stage in which an equipment is unavailable for normal operation due to an event directly related to the equipment which results in reduction in STATCOM Station capacity.

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## b) Scheduled Outage

An outage which can be scheduled at least one week in advance

c) Forced outage

The stage in which the equipment is unavailable for normal operation but is not in the scheduled outage stage and which results in reduction in STATCOM Station capacity i.e. an outage which is not scheduled outage.

#### 6.9.2. Capacity terms

Maximum Continuous Capacity (Pm)

The maximum STATCOM Station capacity (MVAR) for which continuous operation under normal condition is possible.

#### 6.9.3. Outage duration terms

Actual Outage Duration (AOD) The time elapsed in hours between the start and end of an outage.

#### 6.9.4. Time Categories

- a) The number of hours in the reporting period in a full year, the period year is 8760 hours. If the equipment is commissioned, part way through a year, the period hours will be proportionately less than 8760 hours.
- b) Total Outage hour (TOH)

The sum of all outage duration within the reporting period. TOH = AOD

## 6.9.5. Availability & Reliability Terms

#### **Unavailability:**

Unavailability is the duration for which the STATCOM Station is not available with specified rating due to forced outages per year. If part of the station is unavailable, then the unavailability duration shall be counted proportionally. However, if STATCOM is out then its duration shall count as fully unavailable STATCOM Station. However, If STATCOM unit is out then the STATCOM Station unavailability shall be counted proportionally STATCOM capacity. STATCOM Station Control system outage shall count as full STATCOM Station unavailability. 'OF' is the outage frequency which will be the number of forced outages per year.

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The period basis for availability and reliability calculations shall be 12 months. The TSP shall ensure that the design will meet the specified guaranteed and design target value of availability and reliability.

Outage times for repair, maintenance and replacement of components shall be based on the premises that all items in the list of recommended spare parts are on hand, that all maintenance schedule of recommended maintenance are adhered to. Reliability calculations shall be made and shall be presented as the expected frequency of unscheduled loss of STATCOM Station capacity. For simultaneous occurrence of events, for either of which a loss of capacity would result, the longer repair time shall be counted.

The facilities shall be assumed to be utilized 100% of the time at 100% load, regardless of the actual reactive power generated/absorbed by the STATCOM Station. Hence the availability and reliability assessment will be based on the capability of STATCOM Station to generate/absorb the rated reactive power regardless of whether, it is in service or not.

## 6.9.6. Availability Requirement

The calculated availability of the system considered on the annual basis shall be equal to or exceed the following target values.

Minimum availability requirement of each complete STATCOM Station

Guaranteed for STATCOM Station - 98%

The outages of STATCOM Station capacity caused by the failure of equipment outside the scope of the TSP shall not be considered for calculation of availability and reliability guarantee. However, such outage shall be restricted to

- 1) Complete loss to 400 kV supply (at PCC)
- 2) Human Error.

Circumstances causing curtailment of STATCOM Station capacity that will be included in reliability and availability assessment and which can lead to forced outages shall include but not be limited to the following:

- a) Failure of equipment
- b) Mal-operation of control and protection system
- c) Failure to start
- d) Reduction in capacity.



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## 6.9.7. Reliability Requirement

## a) Reliability

In the assessment of reliability, the following events shall also be considered to constitute a STATCOM Station outage:

- i) A STATCOM Station shut down.
- ii) A reduction of STATCOM Station capacity due to outage of any component of STATCOM Station

The calculated reliability of the complete STATCOM Station shall be equal to or exceed the following design target values.

The average outage frequency per year for each STATCOM Station shall not exceed the following values:

	Design target for STATCOM Station	Max acceptable Guaranteed value for STATCOM Station
Total Numbers of	3 x Nos. of STATCOM	5 x Nos. of STATCOM
Forced Outage	Station	Station

**6.9.8.** Guaranteed Failure Rate OF Sub modules (including all component and electronic): The maximum annual guaranteed failure rate of sub module (including all component and electronic) shall not exceed 1.0% per STATCOM. The failure rate shall not include failures directly attributable to operation and maintenance errors

# 6.9.9. GUARANTEED OF FAILURE RATE AC POWER CAPACITOR

The maximum guaranteed annual capacitor failure rate shall not exceed 0.15% except first unit failure. The capacitor shall be considered as failed if its Capacitance value varies more than  $\pm 5\%$  of the (actual measured) name plate value. Leakage of oil from the capacitor and deformation of the capacitor unit shall be considered as a failure even if the capacitance value is within the tolerance limits.

# 7. Design Principles

The objective for the design of the STATCOM Station shall be to achieve high level of availability and reliability as specified. Special attention shall be given to design the STATCOM Station to avoid forced outages. The TSP shall conduct thorough design reviews to ensure minimum risk of such outages. The TSP shall give careful attention to related factors affecting STATCOM Station

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performance such as subsystem & system testing, protective relays coordination and proper setting of relays.

Except where greater reliability requirements are specified in these specifications, the design basis for STATCOM Station shall be such that no single contingency downstream from the medium voltage bus shall cause a total outage of the STATCOM Station. The following general criteria shall be followed for the design of the control system:

- a) Use of components similar to those whose reliability has already been proved in use.
- b) Use of good design practices, surge protection, filtering and interference buffers to assure Immunity to sensitive component and circuits against damage and interference by induced voltages and currents in the external cabling and cubicle wiring.
- c) Use of fail safe and self-checking design features.
- d) Use of component and equipment redundancy, by means of either duplication or triplication with automatic transfer facilities wherever necessary to meet the requirement of these specifications.
- e) Design which in the event of component failures, provide for transfer to a less complex operating mode.
- f) Provision of alarm, fault diagnosis & indication

## 8. STATCOM Station Main Components

#### 8.1. STATCOM Unit

The main electrical data of the STATCOM Units are the following:

0	Rated voltage	20 kV Minimum
0	Rated frequency	50 Hz
0	Redundancy (Sub Module) higher	2 Nos. or 5% whichever is
0	Rated Power of each STATCOM unit/Branch	±50 MVAR Minimum
0	Valve Cooling	Deionized/Demineralized water

In general, the STATCOM units shall equally share the load however under contingency condition it should be possible to run the units with unequal load.

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Charging of the DC capacitors of Sub module during initial start-up shall be achieved by means of Resistors and bypass breaker arrangement. The charging resistor for DC capacitor of STATCOM Sub module should be designed for three charges per hour followed by appropriate cooling time. Power for the gate level control shall be derived internally from Sub module. The offered STATCOM Units with its Control system shall be suitably located inside the STATCOM Station Building.

## 8.1.1. STATCOM Valve

The valve shall be designed to meet the performance requirements described in this specification and as described below.

In order to ensure a modern low loss and reliable solution, the STATCOM valve assembly shall use the multi-module (including redundant sub modules) approach.

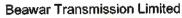
The valves shall be designed to ensure satisfactory operation according to the overall performance requirements and include all necessary auxiliary equipment required for smooth and reliable operation. The valves shall be indoor air-insulated and cooled by de-mineralized water. The valves shall be of modular design and have removable Sub-Module for ease of maintenance. The valves shall be mounted to allow easy access for visual inspection, routine maintenance and replacement, and facilities shall be provided to enable the easy access.

## 8.1.2. Semiconductor Switches

The electronic switches should be designed with the aim to achieve operation according to the overall performance requirements of the STATCOM Station. The valve shall be designed with individual semiconductor switches applied in a conservative manner with regard to their basic design parameters. The semiconductor switch shall meet the requirements of IEC 60747 except where otherwise specified herein.

The semiconductor switches shall be designed to withstand all stresses expected under steady state, transient and temporary overvoltage conditions. Basic semiconductor devices shall be of the Press Pack type, or packaged to provide short circuit means in case of device failure such that the STATCOM can continue to operate without interruption. The adjacent sub module should be protected against possible explosion of semiconductor switch.

Under the restriction of redundancy (minimum two or 5% whichever is higher)





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i.e. the failure of any semiconductor switch or sub module or monitoring device etc. shall not prevent continued system operation. In the event of any of the above failure, the STATCOM shall annunciate and identify the specific location of the failed device and continue operation until such time as repairs can be scheduled. During such time the next shutdown can be availed, the STATCOM must continue to operate without downgrading STATCOM capability.

The switching device's design should include an appropriate allowance for unequal voltage distribution across individual devices in the valve due to stray capacitor and component tolerances.

The switching device's design should include an appropriate allowance for unequal voltage distribution across individual devices in the valve due to stray capacitor and component tolerances.

Each switching device should be able to operate within component ratings, generally with at least two failed sub-module or level. The number of possible failed sub-modules or levels as specified shall be consistent with the availability requirements of the STATCOM system.

## 8.1.3. Sub module for Multi-Module Topology

The key element of the Multi-Module topology shall be the Sub module. By increasing the number of these sub modules, it is possible to obtain high voltage with extremely low harmonic distortion and very low dv/dt using low switching frequency that reduces power losses. Sub module shall have the following characteristics:

VSC sub-modules should be protected against overvoltages with appropriate strategies. Description of the failure mode of the switching device and the strategies used following failure should be provided.

In each fiber optic cable (having multiple fiber cores) used for control/communication purpose of sub-module at least two fiber cores shall remain available as spare for future use.

8.1.4. The STATCOM sub module has DC capacitors that require a charge to allow full functionality and performance. At the startup of the STATCOM Station, the capacitors are discharged. During the energization sequence of the STATCOM, Capacitors are charged from the main power grid via resistor operated in series to the main connection circuits. Once the desired charging

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voltages are reached, the charging resistor circuit is bypassed using bypass switch/breaker.

The Type and Rating of the charging resistor and associated bypass switch shall be designed with the aim to achieve operation according to the overall performance requirements of the STATCOM Station and shall conform to relevant Standard.

## 8.1.5. STATCOM Valve Cooling system

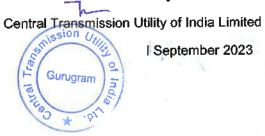
A closed-loop recirculating system shall be provided with full heat rejection capacity with redundancy for pumps, heat exchangers, and fans, appropriate to the STATCOM Station availability requirements. The cooling system should be able to maintain full capacity at maximum ambient temperature and maximum STATCOM reactive power output. The cooling system should be able to operate at the lowest ambient temperature and zero output specified. The Valve cooling system shall have black start capability and necessary UPS/UMD shall be provided separately for each STATCOM Unit.

The valve cooling system shall be designed to meet the performance requirements described in this specification and as described below.

- Each STATCOM Unit shall have its own de-ionized water valve a) cooling system with redundant pumps.
- For cooling the STATCOM valves, a deionized re-circulating b) (closed loop) water system shall be used.
- Water to air heat exchanger shall be used for cooling of this dec) ionized water. Water to water heat exchanger shall not be employed.
- System shall be designed such that no shut down of STATCOM d) be resorted to for making up the deionized water in the system. The make-up water should comply with the recommended PH and purity.
- Cooling water shall have a constant flow rate irrespective of e) loading. The flow rate shall be decided on the basis of extreme operating conditions.
- The control system for cooling system shall be redundant type f) including the provision of redundant control supply and main power supply. However, in place of redundant control system







for cooling system, suitable alternate mode is also acceptable meeting the requirement of fulfilling cooling system operation even if failure of cooling control.

- 2x100% pumps with one as standby shall be provided for the **g**) primary. Should a pump failure occur, the second pump should automatically switch in without shutting down the STATCOM. An alarm shall be displayed at the control panel for failure of first pump and standby pump in operation.
- with h) Each coolina shall be provided system independent/dedicated UMD supply however common battery for both UMD power supply may be accepted. A UMD system will provide an extended capability of the STATCOM Station to deliver reactive power without any interruption, adding a buffer against the system faults or during events such as delayed voltage recovery or TOV.
- The secondary cooling system shall be redundant type such i) that it shall be possible to take out 10% (minimum one number) of the cooler module (fan unit) of secondary cooling system without affecting the rated performance of STATCOM).
- The cooling system should be designed and provided to permit j) work on faulty pump / faulty fan without shutting down the system.
- Normally no make-up water shall be required however in case k) of expansion vessel level going low; same shall be replenished automatically by means of make-up water tank and make up water pump to be supplied with the system.
- TSP shall provide water treatment plant of sufficient capacity. I) The purification (treatment) system shall be designed to maintain the conductivity below 1 micro siemens. A resistivity cell in the outgoing water from deionizer should detect the depletion of ionized material. Filters and deionizers shall be designed to allow replacement during operation. Normal replacement shall not be required more than once every year.
- Filters and deionizer/deoxidizer material shall be designed to m) allow replacement within minutes without shutdown of the cooling unit. (Normal replacement should not be required more than once/year).



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- n) Primary cooling system shall monitor its own operation and condition of cooling water.
- o) The protection system of cooling cycle shall have minimum following alarms:
- p) Depleted deionizing cell
  - i) Depleted deionizing cell
  - ii) Low water resistivity
  - iii) High water temperature
  - iv) Primary pump stopped
  - v) Fan stopped
  - vi) Primary pump or fan interlock circuits faulty
  - vii) Primary cycle (Make-up water) tank level low
  - viii) Failure of control supply.
  - ix) UMD/UPS fault.
- q) Following shutdown alarms / TRIP shall be provided with cooling system protection. Excessive low water resistivity Excessive high water temperature, complete loss of auxiliary supply to primary pumps, low flow, Low Pressure etc.
- r) The dissipative components of the converter are cooled with deionized water.
- s) The power losses are transferred to the external ambient by means of a deionized water /air heat exchanger. All the piping and other components Complete instrumentation set has been mounted on board in order to check the status of the cooling system:
  - Conductivity gauge system.
  - Flow meter equipped with two set points (alarm and trip).
  - Pressure meter
  - Two thermometers for inlet and two thermometers for outlet (two set points for alarm and trip)
  - Thermostat

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- t) The status of the cooling system is monitored by means of the control system.
- u) Replacement of certain cooling equipment (e.g., pumps, fans, cooler unit etc.), if defective, should be possible while the cooling system still operates.

## 8.1.6. Tests on STATCOM Unit Valve

All applicable tests i.e. Operational Type Tests, Dielectric Type Tests, Test for valve insensitivity to electromagnetic disturbance & Production tests shall be done as per latest edition of IEC 62927.

## 8.2. STATCOM Station Control equipment and operator interface

## 8.2.1. Control Equipment

The control systems should achieve the functional objectives given in Clause 6.2. The accuracy of voltage should be within  $\pm$  1% of the reference voltage. The accuracy of the gradient and linearity of the slope delivered by the STATCOM Station should be defined in relation to the current deviation from the theoretical slope defined in Clause 3.1. The maximum deviation should be less than  $\pm$  5% of nominal current.

The control system design shall be based on single fail criterion i.e. failure of any one component in the system should not result in to outage of the complete system. As a minimum, a dual (hot standby) digital programmable controller shall be supplied for each STATCOM unit/branch and STATCOM Station to control the STATCOM, MSRs and MSCs completely including the functions listed as mentioned below:

- a. The controller shall have diagnostic and self-checking features for both itself, and for valves, gate firing and drive circuits, interface hardware and software. This is required to reduce outage times and to facilitate fault finding.
- b. The Controller shall be reprogrammable. The Owner shall have at least the following possibility for changing the following reference and limit values via HMI:
- c. Closed loop Controllers:

The STATCOM Station controller shall have means to modify the reference set points. This refers to the functionality that will allow



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all the control parameters to be adjustable within selectable limits and is inclusive of, but not limited to following:

- o Voltage controller
- o Q controller (reactive power controller).
- o Supplementary VSC current controller.
- o Other supplementary control functions.
- d. Sequence Controllers:

The sequence control and open-loop controllers shall include the control of all switchgears and associated control gear and external devices.

- e. The Controller shall have at least 10% excess I/O capacity to allow future program upgrades to satisfy the changing requirements of the power systems or future extensions to the STATCOM Stations. As a minimum a control of up to 4 future HV shunt devices (reactors or capacitors) shall be included in the offer.
- f. All control signals available for remote control must also be available locally so as to ensure that a local operator can operate the STATCOM Station if the communications link between STATCOM Station and remote control centers is lost.
- g. A changeover switch shall be provided for control the selection of local or remote control.
- h. Tsp shall provide the equipment necessary for the purpose of control, protection and interlocking of all equipments within the scope of supply.
- i. TSP shall be responsible for design and coordination of control, protection and interlocking system and switching sequences within the STATCOM Station. All necessary interfacing required between AC switchyard equipment and STATCOM Station for the above purpose shall also be included in the scope of TSP.
- j. It is proposed to control STATCOM through a Supervisory Control and Data Acquisition (SCADA) System. All the data shall be acquired through suitable means from field and various components and control is executed through the redundant HMI. The local STATCOM Station Control system shall consist of

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Redundant STATCOM Station controller, redundant HMI workstation, Gateway, STATCOM Station Control System Engineering cum Disturbance Recorder (DR), PC which can also be used as standby HMI workstations in case of emergency with associated peripheral equipment such as color laser log Printers, Color laser jet fault record printer, GPS System, Inverter / UPS etc. all interconnected via redundant Ethernet based Station LAN Network. Each work-stations and PCs at STATCOM Station shall have at least 19" LED display.

- k. In addition to above, HMI workstation (identical to HMI Workstation provided in STATCOM Station control room) should also be provided in control room of main 400 kV substation. This HMI workstation should be powered from an independent UPS system sufficient enough to provide power to HMI workstation for minimum two hours in case of auxiliary power failure.
- I. The control equipments shall satisfy the reliability and availability requirements specified in this specification
- m. All necessary measures shall be taken to ensure satisfactory operation in presence of harmonic current and voltage, noise and radio interference signals. The equipments shall be designed to operate in the environmental conditions specified in the specification

## 8.2.2. Operator Interface

- a) Each STATCOM Station shall have a SCADA consisting of an HMI which shall provide a Centralized (local) operator control of the STATCOM Station functions. All human interface operations necessary for the control and monitoring of the STATCOM shall be provided at this point.
- b) Any abnormal condition requiring operator action or intervention or maintenance on any of the STATCOM Station subsystems shall be annunciated at the STATCOM Station control room and

   *J* the Substation control room.
- c) The local HMI shall include the following diagrams as different screens in the display system:

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- i. Complete STATCOM Units and STATCOM Station single line diagram including EHV and MV busses
- ii. AC Auxiliary supply and distribution
- iii. DC Auxiliary supply and distribution
- iv. STATCOM Valve cooling systems
- v. Interlocking system.
- d) These diagrams shall indicate status, alarms, voltages, currents, etc. The HMI shall provide complete diagnostics on alarm and trip indications as required and discussed in this specification, including SER information.
- e) A facility shall be provided whereby the local HMI features and functions shall be accessible from remote. A remote user shall be able to view screens and change STATCOM Station parameter settings.
- f) As Fatehgarh-3 substation where STATCOM Station shall be installed, will be equipped with Substation Automation System (SAS) conforming to IEC 61850, it is required that STATCOM Station control and monitoring shall be integrated with SAS already provided at main 400 kV Sub-station by the TSP. It is proposed to connect STATCOM Station SCADA with SAS through a Gateway and the database, configuration etc. of main substation SAS shall be upgraded to incorporate STATCOM Station events, alarms, Controls (both switchgear and control functions of STATCOM Station like setting of parameters etc.) so that STATCOM Station can be effectively monitored and controlled from main substation SAS and shall be monitored from Load Dispatch Center (NRLDC).

## 8.3. STATCOM Station Protection System

#### 8.3.1 Protection system Design

a) To ensure that faults are cleared within stability critical clearing time, to minimize damage to plant, and to avoid voltage collapse, loss of load or load limitations, TSP shall provide a high speed main protection scheme. An independent (having separate measurement system) back-up protection scheme shall be provided in the event of the main protection scheme failing or switched out for maintenance.

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- b) The STATCOM Station shall be completely self-protecting (unit protection). STATCOM Station shall be protected from damage for all conditions of over-current, overvoltage, excessive reactive power loading, unbalance due to loss of capacitor elements, phase-to-phase and phase-to-ground faults, three phase faults, loss of cooling, semiconductor valve or control malfunction, faults (STATCOM, MV system) in individual primary connected components of the STATCOM, HV system faults, etc. The STATCOM Station shall withstand the maximum fault current for a period of the maximum fault clearing time as specified, considering second contingency cases due to the previously mentioned conditions.
- c) All protection equipment and systems should be properly coordinated to prevent incorrect operations of the protection equipment or systems during normal STATCOM Station operation, including anticipated abnormal conditions on the transmission system, as specified. Fail-safe principles should be applied throughout.
- **8.3.2.** The basic principle and order of precedence for the control and protection shall be, to take care of following:
  - · Correctly identify a fault, problem or error condition,
  - Only if necessary, isolate the minimum number of components, subsystems whenever possible,
  - Utilize degraded modes to the maximum extent possible either directly (no interruption of the STATCOM Station operation) or indirectly (by tripping the STATCOM Station momentarily in order to isolate the branch and re-energisation of the STATCOM Station).
  - Trip STATCOM Station and Block.
  - a) Failure of the STATCOM Station Interface (SCADA interface) shall not result in a Protection trip of the STATCOM Station. A fail-safe philosophy shall be implemented to allow the STATCOM Station to operate safely and independently from the STATCOM Station Interface (SCADA interface).
  - b) Protection equipment shall be designed and applied to provide maximum discrimination between faulty and healthy circuits.



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- c) The Protection shall be sufficiently sensitive to cater for the full range from maximum to minimum fault level condition. The Protection shall also be suitable for a system fault level equal to the maximum short circuit capacity of the substation. All current transformer design shall be based on these fault levels.
- d) All required protective, control devices, etc. including auxiliary instrument transformers and panels, relays, cabling, wiring, indication, and all other associated plant and material necessary for the effective operation of the protection systems shall be supplied and installed by TSP.
- e) The protective relays shall be microprocessor based. Relays shall have approved characteristics and mounted in dust and moisture proof cases. The protective relays shall be provided with visual indication for starting, tripping and failure of the protective function. The LEDs shall be reset without opening the covers. The protection relays shall also be equipped with HMI facilities suitable for manual parameter settings and viewing of the settings. Relays with provision for manual operation from outside the case, other than for resetting, are not acceptable. Relay settings shall be visible and readable without having to remove the relay cover. Relays shall be of approved construction and shall be arranged so that adjustments, testing and replacement can be effected with the minimum of time and labor. Auxiliary Relays of the hand reset type if provided shall be capable of being reset without opening the case. Electrically reset tripping relays shall be provided as necessitated by the system of control, such as for those circuits subject to remote supervisory control.
- f) Relay contacts shall be suitable for making and breaking the maximum currents which they may be required to control in normal service but where contacts of the protective relays are unable to deal directly with the tripping currents, approved Auxiliary tripping relays shall be provided. In such cases, the number of auxiliary tripping relays operating in tandem shall be kept to a minimum in order to achieve fast and reliable fault clearance times. Separate contacts shall be provided for alarm and tripping functions. Relay contacts shall make firmly without bounce and the whole of the relay mechanisms shall be as far as possible unaffected by vibration or external magnetic fields
- g) Steps shall be taken to protect the circuitry from externally impressed transient voltages which could reach the circuitry via

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connections to instrument transformers or the station battery. The outing of cables should be such as to limit interference to a minimum. Any auxiliary supplies necessary to power solid state circuits shall be derived from the main station battery and not from batteries internal to the protection.

## h) Relay communication

The Relays shall also have a communication port provided on the front of the relay for configuration and parameter settings as well as downloading of data. A direct port suitable for remote communication shall also be provided at the back of the Relay. This port shall conform to IEC - 61850.

## i) Tripping schemes

- Tripping of MV circuit breakers shall be done by means of two separated trip signals.
- Duplicate high security tripping circuits for MV Circuit Breaker shall comprise two independent high speed (less than 10 ms) high burden (greater than 150 W) tripping relays for each circuit, each with its own independent DC supply. The trip circuits for all circuit breakers need to be equipped with a "lockout" function and it shall be possible for this to be reset manually and remotely by the operator.
- j) The protection for the power system is based on a normal switching state and an occurrence of a single fault. This means that faults resulting from maintenance as well as the simultaneous occurrence of two or more faults are not taken into account.
- k) The input circuits of the digital protections shall be monitored by means of a plausibility check. If any incorrect information is found, the protection function shall be blocked by the protection. All protection relays shall have facilities for monitoring trip circuits. Detection of an interruption in the case of a switched on circuit breaker shall be signaled.

# I) Test facilities



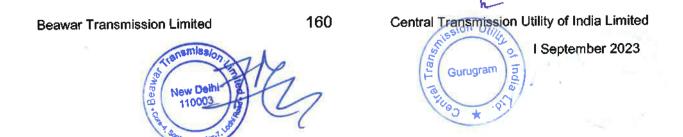


- It shall be possible to test the protective device during operation without causing trips. Links shall be provided for isolation of individual protection trip circuits and the common protection trip circuit to each circuit breaker trip coil.
- Separate test facilities shall be provided for each current and voltage transformer secondary circuit so as to give access for testing of protection relays and associated circuits. The Test facility to be supplied shall have two selectable positions, a Service and a Test position. In the service Position, the test switch connects CTs and VTs signals to the Relays and trip commands to the circuit breaker trip coils. In the Test Position, the test switch applies a short-circuit to the CT secondary windings and open circuits the VT secondary cores and allow injection of secondary current and voltage into the relay. At the same time, the Trip commands to the Circuit Breaker Trip Coils are Isolated. The test Switch supplied shall be to the Approval of the Owner.
- m) The protection of the electrical system shall be designed and installed in such a way that the failed equipment is disconnected selectively and automatically. All equipment are to remain operative during transient phenomena, which may arise during switching or other disturbances to the system.

# n) Auxiliary DC Supplies

 The protection concept has to be designed in a way so that back-up protection is provided at all times. All protection relays shall be configured in a way that failure of one Auxiliary DC system will not affect the relay. If all DC supplies to the controllers are lost, the STATCOM Station breaker must be tripped via the protection panel.

# o) Electromagnetic Compatibility



- Electronic Relays and other electronic devices and the ancillary circuits connected to them, such as power supplies, current and voltage transformer secondaries, status or tripping or alarm circuits shall be designed to ensure that they are compatible for use in the hostile electrical environment found in an MV or HV substation.
- Adequate steps by means of suitable design, shall be taken to prevent Electromagnetic Interference (EMI), (generated by sources such as circuit breakers, disconnectors, lightning, radio or radar emissions, switching contactors in dc circuits etc.) or Electrostatic Discharges (ESD) from affecting relay performance or causing damage to components.
- All relays offered shall therefore have been type-tested to meet the current requirements of IEC Standards with respect to High Frequency disturbance, Fast Transients, Electrostatic Discharge, Radio Frequency Interference testing etc.
- p) List of Protection functions for STATCOM Station

# **Coupling Transformer Protection:**

- i) Biased Differential protection (87T)
- ii) REF protection (64T)
- iii) Overcurrent protection (50, 51)
- iv) Ground Overcurrent (51N)
- v) Overflux protection (HV and MV)
- vi) Transformer mechanical trips

# STATCOM MV Bus Protection:

- i) Bus Differential protection (87)
- ii) Ground over current protection (51N), used with neutral Grounding Transformer
- iii) Under / Over Voltage (59 Ph-Ph) protection
- iv) Over voltage (Open Delta) protection

# STATCOM Branch Protection:

- i) Differential protection (87)
- ii) Overload protection (49)
- iii) Overcurrent protection inside delta (50, 51)
- iv) Negative phase sequence protection (46)
- v) STATCOM branch overcurrent protection (50, 51, 50N, 51N)

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## MSR Branch Protection:

- i) Differential protection (87)
- ii) Ground over current protection (51N)
- iii) Reactor branch unbalance protection (Negative Phase Sequence)
- iv) Thermal Overload protection

## **MSC Branch Protection:**

- i) Ground over current protection (51N)
- ii) Capacitor Overvoltage (Using current signal) protection.
- iii) Capacitor unbalance protection (60C)
- iv) Over current protection (50, 51)
- The protection functions listed above are minimum set of function to be provided, any additional protection required to fulfill the requirement of protection system shall also be provided.
- Further protection function of individual branch (STATCOM, MSC, MSR) shall trip the respective branch MV CB.
- All CBs shall be provided with individual Breaker Failure protection relay. Breaker Failure relay shall have the logic based on current signal or CB close open status.
- Any fault on MV bus will trip the 400 kV breaker. However, any branch fault shall be cleared by respective MV branch Circuit Breaker.
- Protection System for the STATCOM valve portion of the STATCOM station shall be provided in the redundant controllers to isolate the STACOM valve during internal overload/overvoltage, ground fault etc.

## 8.4. STATCOM Station Fault Recording System

An integrated Transient Fault Recording (TFR) System shall be supplied, installed & commissioned. This shall include trigger level settings for analog, etc. subject to review and comment. Disturbance and event recording facilities are required for local monitoring of the STATCOM following a disturbance on the power system or the STATCOM System. The following inputs are required:

All analogue signals (output signals)



- All digital signals (control outputs, status indications, commands, alarms and trip indications). Internal STATCOM Station control signals/variables to be selectable.
- The accuracy of the TFR for event inputs shall be at least 100 µs (sampling rate of minimum 10 kHz).
- The TFR shall have provision for remote access and retrieval of recorded information on to a PC. For this purpose, a communication link to the Substation LAN shall be implemented.
- The remote software application for the data retrieval shall be included.

## 8.5. Mechanically Switched Reactor (MSR)

MSR is a fixed source of inductive reactive power connected in shunt to the MV bus of STATCOM Station and switched by means of Circuit breaker (with control switching device) based on the command from STATCOM Station control system. The rated capability of MSRs shall be at 400 kV (Referred to as "Point of Common Coupling" or PCC) and in the steady state frequency range of 48.5 Hz-50.5 Hz. However, The MSR Components shall be designed with the aim to achieve operation according to the overall performance requirements of the STATCOM Station. The individual components of MSR shall be able to withstand the onerous condition imposed by system overvoltage and harmonics. The MSR consists of 3-ph Air Core Reactor, 3-ph MV Circuit breaker (SF6/Vaccum type), associated current transformer, 3ph Disconnector and associated safety grounding switch. The MSR area shall be fenced and castle key interlock with safety grounding switch shall be provided for human safety.

Specification for individual components like Air core reactors etc. is provided in the subsequent clause.

## 8.6. Mechanically switched capacitor (MSC)

MSC is a switched 3-phase capacitor bank connected in shunt to the MV bus of STATCOM station and switched automatically by means of Circuit breaker (with control switching device) based on the command from STATCOM Station control system. The rated capability of MSCs shall be at 400 kV (Referred to as "Point of Common Coupling" or PCC) and in the steady state frequency range of 48.5 Hz-50.5 Hz.

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However, TSP will ensure the corresponding values at PCC (400 kV) for possible operating condition measured at PCC. The MSC Components shall be designed with the aim to achieve operation according to the overall performance requirements of the STATCOM Station. The individual components of MSC shall be able to withstand the onerous condition imposed by system overvoltages and harmonics. The MSC consists of 3-ph AC power capacitor bank, current limiting air core reactor as required, 3-ph MV Circuit breaker current transformer. 3-ph associated (SF6/Vaccum type), Disconnector and associated safety grounding switch. The MSC area shall be fenced and castle key interlock with safety grounding switch shall be provided for human safety. Specification for individual components like Capacitors, Air core reactors etc. is provided in the subsequent clauses.

## 8.7. Air Core Reactors

- a) Reactors shall be air core, dry type, be suitable for outdoor installation and there shall be no tapping on the reactors. The insulation level shall be adequate and TSP has to ensure proper insulation coordination.
- b) The insulation of the reactor shall be class F and hot spot temperature rise shall not exceed 105°C above ambient temperature. Winding temperature rise shall not exceed 80°C above ambient temperature.
- c) The reactor shall be designed to withstand thermal dynamic shocks and mechanical shocks while in service and during erection.
- d) The reactor shall fully conform to the relevant IEC standard,
- e) The reactor shall be designed to withstand overloading due to over voltage as specified and shall also be subjected to excitation by harmonics; the reactor must be able to withstand such events without deterioration in normal life.
- f) The reactors shall be subjected to type and routine tests in accordance with the latest issue of IEC-60076 as appropriate to the type of reactor provided.

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g) Tests on Reactors: The reactors shall be subjected to type and routine tests in accordance with the latest issue of IEC-60076 as appropriate to the type of reactor provided.

## 8.8. AC POWER CAPACITORS

## i) General

- a) The capacitor banks shall comprise of capacitor units, discharge devices, protection equipment, series reactor as required, earthing switches, suitably connected in series and parallel, mounted at ground level with protected fencing all round. The number, arrangement and connection of capacitor banks shall be designed to suit the requirement of compensator as a whole. If convenient, the capacitor banks may be used in conjunction with reactors. In this event the rating of capacitor shall be adequate to cope up with the harmonic loading. The frequency variations shall also be considered. To limit the peak in rush current for switching in the capacitors, current limiting reactors with parallel connected damping resistors if required shall be connected in series with shunt capacitor banks.
- b) The capacitors shall be provided with internal type fuses. Alternatively, fuseless capacitor is also acceptable.
- c) Fuses shall not melt nor shall deteriorate when subjected to the inrush current during the life of the bank.
- d) With the capacitor charged to a peak voltage, the fuses associated with the healthy elements shall not melt when carrying the discharge current resulting from a breakdown of an element or from an external short circuit.
- e) Fuses shall be capable of disconnecting a faulty element over a range of voltage across the unit terminals from 0.9 times rated unit voltage (Un) to 2.0 Un. In addition, if all the elements in same row of an internally fused capacitor were to fail as a result of a cascading action, the last fuse element to melt shall be capable of successful disconnection with a voltage of not less than 1.5 times.

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- f) After fuse operation the fuse assembly shall be able to withstand continuously at least 1.5 times rated unit voltage Un across the gap for 10 Seconds.
- g) Fuses shall be preferably of the current limiting type but fuse system shall in any event be designed to ensure that energy released into a faulty capacitor unit is less than the valve that will cause rupture or bursting of the container.
- h) The capacitor units shall be outdoor type. The container of the capacitor shall be of stainless steel.
- Each capacitor unit shall be readily accessible and replaceable without disturbing any other unit. The supporting frames shall be designed to provide adequate ventilation to the units.
- capacitor unit shall be The dielectric fluid used in j) bio-degradable, non-toxic. safe & environmentally Polychlorinated biphenyle (PCB) type dielectric or any of its derivatives shall not be acceptable.

## ii) Construction & Design Requirement

- a) The capacitors shall conform to IEC-60871. The capacitors shall be provided with internally mounted discharge resisters with characteristics in accordance with IEC-60871.
- b) The current limiting reactors (as required) shall be dry type and connected in series with the capacitor bank. Suitable lifting lugs shall be provided.
- c) The capacitor enclosure shall have sufficient strength to withstand without damage or loss of life, mechanical load, both in operation and during erection. The loads shall include electromagnetic forces including those during faults external or internal to the capacitor bank, wind loading, forces due to expansion and contraction caused by ambient temperature and load variation and seismic effects all as specified.

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- d) The capacitor units shall be interchangeable in order to reduce the spare requirements and simplify maintenance procedures.
- e) The capacitor stack shall be vibration free. Stack shall have a fixed potential, that is connected to one electrical points in the bank. The stack shall be of galvanized structural steel.
- f) The capacitor racks shall be supplied complete with all capacitor units, insulators, and connection and shall be equipped with lifting lugs/eyes to facilitate assembly into the stacks. The racks shall be constructed of galvanized structural steel. No drilling of galvanized steel shall be allowed. Each rack shall be labeled with the weight of the fully equipped racks, the phase and bank of which it forms a part. The maximum and minimum capacitor unit capacitance which may be substituted into the racks as spares shall be suitably identified. Suitable warning labels shall be affixed.
- g) The capacitor shall be specially designed to be suitable for intermittent duty to which they are suitable to.
- h) The capacitors should comply with the overload capacity as per NEMA.
- i) The capacitor elements shall be vacuum dried inside the case prior to impregnation with dielectric fluid. After impregnation, the capacitor unit shall be sealed immediately upon removal of the impregnated reservoir.
- j) The discharge register shall discharge the unit from peak operating voltage to less than 75 Volts within 10 minutes.
- k) The capacitor case shall be made from type 409 stainless steel or equivalent stainless steel with all joints welded and tested for leaks.
- I) All racks and bus insulators as well as the insulators used to insulate each stack of capacitor from ground level shall be pincap or post type. The minimum voltage rating shall be 15 kV and low frequency wet withstand voltage of all insulator used to

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insulate within or between the capacitor racks of a stack shall not be less than three times the actual voltage stress across the insulators. The insulator shall be outdoor type manufactured from wet porcelain. The insulators shall be bolted to the top members of the frame to support electric grade aluminum buses.

- m) The size and groupings of the individual capacitor units shall be such that a single blown fuse will not cause the voltage across parallel group to rise by more than 10%.
- n) The redundancy to be provided, shall be as per requirement specified regarding reliability and availability in clause mentioned elsewhere.

# iii) Capacitor Unit Failure Detection

The stages of capacitor units or element failure detection shall be provided as below.

- A three-step unbalanced current protection shall be provided in each capacitor bank to initially generate an alarm when the unbalance limit is reached and finally to trip the bank in case of limit being exceeded.
- b) The first stage shall generate an alarm and the capacitor unit shall continue in service. It may be assumed that the bank shall be disconnected for maintenance within 2 weeks.
- c) The second stage shall generate a separate alarm and a delayed trip signal which will disconnect the bank after two hours.
- d) The third stage shall cause immediate disconnection of Capacitor Bank.

# iv) Tests on Capacitors

All the tests on capacitor units shall be generally in accordance with the latest issue of IEC publication 60871.

# 8.9. Coupling Transformer

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The TSP shall provide 04 Nos. single phase coupling transformer to operate as 3- ph bank with one unit as spare for stepping down the voltage from 400 kV system to a suitable medium voltage value as required. The Medium Voltage side of the coupling transformer to couple with the STATCOM shall not be less than 20 kV to ensure optimum power transformation.

The Coupling Transformer shall be designed with the aim to achieve operation according to the overall performance requirements of the STATCOM Station. The transformer should be designed & rated to carry complete capacitive and inductive reactive loading as specified for STATCOM Station including that of mechanically switched capacitor and Reactors etc.), as well as harmonic currents associated with the most onerous operating conditions of STATCOM Station, without loss of life.

The coupling transformer shall be designed in accordance with the most upto date experience in STATCOM application and shall incorporate the latest improvements of design currently employed in the industry. The Comprehensive design review of Coupling Transformer of STATCOM Station shall be carried out by the TSP.

## 8.9.1. General Requirements

The coupling transformer shall be designed electrically and mechanically for operating conditions peculiar to STATCOM Station operation, which shall include, but not be limited to the following:

- a) Electrical insulation problems resulting from the transformer being subjected to voltages of distorted sinusoidal wave shape because of saturation, harmonics, trapped DC in capacitors etc.
- b) The cumulative effect of electro-dynamic forces produced during valve commutation or other short circuit conditions imposed by valve design limitation and valve group operation.
- c) Harmonic currents due to STATCOM operation, with particular reference to additional stray losses resulting from these harmonic currents.
- d) No generation of uncharacteristic harmonics by the transformers.
- e) Stresses due to normal control operation and other onerous operations such as blocking and de-blocking.
- f) Stress due to fast response requirement of STATCOM for loading from 100% inductive to 100% capacitive and vice-versa.

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- g) Overvoltage stresses for which STATCOM shall be designed as per specification would apply for transformer also.
- h) All other stresses for which STATCOM Station shall be designed as per specification would apply for transformer also.
- i) The transformer and all its accessories like Bushings, CTs etc. shall be designed to withstand without damage, the thermal and mechanical effects of any external short circuit to earth and of short circuit across the terminals of any winding for a period of 3 seconds. The short circuit level of 400 kV system to which the transformer shall be connected as per the maximum short circuit level of main substation. Short Circuit level of the Coupling Transformer shall be as per Short Circuit level of the respective Substation. Short circuit level for HV bushing shall be 63 kA for 1 Sec.
- j) The transformer shall be capable of being loaded in accordance with IEC-60076 or the overload conditions as specified which is worst. There shall be no limitation imposed by bushings during its terminal fault.
- k) The transformer shall be capable of withstanding the mechanical stresses caused by symmetrical or asymmetrical faults on any winding.
- I) The transformer should be designed to carry a certain level of direct current consistent with the STATCOM design. To ensure minimum harmonic generation, the saturation flux density of the transformer should be higher than the maximum flux density reached over the full steady state (continuous operating) range; this margin shall be at least 10%. This maximum flux density (over the full steady state range) is obtained at the highest secondary voltage during any reactive power generation, highest reference voltage, minimum slope, and minimum continuous frequency. The flux density at the highest secondary voltage shall lie in the linear portion of the B-H curve. Any harmonic generated by the transformer should be considered by the design of the STATCOM.
- m) All protection class Current Transformers in coupling transformer shall be of PX/PS type. Other details of these Current Transformers shall be as per protection/metering requirement and shall be decided during detailed engineering. However, the parameters of WTI Current Transformer for each winding shall be as per Coupling Transformer manufacturer.

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- Transformers shall be capable of operating under natural cooled n) condition up to the specified load. The forced cooling equipment shall come into operation by pre-set contacts of winding temperature indicator and the transformer shall operate as a forced cooling unit initially as ONAF up to specified load and then as OFAF. Cooling shall be so designed that during total failure of power supply to cooling fans and oil pumps, the transformer shall be able to operate at full load for at least ten (10) minutes without the calculated winding hot spot temperature exceeding 140 deg C. Transformers fitted with two coolers, each capable of dissipating 50 per cent of the loss at continuous maximum rating, shall be capable of operating for 20 minutes in the event of failure of the oil circulating pump or blowers associated with one cooler without the calculated winding hot spot temperature exceeding 140 deg C at continuous max rating.
- o) The transformer shall be free from any electrostatic charging tendency (ECT) under all operating conditions when all oil circulation systems are in operation. In general, oil flow speed shall not exceed 1.0 m/sec within winding in the oil flow system of the transformers. The manufacturer shall ensure that there is no electrostatic charging tendency in the design.

SI. No.	Description	Unit	<b>Technical Parameters</b>
1.1	Rated Capacity		
	HV	MVA	To meet the performance
	MV	MVA	requirement & ratings of STATCOM. The transformer shall be suitable for 100% reactive loading
1.2	Voltage ratio (Line to Line)		400 / XX (*)
1.3	Single / Three Phase Design		Single phase
1.4	Applicable Standard		IEC 60076
1.5	Rated Frequency	Hz	50

The Technical Parameters of Transformer shall be as below

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SI. No.	Description	Unit	<b>Technical Parameters</b>
1.6	Cooling & Percentage Rating at		ONAN/ONAF/(OFAF or
	different cooling		ODAF): 60% / 80%/100%
			OR
			ONAN/ONAF1/ONAF2:
			60% /80%/100%
			OR
			OFAF (with 5 x 25% unit
			cooler if required)
1.7	Impedance at 75 Deg C		
	HV-MV		To suit the design
			requirements.
1.8	Tolerance on Impedance (HV-	%	As per IEC
	MV)		
1.9	Service		Outdoor
1.10	Duty		Continuous Reactive
			loading
1.11	Overload Capacity		IEC-60076-7
1.12	Temperature rise over 50deg C		
	ambient Temp		
i)	Top oil measured by	°C	45
	thermometer		
ii)	Average winding measured by	°C	50
	resistance Method		
1.13	Windings		
i)	System Fault level		
	HV	kA	63
	MV	kA	To suit the design
			requirements.
ii)	Lightning Impulse withstand		
	Voltage		
	HV	kVp	1300
	MV	kVp	*
	Neutral	kVp	170
iii)	Switching Impulse withstand		
	Voltage		
	HV	kVp	1050
iv)	One Minute Power Frequency		
	withstand Voltage		

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SI. No.	Description	Unit	<b>Technical Parameters</b>
	HV	kVrms	570
	MV	kVrms	*
	Neutral	kVrms	70
V)	Neutral Grounding		Solidly grounded
vi)	Insulation		
	HV		Graded
	MV		Uniform
vii)	Tan delta of winding	%	< 0.5
1.14	Vector Group (3 – ph) (unless specified differently elsewhere)		YNd*
1.15	Tap Changer		Not Applicable
1.16	Bushing		
i)	Rated voltage		
	HV	kV	420
	MV	kV	*
	Neutral	kV	.36
ii)	Rated current (Min.)		
	HV	A	*
	MV	A	*
	Neutral	A	*
iii)	Lightning Impulse withstand Voltage		
	HV	kVp	1425
	MV	kVp	*
	Neutral	kVp	170
iv)	Switching Impulse withstand Voltage		
	HV	kVp	1050
V)	One Minute Power Frequency withstand	14	
	Voltage		
	HV	kVrms	695
	MV	kVrms	*
	Neutral	kVrms	77
vi)	Minimum total creepage distances		
	HV	mm/kV	31mm / kV

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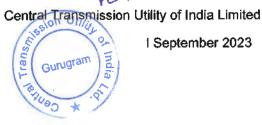
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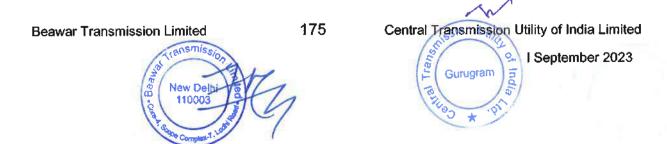
The MV Switchgear shall be designed with the aim to achieve operation according to the overall performance requirements of the STATCOM Station.

# 8.10.1. MV Circuit Breaker

The MV Circuit Breaker shall comply with the IEC and all other relevant Standards, and as specified in this specification. They shall satisfy the General Technical Requirements and shall be designed to operate in the environmental conditions specified in this specification.

The Circuit Breaker offered should be of SF6 type /Vacuum type only and of class C2, M2 as per IEC

- i) The circuit breaker shall be complete with terminal connectors, operating mechanism, control cabinets, piping, interpole cable, cable accessories like glands, terminal blocks, marking ferrules, lugs, pressure gauges, density monitors (with graduated scale), galvanised support structure for CB and control cabinets, their foundation bolts and all other circuit breaker accessories required for carrying out all the functions the CB is required to perform.
- ii) All necessary parts to provide a complete and operable circuit breaker installation such as main equipment, terminals, control parts, connectors and other devices whether specifically called for herein or not shall be provided.
- iii) The support structure of circuit breaker shall be hot dip galvanised. Exposed hardware items shall be hot dip galvanised or Electro-galvanised.
- iv) MV Circuit Breaker shall be equipped with controlled switching with consequent optimization of switching behavior, when used in:
  - Switching of Capacitor Bank
  - Switching of shunt Reactor Bank



SI. No.	Description	Unit	<b>Technical Parameters</b>	
	MV	mm/kV	31mm / kV	
	Neutral	mm/kV	31mm / kV	
vii)	Tan delta of bushings			
	HV	%	Refer Note 2	
	MV	%	Refer Note 2	
viii)	Max Partial discharge level at Um			
	HV	рС	10	
	MV	рС	10	
	Neutral		-	
1.17	Max Partial discharge level at 1.58 * Ur /√3	рС	100	
1.18	Max Noise level at rated voltage and at principal tap at no load and all cooling Active	dB	80	
1.19	Maximum Permissible Losses of			
	Transformers			
i)	Max. No Load Loss at rated voltage and Frequency	kW	To suit the design requirements.	
ii)	Max. Load Loss at maximum continuous current and at 75 ^o C	kW	To suit the design requirements.	
iii)	Max. Auxiliary Loss at rated voltage and Frequency	kW	To suit the design requirements.	

### Notes:

- No external or internal Transformers / Reactors are to be used to 1. achieve the specified HV/MV impedances.
- 2. The criteria for Transformer losses shall be "Copper Loss (Load Loss) > Iron Loss (No Load Loss) > Cooler Loss (Auxiliary Loss)".
- (*) marked parameters shall be decided based on STATCOM 4. manufacturer's requirement

#### 8.10. STATCOM Station MV Switchgear

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The instrument transformers shall comply with the relevant IEC Standards. They shall satisfy the general Technical Requirement specified in specification and shall be designed to operate in the environmental conditions specified in this Specification. The instrument transformers provided for control, metering and protective relaying functions shall have voltage & current ratings, accuracy ratings and burden capabilities adequate to provide their designated functions within the overall accuracy requirement of the systems.

# Voltage Transformers

Voltage transformers shall comply with the relevant IEC standards IEC 61869 (Part-1, Part-3 and Part-5).

# Current Transformers

Current transformers shall comply with 61869 (Part-1 and Part-2). Type tests and routine tests as per relevant IEC.

# 8.10.4. Surge Arrester

TSP shall install the surge arresters necessary for the protection of the equipment associated with STATCOM Station in accordance with the requirements as per insulation coordination study. The surge arresters shall give consistent protection to their associated equipment against overvoltages produced by lightning or switching surges, internal or external station faults, and other system disturbances.

The surge arresters shall be rated such that they are able to discharge a specified maximum energy due to the application of lightning, switching surges, temporary over voltages and faults as determined by insulation coordination studies, without coming into the temperature region where thermal runaway could result upon subsequent application of maximum transient and steady state voltage conditions.

The arrester housing shall be porcelain/composite type. The end fittings shall be made of non-magnetic and corrosion proof material.

Internal components shall be designed to eliminate internal corona and also to ensure minimal capacitive coupling with any conducting layer of pollutant on the outside of the porcelain housing Particular attention shall be given to the high discharge currents which some of

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- v) Reactor Switching Duty test shall be conducted on MV Circuit Breaker in line with latest edition of IEC 62271-110.
- vi) Type Tested for Back-to-Back Capacitor Bank Switching as per latest edition of IEC 62271-100.
- vii) Routine tests as per IEC: 62271-100 shall be performed on all circuit breakers.
- viii) The medium voltage circuit breakers in any of the branches shall be designed to switch off metallic three phase short circuits limited only by the transformer impedance of the STATCOM System (Coupling transformer) with the initial short circuit current and DC component according to IEC 60909-0. Thereby the worst case time constant where the maximum short circuit peak and DC component occur shall be considered. The network shall be considered to deliver the maximum short circuit power of the substation.

### 8.10.2. MV Isolator and Earth Switch

The isolators and earth switches shall comply with the IEC and all other relevant Standards, and as specified in this specification. They shall satisfy the General Technical Requirements and shall be designed to operate in the environmental conditions specified in this specification.

- The isolators and accessories shall conform in general to IEC-62271 series as per relevance (or IS:9921) except to the extent explicitly modified in specification.
- ii) Earth switches shall be provided on isolators wherever called for.
- iii) Switches shall be motor operated with local & remote operation feature and local manual operation feature. Remote operation of Earth Switch is not required.
- iv) Disconnections and earth switches shall electrically and mechanically be interlocked. Castle Key interlocking facilities shall be provided to mechanically interlock the earth switch and Isolator to the doors of valve rooms.

### 8.10.3. Instrument Transformers for STATCOM Station



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the arresters may experience in service due to discharge of stored energy of the ac filter and reactive compensating equipment, tripping of STATCOM etc.

#### 8.11. STATCOM Station Auxiliary Power Supply

The auxiliary supply of STATCOM Station shall conform with the reliability. availability. requirements relating to and system redundancy, performing continuously to help ensure that the complete STATCOM Station operates as per the requirements. STATCOM station Auxiliary supply including all necessary switchgear (viz. AC/DC, lighting boards etc.) shall be completely separate from the main substation auxiliary supply, all loads of STATCOM station shall be fed from this supply. The auxiliary supply provides power to the controllers, cooling system, station supplies, and various other essential and non-essential loads. With the exception of the cooling system, all other essential loads are also connected to the DC system of the STATCOM Station which is also to be provided separately from the DC system of the main substation.

The auxiliary supply system shall be able to provide a stable supply for the STATCOM Station during system faults such as single-phase faults, phase-to-phase faults, and three-phase faults and LVRT (Low Voltage Ride Through) to allow continuous operation of the STATCOM Station during these transient events.

The auxiliary supply system of each STATCOM Station shall consist of two main incomers and one emergency incomer from DG set. The two main incomers shall be required to be paired to act redundantly to help ensure a certain degree of reliability and availability. One of the main incomer shall be supplied from 33kV tertiary winding of ICT at the main substation. The other main incomer can be supplied from any one of the following three options:

- Supplied from Tertiary/Yoke winding of STATCOM coupling Transformer.
- Supplied from MV Bus Bar of STATCOM Station.

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• Supplied from Power PT on HV side of coupling Transformer.

Wherever the Voltage variation on the incomer is very high, a solid state AVR (Automatic Voltage Regulator) shall be provided to control

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the auxiliary supply voltage.

All MV incomers shall be provided with suitable CB, disconnector, instrument Transformer etc. along with necessary protection system.

## 8.12. Fire Protection System for STATCOM Station:

Necessary fire protection for STATCOM units, Coupling Transformer, MSC, MCR and Harmonic filter (if any) shall be required. Fire-fighting system shall conform to CEA (Measures Relating to Safety & Electric Supply) Regulations.

Suitable fire detection system using smoke detectors and/or heat detectors shall be provided in STATCOM Station for all room and areas. These smoke fire detection systems shall be connected to a separate Fire annunciation system clearly identifying the zone.

The hydrant system shall be extended from fire fighting system of the substation in the yard. Suitable no. of hydrant shall be provided for protection of STATCOM Station equipment in the yard namely Coupling Transformer, MSCs, MSRs and Harmonic Filter (if required) etc. as applicable for the station. Further suitable nos. of hydrant shall also be provided for STATCOM Station building.

If HVW (High Velocity Water) Spray system is provided for transformers and reactors of main substation, the same may be extended for coupling transformer.

### 8.13. Air-conditioning and ventilation system for STATCOM station

The STATCOM Station shall be provided with Air conditioning system as per requirement.

### 1) AC System (Except Valve Hall):

Air condition system shall be provided for the following rooms in the STATCOM Building:

- a. Control and Relay room
- b. Battery room
- c. Conference Room
- d. Store cum workshop
- e. Cooling system room
- f. Lobby

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Capacity and quantity of the AC units shall be decided based on heat load calculation and redundancy requirement.

## 2) Air-Conditioning System for Valve hall:

Air-Conditioning shall be provided for each Valve room for maintaining the following inside conditions round the year:

Dry Bulb Temperature (DBT): 35 °C (Maximum)

Relative Humidity (RH) - 60% (Maximum)

The system shall be designed for an outside ambient temperature of 50 °C. Based on the above system design & parameters for valve room the AC system shall comprise of "AHU & Air-cooled DX Condensing units" with one Main & one Standby unit for each room. The system shall be designed for 24 Hours, 365 Days of the year operation to maintain the inside temperatures of the Valve Hall for proper operation of the critical equipment. The air-cooled condensing unit shall be designed for continuous duty.

# 9. Engineering studies

The TSP shall carry out studies as brought out in this section with a model of the STATCOM in PSSE and PSCAD and documentation of the same shall be preserved and to be submitted to CEA/CTU, as per their request. The objective of these studies is to verify the steady state requirement of reactive power under normal and contingent operating conditions for peak and light loads conditions in the network.

The studies shall have to be carried out for

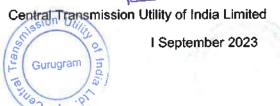
- Peak Load
- Light Load
- Contingency Conditions

The load flow and dynamic file available with CTU shall be provided to the TSP in PSSE version 34 format. If data is not available typical data shall be assumed by TSP.

The studies should demonstrate that the STATCOM system meets all system and equipment specified performance criteria as per the specification. Engineering studies should include, but not be limited to, the studies described in subsequent subsections.



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#### 9.1. System dynamic performance studies

Dynamic performance studies should verify that the STATCOM system controls the system's dynamic performance during system disturbances. Dynamic performance studies include the following:

- Studies verifying that the STATCOM provides adequate dynamic а. control to meet the system and STATCOM system performance criteria for the system conditions.
- Study of response time and of the STATCOM system's behavior b. and contribution to the system's recovery from faults.
- Studies to verify the operation of any supplementary controls C. oscillations following system desianed to damp power disturbances.
- d. Studies to evaluate the interaction of the STATCOM controls with the other nearby control systems, including High Voltage Direct Current (HVDC) controls, generator controls, and controls of other Flexible AC Transmission System (FACTS) devices.

In addition to the above, relevant studies shall include the cases stated as mentioned in Annexure-I

#### 9.2. Harmonic performance

The studies should evaluate resultant maximum harmonic levels at the STATCOM system Point of Common Coupling (PCC), and determine maximum stresses on all STATCOM system components. The study report should include the following:

- Evaluation of specified system and operating conditions (refer to a. Clause 5) under all possible STATCOM operating conditions.
- Evaluation within maximum ranges of STATCOM system **b**. component tolerances (worst performance values may not occur at detuning extremes).
- Evaluation with maximum system voltage unbalance (refers to C. item 8 and item 9 in Table 3 of Clause 5).
- Evaluation of worst case resonance condition between d. STATCOM system and overall system.
- Evaluation of possible resonant overvoltages. e.
- Transformer saturation induced harmonics for component rating f. calculation only.
- Evaluation of impact considering single phase auto reclose g. deadtime.



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# 9.3. Electromagnetic transients, control performance, and overvoltage studies

Transient overvoltage studies should be performed with the actual controls modeled to verify that the STATCOM system equipment is adequately protected against overvoltages and overcurrents (including excessive valve recovery voltages) from power system transients resulting from switching, fault clearing events, and credible STATCOM system misoperations. Evaluation shall include the following:

- a. Study of start-up, including transformer energization, shutdown, switching coordination, and other local area network switching events
- b. Study of STATCOM system protection and protection coordination
- c. Faults on the HV and MV bus (single line-to-ground, phase-tophase, and three-phase)
- d. Faults across the VSC, capacitors, and other equipment if used
- e. Control interaction

# 9.4. Insulation coordination study

Overall insulation coordination should be verified by considering the results of studies (dynamic overvoltages, and fault and switching transients), including the impacts of lightning surges on the STATCOM equipment. This study should determine and verify insulation levels, clearances, and arrester placement and ratings.

# 9.5. Other Studies

- a) Grounding Study
- b) Protection coordination
- c) PLC/radio interference
- d) Magnetic field strength
- e) Other studies as applicable

# 9.6. Software simulation models

The TSP shall provide the latest following PSCAD and PSSE simulation model(s) and parameters to CEA/CTU/GRID-INDIA alongwith detailed documentation for the purpose of future simulation to adequately represent and model the proposed STATCOM system in the respective software:

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- Stability model. TSP should provide a detailed STATCOM а. system dynamics model for use in (PSCAD and PSSE) powerflow and stability simulation software. The model detail should be appropriate and complete for positive-sequence power system simulation and analysis that is typically performed with powerflow and transient stability programs. All appropriate control features for such analysis will be modeled, and necessary documentation on the theory and use of model should be provided. Stability model should be non-proprietary and freely available for distribution.
- Transients model. TSP should provide a detailed STATCOM b. transients model for use in PSCAD. The model detail should be appropriate and complete for transient response calculation of the STATCOM system. All appropriate control features for such analysis will be modeled, and necessary documentation on the theory and use of model should be provided.

#### **Factory tests of controls** 10.

The integrated nature of the performance of the STATCOM in an electrical grid requires the following tests:

- The TSP should perform factory simulator system tests for а. integrated control and protection system to ensure the proper operation of the same. The control system should be connected to a digital simulator with adequate representation of the electrical network for various conditions. The STATCOM system controller needs to be representative of control functions, including basic controllers but inclusive of supplementary controls, firing controls, and protective functions integrated into the controllers.
- The simulator should provide an accurate network representation b. including network harmonic behavior, as well as synchronous condensers, power stations, generators (with AVRs), and pump storage schemes, existing HVDC, SVCs and STATCOMs, future SVCs and STATCOMs, FSC (fixed series capacitors), and shunt reactors/capacitors/filters.

STATCOM system control function type tests on a simulator should include the following:

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- Verification of each control function.
- Verification of control linearity. _

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- Verification of control redundancy.
- Verification of the monitoring system.
- Verification of the protection system with reference to integrated protective functions included in the Controllers and firing controllers.
- Verification of overall system performance for minor and major system disturbances.
- Verification of processor loading of all digital controllers.
- Verification of STATCOM system parallel operation with other controls in the system and control Stability.
- Verification of control equipment performance for auxiliary power supply voltage (AC and DC) and frequency variations (AC).
- Routine production tests of all control functions, and separately of all protection functions.

# 11. VISUAL MONITORING SYSTEM FOR WATCH AND WARD OF STATCOM STATION

Visual monitoring system (VMS) for effective watch and ward of STACOM station premises covering the areas of entire switchyard, STATCOM building, Coupling Transformer, Cooling Towers and main gate, shall be provided. The TSP shall design, supply, erect, test and commission the complete system including cameras, Digital video recorder system, mounting arrangement for cameras, cables, LAN Switches, UPS and any other items/accessories required to complete the system.

Features of VMS system shall be as those specified for main substation.

The number of cameras and their locations shall be decided in such a way that any location covered in the area can be scanned. The cameras shall be located in such a way to monitor at least:

- a) Coupling Transformer, Mechanically Switched Reactors (if any) and Mechanically Switched Capacitors (if any), AC filter banks (if any).
- b) STATCOM Valve hall, Cooling System, Electrical and Mechanical Auxiliary area.

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- c) Entrance to STATCOM Station.
- d) All other Major Equipments (such as CB, CT, VT, SA etc.)

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The cameras can be mounted on structures, buildings or any other suitable mounting arrangement.

## 12. Spares, Special Tools and Tackles

Considering high technology proprietary equipment of the STATCOM TSP shall ensure necessary spares are procured to maintain the necessary reliability and availability of STATCOM station. Further all necessary special tools and tackles required for erection, testing, commissioning and maintenance of equipment shall also be taken.





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### Contingency Cases for Fatehgarh-III STATCOM **N-1 Contingency** A) Contingency at 765 kV level

- Three Phase Fault close to 765 kV bus of Fatehgarh-III S/s (Section-2) 1... followed by tripping of one circuit of Fatehgarh-III S/s (Section-2) -Beawar 765 kV D/c line (1st) (fault persist for 100 ms)
- Single Phase to Ground Fault close to 765 kV bus of Fatehgarh-III S/s 2. (Section-2) followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Fatehgarh-III S/s (Section-2) –Beawar 765 kV D/c line (1st)
- 3. Three Phase Fault close to 765 kV bus of Beawar S/s followed by tripping of one circuit of Fatehgarh-III S/s (Section-2) -Beawar 765 kV D/c line (1st) (fault persist for 100 ms)
- Single Phase to Ground Fault close to 765 kV bus of Beawar S/s 4. followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Fatehgarh-III S/s (Section-2) –Beawar 765 kV D/c line (1st)
- 5. Three Phase Fault close to 765 kV bus of Beawar S/s followed by tripping of one circuit of Beawar-Dausa 765 kV D/c line (fault persist for 100 ms)
- 6. Single Phase to Ground Fault close to 765 kV bus of Beawar S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Beawar-Dausa 765 kV D/c line
- Three Phase Fault close to 765 kV bus of Dausa S/s followed by 7. tripping of one circuit of Beawar-Dausa 765 kV D/c line (fault persist for 100 ms)
- Single Phase to Ground Fault close to 765 kV bus of Dausa S/s 8. followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Beawar-Dausa 765 kV D/c line



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- Three Phase Fault close to 765 kV bus of Beawar S/s followed by tripping of one circuit of Beawar–Ajmer 765 kV D/c line (fault persist for 100 ms)
- 10. Single Phase to Ground Fault close to 765 kV bus of Beawar S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Beawar-Ajmer 765 kV D/c line
- 11. Three Phase Fault close to 765 kV bus of Ajmer S/s followed by tripping of one circuit of Beawar-Ajmer 765 kV D/c line (fault persist for 100 ms)
- 12. Single Phase to Ground Fault close to 765 kV bus of Ajmer S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Beawar–Ajmer 765 kV D/c line
- 13. Three Phase Fault close to 765 kV bus of Beawar S/s followed by tripping of one circuit of Beawar– Chittorgarh 765 kV D/c line (fault persist for 100 ms)
- 14. Single Phase to Ground Fault close to 765 kV bus of Beawar S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Beawar– Chittorgarh 765 kV D/c line
- 15. Three Phase Fault close to 765 kV bus of Chittorgarh S/s followed by tripping of one circuit of Beawar– Chittorgarh 765 kV D/c line (fault persist for 100 ms)
- 16. Single Phase to Ground Fault close to 765 kV bus of Chittorgarh S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Beawar– Chittorgarh 765 kV D/c line
- Three Phase Fault close to 765 kV bus of Bhadla-III S/s followed by tripping of one circuit of Ramgarh- Bhadla-III 765 kV D/c line (fault persist for 100 ms)
- 18. Single Phase to Ground Fault close to 765 kV bus of Bhadla-III S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Ramgarh- Bhadla-III 765 kV D/c line

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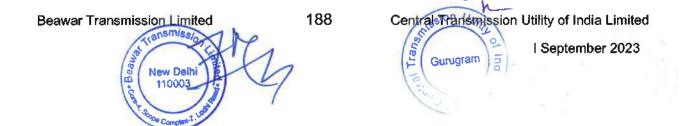


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- 19. Three Phase Fault close to 765 kV bus of Ramgarh S/s followed by tripping of one circuit of Ramgarh- Bhadla-III 765 kV D/c line (fault persist for 100 ms)
- 20. Single Phase to Ground Fault close to 765 kV bus of Ramgarh S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Ramgarh- Bhadia-III 765 kV D/c line
- 21. Three Phase Fault close to 765 kV bus of Bhadla-III S/s followed by tripping of one circuit of Bhadla-III -Sikar-II 765 kV D/c line (fault persist for 100 ms)
- 22. Single Phase to Ground Fault close to 765 kV bus of Bhadla-III S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Bhadla-III -Sikar-II 765 kV D/c line
- 23. Three Phase Fault close to 765 kV bus of Sikar-II S/s followed by tripping of one circuit of Bhadla-III -Sikar-II 765 kV D/c line (fault persist for 100 ms)
- 24. Single Phase to Ground Fault close to 765 kV bus of Sikar-II S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Bhadla-III -Sikar-II 765 kV D/c line

# Contingency at 400 kV level

- 25. Three Phase Fault close to 400 kV bus of Fatehgarh-III S/s (Section-2) followed by tripping of one circuit of Fatehgarh-III S/s (Section-2) Fatehgarh-IV (Section-1) 400 kV D/c line (fault persist for 100 ms)
- 26. Single Phase to Ground Fault close to 400 kV bus of Fatehgarh-III S/s (Section-2) followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Fatehgarh-III S/s (Section-2) –Fatehgarh-IV (Section-1) 400 kV D/c line
- 27. Three Phase Fault close to 400 kV bus of Fatehgarh-IV S/s (Section-1) followed by tripping of one circuit of Fatehgarh-III S/s (Section-2) Fatehgarh-IV (Section-1) 400 kV D/c line (fault persist for 100 ms)



- 28. Single Phase to Ground Fault close to 400 kV bus of Fatehgarh-IV S/s (Section-1) followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Fatehgarh-III S/s (Section-2) –Fatehgarh-IV (Section-1) 400 kV D/c line
- 29. Three Phase Fault close to 400 kV bus of Fatehgarh-III S/s (Section-2) followed by tripping of one circuit of Fatehgarh-III S/s (Section-2) Bhadla-III 400 kV D/c line (fault persist for 100 ms)
- 30. Single Phase to Ground Fault close to 400 kV bus of Fatehgarh-III S/s (Section-2) followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Fatehgarh-III S/s (Section-2) –Bhadla-III 400 kV D/c line
- 31. Three Phase Fault close to 400 kV bus of Bhadla-III S/s (Section-2) followed by tripping of one circuit of Fatehgarh-III S/s (Section-2) Bhadla-III 400 kV D/c line (fault persist for 100 ms)
- 32. Single Phase to Ground Fault close to 400 kV bus of Bhadla-III S/s (Section-2) followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Fatehgarh-III S/s (Section-2) –Bhadla-III 400 kV D/c line
- 33. Three Phase Fault close to 400 kV bus of Beawar S/s followed by tripping of Beawar–Merta 400 kV line (fault persist for 100 ms)
- 34. Single Phase to Ground Fault close to 400 kV bus of Beawar S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Beawar-Merta 400 kV line
- 35. Three Phase Fault close to 400 kV bus of Merta S/s followed by tripping of Beawar–Merta 400 kV line (fault persist for 100 ms)
- 36. Single Phase to Ground Fault close to 400 kV bus of Merta S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Beawar–Merta 400 kV line
- 37. Three Phase Fault close to 400 kV bus of Beawar S/s followed by tripping of Beawar–Kota 400 kV line (fault persist for 100 ms)
- 38. Single Phase to Ground Fault close to 400 kV bus of Beawar S/s followed by single pole opening (100 ms) of the faulted phase and

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unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Beawar-Kota 400 kV line

- 39. Three Phase Fault close to 400 kV bus of Kota S/s followed by tripping of Beawar–Kota 400 kV line (fault persist for 100 ms)
- 40. Single Phase to Ground Fault close to 400 kV bus of Kota S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Beawar–Kota 400 kV line
- 41. Three Phase Fault close to 400 kV bus of Bhadla-III S/s followed by tripping of one ckt of Bhadla-III–Fatehgarh-II 400 kV D/c line (fault persist for 100 ms)
- 42. Single Phase to Ground Fault close to 400 kV bus of Bhadla-III S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Bhadla-III-Fatehgarh-II 400 kV D/c line
- 43. Three Phase Fault close to 400 kV bus Fatehgarh-II S/s followed by tripping of one ckt of Bhadla-III–Fatehgarh-II 400 kV D/c line (fault persist for 100 ms)
- 44. Single Phase to Ground Fault close to 400 kV bus of Fatehgarh-II S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. tripping of one circuit of Bhadla-III–Fatehgarh-II 400 kV D/c line

# Contingency at 220kV level

- 45. Three phase fault close to 220KV Fatehgarh-III S/s (Section-2) bus with Tripping of 220KV ABC RE Solar (400MW) - Fatehgarh-III S/s (Section-2) line
- 46. Three phase fault close to 400KV Fatehgarh-III S/s (Section-2) bus, with Tripping of 400 kV Azure Power (500MW+500MW) - Fatehgarh-III S/s (Section-2) line
- Three phase fault close to 220KV Fatehgarh-III S/s (Section-2) bus with Tripping of 220kV Adani Renewable Energy Holding Four Ltd. (300MW) - Fatehgarh-III S/s (Section-2) line
- 48. Three phase fault close to 400KV Fatehgarh-III S/s (Section-2) bus with Tripping of 400 kV Adani Renewable Energy Holding Four Ltd. (900MW) - Fatehgarh-III S/s (Section-2) line

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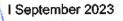
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49. Three phase fault close to 220KV Fathegarh-IV S/s (Section-1) bus with Tripping of 220kV ABC RE Solar (380MW) - Fathegarh-IV S/s (Section-1) line

# B) N-1-1 Contingency Contingency at 765 kV level

- Case 1 & 2 (consider as separate cases) + Single Phase Fault close to 765 kV bus of Fatehgarh-III S/s (Section-2) followed by single pole opening (100 ms) of the faulted phase (2nd ckt of Fatehgarh-III S/s (Section-2) –Beawar 765 kV D/c line) and successful re-closure (dead time 1 second)
- Case 3 & 4 (consider as separate cases) + Single Phase Fault close to 765 kV bus of Beawar S/s followed by single pole opening (100 ms) of the faulted phase (2nd ckt of Fatehgarh-III S/s (Section-2) –Beawar 765 kV D/c line) and successful re-closure (dead time 1 second)
- 3. Case 5 & 6 (consider as separate cases) + Single Phase Fault close to 765 kV bus of Beawar S/s followed by single pole opening (100 ms) of the faulted phase (2nd ckt of Beawar–Dausa 765 kV D/c) line and successful re-closure (dead time 1 second)
- 4. Case 7 & 8 (consider as separate cases) + Single Phase Fault close to 765 kV bus of Dausa S/s followed by single pole opening (100 ms) of the faulted phase (2nd ckt of Beawar–Dausa 765 kV D/c) and successful re-closure (dead time 1 second)
- 5. Case 9 & 10 (consider as separate cases) + Single Phase Fault close to 765 kV bus of Beawar S/s followed by single pole opening (100 ms) of the faulted phase (2nd ckt of Beawar–Ajmer 765 kV D/c line) and successful re-closure (dead time 1 second)
- Case 11 & 12 (consider as separate cases) + Single Phase Fault close to 765 kV bus of Ajmer S/s followed by single pole opening (100 ms) of the faulted phase (2nd ckt of Beawar–Ajmer 765 kV D/c line) and successful re-closure (dead time 1 second)
- 7. Case 13 & 14 (consider as separate cases) + Single Phase Fault close to 765 kV bus of Beawar S/s followed by single pole opening (100 ms) of the faulted phase (2nd ckt of Beawar– Chittorgarh 765 kV D/c line) and successful re-closure (dead time 1 second)
- Case 15 & 16 (consider as separate cases) + Single Phase Fault close to 765 kV bus of Chittorgarh S/s followed by single pole opening (100 ms) of the faulted phase (2nd ckt of Beawar– Chittorgarh 765 kV D/c line) and successful re-closure (dead time 1 second)

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- Case 17 & 18 (consider as separate cases) + Single Phase Fault 9. close to 765 kV bus of Bhadla-III S/s followed by single pole opening (100 ms) of the faulted phase (2nd ckt of Ramgarh- Bhadla-III 765 kV D/c line) and successful re-closure (dead time 1 second)
- Case 19 & 20 (consider as separate cases) + Single Phase Fault 10. close to 765 kV bus of Ramgarh S/s followed by single pole opening (100 ms) of the faulted phase (2nd ckt of Ramgarh- Bhadla-III 765 kV D/c line) and successful re-closure (dead time 1 second)
- Case 21 & 22 (consider as separate cases) + Single Phase Fault 11. close to 765 kV bus of Bhadia-III S/s followed by single pole opening (100 ms) of the faulted phase (2nd ckt of Bhadla-III -Sikar-II 765 kV D/c line) and successful re-closure (dead time 1 second)
- Case 23 & 24 (consider as separate cases) + Single Phase Fault 12. close to 765 kV bus of Sikar-II S/s followed by single pole opening (100 ms) of the faulted phase (2nd ckt of Bhadla-III -Sikar-II 765 kV D/c line) and successful re-closure (dead time 1 second)

# Contingency at 400 kV level

- Case 25 & 26 (consider as separate cases) + Single Phase Fault 1. close to 400 kV bus of Fatehgarh-III S/s (Section-2) followed by single pole opening (100 ms) of the faulted phase and unsuccessful reclosure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. 2nd circuit of Fatehgarh-III S/s (Section-2) -Fatehgarh-IV (Section-1)
- 2. Case 27 & 28 (consider as separate cases) + Single Phase Fault close to 400 kV bus of Fatehgarh-IV (Section-1) followed by single pole opening (100 ms) of the faulted phase and unsuccessful reclosure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. 2nd circuit of Fatehgarh-III S/s (Section-2) -Fatehgarh-IV (Section-1)
- 3. Case 29 & 30 (consider as separate cases) + Single Phase Fault close to 400 kV bus of Fatehgarh-III S/s (Section-2) followed by single pole opening (100 ms) of the faulted phase and unsuccessful reclosure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. 2nd circuit of Fatehgarh-III S/s (Section-2) -Bhadla-III 400 kV D/c line
- Case 31 & 32 (consider as separate cases) + Single Phase Fault 4. close to 400 kV bus of Bhadla-III S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time

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1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. 2nd circuit of Fatehgarh-III S/s (Section-2) –Bhadla-III 400 kV D/c line

- Case 41 & 42 (consider as separate cases) + Single Phase Fault close to 400 kV bus of Bhadla-III S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. 2nd circuit of Bhadla-III–Fatehgarh-II 400 kV D/c line
- 6. Case 43 & 44 (consider as separate cases) + Single Phase Fault close to 400 kV bus of Fatehgarh -II S/s followed by single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line i.e. 2nd circuit of Bhadla-III–Fatehgarh-II 400 kV D/c line

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# **Frequently Asked Queries:**

## 1.0 Transmission Line:

- 1.1 Please clarify that whether shutdowns for crossing of existing transmission lines of POWERGRID/STUs/ Power Evacuation Lines from Generation Plants/ Any other Transmission Licensee will be given to TSP on chargeable basis or free of cost.
  - **Reply:** Shutdowns for crossing of existing transmission lines of POWERGRID/ STUs/ Power Evacuation Lines from Generation Plants/ Any other Transmission Licensee will be given to TSP by the concerned owner of the lines as per their own terms & conditions. As far as shutdown of ISTS lines are concerned the same can be availed by approaching respective Regional Power Committee.
- 1.2 We understand that the suggested swing angle criteria are applicable for Suspension Insulator in Suspension Tower. Further, you are requested to provide similar swing angle and clearance criteria for Pilot Insulator with Jumper & Jumper.
  - **Reply:** It is clarified that the swing angle criteria (as mentioned in RFP) for transmission lines is applicable for Suspension Insulator in Suspension Tower. Further, as per Clause 3.0 of Specific Technical Requirements for transmission lines, Transmission service Provider (TSP) shall adopt any additional loading/design criteria for ensuring reliability of the line, if so desired and /or deemed necessary.
- 1.3 We request you to kindly allow that use of diamond configuration at Power line crossings and the existing owner of the lines may be directed to allow the same for the successful bidders.
  - **Reply:** Power line crossing including Diamond configuration is responsibility of the TSP. TSP shall formally submit the profile of the crossing section to the owner of the existing line suggesting proposed crossing alternatives. The crossing will have to be carried out as per approval of owner of the existing line.
- 1.4 It is requested you to kindly provide present status of Forest Clearances if any transmission line corridor area falling in wildlife forest / reserve forest/ mangroves.

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**Reply:** Based on the preliminary route survey, the process of initiation of forest clearance for the forest stretches, if any, enroute the

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proposed line alignment will be initiated by way of writing letters to the concerned authority (ies). However, it may be noted that it will be the responsibility of TSP for obtaining forest clearance for the forest stretches as provided in the survey report and also for any forest area encountered during detailed survey.

### 2.0 Substation

2.1 We understand that space for storage of O&M spare shall be provided by existing owner within the station boundary without any cost. Kindly confirm.

**Reply:** Space for storage of O&M spares shall be arranged by TSP on its own.

2.2 We presume that the O&M for the end Termination bays will be in the scope of the TSP and TSP shall not be liable for any payment towards O&M to the existing owner of the substation. Kindly confirm.

**Reply:** Operation and maintenance of the bays is solely responsibility of the TSP.

- 2.3 With reference to subject scheme of existing sub-station, we assumed following scope of work:
  - (a) We assumed internal road is available and need not to consider in the present scope of work.
  - (b) Drainage is available and need not to consider in the present scope of work.
  - (c) Cable trench extension in adjacent to Main cable trench only under present scope of work.
  - (d) Levelled area being provided by developer for bay extension.
  - **Reply:** Regarding requirement of internal road, drainage, cable trench, leveling of the bay extension area, bidder is advised to visit site and acquaint themselves with the provisions/facilities available at substation.
- 2.4 Kindly provide the soil investigation report of soil parameters of existing substation.
  - **Reply**: Bidder is advised to visit the substation site and ascertain the requisite parameters.
- 2.5 Kindly confirm, energy accounting of aux. power consumption. Whether it will be on chargeable basis or part of transmission loss.

Reply: It will be on chargeable basis.

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Communication systems e.g. OPGW, FOTE, PMU etc. are required for grid operation through RLDC/SLDC, speech communication, tele-protection and tele-metering.

- 3.2 Is space for installation of communication panels are provided to TSP in existing Substations incase new bays are in the scope of TSP?
  - **Reply**: The space related issues are deliberated in the RFP itself. TSP to carry out survey of the existing substation for physical space requirement. In case space is not available in the existing substation then TSP shall accommodate the same in the respective bay SPR (Switchyard Panel Room)/Bay Kiosk/ Relay panel room in case of GIS s/s. Further, TSP to connect and integrate the proposed FOTE with the existing FOTE in the control room.

In Case 132kV Substation TSP shall accommodate the said panels either by extension of existing control room or other arrangements.

- 3.3 How is the OPGW laying done in case of LILO lines?
  - **Reply**: In case LILO lines are on same towers (e.g. both Line in and Line Out portion are on same towers, generally done LILO of S/C lines). Then 2x24F OPGW shall be required to install by TSP on both earthwire peak on 400kV & 765kV lines where two E/W peaks are available. On 220 & 132kV lines where only one E/W peak is available TSP to install one no. 48F OPGW.

Incase LILO lines are on different towers (e.g. both Line In and Line Out portion are on different towers, generally done LILO of D/C lines). Then 1x24F OPGW shall be required to install by TSP on one earthwire peak, on both Line In and Line Out portions of 400kV & 765kV lines. On 220 &132kV lines where only one E/W peak is available TSP to install one no. 24F OPGW in place of conventional earthwire.

3.4 How is the OPGW laying done in case Multi circuit Towers?

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**Reply:** In case two different lines are using common multi circuit portion for some distance (originating from different stations, may be terminating on same or on different stations). Two no. 24F OPGW to be installed on both E/W peaks for common M/C portion of 765kV & 400kV lines.

Incase 220/132kV lines using multi circuit portion where single E/W peak is available one no. 48F may be installed for common multi circuit portion.

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New Delhi 110003

Central Transmission Utility of India Limited September 2023

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We understand that VMS requirement is for unmanned stations only. For 2.6 Manned stations VMS is not compulsory.

Reply: VMS shall be provided in line with requirements of RfP document.

It is understood that Construction water and power shall be provided free 2.7 of cost to TSP by respective substation owner for construction of new bavs.

Reply: Arrangement of construction power & water is in the scope of TSP.

- 2.8 It is understood that existing fire hydrant system shall be extended by the TSP for bay extension.
  - Reply: Existing fire hydrant system shall be extended from existing system (if required)
- Please clarify that Status of land acquisition for Substations. Whether the 2.9 lands have been acquired by BPC and will be transferred to TSP.

**Reply:** The acquisition of land for substation is in the scope of TSP.

- We understood that no any dedicated metering CT & CVT required for 2.10 Line/feeders. Further, we understood that requisite Energy meters for various 765kV, 400kV & 220kV Feeders shall be provided & installed by CTU free of cost to TSP.
  - Dedicated metering CT and CVT are not required for Reply: line/feeders. Metering core of existing CT/CVT can be used provided accuracy class is matching with metering requirement. Requisite Special Energy Meters shall be provided and installed by CTU at the cost of TSP in C&P panel subject to space availability, else, in separate metering panel (to be provided by TSP at its cost).

#### 3.0 Communication

- What are the usage of OPGW, FOTE, PMU etc. under communication 3.1 requirement of RFP?
  - User shall be responsible for providing compatible equipment Reply: along with appropriate interface for uninterrupted communication with the concerned control center and shall be responsible for successful integration with the communication system provided by CTU.

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# Schedule: 2

# Scheduled COD

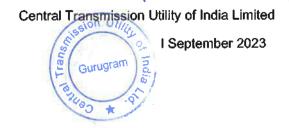
# [Note: As referred to in the definition of "Element", "Scheduled COD", and in Articles 3.1.3 (c), 4.1 (b) and 4.3 (a) of this Agreement]

Sr. No.	Name of the Transmission Element	Scheduled COD in months from Effective Date	Percentage of Quoted Transmission Charges recoverable on Scheduled COD of the Element of the Project	Element(s) which are pre-required for declaring the commercial operation (COD) of the respective Element
1.	Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus Reactor		15.81 %	All elements of scheme marked at S. No. 1, 2, 3 and 4 are required to be commissioned simultaneously as
2.	LILO of both circuit of Ajmer- Chittorgarh 765 kV D/c at Beawar		14.10 %	their utilization is dependent on commissioning of
3.	LILO of 400kV Kota –Merta line at Beawar	18 months	1.84 %	each other
4.	Fatehgarh-3 PS – Beawar 765 kV D/c along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line		56.92 %	
5.	± 2x300MVAr STATCOM, 4x125 MVAr MSC, 2x125 MVAr MSR at Fatehgarh3 PS along with 2 nos. of 400 kV bays at Fatehgarh-3 PS	24 months	11.33 %	

Beawar Transmission Limited New Delhi New Delhi  The payment of Transmission Charges for any Element, irrespective of its successful commissioning on or before its Scheduled COD, shall only be considered after successful commissioning of the Element(s), which are pre-required for declaring the commercial operation of such Element as mentioned in the above table.

Scheduled COD for the Project is: 24 months from Effective Date. [Note: List of Element(s) along with the critical Element(s) to be provided by CEA]





# Schedule: 3

# Safety Rules and Procedures

#### [Note: As referred to in Articles 5.6 of this Agreement]

#### 1: Site Regulations and Safety:

The TSP shall establish Site regulations within sixty (60) days from fulfilment of conditions subsequent, as per Prudent Utility Practices setting out the rules to be observed till expiry of the Agreement at the Site and shall comply therewith.

Such Site regulations shall include, but shall not be limited to, rules in respect of security, safety of the Project, gate control, sanitation, medical care, and fire prevention, public health, environment protection, security of public life, etc.

Copies of such Site regulations shall be provided to the Nodal Agency and the CEA for the purpose of monitoring of the Project.

#### 2: **Emergency Work:**

In cases of any emergency, the TSP shall carry out all necessary remedial work as may be necessary.

If the work done or caused to be done by any entity, other than the TSP, the TSP shall, reimburse the actual costs incurred, to the other Party carrying out such remedial works.

#### 3: Site Clearance:

In the course of execution of the Agreement, the TSP shall keep the Site reasonably free from all unnecessary obstruction, storage, remove any surplus materials, clear away any wreckage, rubbish and temporary works from the Site, and remove any equipment no longer required for execution of the Agreement. After completion of all Elements of the Project, the TSP shall clear away and remove all wreckage, rubbish and debris of any kind from the Site, and shall leave the Site clean and safe.

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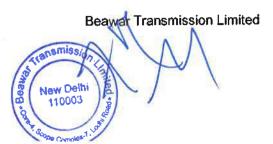


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# 4: Watching and Lighting:

The TSP shall provide and maintain at its own expense all lighting, fencing, and watching when and where necessary for the proper construction, operation, maintenance / repair of any of the Elements of the Project, or for the safety of the owners and occupiers of adjacent property and for the safety of the public, during such maintenance / repair.





# Schedule: 4

# **Computation of Transmission Charges**

## 1.1 General

The Monthly Transmission Charges to be paid to the TSP for providing Transmission Service for any Contract Year during the term of the Agreement shall be computed in accordance with this Schedule and paid as per Sharing Regulations.

Illustration regarding payment of Transmission Charges under various scenarios (considering definitions of Contract Year, Expiry Date & Monthly Transmission Charges above) is as below: -

### Illustration-1: In case the Project Elements achieve COD as per Schedule

Quoted Transmission Charges: Rs. 140 Million

Completion Schedule:

Element No.	Completion Schedule in Months	Scheduled CoD of the Element	Actual CoD of the Element	% Charges recoverable on Scheduled CoD of the Element
Element 1	28	1-Feb-2018	1-Feb-2018	25%
Element 2	38	1-Dec-2018	1-Dec-2018	75%

Tariff Payable as follows:

Transmissi	Transmission Charges for Element 1			Charges for	Element 2
1-Feb-18 to 31-Mar-18	140 X 25% X ((28+31)/365)	5.65			0.00
1-Apr-18 to 30-Nov-18	140 X 25% X (244/365)	23.39			0.00
1-Dec-18 to 31-Mar-19		140 X 1009	% X (121/365)		46.41
2		140 X [·]	100% X 1		140
3		140 X [·]	100% X 1		140
4		140 X 1	100% X 1		140
5		140 X ⁻	100% X 1		140
36 (1-Apr to 30- Nov)		140 X 100%	6 X (244/365)		93.59

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# Illustration-2: In case of extension of Scheduled COD as per Article 4.4.1 & 4.4.2 of this Agreement

Quoted Transmission Charges: Rs. 140 Million

**Completion Schedule:** 

Element No.	Completion Schedule in Months	Scheduled CoD of the Element	Actual CoD of the Element	% Charges recoverable on Scheduled CoD of the Element
Element 1	20	1-Feb-2018	1-Jul-2018	25%
Element 2	28	1-Oct-2018	1-Dec-2018	75%

Tariff Payable as follows:

Transmissi	on Charges for Ele	ement 1	Transmission	Charges for I	Element 2
1 <b>-Fe</b> b-18 to 31-Mar-18	-	0.00			0.00
1-Apr-18 to 30-Jun-18		0.00			0.00
1-Jul-18 to 30-Nov-18	140 X 25% X (153/365)	14.67		_	0.00
1-Dec-18 to 31-Mar-19		140 X 1009	% X (121/365)		46.41
2		140 X	100% X 1		140
3		140 X	100% X 1		140
4		140 X	100% X 1	21	140
5		140 X	100% X 1		140
					00.50
36 (1-Apr to 30- Nov)		140 X 1009	% X (244/365)		93.59



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# Illustration-3: In case of delay in achieving COD of Project & all individual Elements (COD of the Project achieved in Contract Year 1)

Quoted Transmission Charges: Rs. 140 Million

**Completion Schedule:** 

Element No.	Completion Schedule in Months	Scheduled CoD of the Element	Actual CoD of the Element	% Charges recoverable on Scheduled CoD of the Element
Element 1	20	1-Feb-2018	1-Dec-2018	25%
Element 2	28	1-Oct-2018	1-Dec-2018	75%

Tariff Payable as follows:

Transmission	Transmission Charges for Element 1			Transmission Charges for Element		
1-Feb-18 to 31-Mar-18		0.00		_	0.00	
1-Apr-18 to		0.00			0.00	
30-Sept-18 1-Oct-18 to 30-Nov-18		0.00	1-Oct-18 to 30-Nov-18		0.00	
1-Dec-18 to 31-Mar-19		140 X 100	% X (121/365)		46.41	
2		140 X	100% X 1		140	
3		140 X	100% X 1		140	
4		140 X	100% X 1		140	
5			100% X 1		140	
36 (1-Apr to 30- Nov)		140 X 100	% X (244/365)		93.59	

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# Illustration-4: In case of delay in achieving COD of Project & all individual Elements (COD of the Project achieved in Contract Year other than Contact Year 1)

Quoted Transmission Charges: Rs. 140 Million

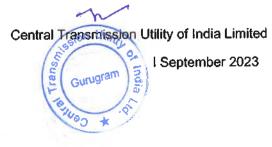
Completion Schedule:

Element No.	Completion Schedule in Months	Scheduled CoD of the Element	Actual CoD of the Element	% Charges recoverable on Scheduled CoD of the Element
Element 1	38	1-Oct-2019	1-May-2020	25%
Element 2	38	1-Oct-2019	1-May-2020	75%

Tariff Payment to be paid as:

Transmission	Charges for	Element 1	Transmission Charges for Element 2		
1-Oct-19 to 31-Mar-20		0.00	1-Oct-19 to 31-Mar-20		0.00
1-Apr-20 to 30-Apr-20	-	0.00	1-Apr-20 to 30-Apr-20	-	0.00
1-May-20 to 31-Mar-21		140 X 100	% X (335/365)		128.49
2		140 X 100% X 1			
3		140 X 100% X 1			
4		140 X	100% X 1		140
5			100% X 1		140
******					
36 (1-Apr to 30- Apr)		140 X 100	0% X (30/ 365)		11.51

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# Illustration5: In case of delay in achieving COD of Element but Project COD achieved on time

Quoted Transmission Charges: Rs. 140 Million

Completion Schedule:

Element No.	Completion Schedule in Months	Scheduled CoD of the Element	Actual CoD of the Element	% Charges recoverable on Scheduled CoD of the Element
Element 1	20	1-Feb-2018	1-Jul-2018	25%
Element 2	30	1-Dec-2018	1-Dec-2018	75%

Tariff Payable as follows:

Transmission Charges for Element 1		Transmission Charges for Element 2			
1-Feb-18 to		0.00			0.00
31-Mar-18				1	
1-Apr-18 to 30-Jun-18		0.00			0.00
1-Jul-18 to 30-Nov-18	140 X 25% X (153/365)	14.67			0.00
1-Dec-18 to 31-Mar-19		140 X 100%	6 X (121/365)		46.41
2		140 X 1	100% X 1		140
3	140 X 100% X 1			140	
4	140 X 100% X 1			140	
5		140 X 1	00% X 1		140
36 (1-Apr to 30- Nov)		140 X 100%	6 X (244/365)		93.59

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## Illustration-6: In case of early commissioning of Project

# Quoted Transmission Charges: Rs. 140 Million

**Completion Schedule:** 

Element No.	Completion Schedule in Months	Scheduled CoD of the Element	Actual CoD of the Element	% Charges recoverable on Scheduled CoD of the Element
Element 1	38	1-Oct-2019	1-Jul-2019	25%
Element 2	38	1-Oct-2019	1-Jul-2019	75%

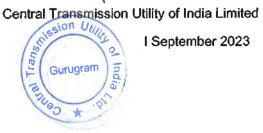
Tariff Payment to be paid as:

Transmission Charges for Element 1		Transmission Charges for Element 2	
1-July-19 to 31-Mar-20	140 X 100	0% X (274/365)	105.09
2	140 X 100% X 1		140
3	140 X 100% X 1		140
4	140 X 100% X 1		140
5	140 X 100% X 1		140
36 (1-Apr to 30- Jun)	140 X 100% X (91/365)		34.91

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# Illustration-7: In case of early commissioning of an element

Quoted Transmission Charges: **Rs. 140 Million** Completion Schedule:

Element No.	Completion Schedule in Months	Scheduled CoD of the Element	Actual CoD of the Element	% Charges recoverable on Scheduled CoD of the Element
Element 1	38	1-Oct-2019	1-Apr-2019	25%
Element 2	38	1-Jul-2019	1-Jul-2019	75%

Tariff Payment to be paid as:

Transmission Charges for Element 1		Transmission Charges for Element 2			
1-Apr-2019 to 30-Jun-19	140 X 25% X (91/365)	8.72	1-Apr-2019 to 30-Jun-19		0.00
1-July-19 to 31-Mar-20	140 X 100% X (274/ 365)			105.09	
2	140 X 100% X 1			140	
3	140 X 100% X 1				140
4	140 X 100% X 1				140
5	140 X 100% X 1			140	
36 (1-Apr-30- Jun)		140 X 100	% X (91/365)		34.91

The Transmission Charges shall be payable on monthly basis as computed above.

### **1.2Computation of Monthly Transmission Charges**

The Monthly Transmission Charges for any month m in a Contract Year n shall be calculated as below:

For AC System:

a. If Actual Transmission System Availability for the month m of contract year n is greater than or equal to 98% and less than or equal to 98.5%;

Monthly Transmission Charges MTC(m) = Tmn *1



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Transmission Service Agreement

b. If Actual Transmission System Availability for the month m of contract year n exceeds 98.5% and less than or equal to 99.75%;

Monthly Transmission Charges MTC(m) = Tmn * (AA/ 98.5%)

c. If Actual Transmission System Availability for the month m of contract year n is greater than 99.75%;

Monthly Transmission Charges MTC(m) = Tmn * (99.75% / 98.5%)

d. If Actual Transmission System Availability for the month m of contract year n is less than 98% and greater than or equal to 95.00%;

Monthly Transmission Charges MTC(m) = Tmn * (AA/ 98%)

e. If Actual Transmission System Availability for the month m of contract year falls below 95%;

Monthly Transmission Charges MTC(m) = Tmn * (AA/ 98%) - 0.02 * (Tmn * (AA/ 95%))

For DC System:

a. If Actual Transmission System Availability for the month m of contract year n is greater than or equal to 95% and less than or equal to 96%;

Monthly Transmission Charges MTC(m) = Tmn *1

a. If Actual Transmission System Availability for the month m of contract year n exceeds 96% and less than or equal to 99.75%;

Monthly Transmission Charges MTC(m) = Tmn * (AA/ 96%)

c. If Actual Transmission System Availability for the month m of contract year n is greater than 99.75%;

Monthly Transmission Charges MTC(m) = Tmn * (99.75% / 96%)

d. If Actual Transmission System Availability for the month m of contract year n is less than 95% and greater than or equal to 92.00%;

Monthly Transmission Charges MTC(m) = Tmn * (AA/ 95%)

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 If Actual Transmission System Availability for the month m of contract year falls below 92%;

Monthly Transmission Charges MTC(m) = Tmn * (AA/ 95%) - 0.02 * (Tmn * (AA/ 92%)

where:

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- AA is the actual Availability, as certified by RPC, as per procedure provided in Schedule 6.
- m is the month in Contract Year 'n'
- Tmn= Transmission Charges for the month 'm' in Contract Year 'n' = (=Transmission Charge/ no. of days in the Year n) * no. of days in month m

Provided, no Transmission Charges shall be paid during the period for which the RLDC has not allowed the operation of the Element/Project due to the failure of the TSP to operate it as per the provisions of the Grid Code.

#### 1.3RLDC Fee & Charges

The payment of RLDC fee & charges, in accordance with relevant regulations of CERC, shall be the responsibility of the TSP.

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#### **Quoted Transmission Charges**

[Quoted Transmission Charges from Annexure - 21 of the RFP of the Selected Bidder to be inserted here]

[To be incorporated from the Bid of the Selected Bidder submitted during the e-reverse auction after its selection]

#### Quoted Transmission Charges: Rs. 2749.39 Million

Proportionate Transmission Charges payable for each Element of the **Project:** 

SI. No.	Name of the Transmission Element	Percentage of Quoted Transmission Charges recoverable on Scheduled COD of the Element of the Project
1.	Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus Reactor	
2.	LILO of both circuit of Ajmer- Chittorgarh 765 kV D/c at Beawar	14.10%
3.	LILO of 400kV Kota –Merta line at Beawar	1.84%
4.	Fatehgarh-3 PS – Beawar 765 kV D/c along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh- 3– Beawar 765 kV D/c line	50.92 %
5.	± 2x300MVAr STATCOM, 4x125 MVAr MSC, 2x125 MVAr MSR at Fatehgarh3 PS along with 2 nos. of 400 kV bays at Fatehgarh-3 PS	11.33%

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#### Appendix II of the Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations 2019

# Procedure for Calculation of Transmission System Availability Factor for a Month

- 1. Transmission system availability factor for nth calendar month ("TAFPn") shall be calculated by the respective transmission licensee, got verified by the concerned Regional Load Dispatch Centre (RLDC) and certified by the Member-Secretary, Regional Power Committee of the region concerned, separately for each AC and HVDC transmission system and grouped according to sharing of transmission charges. In case of AC system, transmission System Availability shall be calculated separately for each Regional Transmission System and inter-regional transmission system. In case of HVDC system, transmission System, transmission System Availability shall be calculated on consolidate basis for all inter-state HVDC system.
- 2. Transmission system availability factor for nth calendar month ("TAFPn") shall be calculated by consider following:
  - i) **AC transmission lines:** Each circuit of AC transmission line shall be considered as one element;
  - ii) Inter-Connecting Transformers (ICTs): Each ICT bank (three single phase transformer together) shall form one element;
  - iii) Static VAR Compensator (SVC): SVC along with SVC transformer shall form one element;
  - iv) **Bus Reactors or Switchable line reactors:** Each Bus Reactors or Switchable line reactors shall be considered as one element;
  - v) **HVDC Bi-pole links:** Each pole of HVDC link along with associated equipment at both ends shall be considered as one element;
  - vi) **HVDC back-to-back station:** Each block of HVDC back-to-back station shall be considered as one element. If associated AC line (necessary for transfer of inter- regional power through HVDC back-to-back station) is not available, the HVDC back-to-back station block shall also be considered as unavailable;
  - vii) Static Synchronous Compensation ("STATCOM"): Each STATCOM shall be considered as separate element.

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3. The Availability of AC and HVDC portion of Transmission system shall be calculated by considering each category of transmission elements as under:



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#### Transmission Service Agreement

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TAFMn (in %) for AC system:

(o + p + q + r+u)

Where,

0	=	Total number of AC lines.
AVo	=	Availability of o number of AC lines.
p	=	Total number of bus reactors/switchable line reactors
AVp	=	Availability of p number of bus reactors/switchable line reactors
q	=	Total number of ICTs.
AVq	=	Availability of q number of ICTs.
ſ	=	Total number of SVCs.
AVr	#	Availability of r number of SVCs
u	=	Total number of STATCOM.
AVu	=	Availability of u number of STATCOMs

### TAFMn (in %) for HVDC System:

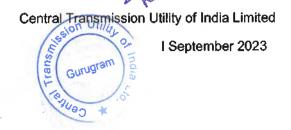
 $=\frac{\sum_{x=1}^{s} Cxbp(act) X AVxbp + \sum_{y=1}^{t} Cy(act) btb X AVybtb}{\sum_{x=1}^{s} Cxbp + \sum_{y=1}^{t} Cybtb} \times 100$ 

Where

Cxbp(act) = Total actual operated capacity of xth HVDC pole Cxbp = Total rated capacity of xth HVDC pole



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#### **Transmission Service Agreement**

АУхбр	=	Availability of x th HVDC pole
Cybfb(act)	=	Total actual operated capacity of y th HVDC back-to-back station
		block
Cybtb	=	Total rated capacity of yth HVDC back-to-back station block
AVybtb	-	Availability of y th HVDC back-to-back station block
S.	=	Total no of HVDC poles
t	=	Total no of HVDC Back to Back blocks

- 4. The availability for each category of transmission elements shall be calculated based on the weightage factor, total hours under consideration and non-available hours for each element of that category. The formulae for calculation of Availability of each category of the transmission elements are as per **Appendix-III**. The weightage factor for each category of transmission elements shall be considered asunder:
  - (a) For each circuit of AC line Number of sub-conductors in the line multiplied by ckt-km;
  - (b) For each HVDC pole- The rated MW capacity x ckt-km;
  - (c) For each ICT bank The rated MVA capacity;
  - (d) For SVC- The rated MVAR capacity (inductive and capacitive);
  - (e) For Bus Reactor/switchable line reactors The rated MVAR capacity;
  - (f) For HVDC back-to-back station connecting two Regional grids- Rated MW capacity of each block; and
  - (g) For STATCOM Total rated MVAR Capacity.
- 5. The transmission elements under outage due to following reasons shall be deemed to be available:
- i. Shut down availed for maintenance of another transmission scheme or construction of new element or renovation/upgradation/additional capitalization in existing system approved by the Commission. If the other transmission scheme belongs to the transmission licensee, the Member Secretary, RPC may restrict the deemed availability period to that considered reasonable by him for the work involved. In case of dispute regarding deemed availability, the matter may be referred to Chairperson, CEA within 30 days.
- ii. Switching off of a transmission line to restrict over voltage and manual tripping of switched reactors as per the directions of concerned RLDC.
- 6. For the following contingencies, outage period of transmission elements, as certified by the Member Secretary, RPC, shall be excluded from the total time of the element under period of consideration for the following contingencies:



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- i) Outage of elements due to acts of God and force majeure events beyond the control of the transmission licensee. However, whether the same outage is due to force majeure (not design failure) will be verified by the Member Secretary, RPC.A reasonable restoration time for the element shall be considered by Member Secretary, RPC and any additional time taken by the transmission licensee for restoration of the element beyond the reasonable time shall be treated as outage time attributable to the transmission licensee. Member Secretary, RPC may consult the transmission licensee or any expert for estimation of reasonable restoration time. Circuits restored through ERS (Emergency Restoration System) shall be considered as available;
- ii) Outage caused by grid incident/disturbance not attributable to the transmission licensee, e.g. faults in substation or bays owned by other agency causing outage of the transmission licensee's elements, and tripping of lines, ICTs, HVDC, etc. due to grid disturbance. However, if the element is not restored on receipt of direction from RLDC while normalizing the system following grid incident/disturbance within reasonable time, the element will be considered not available for the period of outage after issuance of RLDC's direction for restoration;

Provided that in case of any disagreement with the transmission licensee regarding reason for outage, same may be referred to Chairperson, CEA within 30 days. The above need to be resolved within two months:

Provided further that where there is a difficulty or delay beyond sixty days, from the incidence in finalizing the recommendation, the Member Secretary of concerned RPC shall allow the outage hours on provisional basis till the final view.

- 7. Time frame for certification of transmission system availability: (1) Following schedule shall be followed for certification of availability by Member Secretary of concerned RPC:
  - Submission of outage data by Transmission Licensees to RLDC/ constituents
    - By 5th of the following month;
  - Review of the outage data by RLDC / constituents and forward the same to respective RPC – by 20th of the month;
  - Issue of availability certificate by respective RPC by 3rd of the next month.



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#### Appendix-III

## FORMULAE FOR CALCULATION OF AVAILABILITY OF EACH CATEGORY OF TRANSMISSION ELEMENTS

#### For AC transmission system

- AVo(Availability of 0 no. of AC lines) =  $\frac{\sum_{i=1}^{n} Wi(Ti TNAi)/Ti}{\sum_{i=1}^{n} Wi}$
- AVq(Availability of q no. of ICTs) =  $\frac{\sum_{k=1}^{q} W_{k}(Tk TNAk)/Tk}{\sum_{k=1}^{q} W_{k}}$
- AVr(Availability of r no. of SVCs) =  $\frac{\sum_{i=1}^{r} Wi(Ti TNAi)/Ti}{\sum_{i=1}^{r} Wi}$
- AVp(Availability of p no. of Switched Bus reactors) =  $\frac{\sum_{m=1}^{p} Wm(Tm TNAm)/Tm}{\sum_{m=1}^{p} Wm}$
- AVu(Availability of u no. of STATCOMs) =  $\frac{\sum_{n=1}^{N} Wn(Tn TNAn)/Tn}{\sum_{n=1}^{N} Wn}$
- $AV_{xbp}(Availability of an individual HVDC pole) = \frac{(Tx TN)}{Tx}$

AV_{ybtb} (Availability of an individualHVDC Back-to-back Blocks) =(T

$$=\frac{(Ty - TNAy)}{Ty}$$

#### For HVDC transmission system

For the new HVDC commissioned but not completed twelve months;

For first 12 months: [(AVxbp or AVybtb)x95%/85%], subject to ceiling of 95%.

Where,

0	=	Total number of AC lines;
AVo	=	Availability of o number of AC lines;
P	=	Total number of bus reactors/switchable line reactors;
AVp	=	Availability of p number of bus reactors/switchable line reactors;
q	=	Total number of ICTs;
AVq	=	Availability of q number of ICTs:
r	=	Total number of SVCs;
AVr	=	Availability of r number of SVCs;.
U	=	Total number of STATCOM:

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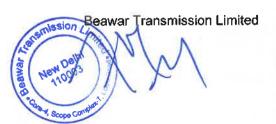
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AVu	=	Availability of u number of STATCOMs;
Wi	Ξ	Weightage factor for ith transmission line;
Wk	=	Weightage factor for kth ICT;
W!	Ξŗ	Weightage factors for inductive & capacitive operation of <i>l</i> th SVC;
Wm	=	Weightage factor for mth bus reactor;
Wn	=	Weightage factor for nth STATCOM.

Ti, , Tk, Tl, , The total hours of ith AC line, kth ICT, lth SVC, mth Switched Bus Reactor
 Tm, Tn, Tx, Ty
 & nth STATCOM, xth HVDC pole, yth HVDC back-to-back blocks during
 the period under consideration (excluding time period for outages not
 attributable to transmission licensee for reasons given in Para 5of the
 procedure)

T_{NA}i , T_{NA}k -The non-availability hours (excluding the time period for outages notT_{NA}i, T_{NA}m,attributable to transmission licensee taken as deemed availability asT_{NA}m, T_{NAX}, T_{NAX}per Para 5 of the procedure) for ith AC line, kth ICT, lth SVC , mth SwitchedEus Reactor, nth STATCOM, xth HVDC pole and ythHVDC back-to-backblock .



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# Entire Bid (both financial bid and technical bid) of the Selected Bidder to be attached here

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#### **Contract Performance Guarantee**

(To be on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution. Foreign entities submitting Bids are required to follow the applicable law in their country.)

In consideration of the ......[Insert name of the SPV or Selected Bidder on behalf of the TSP, or Lead Member in case of the Consortium, with address] agreeing to undertake the obligations under the Transmission Service Agreement dated .....and the other RFP Project Documents and the Nodal Agency and the ......[Insert the name of the BPC], agreeing to execute the RFP Project Documents with the Selected Bidder. regarding setting up the Project, the the guarantee and address of the head office] (hereinafter referred to as Bank") hereby agrees unequivocally, irrevocably and "Guarantor unconditionally to pay to ..... (being the Nodal Agency) at indicated in the TSA] forthwith on demand in writing from the Nodal Agency or any Officer authorized by it in this behalf, any amount up to and not exceeding Rupees .....) only [Insert the bank guarantee] on behalf of M/s. the amount of 

This guarantee shall be valid and binding on the Guarantor Bank up to and including ......and shall not be terminable by notice or any change in the constitution of the Bank or the term of the Transmission Service Agreement or by any other reasons whatsoever and our liability hereunder shall not be impaired or discharged by any extension of time or variations or alternations made, given, or agreed with or without our knowledge or consent, by or between parties to the respective agreement.

Beawar Transmission Limited

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Central Transmission Utility of India Limited

Gurugram



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September 2023

The Guarantor Bank hereby expressly agrees that it shall not require any proof in addition to the written demand from ...... (in its roles as the Nodal Agency), made in any format, raised at the above mentioned address of the Guarantor Bank, in order to make the said payment to Nodal Agency.

The Guarantor Bank shall make payment hereunder on first demand without conditions and notwithstanding any objection by restriction or finsert name of the Selected Bidderl. ..... The Guarantor Bank shall not require Nodal Agency to justify the invocation of this BANK GUARANTEE, nor shall the Guarantor Bank have any recourse against Nodal Agency in respect of any payment made hereunder.

THIS BANK GUARANTEE shall be interpreted in accordance with the laws of India.

The Guarantor Bank represents that this BANK GUARANTEE has been established in such form and with such content that it is fully enforceable in accordance with its terms as against the Guarantor Bank in the manner provided herein.

**THIS BANK GUARANTEE** shall not be affected in any manner by reason of merger, amalgamation, restructuring, liquidation, winding up, dissolution or any other change in the constitution of the Guarantor Bank.

The Guarantor Bank acknowledges that this BANK GUARANTEE is not personal to Nodal Agency and may be assigned, in whole or in part, (whether absolutely or by way of security) by Nodal Agency to any entity to whom the Nodal Agency is entitled to assign its rights and obligations under the Transmission Service Agreement.



#### Transmission Service Agreement

The Guarantor Bank hereby agrees and acknowledges that Nodal Agency shall have a right to invoke this Bank Guarantee either in part or in full, as it may deem fit.

Notwithstanding anything contained hereinabove, our liability under this Guarantee Crores (Rs. restricted to Rs. is force until it shall remain in only and .....) Transmission Service Agreement], with an additional claim period of three hundred sixty five (365) days thereafter. This BANK GUARANTEE shall be extended from time to time for such period, as may be desired by ...... [Insert name of the Selected Bidder or Lead Member in case of the Consortium or SPVI. We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only if Nodal Agency serves upon us a written claim or demand.

#### In witness where of:

Signature .....

Name: ..... Power of attorney No.: .....

For:

...... [Insert Name of the Bank]

Banker's Seal and Full Address, including mailing address of the Head Office



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#### Methodology for determining the Relief Under Force Majeure Event & Change in Law during Construction Period

The relief in the form of revision in tariff due to Force Majeure Event leading to extension of Scheduled COD for a period beyond one hundred eighty (180) days and/ or Change in Law during the construction period shall be as under:

 $\Delta T = [(P \times d)] \div [1 - (1 + d)^{(-n)}]$ 

Where,

∆T = Change in Transmission Charges for each year

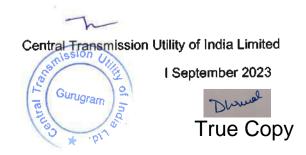
P = Sum of cumulative increase or decrease in the cost of the Project due to Change in Law and interest cost during construction corresponding to the period exceeding one hundred eighty (180) due to Force Majeure Event leading to extension of Scheduled COD for a period beyond one hundred eighty (180) days

n = number of years over which the Transmission Charges has to be paid

d = 7.70 % (Discount rate as notified by the CERC, applicable on the Bid Deadline as per CERC notification dated 06.04.2023).

The increase in Transmission Charges as stated above shall be applicable only if the value of increase in Transmission Charges as calculated above exceeds 0.30% (zero point three percent) of the quoted Transmission Charges of the TSP.

Beawar Transmission Limited 222 ansmise New De 11000



# Annexure-14 (Colly.)

#### FORM-I

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# Application Form for Grant of Transmission licence

1.	Particulars of the Applicant	
I.	Name of the Applicant	: Beawar Transmission Limited
II.	Status	: Public Limited Company
III.	Address	: DLF Cyberpark, Tower – B, 9th Floor,
		Udyog Vihar, Phase-III, Sector 20,
		Gurugram – 122008.
IV.	Name, Designation & Address of	: Mr. Balaji Sivan
	the contact person	Authorized Signatory of the Applicant
		DLF Cyberpark, Tower – B, 9th Floor,
		Udyog Vihar, Phase-III, Sector 20,
		Gurugram – 122008.
V.	Contact Tel. No	: - + 91 8527544855
VI.	Fax No.	: N.A
VII.	Email ID	: balaji.sivan@sterlite.com
VIII.	Place of Incorporation/	: Registrar of Companies, Delhi
	Registration	
IX.	Year of Incorporation	: 2022
X.	Registration Following documents	are to be enclosed:
	a. Certificate of registration	: Annexed to the Petition and marked as
		'Annexure 3
	b. Original Power of Attorney of	: Annexed with Form I as Annexure
	the signatory to commit the	
	Applicant or its promoter	

# 2. Particulars of the Project for which licence is being sought;

(a) Transmission Lines:

Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part F		
S. No.	Name of the Transmission Element	
1	LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar	
2	LILO of 400kV KotaMerta line at Beawar	
3	<ul> <li>Fatehgarh-3- Beawar 765 kV D/c along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3- Beawar 765 kV D/c line</li> <li>Switching equipment for 765 kV 330 MVAR switchable line reactor -4 nos.</li> <li>765 kV, 330 MVAr Switchable line reactor- 4 nos.</li> </ul>	

# (b) Sub-stations: -

4	Establishment of 2x1500MVA 765/400kV Substation at suitable
	location near Beawar along with 2x330 MVAr 765kV Bus Reactor &
	2x125 MVAr 420kV Bus Reactor.
	• 765/400kV 1500 MVA ICTs: 2 nos.
	• (7x500 MVA, including one spare unit)
	• 330 MVAr, 765 kV bus reactor- 2 nos.
	• (7x110 MVAr, including one spare unit)
	• 765kV ICT bays – 2 nos.
	• 400 kV ICT bays – 2 nos.
	<ul> <li>765 kV line bays – 6 nos.</li> </ul>
	• 400kV line bay – 2 nos.
2	• 765kV reactor bay – 2 nos.
	• 125 MVAr, 420kV bus reactor – 2 nos.
	420 kV reactor bay – 2 nos.
	Future provisions: Space for

	<ul> <li>765/400kV ICTs along with bays: 2 nos.</li> <li>765kV line bay along with switchable line reactor: 8nos.</li> <li>765kV Bus Reactor along with bays: 2 nos.</li> </ul>
	<ul> <li>400/220 kV ICTs along with bays: 2nos.</li> <li>400 kV line bays along with switchable line reactor: 4 nos.</li> </ul>
	<ul> <li>400kV Bus Reactor along with bays: 1 no.</li> <li>220 kV line bays: 4 nos.</li> </ul>
5	± 2x300MVAr STATCOM, 4x125 MVAr MSC, 2x125 MVAr MSR at Fatehgarh- 3 PS along with 2 nos. of 400 kV bays at Fatehgarh-3 PS

(c) Commissioning schedule:

The target completion date for the Transmission works described in Point 2(a) and 2 (b) above is 18 months (for S. Nos. 1 to 4) and 24 months (for S. No. 5) from the effective date.

(d) Identified Long-term transmission customers of the Project: -

(Agreements or status of discussion on Agreements to be submitted along with application)

- (e) Any other relevant information: -
  - 3. Levelised transmission charges in case of project selected through the transparent process of competitive bidding and estimated completion cost of the project in other cases

(The levelised transmission charges estimated cost should be indicated in INR, along with the base month and year in case of the estimated cost):

Rs. 2749.39 million per annum

- 4. In case applicant has been selected in accordance with the guidelines for competitive bidding, enclose:
- a) Recommendation of selection by the Empowered Committee:
- b) Evaluation report made public by the Bid Process Coordinator:

5. List of documents enclosed: As mentioned in the Index

Date: 25.09.2023 Place: New Delhi

SMIS. * BENE

(Signature of the applicant or the person authorized)

////SterlitePower

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CERTIFIED TRUE COPY OF THE RESOLUTION PASSED IN THE MEETING OF THE BOARD OF DIRECTORS OF BEAWAR TRANSMISSION LIMITED ON WEDNESDAY, SEPTEMBER 20, 2023

Authority for making petitions to Central Electricity Regulatory Commission ("CERC") and to deal on behalf of the Company

"**RESOLVED FURTHER THAT** Mr. Arun kailasam, Mr. Amit Charan and Ms. Rachna Mohan, directors of the Company, and Mr. Balaji Sivan Authorized Representative be authorized to:

- a) make an application / petition to CERC for grant of transmission license and adoption of tariff under Electricity Act, 2003 and Tariff Adoption, approval for creation of security and to execute all necessary applications, documents, undertakings in connection therewith and personally appear before CERC or any other related statutory authority as may be required;
- b) file petitions before CERC from time to time on behalf of the Company;
- c) appoint any consultant and lawyers for representing before CERC;
- d) deal with any Central Transmission Utility of India Limited or any other statutory agency for the purpose of License and Tariff Adoption;
- e) register and operate online account of the Company to be created on CERC Portal for e-filing of petitions; and
- f) do all such acts, deeds, matters and things necessary to give effect to this resolution

for Establishment of TRANSMISSION SYSTEM FOR EVACUATION OF POWER FROM REZ IN RAJASTHAN (20GW) UNDER PHASE-III PART F (hereinafter referred to as "Project") awarded to the Company by REC Power Development and Consultancy Limited, the Bid Process Coordinator, appointed by the Ministry of Power.

**RESOLVED FURTHER THAT** certified true copy of this resolution be issued under the signatures of any one of the Directors of the Company."

For Beawar Transmission Limited avansmis 0 ā Rachna Mohan

Director DIN: 10235989 Address: H. No. 56, Pushpanjali Colony, Vikas Marg Ext., Karkardooma, East Delhi, Delhi-110092

Date: 22/09/2023 Place: Gungrom



True Copy

Registered Office : YC Co Working Space, 3rd Floor, Plot No.94, Dwarka Sec.13, Opp. Metro, Near Raddison Blu, South West Delhi, New Delhi- 110078

CIN : U40106DL2022GOI397400 | E-mail id: secretarial.grid@sterlite.com www.sterlitepower.com



### BEFORE THE HON'BLE CENTRAL ELECTRICITY REGULATORY COMMISSION, NEW DELHI. PETITION NO.____ / TL / 2023

#### **IN THE MATTER OF:**

Beawar Transmission Limited

... Petitioner

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Versus

Central Transmission Utility of India Limited & Ors.

...Respondents

#### VAKALATNAMA

I/We, Beawar Transmission Limited, the Petitioner in the above Petition appoint and retain Mr. Gaurav Dudeja (D/1125/2009; Email: <u>gaurav.dudeja@phoenixlegal.in;</u> Mob: +91 9818833778), Mr. Dhruval Singh (UP/M/03243/2020; Email: <u>dhruval.singh@phoenixlegal.in;</u> Mob: + 91 9099760530) Ms. Diya Dutta (D/4274/2022; Email <u>diya.dutta@phoenixlegal.in;</u> Mob: +91 8130899113) and Phoenix Legal to act and appear for me/us in the above Petition on my/our behalf to conduct and prosecute (or defend) he same and all proceedings that may be taken in respect of any Application connected with the same or any decree or other passed herein, to file and obtain return of documents, and to deposit and receive on my/our behalf in the said Petition and in Application of Revenue and represent me/us and take "all necessary steps on my/our behalf in the above matter. I/We agree to ratify all apsilon."

MEMO OF APPEARANCE

all necessary steps on my/our behalf in the above matter. I/We agree to ratify done by the aforesaid Advocate in pursuance of this authority.



ER

Sir,

Please enter appearance on behalf of the Petitioner in the above matter.

Dated this the 25th day of September, 2023.

4234 2000 Drowal 103243/2010 1125/2009

Gaurav Dudeja, Partner Phoenix Legal Advocates for Petitioner Phoenix House, 254, 1st Floor, Okhla Industrial Estate, Phase- III, New Delhi- 110020



**////Sterlite** Power

CERTIFIED TRUE COPY OF THE RESOLUTION PASSED IN THE MEETING OF THE BOARD OF DIRECTORS OF BEAWAR TRANSMISSION LIMITED ON WEDNESDAY, SEPTEMBER 20, 2023

Authority for making petitions to Central Electricity Regulatory Commission ("CERC") and to deal on behalf of the Company

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- b) file petitions before CERC from time to time on behalf of the Company;
- c) appoint any consultant and lawyers for representing before CERC;
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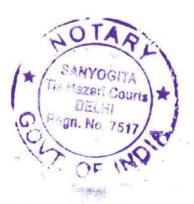
**RESOLVED FURTHER THAT** certified true copy of this resolution be issued under the signatures of any one of the Directors of the Company."

For Beawar Transmission Limited

smis 3 **Rachna Mohan** 

Director DIN: 10235989 Address: H. No. 56, Pushpanjali Colony, Vikas Marg Ext., Karkardooma, East Delhi, Delhi-110092

Date: 22/09/2023 Place: Gurugroun



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