STANDARD SINGLE STAGE REQUEST FOR PROPOSAL DOCUMENT

FOR

SELECTION OF BIDDER AS TRANSMISSION SERVICE PROVIDER THROUGH TARIFF BASED COMPETITIVE BIDDING PROCESS

TO

ESTABLISH INTRA-STATE TRANSMISSION SYSTEM

FOR

CONSTRUCTION OF 400/220 KV, 2X500 MVA GIS SUBSTATION JEWAR, 220/33 KV, 2X60 MVA GIS SUBSTATION CANTT (CHAUKAGHAT) VARANASI, 220/33 KV, 3X60 MVA GIS SUBSTATION VASUNDHARA (GHAZIABAD), 220/132/33 KV, 2X160+2X40 MVA SUBSTATION KHAGA (FATEHPUR) WITH ASSOCIATED LINES

ISSUED BY

PFC CONSULTING LTD.

(A wholly owned subsidiary of Power Finance Corporation Ltd.)

Registered Office:
1st Floor, "Urjanidhi", 1, Barakhamba Lane,
Connaught Place, New Delhi-110001

May 04, 2023

PFC CONSULTING LIMITED
(A wholly owned subsidiary of Power Finance Corporation Limited)

Corporate Office:
9th Floor, A-Wing, Statesman House
Connaught Place, New Delhi-110001

Request for Proposal Document for selection of Bidder as Transmission Service Provider through tariff based competitive bidding process to establish Intra-State Transmission System for "**Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines**" is issued by PFC Consulting Limited.

This RFP document is issued to -

M/s. _____

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_____

General Manager
PFC Consulting Limited
9th Floor, A-Wing, Statesman House
Connaught Place, New Delhi-110001
Email: pfccl.itp@pfcindia.com
Place: New Delhi
Date:
Signature: ……

REQUEST FOR PROPOSAL NOTIFICATION

PFC Consulting Limited
(A wholly owned subsidiary of Power Finance Corporation Limited)

Corporate Office:
9th Floor, A-Wing, Statesman House
Connaught Place, New Delhi-110001

1. UP Power Transmission Corporation Limited (UPPTCL) has placed Letter of Intent (LoI) dated 23.02.2023 for appointing PFC Consulting Limited (PFCCL) to be the Bid Process Coordinator (BPC) for the purpose of selection of Bidder as Transmission Service Provider (TSP) to establish Intra-State transmission system for **"Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines"** through tariff based competitive bidding process.

2. PFC Consulting Limited (PFCCL) (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 Intra-State Transmission System - **Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines**(hereinafter referred to as 'Project') on build, own, operate & transfer basis and to provide transmission service:

Transmission System for Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines		
S. No.	**Name of Transmission Element**	**Scheduled COD from Effective Date**
A.	**Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar (Gautam Budh Nagar) with Associated lines**	
A1	Construction of 400/220 kV, 2×500MVA GIS substation Jewar (GautamBudh Nagar) (alongwith 125MVAR reactor) • 400 kV GIS feeder bay – 02 Nos. • 400 kV GIS Bus Coupler bay – 01 No. • 400 kV GIS Bus reactor bay – 01 No.	18 months

Transmission System for Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines		
S. No.	**Name of Transmission Element**	**Scheduled COD from Effective Date**
	• 400 kV GIS ICT bay – 02 Nos. • 220 kV GIS feeder bay – 02 Nos. • 220 kV GIS Bus Coupler bay – 01 No. • 220 kV GIS ICT bay – 02 Nos. • 220 kV GIS Interconnecting (220 kV S/S Jewar) bay – 02 Nos. • 220 kV GIS Feeder (220 kV S/S Sector-28 YEIDA) bay – 02 Nos.	
A2	LILO of one ckt. of 400 kV Greater Noida (765 kV) – Sector - 148 (400), Noida DC line at 400/220 kV GIS Substation Jewar (Gautam Budh Nagar) (for LILO, twin HTLS conductor and OPGW stringing work on narrow base multi circuit towers)	
B.	**Construction of 220/33 kV, 2x60 MVA GIS substation Cantt, (Chaukaghat) Varanasi with associated lines**	
B1	Construction of 220/33 kV, GIS Substation Cantt, (Chaukaghat) Varanasi • 220 kV GIS feeder bay – 02 Nos. • 220 kV GIS Bus Coupler bay – 01 No. • 220 kV GIS ICT bay – 02 Nos. • 33 kV GIS feeder bay – 12 Nos. • 33 kV GIS Transfer Bus Coupler bay – 01 No. • 33 kV GIS ICT bay – 02 Nos.	18 months
B2	LILO of one ckt, of 220 kV Satnath (400)- Gajokhar DC line at Cantt.(Chaukaghat) Varanasi construction of 41.5 Km (37 Km overhead line (Zebra Conductor) on Lattice Tower and construction of 4.5 Km 630 mm^2 line with copper XLPE cable	
C.	**Construction of 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad) with associated lines**	
C1	Construction of 220/33 kV GIS substation Vasundhara (Ghaziabad) • 220 kV GIS feeder bay – 03 Nos. • 220 kV GIS feeder bay (spare) – 01 No. • 220kV GIS Bus Coupler Bay- 01 No.	18 months

Transmission System for Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines		
S. No.	**Name of Transmission Element**	**Scheduled COD from Effective Date**
	• 220 kV GIS ICT bay – 03 Nos. • 33 kV GIS feeder bay – 10 Nos. • 33 kV GIS Transfer Bus Coupler bay – 01 No. • 33 kV GIS bus sectionalized bay – 02 Nos. • 33 kV capacitor bank bay (1x10 MVAR)– 03 Nos. • 33 kV GIS ICT bay – 03 Nos. • 33/0.4 kV Station transformer bay – 02 Nos.	
C2	LILO of one ckt, of 220 kV Muradnagar(400)- Sahibabad (220) SC line at 220 kV Substation Vasundhara (Ghaziabad) (Multi Ckt. / Monopole Tower)(Zebra conductor)	
C3	220 kV Indirapuram (400) – Vasundhara SC line (Monopole and Narrowbase multi ciruit tower)	
D.	**Construction of 220/132/33 kV, 2x160+2x40 MVA Substation Khaga (Fatehpur) with associated lines**	
D1	Construction of 220/132/33 kV, Substation Khaga (Fatehpur) • 220 kV feeder bay – 02 Nos. • 220 kV spare feeder bay – 02 Nos. • 220 kV bus coupler – 01 No. • 220 kV transfer bus coupler – 01 No • 220 kV ICT bay – 02 Nos. • 132 kV feeder bay – 03 Nos. • 132 kV spare feeder bay – 01 No. • 132 kV bus coupler – 01 No. • 132 kV transfer bus coupler – 01 No • 132 kV ICT bay – 04 Nos. • 33 kV Feeder Bay – 07 Nos. • 33 kV Transfer Bus Coupler bay – 01 No. • 33 kV ICT bay – 02 Nos.	18 months
D2	220 kV Fatehpur (765) PG -Khaga DC line (Zebra Conductor)	
D3	132 kV Khaga (220) – Khaga DC line	
D4	132 kV Khaga (220) — Hussainganj SC line	
D5	132 kV Bay 132 kV Substation Khaga	

Transmission System for Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines		
S. No.	**Name of Transmission Element**	**Scheduled COD from Effective Date**
D6	132 kV Hybrid Bay at 132 kV substation Hussainganj	

Note:

1. *UPPTCL to provide adequate land for construction of 400/220 kV, 2x500 MVA GIS Substation at Jewar (Gautam Budh Nagar) free of cost and shall be handed over to TSP as is where basis.*

2. *UPPTCL to provide adequate land for construction of 220/33 kV, 2x60 MVA GIS substation at Cantt, (Chaukaghat) Varanasi free of cost and shall be handed over to TSP as is where basis.*

3. *UPPTCL to provide adequate land for construction of 220/33 kV, 3x60 MVA GIS substation at Vasundhara (Ghaziabad) free of cost and shall be handed over to TSP as is where basis.*

4. *UPPTCL to provide adequate land for construction of 220/132/33 kV, 2x160+2x40 MVA Substation at Khaga (Fatehpur) free of cost and shall be handed over to TSP as is where basis.*

5. *02 Nos., 220 kV Bay at Fatehpur (765) PG shall be under scope of developer.*

6. *02 Nos., 132 kV Bay at 132 kV S/s Khaga shall be under scope of developer.*

7. *01 No., 132 kV Hybrid Bay at 132 kV S/s Husainganj shall be under scope of developer.*

8. 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 State Government and State Commission and other relevant Orders, Rules/ Regulations of Central Government and Central Commission, as applicable.

9. **Transmission License**: The TSP shall obtain the Transmission License from the State Commission.

10. **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 State

Commission, which, after expiry, may be further extended by such period as deemed appropriate by the State 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.

11. 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 **SPV [which is under incorporation]** 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 **SPV [which is under incorporation]**, 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 STU or its successors or an agency as decided by the State 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 STU shall be entitled to take over the project assets Suo moto.

12. **Commencement of Transmission Service**: The Bidder shall have to commence Transmission Service in accordance with the provisions of the Transmission Service Agreement.

13. **Transmission Charges**: The Transmission Charges shall be payable by the Long Term Transmission Customer(s) in Indian Rupees. Bidders shall quote the Transmission Charges as per the pre-specified structure, as mentioned in the RFP.

14. **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 **General Manager, Tel. +91 11 23443996, Fax +91 11 23443990, Email: pfccl.itp@pfcindia.com** at the address given in para 12 below with a non-refundable fee of **Rs. 5,00,000/- (Rupees Five Lakh Only) or US$ 7000/- (US Dollars Seven Thousand Only)** plus 18% GST, to be paid via electronic transfer to the following Bank Account**:**

    Bank Account Name : PFC Consulting Limited
    Account No. : 000705036117
    Bank Name : ICICI Bank
    IFSC : ICIC0000007
    Branch : Connaught Place, New Delhi-110001

    latest by July 06, 2023. 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 **May 04, 2023 to July 06, 2023 between 10:30 hours (IST) to 16:00 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.

15. **Receipt and opening of Bid:** The Bid must be uploaded online through the electronic bidding platform on or before **15:00 hours (IST) on July 07, 2023**. Technical Bid will be opened by the Bid Opening Committee on the same day at **15:30 hours (IST)** in the office of UP Power Transmission Corporation Limited (UPPTCL), Shakti Bhawan, Lucknow 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.

16. 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.

17. **Nodal person for enquiries and clarifications**

All correspondence and clarification in respect of RFP document shall be addressed to:

General Manager
PFC Consulting Limited
9th Floor, A-Wing, Statesman House
Connaught Place, New Delhi - 110001, India
Tel. + 91-11-23443996
Fax + 91-11-23443990
Email: pfccl.itp@pfcindia.com

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.

INDEX

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, the CERC (Terms and Conditions of Tariff) Regulations 2019, UPERC (Terms and Conditions for determination of Transmission Tariff) Regulations, 2019 / Uttar Pradesh Electricity Regulatory Commission (Multi Year Transmission Tariff) Regulations, 2019, UPERC (Grant of Connectivity to Intra- State Transmission System) Regulations 2010, UPERC (General condition of Transmission License) Regulations 2005, UPERC (Terms and Conditions for Open Access) Regulations, 2004, UP Electricity Grid Code 2007 or any other relevant electricity law, rule or regulation prevalent in UP/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;

"Allocated Project Capacity" shall mean, for each Long Term Transmission Customer, the sum of the generating capacities allocated to such Long Term Transmission Customer from the ISGS and the contracted power, if any, as adopted by UPERC from time to time in determining sharing of transmission charges between the Long Term Transmission Customers;

"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 **Rs. 6.84 Crore (Rupees Six Crore Eighty Four Lakh Only)** only, 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 Evaluation Committee" shall mean the committee constituted by Government of Uttar Pradesh vide G.O No._281/24-UNNP/18-14 (Prakosth)/18 dated 4th May, 2018;

"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;

"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;

"Central Government" shall mean the Government of India;

"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;

"CTU/Central Transmission Utility" shall have same meaning as defined in the Electricity Act, 2003;

"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 Intra-State Transmission System which will be owned, operated and maintained by the concerned 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;

"Empowered Committee" shall mean the committee constituted by the Government of Uttar Pradesh vide Go No. 280/24-U.N.N.P/18-14 (Prakosth)/18 dated May 04, 2018;

"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;

"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;

"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;

"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;

"Intra-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;

"Lead Long Term Transmission Customer" shall have the meaning as ascribed thereto in the TSA;

"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;

"Long Term Transmission Customer" shall mean a person availing or intending to avail access to the Intra-State Transmission System for a period up to twenty-five years (25) or more, and for the purposes of this Project, or any such other person who executes a supplementary agreement for availing transmission service as per the provisions of the TSA;

"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;

"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. Any other agreement, as may be required;

"Scheduled COD" shall have the meaning as ascribed hereto in Clause 2.6 of this RFP;

"State Commission" or "UPERC" shall mean the Uttar Pradesh Electricity Regulatory Commission constituted under Section-82 of The Electricity Act, 2003 and any successors and assigns;

"State Government" shall mean the Government of Uttar Pradesh;

"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;

"STU" or **"State Transmission Utility"** shall have same meaning as defined in the Electricity Act, 2003;

"Share Purchase Agreement" shall mean the agreement amongst PFC Consulting Limited, **SPV [which is under incorporation**] and the Successful Bidder for the purchase of one hundred (100%) per cent of the shareholding of the **SPV [which is under incorporation]** for the Acquisition Price, by the Successful Bidder on the terms and conditions as contained therein;

"Successful Bidder" or **"Selected Bidder"** shall mean the Bidder selected pursuant to this RFP to acquire one hundred percent (100%) equity shares of **SPV [which is under incorporation]**, 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 State Commission, and as computed in terms of the provisions of Schedule 4 of the TSA, payable to the Licensee by the Long Term Transmission Customers as per provisions of Transmission Service Agreement.

"Transmission License" shall mean the license granted by the State Commission in terms of the relevant regulations for grant of such license issued under the Electricity Act, 2003;

"Transmission Service Agreement" or **"TSA"** shall mean the agreement entered into between Long Term Transmission Customer 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;

"Transmission Service Provider" or "TSP" shall mean **SPV [which is under incorporation]** 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) shall be under the direct control or indirectly under the common control of such entity.

SECTION – 1

INTRODUCTION

SECTION 1

1. INTRODUCTION

1.1 UP Power Transmission Corporation Limited (UPPTCL) has placed Letter of Intent (LoI) dated 23.02.2023 for appointing PFC Consulting Limited (PFCCL) to be the Bid Process Coordinator (BPC) for the purpose of selection of Bidder as Transmission Service Provider (TSP) to establish Intra-State transmission system for **"Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines"** 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 Uttar Pradesh. The TSP will make the Project available against payment of Transmission Charges, as adopted by the Commission, payable to the TSP, as per provisions of Transmission Service Agreement.

1.2 The TSP will be required to establish the following Inter State Transmission System for **Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines** (hereinafter referred to as 'Project') on build, own, operate and transfer basis, and to provide transmission service.

Transmission System for Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines		
S. No.	**Name of Transmission Element**	**Scheduled COD from Effective Date**
A.	**Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar (Gautam Budh Nagar) with Associated lines**	
A1	Construction of 400/220 kV, 2×500MVA GIS substation Jewar (GautamBudh Nagar) (alongwith 125MVAR reactor) • 400 kV GIS feeder bay – 02 Nos. • 400 kV GIS Bus Coupler bay – 01 No. • 400 kV GIS Bus reactor bay – 01 No.	18 months

Transmission System for Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines		
S. No.	**Name of Transmission Element**	**Scheduled COD from Effective Date**
	• 400 kV GIS ICT bay – 02 Nos. • 220 kV GIS feeder bay – 02 Nos. • 220 kV GIS Bus Coupler bay – 01 No. • 220 kV GIS ICT bay – 02 Nos. • 220 kV GIS Interconnecting (220 kV S/S Jewar) bay – 02 Nos. • 220 kV GIS Feeder (220 kV S/S Sector-28 YEIDA) bay – 02 Nos.	
A2	LILO of one ckt. of 400 kV Greater Noida (765 kV) – Sector -148 (400), Noida DC line at 400/220 kV GIS Substation Jewar (Gautam Budh Nagar) (for LILO, twin HTLS conductor and OPGW stringing work on narrow base multi circuit towers)	
B.	**Construction of 220/33 kV, 2x60 MVA GIS substation Cantt, (Chaukaghat) Varanasi with associated lines**	
B1	Construction of 220/33 kV, GIS Substation Cantt, (Chaukaghat) Varanasi • 220 kV GIS feeder bay – 02 Nos. • 220 kV GIS Bus Coupler bay – 01 No. • 220 kV GIS ICT bay – 02 Nos. • 33 kV GIS feeder bay – 12 Nos. • 33 kV GIS Transfer Bus Coupler bay – 01 No. • 33 kV GIS ICT bay – 02 Nos.	18 months
B2	LILO of one ckt, of 220 kV Satnath (400)- Gajokhar DC line at Cantt.(Chaukaghat) Varanasi construction of 41.5 Km (37 Km overhead line (Zebra Conductor) on Lattice Tower and construction of 4.5 Km 630 mm^2 line with copper XLPE cable	
C.	**Construction of 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad) with associated lines**	
C1	Construction of 220/33 kV GIS substation Vasundhara (Ghaziabad) • 220 kV GIS feeder bay – 03 Nos. • 220 kV GIS feeder bay (spare) – 01 No.	18 months

Transmission System for Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines		
S. No.	**Name of Transmission Element**	**Scheduled COD from Effective Date**
	• 220kV GIS Bus Coupler Bay- 01 No. • 220 kV GIS ICT bay – 03 Nos. • 33 kV GIS feeder bay – 10 Nos. • 33 kV GIS Transfer Bus Coupler bay – 01 No. • 33 kV GIS bus sectionalized bay – 02 Nos. • 33 kV capacitor bank bay (1x10 MVAR)– 03 Nos. • 33 kV GIS ICT bay – 03 Nos. • 33/0.4 kV Station transformer bay – 02 Nos.	
C2	LILO of one ckt, of 220 kV Muradnagar(400)- Sahibabad (220) SC line at 220 kV Substation Vasundhara (Ghaziabad) (Multi Ckt. / Monopole Tower)(Zebra conductor)	
C3	220 kV Indirapuram (400) – Vasundhara SC line (Monopole and Narrowbase multi ciruit tower)	
D.	**Construction of 220/132/33 kV, 2x160+2x40 MVA Substation Khaga (Fatehpur) with associated lines**	
D1	Construction of 220/132/33 kV, Substation Khaga (Fatehpur) • 220 kV feeder bay – 02 Nos. • 220 kV spare feeder bay – 02 Nos. • 220 kV bus coupler – 01 No. • 220 kV transfer bus coupler – 01 No • 220 kV ICT bay – 02 Nos. • 132 kV feeder bay – 03 Nos. • 132 kV spare feeder bay – 01 No. • 132 kV bus coupler – 01 No. • 132 kV transfer bus coupler – 01 No • 132 kV ICT bay – 04 Nos. • 33 kV Feeder Bay – 07 Nos. • 33 kV Transfer Bus Coupler bay – 01 No. • 33 kV ICT bay – 02 Nos.	18 months
D2	220 kV Fatehpur (765) PG -Khaga DC line (Zebra Conductor)	
D3	132 kV Khaga (220) – Khaga DC line	
D4	132 kV Khaga (220) — Hussainganj SC line	

Transmission System for Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines		
S. No.	**Name of Transmission Element**	**Scheduled COD from Effective Date**
D5	132 kV Bay 132 kV Substation Khaga	
D6	132 kV Hybrid Bay at 132 kV substation Hussainganj	

Note:

1. *UPPTCL to provide adequate land for construction of 400/220 kV, 2x500 MVA GIS Substation at Jewar (Gautam Budh Nagar) free of cost and shall be handed over to TSP as is where basis.*

2. *UPPTCL to provide adequate land for construction of 220/33 kV, 2x60 MVA GIS substation at Cantt, (Chaukaghat) Varanasi free of cost and shall be handed over to TSP as is where basis.*

3. *UPPTCL to provide adequate land for construction of 220/33 kV, 3x60 MVA GIS substation at Vasundhara (Ghaziabad) free of cost and shall be handed over to TSP as is where basis.*

4. *UPPTCL to provide adequate land for construction of 220/132/33 kV, 2x160+2x40 MVA Substation at Khaga (Fatehpur) free of cost and shall be handed over to TSP as is where basis.*

5. *02 Nos., 220 kV Bay at Fatehpur (765) PG shall be under scope of developer.*

6. *02 Nos., 132 kV Bay at 132 kV S/s Khaga shall be under scope of developer.*

7. *01 No., 132 kV Hybrid Bay at 132 kV S/s Husainganj shall be under scope of developer.*

1.3 Project Description

- Data Centers under construction in Noida/Greater Noida has to be supplied power from two separate sources as per the data center policy approved by the Government.
- To provide smooth power supply to the under construction International Airport Jewar.
- Proposed high speed train and industrial activities in the area.
- To strengthen the existing transmission system to provide a strong secondary source to 220 KV sub-stations.
- Constriction of 220 kV GIS S/s Cantt Chaukaghat, Varanasi will provide support to 33 kV substation of the distribution area like Chaukaghat, Kashi Vidyapeeth,

Municipal corporation, cultural complex, Chaukaghat (S.T.P.), Pandepur (proposed), Dhel Bairiya (proposed) etc.

- Construction of 200 Kv GIS S/s Vasundhara (Ghaziabad), will provide support to 33 kV sub-stations of the distribution unit like Vasundhara Sector -2, Sector-7, sector-8, Sector-10, Sector-16, sector-19 & sector-16 (old) etc.
- Construction of 220 kV S/s Khaga (Fatehpur) will provide second source to 132 kV Hussainganj S/s and 33kV sub-stations of PuVVNL such as Thariav, Ashothar, Jaroli, Mahichamandir, Haswa, Faridpur, Naraini & Dharampursato etc.

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 **SPV [which is under incorporation]** 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 **SPV [which is under incorporation]**, 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 STU or its successors or an agency as decided by the State 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 STU 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 3 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 State Government and State Commission and other relevant Orders, Rules/ Regulations of the Central Government and Central Commission, as applicable.

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 State Commission, as per the provisions of the Electricity Act and regulations made thereunder.

1.6.1.5 The TSP shall seek approval under Section 164 of Electricity Act, from Energy Department, Government of Uttar Pradesh after acquisition of **SPV [which is under incorporation]**. The approval shall be granted by Energy Department, Government of Uttar Pradesh upon generally within 30 days but in no case later than 45 days from the date of receipt of application (complete in all aspects).

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 State 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 PFC Consulting Limited for the acquisition of one hundred percent (100%) of the equity shareholding of **SPV [which is under incorporation]**, 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 **SPV [which is under incorporation]** 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 State Electricity Regulatory Commission applicable 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:

(i) Experience of development of projects in the Infrastructure Sector in the last five (5) years with aggregate capital expenditure of not less than **Rs. 500 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. 100 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. 500 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. 100 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**. 250 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 till the COD of the Project. Failure to comply with 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 <u>Bid submitted by a Bidding Consortium:</u>

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 STU and the BPC and/or the STU 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 <u>Bid submitted by a Bidding Company</u>

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 e-mail 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 into account in preparing their Bid, or for any other reasons, BPC may at its discretion, 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 State 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) is having less than 4 (four) Bidders and the rank of the fourth (4^{th}) Bidder is shared by more than one (1) Bidder, then all such Bidders who share the rank of the fourth (4^{th}) 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)**.

10. 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 **SPV [which is under incorporation]**.

    Note: The effective Equity holding of the Selected Bidder in the **SPV [which is under incorporation]**, as specified in Clause 2.5.8.1 shall be computed as per the provisions of Clause 2.5.8.3 of this RFP.

    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**.

15. Checklist for Technical Bid submission requirements as per **Annexure 16**.

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 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.

l) 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.

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

[1] **BPC shall record reasons for the same.**

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 **SPV [which is under incorporation]**, 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 Central Commission, State Commission 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 Intra-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 Intra-State Transmission Charges and Losses) Regulations, 2020 and other relevant Rules/ Regulations/ Guidelines issued by the Central Government, State Government, Central Commission, State Commission 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 & Long Term Transmission Customers nor their employees or advisors/consultants make any representation 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)/ State Grid Code. 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 **SPV [which is under incorporation]** 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.

(c) If equity is held by the Affiliates, Parent Company or Ultimate Parent Company, then subject to the second proviso of this Clause 2.5.8.1 (c), such Affiliate, Parent Company or

Ultimate Parent Company shall be permitted to transfer its shareholding in **SPV [which is under incorporation]** to another Affiliate or to the Parent Company / Ultimate Parent Company. 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.

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.

Provided further, that the aggregate equity share holding of the Bidding Consortium or a Bidding Company in the issued and paid up equity share capital of **SPV [which is under incorporation]** shall not be less than fifty one percent (51%) up to a period of one (1) year after COD of the Project and the lead Member of the Consortium shall have the equity share holding not less than twenty six percent (26%). 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.

(d) All transfer(s) of shareholding of **SPV [which is under incorporation]** by any of the entities referred to above, shall be after prior written intimation to the Lead Long Term Transmission Customer.

2.5.8.2. The Selected Bidder may invest in the equity share capital of **SPV [which is under incorporation]** through its Affiliate(s) or Ultimate Parent Company or Parent Company. Details of such investment will have to be specified in the Technical Bid as per Format 2 of Annexure 8 of the RFP. If the Selected Bidder so invests through any Affiliate(s) or Ultimate Parent Company or Parent Company, the Selected Bidder shall be liable to ensure that minimum equity holding/lock-in limits specified in Clause 2.5.8.1 and as computed as per the provisions of Clause 2.5.8.3 are still maintained.

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 **SPV [which is under incorporation]** 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 **SPV [which is under incorporation]** then holding of Selected Bidder A in **SPV [which is under incorporation]** 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 **SPV [which is under incorporation]**, then for the purposes of ascertaining the minimum equity/equity lock-in requirements specified above, the

effective holding of Bidder A in **SPV [which is under incorporation]** 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;

S. 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
A.	**Construction of 400/220kV, 2×500 MVA GIS substation Jewar with associated lines**			
A1	Construction of 400/220 kV, 2×500MVA GIS substation Jewar (GautamBudh Nagar) (alongwith 125MVAR reactor)	18 months	30.85%	Elements at Sr. No. A1 & A2 shall be required simultaneously.
A2	LILO of one ckt. of 400 kV Gr. Noida (765 kV) – Sector-148 (400) Noida DC line at 400/220 kV GIS			
B.	**Construction of 220/33 kV, 2×60 MVA GIS substation Cantt. (Chaukaghat) Varanasi with associated lines**			
B1	Construction of 220/33 kV GIS substation Cantt. (Chaukaghat) Varanasi	18 months	26.78%	Elements at Sr. No. B1 & B2 shall be required simultaneously.
B2	LILO of one ckt. of 220 kV Sarnath (400) – Gajokhar DC line at Cantt. (Chaukaghat) Varanasi construction of 41.5 Km (37 Km overhead line (Zebra Conductor) on Lattice Tower and construction of 4.5 Km 630 mm^2 line with copper XLPE cable			

S. 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
C.	**Construction of 220/33 kV, 3×60 MVA GIS substation Vasundhara (Ghaziabad) with associated lines**			
C1	Construction of 220/33 kV GIS substation Vasundhara	18 months	17.11%	Elements at Sr. No. C1 & C2 shall be required simultaneously.
C2	LILO of one ckt. of 220 kV Muradnagar (400) – Sahibabad (220) SC line at 220 kV substation Vasundhara (Ghaziabad) (Multi Ckt./Monopole Tower) (Zebra conductor)			
D.	**Construction of 220/132/33 kV, 2×160+2×40MVA substationKhaga (Fatehpur) with associated lines**			
D1	Construction of 220/132/33 kV substation Khaga (Fatehpur)	18 months	25.26%	Elements at Sr. No. D1, D2, D3, D4, D5 & D6 shall be required simultaneously.
D2	220 kV Fatehpur (765) PG – Khaga DC line (Zebra Conductor)			
D3	132 kV Khaga (220) – Khaga DC line			
D4	132 kV Khaga (220) – Hussainganj SC line			
D5	132 kV Bay at 132 kV substation Khaga			
D6	132 kV Hybrid Bay at 132 kV substation Hussainganj			

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**

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 **15:00 Hrs (IST) on July 07, 2023**. 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
04.05.2023	Issuance of RFP
24.05.2023	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.
31.05.2023	Pre-Bid meeting(s)
12.06.2023	Issue of written clarifications and revised RFP documents
22.06.2023	Issue of final RFP Project Documents
07.07.2023	Submission of Bid (Online submission of Bid through electronic bidding portal)
07.07.2023	Opening of Technical Bid
17.07.2023	Shortlisting and announcement of Qualified Bidders on bidding portal
18.07.2023	Opening of Financial Bid - Initial Offer
19.07.2023	Electronic reverse auction (Financial Bid – Final Offer) for the Qualified Bidders.
24.07.2023	Submission of original hard copies of Annexure 3, Annexure 4, Annexure 6, as applicable and Annexure 14 by the bidder with lowest Final Offer
27.07.2023	Selection of Successful Bidder and issue of LOI
07.08.2023	Signing of RFP Project Documents and transfer of **SPV [which is under incorporation]**

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 (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 Account Name	**: PFC Consulting Limited**
Account No.	**: 000705036117**
Bank Name	**: ICICI Bank**
IFSC	**: ICIC0000007**

Branch : Connaught Place, New Delhi-110001

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 **SPV [which is under incorporation]**, 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 **SPV [which is under incorporation]** 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 Long Term Transmission Customer the Contract Performance Guarantee for an amount of **Rs. 17.10 Crore** (**Rupees Seventeen Crore Ten Lakh 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 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 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 Uttar Pradesh Power Transmission Corporation Limited (UPPTCL), Shakti Bhawan, Lucknow in the online presence of Bidders' representatives who wish to attend:

Opening of Envelope (Technical Bid): **15:30 hours (IST) on July 07, 2023** 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 **15:00 hours (IST)** on **July 18, 2023** in the office of Uttar Pradesh Power Transmission Corporation Limited (UPPTCL), Shakti Bhawan, Lucknow

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:

General Manager
PFC Consulting Limited
9th Floor, Wing-A, Statesman House,
Connaught Place, New Delhi - 110001
Tel. + 91 11 23443996
Fax + 91 11 23443990
Email: pfccl.itp@pfcindia.com

2.15 Other Aspects

2.15.1. The draft of the Transmission Service Agreement and Share Purchase Agreement have been attached to this RFP.

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 Long Term Transmission Customers 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 **SPV [which is under incorporation]** from PFC Consulting Limited, who shall sell to the Selected Bidder, the equity shareholding **SPV [which is under incorporation]**, along with all its related assets and liabilities;

Stamp duties payable on purchase of one hundred percent (100%) of the equity shareholding of **SPV [which is under incorporation]**, 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 **SPV [which is under incorporation]**, 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 Lead Long Term Transmission Customer,

ii. all rights and obligations of **SPV [which is under incorporation]**, shall be of the TSP,

iii. any decisions taken by the BPC prior to the Effective Date shall continue to be binding on the Long Term Transmission Customers and

iv. contractual obligations undertaken by the BPC shall continue to be fulfilled by the TSP.

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 State Commission for grant of Transmission License and make an application to the State 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 PFC Consulting Limited is willing to sell the entire equity shareholding of **SPV [which is under incorporation]**, 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 State 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 State Government on the recommendations of Empowered Committee. However, before recommending so, Empowered Committee 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 Empowered Committee, 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 Long Term Transmission Customers 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:

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 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;

l) 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 State 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 (4^{th}) 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

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
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
23. List of Long Term Transmission Customers

Bidder may use additional sheets to submit the information for its detailed Bid.

ANNEXURE 1 - COVERING LETTER

(The covering letter should be on the Letter Head of the Bidding Company/ Lead Member of the Consortium)

Date: ……
From: ……
……
……
Tel. No.: ……..
Fax No.: ……..
E-mail address: ……..

To,
PFC Consulting Limited
9thFloor, Wing-A, Statesman House,
Connaught Place, New Delhi - 110001

Dear Sir,

Sub: **Bid for selection of Bidder as Transmission Service Provider to establish Intra-State Transmission System for "Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines" 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.

7. We hereby confirm that in accordance with Clause 2.1.4 of the RFP, we are herewith submitting 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 Bidding Company) 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 Bidding Company), the same shall be met by …….. (Insert name of Technically Evaluated Entity and/or Financially Evaluated Entity or its Ultimate Parent Company, as the case may be).

[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

We have enclosed a Bid Bond of Rupees ……. Crores (Rs. ……) only or US$ ..... (…….US Dollars), in the form of bank guarantee no……[Insert number of the Bank Guarantee] dated……[Insert Date of the Bank Guarantee] as per your proforma (Annexure-14) from……[Insert name of bank providing Bid Bond] and valid up to ……in terms of Clause 2.11 of the RFP.

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,
PFC Consulting Limited
9thFloor, Wing-A, Statesman House,
Connaught Place, New Delhi - 110001

Dear Sir,

Sub: **Bid for selection of Bidder as Transmission Service Provider to establish Intra-State Transmission System for "Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines" 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 Intra-State Transmission System for "**Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines"** 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 name of Technically Evaluated Entity and / or Financially Evaluated Entity or its Ultimate Parent Company, as the case may be). [Insert if applicable]

[To be inserted by the Lead Member only] We are also enclosing legally binding board resolution for the total equity requirement of the Project in case of any breach of any of the equity investment commitment by any of the Consortium Members, in line with the provisions of the Consortium Agreement dated ……. [Bidder to insert date of Consortium Agreement].

The details of contact person are furnished as under:

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)

Know all men by these presents, We ……(name and address of the registered office of the Bidder) do hereby constitute, appoint and authorize Mr./Ms……(name and residential address) who is presently employed with us and holding the position of …… as our attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to our Bid for selection of Bidder as Transmission Service Provider to establish Intra-State Transmission System for "**Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines"** through tariff based competitive bidding process in the country of India, including signing and submission of 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 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 the completion of the bidding process in accordance with the RFP and signing of the Share Purchase Agreement by all the parties thereto.

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)

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 registered office at ……., …..,…..and M/s ……. 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

…….
(Signature of the Authorized Signatory)

Name: ……
Designation: .....
Place: ……
Date: ……..

Name: ……
Designation: .....
Place: ……
Date: ……..

Accepted
Specimen signatures of attorney attested

…….
(Signature)

……

……
(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: ……

Address: ……
……
……

Website Address: ……..

Country of Origin: ……

b. Year Organized: ……..

c. Company's Business Activities: ……
.....

d. Status as a Bidder:

i. Bidding Company
ii. Lead Member of the Bidding Consortium
iii. Member of the Bidding Consortium

Note: tick the applicable serial number

e. Company's Local Address in India (if applicable):

……
……
……

f. Name of the Authorized Signatory: .....

g. Telephone Number: ……

h. Email Address: ……

i. Telefax Number: ……

j. Please provide the following documents:

i. Copy of the Memorandum and Articles of Association and certificate of incorporation or other equivalent organizational document (as applicable),

including their amendments, certified by the Company Secretary as **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: ……

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 **PFC Consulting Limited** to verify our Bid for selection of Bidder as Transmission Service Provider to establish Intra-State Transmission system for "**Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines"** 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)

THIS CONSORTIUM AGREEMENT executed on this..... day of .....Two thousand.....between M/s....., a company incorporated under the laws of ..... and having its Registered Office at ..... (hereinafter called the "Party 1", which expression shall include its successors, executors and permitted assigns) and M/s.....a Company incorporated under the laws of ..... and having its Registered Office at ..... (hereinafter called the "Party n", which expression shall include its successors, executors and permitted assigns) and for the purpose of submitting the Bid, acquisition of **{Name of the SPV Company or "Project specific SPV to be incorporated by the BPC"}**(in case of award) and entering into other Agreement(s) as specified in the RFP (hereinafter referred to as "Agreements") as may be entered into with the Long Term Transmission Customer(s).

WHEREAS, the BPC had invited Bid in response to RFP issued to …… (insert the name of purchaser of RFP) for selection of the bidder as the Transmission Service Provider to establish Intra-State Transmission System for **"Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines"**.

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:

1. In consideration of the selection of the Consortium as the selected bidder by the BPC, we the Members of the Consortium and parties to the Consortium Agreement do hereby unequivocally agree that M/s..... (Insert name of the Lead Member), shall act as the Lead Member as defined in the RFP for self and agent for

and on behalf of ……., ..., ..., ... (the names of all the other Members of the Consortium to be filled in here).

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.

10. 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 Long Term Transmission Customer(s), 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 Long Term Transmission Customer(s). Over the term of the Transmission Service Agreement, the provisions of TSA and State Electricity Regulatory 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 Long Term Transmission Customer (s).

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 Long Term Transmission Customer(s).

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: ……
Designation: .....
Place: ……..
Date: ……..

Attested:
……..
(Signature)
(Notary Public)

Place: ……..
Date: ……..

Note: In case of foreign Bidders, refer to clause 2.5.6 (p)

Appendix 1 to the Consortium Agreement:

Name of the Consortium Member	Responsibilities under the Consortium Agreement
M/s …… (Party 1)	
M/s ……	
M/s …… (Party n)	

ANNEXURE 7 A - FORMAT FOR QUALIFICATION REQUIREMENT

A. NET WORTH

To,

PFC Consulting Limited
9thFloor, Wing-A, Statesman House,
Connaught Place, New Delhi - 110001

Dear Sir,

Sub: Bid for selection of Bidder as Transmission Service Provider to establish Intra-State Transmission System for "Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines" 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.

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 financial requirement				

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 Networth			

* 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,

PFC Consulting Limited
9thFloor, Wing-A, Statesman House,
Connaught Place, New Delhi - 110001

Dear Sir,

Sub: Bid for selection of Bidder as Transmission Service Provider to establish Intra-State Transmission System for "Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines" 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. 100 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)						
……		…….						
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 Qualification Requirement	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)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
……		……. Project 1					
……		…….					
……		…….	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,

PFC Consulting Limited
9thFloor, Wing-A, Statesman House,
Connaught Place, New Delhi - 110001

Dear Sir,

Sub: Bid for selection of Bidder as Transmission Service Provider to establish Intra-State Transmission System for "Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines" 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.

1. To be used by Bidder using development 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)					
Capital cost of project(s) 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., 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,

PFC Consulting Limited
9thFloor, Wing-A, Statesman House,
Connaught Place, New Delhi - 110001

Dear Sir,

Sub: Bidders' Undertakings in respect of Bid for selection of Bidder as TSP to establish Intra-State transmission system for Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines.

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 UPERC (Terms & Conditions for Open Access Regulations, 2009) and as amended from time to time.

3. We give our unconditional acceptance to the RFP dated May 04, 2023 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:

S. 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
A.	**Construction of 400/220kV, 2×500 MVA GIS substation Jewar with associated lines**			
A1	Construction of 400/220 kV, 2×500MVA GIS substation Jewar (GautamBudh Nagar) (alongwith 125MVAR reactor)	18 months	30.85%	Elements at Sr. No. A1 & A2 shall be required simultaneously.
A2	LILO of one ckt. of 400 kV Gr. Noida (765 kV) – Sector-148 (400) Noida DC line at400/220 kV GIS			
B.	**Construction of 220/33 kV, 2×60 MVA GIS substation Cantt. (Chaukaghat) Varanasi with associated lines**			
B1	Construction of 220/33 kV GIS substation Cantt. (Chaukaghat) Varanasi	18 months	26.78%	Elements at Sr. No. B1 & B2 shall be required simultaneously.
B2	LILO of one ckt. of 220 kV Sarnath (400) – Gajokhar DC line at Cantt. (Chaukaghat) Varanasi construction of 41.5 Km (37 Km overhead line (Zebra Conductor) on Lattice Tower and construction of 4.5 Km 630 mm^2 line with copper			

S. 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
	XLPE cable			
C.	**Construction of 220/33 kV, 3×60 MVA GIS substation Vasundhara (Ghaziabad) with associated lines**			
C1	Construction of 220/33 kV GIS substation Vasundhara	18 months	17.11%	Elements at Sr. No. C1 & C2 shall be required simultaneously.
C2	LILO of one ckt. of 220 kV Muradnagar (400) – Sahibabad (220) SC line at 220 kV substation Vasundhara (Ghaziabad) (Multi Ckt./Monopole Tower) (Zebra conductor)			
D.	**Construction of 220/132/33 kV, 2×160+2×40MVA substationKhaga (Fatehpur) with associated lines**			
D1	Construction of 220/132/33 kV substation Khaga (Fatehpur)	18 months	25.26%	Elements at Sr. No. D1,D2,D3,D4,D5 & D6 shall be required simultaneously.
D2	220 kV Fatehpur (765) PG – Khaga DC line (Zebra Conductor)			
D3	132 kV Khaga (220) – Khaga DC line			
D4	132 kV Khaga (220) – Hussainganj SC line			
D5	132 kV Bay at 132 kV substation Khaga			
D6	132 kV Hybrid Bay at 132 kV substation Hussainganj			

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 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 **SPV [which is under incorporation]**, 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 _____[Name of 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 _____[Name of SPV]	Relationship with Bidding Company /Member of the Bidding Consortium	% of equity participation in the _____[Name of 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 **SPV [which is under incorporation]** 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: …….
Telephone No.: ……..
E-mail address: ……..
Fax / No.: ……

To

PFC Consulting Limited
9thFloor, Wing-A, Statesman House,
Connaught Place, New Delhi - 110001

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 May 04, 2023 ('RFP') issued by you for selection of Bidder as Transmission Service Provider for establishing the Intra-State Transmission System for "**Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines**".

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 "**Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines"**.

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: ……

Telephone No.: ……

E-mail address: ……

Fax/No.: ……..

To:

PFC Consulting Limited
9thFloor, Wing-A, Statesman House,
Connaught Place, New Delhi - 110001

Sub: **Undertaking for equity investment**

Dear Sir,

We refer to the Request for Proposal dated May 04, 2023 ('RFP') issued by you regarding setting up of Intra-State transmission system for **Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines** Project on build, own, operate and transfer basis.

We have carefully read and examined in detail the RFP and the RFP Project Documents, including in particular, Clause 2.1.4 of the RFP and Clauses 2.5.2 and 2.5.8 of the RFP, regarding submission of an undertaking regarding the investment in the equity share capital of **SPV [which is under incorporation]** and provisions for minimum equity holding and equity lock-in. We have also noted the amount of the equity investment required to be made in **SPV [which is under incorporation]** by the …… [Insert the name of the Bidder or the Consortium Member] for the Project.

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 **SPV [which is under incorporation]** 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 **SPV [which is under incorporation]** by purchase of existing shares or subscribing to the new shares of **SPV [which is under incorporation]**, 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

Format 1
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]

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:

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 **SPV [which is under incorporation]** representing the entire amount proposed to be invested by the company for the transmission system for **Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines**, partly by acquisition of the existing equity shares from PFC Consulting Limited 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 **SPV [which is under incorporation]**, 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]

3. FURTHER RESOLVED THAT the Board hereby acknowledges the Board Resolution(s) passed by the…….. [Name of the Affiliate(s)/ Parent / Ultimate Parent] regarding the investment of…….(….%) of the equity share capital requirements of **SPV [which is under incorporation]**, which is to be invested by the ……[Name of the Affiliate(s)/ Parent / Ultimate

Parent] for the **SPV [which is under incorporation]**, partly by acquisition of the existing equity shares from PFC Consulting Limited and partly by subscribing to the new equity shares, as per the terms of the RFP.

[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:

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 issuing an Undertaking to the BPC, in the format specified in the RFP issued by the BPC, draft of which is attached hereto and initialed by the Chairman whereby the company undertakes to invest ……percent (.... %) of the total equity share capital of **SPV [which is under incorporation]** representing the entire amount proposed to be invested by ……[insert the name of the Bidder or Member] for the said Project, in case of failure of ……[Insert the name of the Bidder or Member] to make such investment".

FURTHER RESOLVED THAT .....,be and is hereby authorized to take all the steps required to be taken by the Company, including in particular, signing the said Undertaking, submitting the same to the BPC through ……[Insert name of Bidding Company/Lead Member of the Consortium] of all the related documents, certified copy of this Board resolution or letter, 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

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

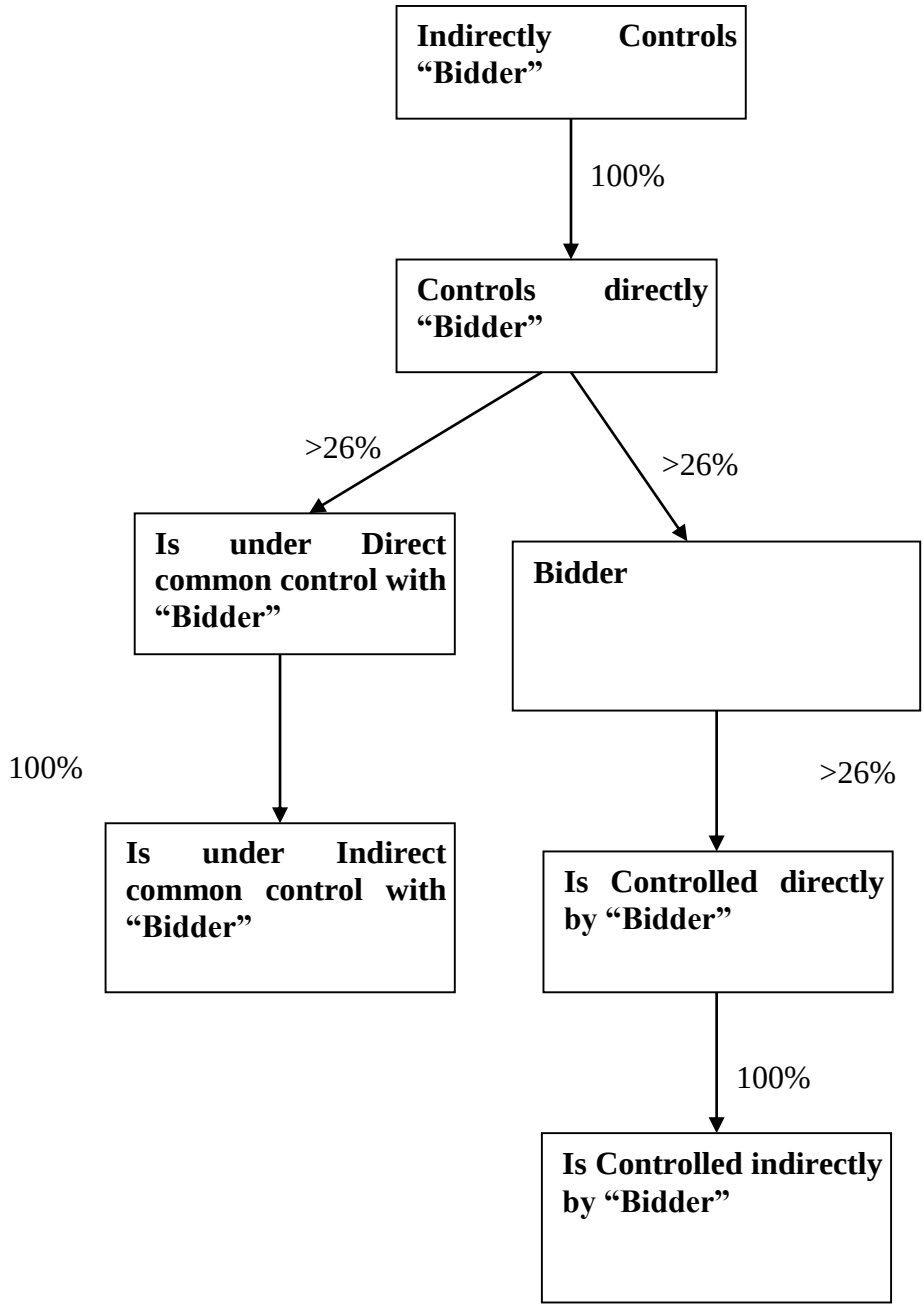
the applicable laws of the respective jurisdictions of the issuing company and the authorizations granted therein are true and valid.

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	a) Format 1 of Annexure 11 - Resolution: 1, 2, and 4 from the Bidder b) Format 2 of Annexure 11 by either Technically/ Financially Evaluated Entity(ies) whose credentials have been used, or Ultimate Parent. Provided, if the Bidder himself is the Ultimate Parent, then Format 2 need not be provided.	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	a) Format 1 of Annexure 11 - Resolution: 1,2, 3 and4 from the Bidder. b) Format 1 of Annexure 11 - Resolution: 1 from the Affiliate and /or Parent and /or Ultimate Parent investing in the equity	None
Bidder himself +	Affiliate and/or Parent Company	a) Format 1 of Annexure 11 -	Yes, by either Parent/ Affiliate(s) whose

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)
others (Affiliate and/or Parent Company and/or Ultimate Parent) in aggregate holding 100% equity	and/or Ultimate Parent	Resolution: 1,2, 3 and 4 from the Bidder. b) Format 1 of Annexure 11 - Resolution: 1 from the Affiliate and/or Parent and/or Ultimate Parent investing in the equity c) Format 2 of Annexure 11 by either Parent / Affiliate(s) whose credentials have been used and /or Ultimate Parent investing in the equity	credentials have been used, or Ultimate Parent

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.)

In consideration of the .....[Insert name of the Bidder] submitting the Bid inter alia for establishing the Intra-State transmission system for **Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines** on build, own, operate and transfer basis, in response to the RFP dated May 04, 2023 issued by PFC Consulting Limited, and the Bid Process Coordinator (hereinafter referred to as BPC) agreeing to consider such Bid of ……. .....[Insert the name of the Bidder] as per the terms of the RFP, the [Insert name and address of the bank issuing the Bid Bond, and address of the Head Office] (hereinafter referred to as "Guarantor Bank") hereby agrees unequivocally, irrevocably and unconditionally to pay to PFC Consulting Limited or its authorized representative at _____[Address of BPC] forthwith on demand in writing from PFC Consulting Limited or any representative authorized by it in this behalf, any amount up to and not exceeding Rupees _____ Only (Rs _____ Crore),on behalf of M/s……[Insert name of the Bidder].

This guarantee shall be valid and binding on the Guarantor Bank up to and including …… [Date to be inserted on the basis of Clause 2.11 of this RFP] and shall not be terminable by notice or any change in the constitution of the Guarantor Bank 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 concerned parties.

Our liability under this Guarantee is restricted to Rupees _____ Only (Rs ____ Crore). Our Guarantee shall remain in force until ……..[Date to be inserted on the basis of Clause 2.11 of this RFP]. PFC Consulting Limited or its authorized representative shall be entitled to invoke this Guarantee until …… [Insert Date, which is three sixty five days (365) days after the date in the preceding sentence]. The Guarantor Bank hereby expressly agrees that it shall not require any proof in addition to the written demand from PFC Consulting Limited or its authorized representative, made in any format, raised at the above mentioned address of the Guarantor Bank, in order to make the said payment to PFC Consulting Limited or its authorized representative.

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 PFC Consulting Limited or its authorized representative to justify the invocation of this BANK GUARANTEE, nor shall the Guarantor Bank

have any recourse against PFC Consulting Limited 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.

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 PFC Consulting Limited 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 PFC Consulting Limited 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 PFC Consulting Limited or its authorized representative serves upon us a written claim or demand.

In witness whereof the Bank, through its authorized officer, has set its hand and stamp on this…….. day of .....at……

Witness:

1……. Signature: ……..
Name and Address Name: ……..

2. …….. Designation with Stamp:
Name and Address

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 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 other RFP Project Documents and the Long Term Transmission Customer(s) and PFC Consulting Limited, agreeing to 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 unequivocally, irrevocably nd unconditionally to pay to the Long Term Transmission Customer(s) at…… [Insert Place and Address of the Long Term Transmission Customer(s) indicated in TSA] forthwith on demand in writing from the Long Term Transmission Customer(s) 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 Long Term Transmission Customer(s) 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 Long Term Transmission Customer(s), made in any format, raised at the above mentioned address of the Guarantor Bank, in order to make the said payment to the Long Term Transmission Customer(s).

The Guarantor Bank shall make payment hereunder on first demand without restriction or conditions and notwithstanding any objection by **SPV [which is under incorporation]**, …… [Insert name of the Selected Bidder], ……. [Insert name of the TSP] and/or any other person. The Guarantor Bank shall not require the Long Term Transmission Customer(s) to justify the invocation of this BANK GUARANTEE, nor shall the Guarantor Bank have any recourse against the Long Term Transmission Customer(s) 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 Long Term Transmission Customer(s) shall not be obliged before enforcing this BANK GUARANTEE to take any action in any court or arbitral proceedings against **SPV [which is under incorporation]** or the Selected Bidder, to make any claim against or any demand on **SPV [which is under incorporation]** or the Selected Bidder, as the case may be, or to give any notice to **SPV [which is under incorporation]** or the Selected Bidder, as the case may be, or to enforce any security held by the Long Term Transmission Customer(s) or to exercise, levy or enforce any distress, diligence or other process against **SPV [which is under incorporation]** or the Selected Bidder, as the case may be.

The Guarantor Bank acknowledges that this BANK GUARANTEE is not personal to the Long Term Transmission Customer(s) and may be assigned, in whole or in part, (whether absolutely or by way of security) by Long Term Transmission Customer(s) to any entity to whom the Long Term Transmission Customer is entitled to assign its rights and obligations under the Transmission Service Agreement.

The Guarantor Bank hereby agrees and acknowledges that the Long Term Transmission Customer(s) 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 Long Term Transmission Customer(s) 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

Notes:

1. The Stamp Paper should be in the name of the Executing Bank.

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 Annexure 3;	
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 Annexure 4;	
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 Annexure 5;	
8. Consortium Agreement duly signed as per Annexure 6, 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;	
b. Calculation sheets, detailing computation of capital expenditure of projects and revenue received in	

Technical Bid Submission Requirements	Response (Yes / No)
construction projects considered for meeting Qualification Requirements, duly signed and stamped by the Statutory Auditor of the Bidding Company / 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 Annexure 7(D), 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 (Annexure 3) has been executed.	

Technical Bid Submission Requirements		Response (Yes / No)
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 etc. submitted as documentary evidence along with Annexure 12.	
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	
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)

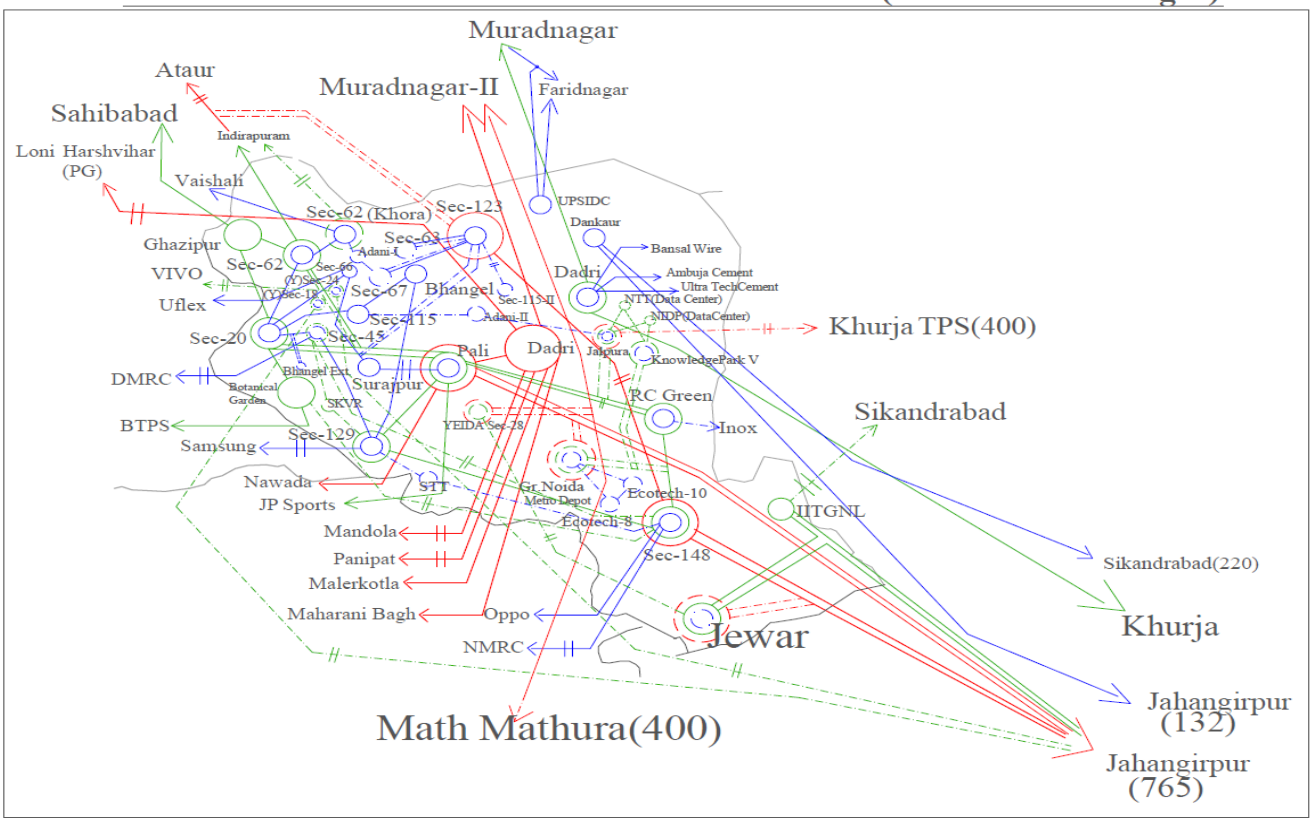
ANNEXURE 17 – LIST OF BANKS

The list of banks shall include all Scheduled Commercial Banks as per Second Schedule of RBI Act-1934 and any amendments thereof.

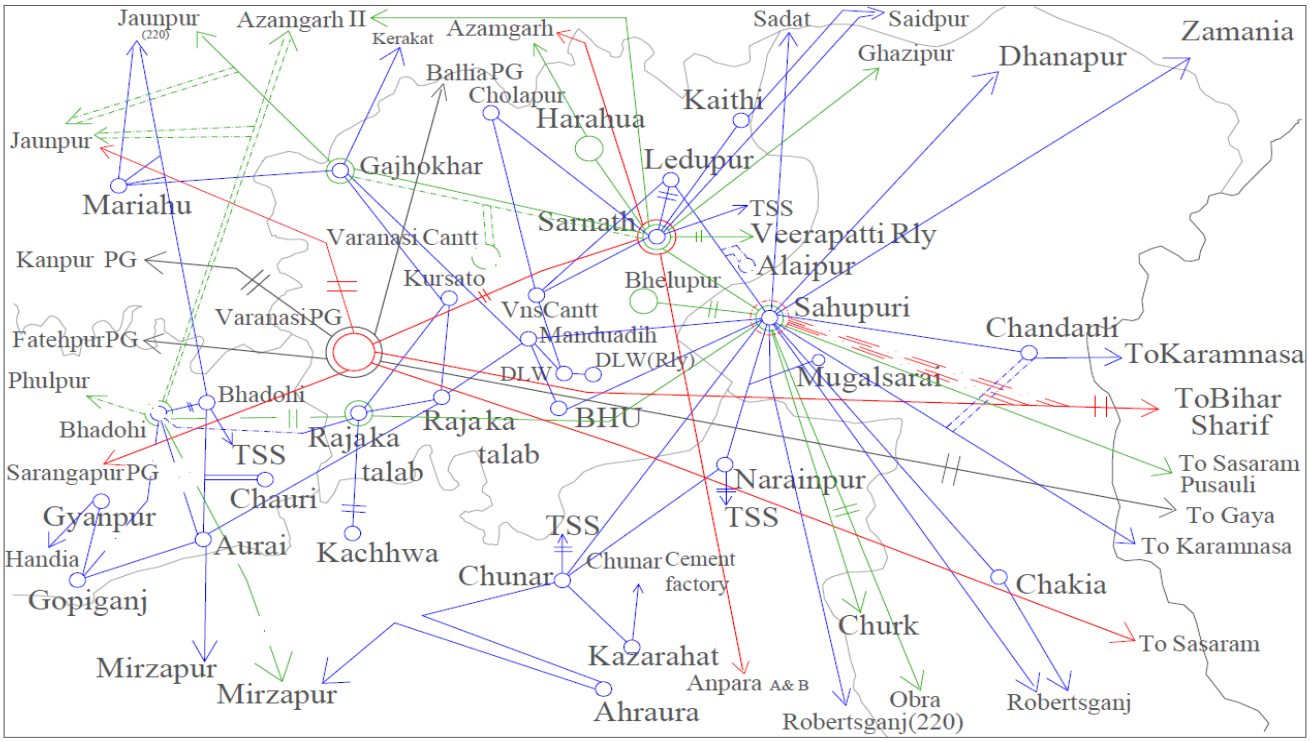
Note:
The above list of banks is indicative and can be modified by the BPC as required and any such change shall not be construed as a deviation from this document.

ANNEXURE 18 - GRID MAP OF THE PROJECT

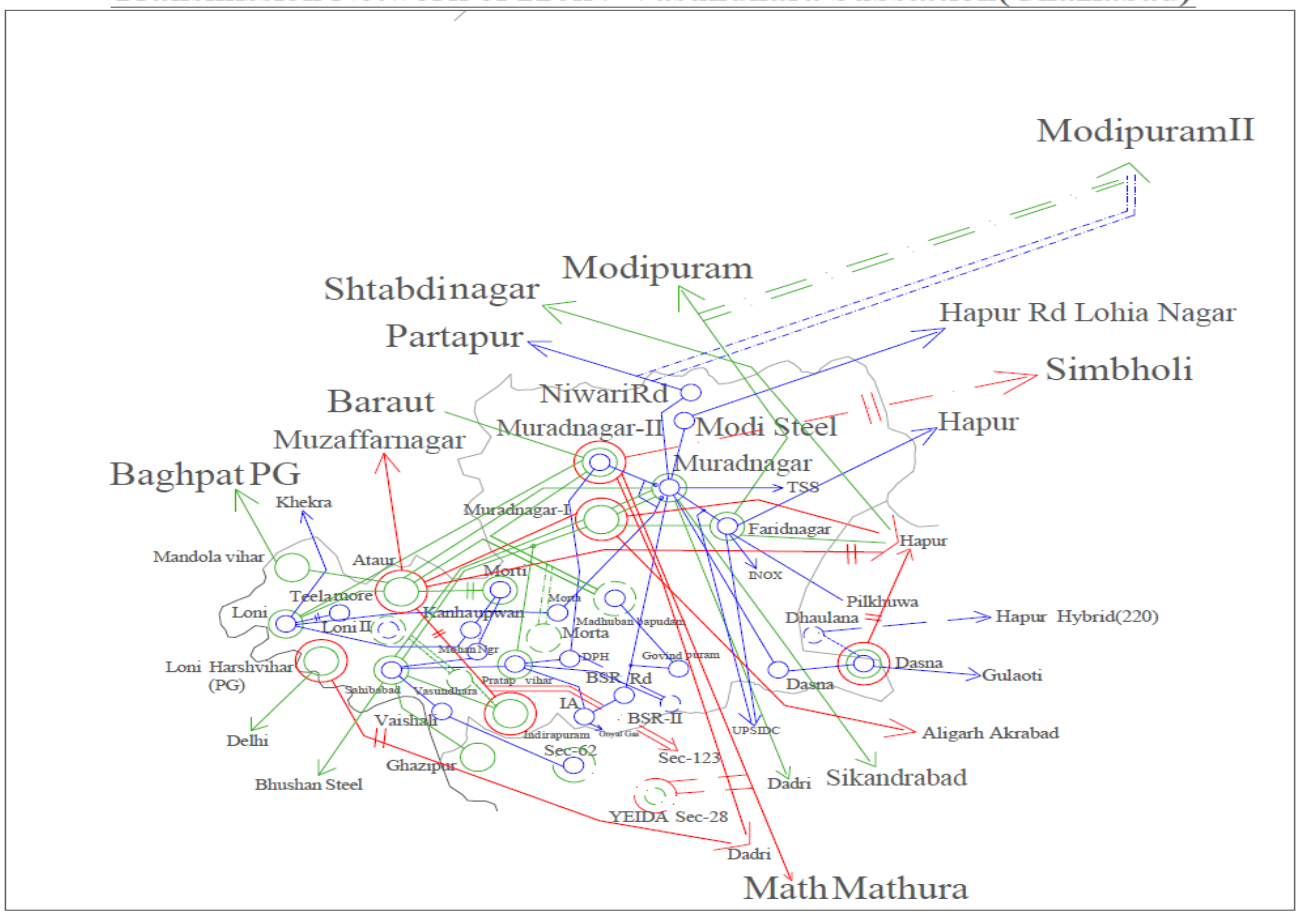
Transmission Network of 400kV Jewar Substation(Gautam Budh Nagar)



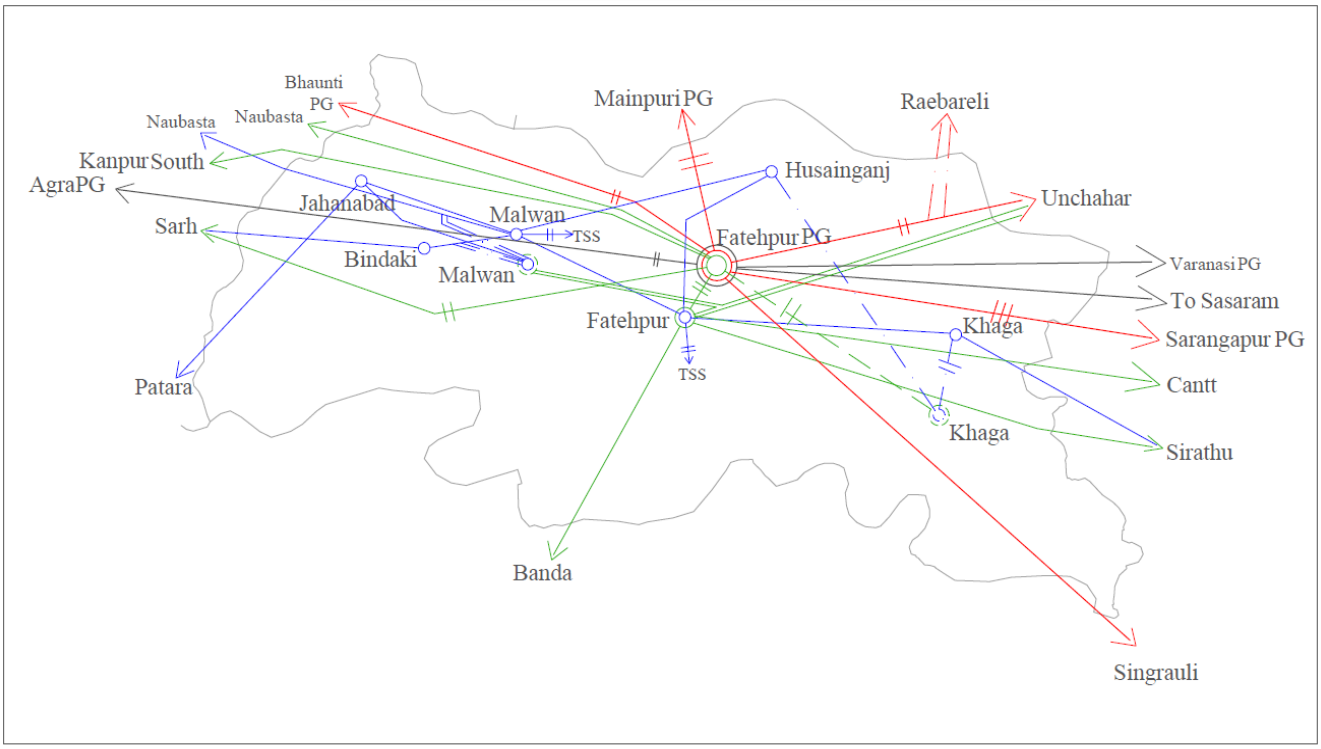
Transmission Network of 220kV Cantt(Chaukaghat) Substation, Varanasi



Transmission Network of 220kV Vasundhara Substation(Ghaziabad)



Transmission Network of 220kV Khaga Substation(Fatehpur)



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: ……

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 23 – LIST OF LONG TERM TRANSMISSION CUSTOMERS

Sl. No.	Name of the Long Term Transmission Customer	Address of Registered Office	Law under which incorporated	Allocated Project Capacity (in %)
1.	Paschimanchal Vidyut Vitran Nigam Ltd.	Hydel Colony, Victoria Park, Meerut-250001 E-mail: md@pvvnl.org Fax: 0121-2666062 Phone: 0121-2665734	Companies Act	31%
2.	Madhyanchal Vidyut Vitran Nigam Ltd.	4A Gokhale Marg, Lucknow-226001 E-mail: md.mvvnl2010@gmail.com Fax: 0522-2208769 Phone: 0522-2208737	Companies Act	21%
3.	Purvanchal Vidyut Vitran Nigam Ltd.	Vidyut Nagar, Bhikharipur, P.O. DLW, Varanasi-221010 E-mail: mdpurvanchalvvnl@gmail.com Fax: 0542-2319158 Phone: 0542-2318437	Companies Act	24%
4.	Dakshinanchal Vidyut Vitran Nigam Ltd.	Urja Bhawan, NH-2 (Agra-Delhi bypass Road) Sikandra Agra-282002 E-mail: dvvnlmd@gmail.com Fax: 0562-2605465 Phone: 0562-2605699	Companies Act	21%
5.	Kanpur Electricity Supply Co. Ltd.	Kesa House, 14/17 Civil Lines, Kanpur - 208001 E-mail: md@kesco.co.in Phone: 0512-2530832	Companies Act	3%

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 www.mstcecommerce.com/eprochome/tsp/index.jsp. 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 GST as per applicable rate to be paid online. The account details will be available in the System generated email sent by MSTC post registration.

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.

tsp@mstcindia.co.in

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:

Ms. Archana Juneja
9990673698

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 …….. day of the month of …… 20……, between, on one hand, …… [Insert name of BPC] through Shri …….. [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) to establish Intra-State transmission system for "**Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines**" 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.

1.2 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.

1.3 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.

3.2 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.

3.3 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.

3.5 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.

3.9 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.

4.2 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)

Along with the technical bid, the Bidder shall submit Bid Bond for an amount of **Rs. 6.84 Crore (Rupees Six Crore Eighty Four Lakh Only)** issued by any Banks from the list provided in RFP Document as Earnest Money/Security Deposit, with the BPC.

5.1 The Earnest Money/Security Deposit shall be valid & retained by the BPC for such period as specified in the RFP Document.

5.2 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.

6.2 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.

6.3 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).

Sh. Atul Sobti (Ex-CMD, BHEL)
Director General SCOPE
F-497, Vikaspuri,
New Delhi-110018

7.2 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.

7.3 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.

7.5 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.

7.8 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.

11.2 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 Parties hereby sign this Integrity Pact at on _____

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 REQUIREMNETS FOR 220 KV AND 132 KV TRANSMISSION LINES

1. GENERAL INFORMATION

The transmission line shall be constructed on self supporting 132kV Galvanized Latticed Steel Double circuit towers and Narrow base Double circuit tower. The phase conductor shall be ACSR PANTHER in vertical formation with three phase of one Circuits being on one side of the tower of 132kV lines respectively. The 7/10 or 7/9 SWG Earth wire/OPGW shall be provided above the conductors for effective shielding of 132KV lines respectively.

2. SERVICE CONDITION

i.	Nominal system voltage	132KV
ii.	Rated highest system voltage	145
iii.	System frequency	50 Hz
iv.	No. of phase	3
v.	Phase configuration	Vertical
vi.	Neutral earthling	Effectively earthed
vii.	BIL	550 kV
viii	Power frequency withstand voltage (wet condition)	230 kV
ix.	Variation in system voltage	+10% to -15%
x.	Variation in system frequency	$\pm$ 5%

TECHNICAL CONDITIONS (TOWERS)

STEEL

- Tower members shall be fabricated out of steel conforming to IS:226/1975 or IS: 2062/1999 with the latest revision thereof.
- The tower members shall be fabricated in accordance with IS: 802(Part –II)-1978 with the latest revision thereof.

Tolerance:

- The following fabrication tolerances shall be allowed as per IS : 7215-1974.
- The maximum allowable difference in diameter of the hole on the two sides of plate or angle shall not exceed 0.8 mm i.e. allowable taper in punched hole shall not exceed 0.8 mm on diameter.
- The tolerance cumulative and between consecutive holes shall be within + 0.5mm.
- The tolerance on the overall length of members shall be within +1.6 mm.
- The tolerance on back mark shall be within +0.5 mm.

TECHNICAL REQUIREMENTS FOR BOLTS

- The bolts shall be hot dip galvanized, Hexagon round hexagon head transmission tower bolts of size M16 for use in construction of transmission towers and sub stations. These must confirm to IS: 12477/1988.
- The dimensions of the M16 shall be as per IS: 12427-1988.

3. INSULATORS

The specification covers design, manufacture, testing and supply and delivery of following insulators suitable for hardware fitting of Zebra ACSR Conductor for 220 kV and Panther ACSR for 132 kV transmission lines.

The equipment offered, shall be complete with all components which are necessary or usually used for their efficient performance and satisfactory maintenance

3.1 DETAILS OF DISC INSULATORS

3.1.1 The insulators of the string shall consist of standard discs for 3 phase 50 Hz effectively earthed system which can be operated at a voltage ten (10) percent higher than the rated system voltage in moderately polluted atmospheric conditions.

3.1.2 The disc insulators shall be made of electro-porcelain. The disc insulators shall be of cap and pin, ball and socket type. porcelain shall be sound, free from defects, thoroughly vitrified and smoothly glazed.

3.1.3 The disc insulators shall be used on 220 KV /132 KV transmission lines in form of single tension/double tension strings.

3.1.4 The design of the insulators shall be such that stresses due to expansion and contraction in any part of the insulators shall not lead to deterioration. Special care should be taken in use of very low autoclave expansion cement to curb the unpredictable cement growth which leads to ageing. The limit of autoclave cement expansion should be as mentioned with the details in relevant standard.

3.1.5 The number of Disc Insulators of each Single suspension/ Single Tension and Double Suspension / Tension insulator string in 220 KV line shall be as follow:-

S. N.	Insulators Strings	No. of Disc Insulators per strings 220 KV	No. of Disc Insulators per strings 132 KV
1	Single Suspension	14	9
2	Double Suspension	2X14	2X9
3	Single Tension	16	10
4	Double Tension	2X16	2X10

3.1.6 The size, minimum creepage distance and EM (Electro mechanical) strength of disc insulators shall be as follows:

S N	Type of Disc (B-Type)	Size (mm)	Min. Creepage distance -mm	EM strength -KN

1	70 KN	255x145	292	70
2	120 KN	280/255 x 145	330	120
3	160 KN	280 x 170	330	160

3.2 TECHNICAL PARTICULARS OF INSULATORS

The insulators to be supplied must fulfill the minimum technical particulars as mentioned below:-

S N	Description	70KN	120 KN	160KN
(A)	**General**			
1.	Type of Insulators (B&S Type)	**16 mm**	**20 mm**	**20 mm**
2.	Outside diameter of disc with tolerance (mm)	**255**	**280/255**	**280**
3.	Distance between centers of disc with tolerance (mm)	**145**	**145**	**170**
4.	Color of glazing of porcelain of Insulators	**Brown**	**Brown**	**Brown**
(B)	**Mechanical Values**			
1.	Electro-Mechanical Strength of single disc (KN)	**70**	**120**	**160**
2.	Breaking strength of single disc not less than (KN)	**70**	**120**	**160**
(C)	**Electrical Values**			
1.	Usual working System voltage (KV)	132/220	132	220
2.	Minimum Creepage distance of single disc (mm)	292	330	330
3.	Power Frequency Puncture Voltage of single Disc (KV) rms.	120	120	125
4.	Power Frequency and minute withstand voltage of single disc (KV) rms. Dry Wet	 70 40	 75 45	 75 45
5.	Impulse withstand voltage (KV) Peak (± wave)	110	120	122
(D)	**Complete string Values (132 KV)**			
	(a) Suspension (b) Tension	9(132KV) 10(220KV) -	- 10	- 16
1.	Power frequency withstand voltage (KV)			
	with arcing horn on both side (i) Dry (132 KV/220 KV) (ii) Wet(132 KV/220 KV)	 350/490 230/395	 380 250	 550 460
	without arcing horn (iii) Dry(132 KV/220 KV) (iv) Wet(132 KV/220 KV)	 260/500 240/405	 400 290	 600 500
2.	Power frequency flashover voltage (KV)			
	(a) with arcing horn on both side (v) Dry(132 KV/220 KV)			

S N	Description	70KN	120 KN	160KN
	(vi) Wet(132 KV/220 KV)	420/560 300/430	450 320	590 520
	(b) without arcing horn (vii) Dry(132 KV/220 KV) (viii) Wet(132 KV/220 KV)	 430/560 310/440	 480 330	 650 560
3.	Impulse withstand voltage (KV)			
	(a) with arcing horn on both side (i) +ive(132 KV/220 KV) (ii) -ive(132 KV/220 KV)	 550/900 550/900	 570 570	 1050 1050
	(b) without arcing horn (i) +ive(132 KV/220 KV) (ii) -ive(132 KV/220 KV)	 560/910 560/910	 650 650	 1150 1150
4.	Impulse flashover voltage (KV)			
	(a) with arcing horn on both side (i) +ive(132 KV/220 KV) (ii) -ive(132 KV/220 KV)	 600/975 600/975	 620 620	 1150 1150
	(b) without arcing horn (i) +ive(132 KV/220 KV) (ii) -ive(132 KV/220 KV)	 610/985 610/985	 700 700	 1200 1200
5.	Maxm. percentage of line to earth voltage distribution of insulator with normal fittings (%)(132 KV/220 KV)	22	20	14.14
6.	Mechanical failing load (kg.) Single Suspension Double Suspension Single Tension Double Tension	 7000 14000 - -	 - - 16500 33000	 - - 16500 33000
7.	No deformation load (kg f)	67% of load at 6 above		

4. CONDUCTOR HARDWARES

4.1 The specification covers design, manufacture, testing & supply and delivery of following hardware fitting suitable for Zebra/Panther ACSR conductor for 220KV/132 KV transmission line. The equipment offered, shall be complete with all components which are necessary or usually used for their efficient performance and satisfactory maintenance.

1- Single Suspension
2- Single Tension
3- Single suspension Pilot fittings
4- Double Suspension
5- Double Tension

4.2 The hardware fittings shall be suitable for three phase, 50 Hz effectively earthed system in moderately polluted atmosphere and for operation at voltage 10% higher than the rated service

voltage. The edges, lips etc of all hardware components shall be so rounded as to reduce corona loss and radio interference voltage to a minimum. The hardware fitting shall be complete with all components which are necessary or usually used for their efficient performance and satisfactory maintenance.

5. CONDUCTOR AND INSULATOR PARTICULARS:

5.1 CONDUCTOR

5.1.1 The hardware fitting for 220 KV lines shall be suitable for Zebra & for 132 KV lines shall be suitable for Panther conductor having particulars as hereunder –

	Code Name	**Zebra**	**Panther**
a	Copper Equivalent Area mm sq.	260	130
b	Total area mm sq.	484.5	261.30
c	No. of Strands	61	37
d	Stranding & wire diameter (mm) Aluminium (mm) Steel (mm)	 54/3.18 7/3.18	 30/3.00 7/3.00
e	Overall dia (mm)	28.62	21.00
f	DC Resistance at 20^{o}C (ohm/Km	0.06868	0.3497
g	Ultimate tensile strength (KN)	130.32	89.67
h	Conductor per phase	Single	Single

5.2 DISC INSULATORS PARTICULARS

		Zebra	**Panther**
1	**70 KN**		
a	Size (mm)	255x145	255x145
b	E&M Strength KN	70	70
c	Discs in string (Nos.)	14	9
d	Ball & Socket (mm)	16/16B	16/16B
II	**Tension string single or Double**		
e	Size (mm)	280x170	255x145
f	E&M Strength mm	160	120
g	Discs in string (Nos.)	16	10
h	Ball & Socket (mm)	20	20

Note – Ball & Socket as per IS: 2486 Part-II

5.3 LENGTH OF FITTINGS WITH INSULATORS

		Zebra	**Panther**
1	Single Suspension (a) Minimum - mm	 2055	 1330

	(b) Maximum - mm	2415	1650
II	Single Tension (a) Minimum - mm (b) Maximum - mm	 2860 3260	 1620 2000
E	Ruling Span – Meters (a) Single Circuit (b) Double Circuit	 380 365	 360 350
F	Configuration (a) Single Circuit (b) Double Circuit	 Delta Vertical	 Delta Vertical
G	Conductor Tension At 32° C	22% of UTS of conductor	22% of UTS of conductor

6. CONDUCTOR ACCESSORIES

The specification covers design, manufacture, testing and supply and delivery of following conductor accessories suitable for Zebra ACSR Conductor for 220 kV transmission line and ACSR Panther Conductor for 132 kV transmission line. The equipment offered, shall be complete with all components which are necessary or usually used for their efficient performance and satisfactory maintenance.

i- Preformed Amour Rods
ii- Vibration Damper
iii- Repair sleeves
iv- Mid span Compression Joints

7. CONDUCTOR AND LINE DATA

The conductor accessories shall be suitable for Zebra/Panther, ACSR. The conductor and line data are as under :-

For Zebra For Panther

S N	Configuration	Vertical/Triangular	Vertical/Triangular
1.	Number of phases	Three /Six	Three /Six
2.	Size of conductor		
	i) Aluminium	54/3.18 mm	30/3.00 mm
	ii) Steel	7/3.18 mm	7/3.30 mm
3	Over diameter	28.62 mm	21.00 mm
4	Weight per meter	1.621 kg	0.974 kg
5	Ultimate tensile strength	130.32 KN	89.67
6	Normal span		

	(i) Single Circuit (ii) Double Circuit	380 m 365 m	365 m 380m
7	Maximum Conductor tension at 32^0C without external load.		
	i. Initial unloaded tension	35 % of UTS.	35 % of UTS.
	ii. Final unloaded tension	25% of UTS.	25% of UTS.
8	Nature of terrain	Generally flat with cultivated fields	
9	i) No. of performed Armour rods used	12 nos	11 nos
	ii) Dia of each rod	7.87 mm	6.35 mm
	iii) Dia of conductor with Armour rods	44.36 mm	33.70 mm
10	Max. permissible dynamic strain after damping	150 Microns	150 Microns

PREFORMED AMOUR RODS:

Preformed Armour Road shall line conform to IS:2121.The technical particulars are given as here under :-

S N		**For Zebra**	**For Panther**
i)	Material (IS: 739-1977)	Aluminium Alloy	Aluminium Alloy
ii)	Number of Rod per set	12	11
ii)	Diameter of each rod (mm)	7.87+0 / -0.1	6.35+0 / -0.1
iii)	Length of each rod (mm)	2540± 25	1950± 25
iv)	Difference between the longest rod and the shortest rod in each set (mm)	16	16
v)	Electrical conductivity at 20^0C	Not less than 39% of IACS (International Annealed Copper standards	
vi)	Ultimate strength of each rod (kg/mm2)	35 Kg	35 Kg
vii)	Marking	Centre line to be marked with black point	
viii)	Shape of end	Parrot bill ended	

8. EARTHWIRE ACCESSORIES

The specification covers design, manufacture, testing and supply of delivery of following earthwire accessories suitable for 7/3.67 mm. Earthwire for 220 KV lines and 7/3.25 mm. Earthwire for 132 KV lines. The equipment offered, shall be complete with all components which are necessary or usually used for their efficient performance and satisfactory maintenance.

i)Suspension clamp (Free centre type)
ii) Tension clamp
iii) Mid span compression joints
iv) Vibration damper

9. SUSPENSION CLAMPS : (FREE CENTER TYPE)

9.1 At all suspension towers suitable suspension clamps shall be used to support the earthwire. The suspension clamps shall hang from U-bolt which is fixed vertically downwards in the ground wire peak of suspension tower. The U-bolt is fixed in the direction of run of the line. This U-bolt is part of tower.

9.2 Necessary arrangement for hanging the suspension clamp form U-bolt shall be supplied along with the suspension clamp and shall be considered as a part of clamp.

9.3 The clamps shall conform to general requirement of IS : 2486 (Part -I) with latest revision thereof.

9.4 The suspension clamps (Complete assembly) shall consist of the following components:

i) Suspension Clamps
ii) Keeper piece
iii) U-bolts
iv) Anchor shackle to be used for suspending the suspension clamp form U-bolt of earthwire peak of the tower.
v) Nuts, bolts, washers and split pins etc.

9.5 The clamping piece and the clamp body shall be clamped by at least two U-bolts of size not less than M-10 diameter having one nut and one 3.5 mm. thick spring lock washer on each of its limbs. Suspension clamps shall be provided with inverted type U-bolts. The limb of one of the U-Bolts shall be long enough to accommodate the lug of the flexible copper bond.

9.6 Total length of suspension clamps assembly between tower peak and axis of earthwire at clamp (including one 65 mm long U-bolt which is already fixed in tower peak) shall be 200 mm.

9.7 The material for the suspension clamps shall be such that it gives the required mechanical strength with specified dimensions. The clamp may be made of either forged steel (as per IS : 2004) or malleable cast iron (as per IS: 2107 and IS: 2108) having good finish. The clamps shall be free from all internal defects like shrinkage inclusion, blow holes etc. and quality of the product shall be uniform throughout.

9.8 There shall be no sharp points in the clamps coming in contact with earthwire.

9.9 All the ferrous parts of compete assembly including bolts, nutsan lock washers shall be hot dip galvanised as per IS: 2633/1972. Spring washer should be electro-galvanised. The female thread of nuts should be oiled only.

9.10 The assembly shall give adequate area of support to the earthwire . The groove of the clamp shall be smooth finished in uniform circular or oval shape and shall slope downwards in a smooth curve in 25 mm length at either end to avoid sharp support for the earthwire and to reduce the

intensity of bending moment at the clamp edge due to vertical load. There shallnot be any displacement in the configuration of the earthwire standards nor shall these be unduly stressed in final assembly.

9.11 The suspension assembly shall be guarantied for the following values:-

1. Slip strength : 8-15%of breaking load of earthwire

2. Minimum failing load : Not less than breaking load of earthwire.

10. **TENSION CLAMPS**

10.1 At all the tension towers, suitable compression type tension clamps shall be used to hold 7/9 SWG galvanised steel earth wire in case of 220 KV lines and 7/10 SWG galvanised steel earth wire in case of 132 KV lines.

10.2 The tension assembly shall consist of the following component parts :

i) Dead and End
ii) Jumper tube.
iii) Anchor D-Shackles
iv) Rivet, washer & cotter pins etc.

10.3 The compression tube & Jumper tube shall give adequate area of support without any slip to the earthwire under normal working tension and vibration conditions.

10.4 The dead end tubes and jumper tubes of tension clamps shall be made of Forged steed as per IS : 2004 with latest revision thereof.

10.5 All the forgings shall be of good finish and free from flaws and other defects. There shall be no sharp points in the tube coming in contact with the earthwire. There shall also not be any displacement in the configuration of the earthwirestrands nor shall they be un-duly stressed in the final assembly. The tube shall be such as to give smooth surface after compression. The complete assembly shall be so designed as to avoid un-due bending in any part of assembly and shall not produce any hindrance to the movement of the clamp in horizontal or vertical directions.

10.6 Suitable lugs for jumper connection shall also be supplied along with necessary bolts and nuts.

10.7 All ferrous parts of complete assembly including bolts, nuts and washers shall be hot dip galvanised as per IS: 2633. Spring washers may be electro galvanised. The female thread of the nuts may be oiled only.

10.8 The assembly shall be connected to horizontal strain plates of the tower body by means of D-Shackle or eye link.

10.9 The jumper terminal plates shall be welded with dead end at an angle of 30^0 from the vertical plane. The jumper shall pass in a vertical plane.

10.10 The assembly shall be supplied complete with dead and jumper tubes, Anchor shokles bolts. nuts and washers .

10.11 The dimensions and the dimensional tolerances of the compressible tube shall be as under :-

(i) Before compression :		**For 7/3.67 mm EW**	**For 7/3.25 mm EW**
(a) Inner dia (mm)	:	11.5 ± 0.2	10.3 ± 0.2
(b) Outer dia (mm)	:	20.0 ± 0.5	18.0 ± 0.2
(ii) After the compression:			
(a) Width (corner to corner) (mm)	:	20.0± 0.5	17.4 ± 0.5
(b) Width (flat to flat) (mm)	:	17.5± 05	15.1 ± 0.5

10.12 The slip strength of the assembly shall not be less than the 95% of the ultimate tensile strength of the earthwire. The ultimate strengths of clamp shall not be less than that of earthwire. The method of testing shall conform to IS: 2121 (part -3) and IS: 2486 (part -I) or an equivalent standards amended upto -date.

11. MID SPAN COMPRESSION JOINTS

11.1 These joints shall be suitable for joining two length of earthwire.

11.2 These shall be made of high strength of mild steel tubes and shall be easily compressible without any crack or failure with 100 ton capacity hydraulic compressor.

11.3 The minimum failing load (slip strength) of the joint shall not be less than 95% of the ultimate tensile strength of the earthwire.

11.4 The joints shall have the same conductivity as the earthwire.

11.5 The dimensions and the dimensional tolerances of the joints shall be as under :-

(i) Before compression :		**For 7/3.67 mm EW**	**For 7/3.25 mm EW**
(a) Inner dia (mm)	:	11.5 ± 0.2	10.3 ± 0.2
(b) Outer dia (mm)	:	20.0 ± 0.5	18.0 ± 0.2
(c) Length (mm)	:	230± 0.5	203 ± 0.2
(ii) After the compression:			
(a) Width (corner to corner) (mm)	:	20.0± 0.5	17.4 ± 0.2
(b) Width (flat to flat) (mm)	:	17.5± 05	15.1 ± 0.2
(c) Length (mm)	:	262± 0.5	220± 0.2

12. VIBRATION DAMPERS

12.1 Stock bridge 4R type vibration damper suitable for 7/3.67 mm earth wire shall be provided at all tension and suspension points on each span (at least one at each end of each earthwire

spans of up to 450 meter) to damp out the vibration up to a limit of 150 micro strains on 220 KV lines.. The dampers shall effectively damp out the vibration of the earthwire for the full frequency range experienced in the earthwire for spans from 200 to 450 meter and wind velocity of 0-30 km per hour. Vibration Dampers shall not be installed on 132 KV Lines

12.2 The necessary technical particulars of dampers design are as given below: -

Sl. No.	Particulars	Details
1.	Configuration	Single steel stranded earthwire at the peak of tower
2.	Height of cable support under every day condition above	
	a)tower	36.5 m
	b)mid span	27 m
3.	Size of cable	7/9 SWG
4.	Span length in meters	
	i) Ruling Span for design	400 m
	ii) Maximum span	450 m
	iii) Minimum span	250 m
5.	Maximum earthwire tension at 32^0C without external load.	
	i. Initial unloaded tension	35 % of UTS.
	ii. Final unloaded tension	25% of UTS.
6.	Nature of terrain	Centrally flat with cultivated fields
7.	If armour rods used	No
8.	Maximum permissible dynamics strain after damping	150 micro strains
9..	Minimum no of cycles for fatigue performance	10 million
10.	Amplitude for fatigue test	$\pm$ 50 mm at the highest resonant frequency
11.	Slip strength of clamp	1. Not less than 250 kg. when an untested vibration demure is installed at the recommended bolt torque on the earthwire. 2. Not less than 200 kg. without retightening the bolts after concocting the Fatigue test.

12.	Max. Wind load	45 kg/m² on full projected area

12.3 The clamp of the vibration damper shall be made of permanent mould cast high strength aluminium alloy. It shall be capable of supporting the damper during installation and to prevent any damage or chafing of the earthwire during fitting and during continued operation which would produce high electrical and mechanical stresses in normal working. If there are any chances of the clamp chafing the earthwire in service, suitable remedial devices shall be provided by the vendor free of cost.

The clamp shall have sufficient grip to maintain the damper in position on the earthwire without damaging the strands or causing premature fatigue. The groove of the clamp body and clamp cap shall be smooth, free of projections, grit or other material which could cause damage to the earthwire when the clamp is installed. Clamping bolts shall be provided with self locking nuts and designed to prevent corrosion of the threads or loosening during service.

12.4 The messenger cable of the damper shall comprise of high strength steel strength which shall be hot dip galvanised as per IS 4826. The steel strands shall be pre-formed and suitably protected against loosening of its standards in order to prevent subsequent droop of weight in service and to maintain consistent flexural stiffness of the cable while in service. The messenger cable shall be suitably and effectively sealed to prevent corrosion.

12.5 The damper mass shall be made of hot dip galvanised mild steel/ cast iron. All castings shall be free from defects such as cracks, shrinkages, inclusions and blow holes etc. The inside and outside surfaces of the damper masses shall be smooth.

The damper mass shall be fixed permanently to the messenger cable with suitable non ferrous sleeves or compound. The damper mass shall not droop more than 5 degrees from the centre of the damper. Each damper mass shall be designed so as to avoid accumulation of rain waters.

12.6 The vibration damper shall be capable of being installed and removed from energized line by means of hot line technique without completely separating components . In addition, the clamp shall be capable of being removed and reinstalled on the conductor at the design torque without damaging the fasteners and conductor surface. The damper assembly shall be electrically conductive.

12.7 The approved vendor shall give full details of the damping characteristics and energy dissipation curve of the dampers and guarantee their effectiveness for the earthwire for damping design.

12.8 The vibration damper shall also conform to IS : 9708-1980 and technical particular given hereunder:-

i) Type	Stock Bridge type 4R
ii) Materials a) Clamps b) Messenger cable	 Aluminium Alloy High tensile steel of strength 140 kg/mm² (19 strands wire)

c) Damper masses	H.D.G. cast Iron
iii) Mass pull off strength	500 kg.
iv) Clamp slip strength	250 kg
v) Maximum permissible dynamic strain	Less than 150 micro -strains
vi) Minimum number of cycles for fatigue performance	10 million cycles at highest resonant frequency at $\pm$ 0.5

13. ERECTION

GENERAL

The line shall be constructed on self supporting, latticed steel towers. The phase conductors shall be in triangular formation (right angle or equi-lateral triangle) in case of Single Circuit line(s) and in vertical formation in case of Double circuit lines. Earthwire shall be provided above the conductors for effective shielding. The construction details shall comply in all respects with the specifications given herein.

The towers shall be fully galvanised including stubs and cleats by hot dip galvanising. The tower members shall be fabricated using structural mild steel sections as per IS: 226/2062. Hexagonal round head galvanised M.S. bolts and nuts with flat washers of 5 mm thick shall be used for connections.

13.1 CLASSIFICATION OF TOWERS :

(a) 'A2' Type Suspension Towers :

The suspension type towers are designed with suspension strings and 2^0 line deviation with design span.

(b) 'B30' Type Tension Towers :

To be used for angle of line deviation up to 30^0 with design span and shall also be suitable for section conditions.

(c) 'C60' Type Tension Towers :

To be used for angle of line deviation up to 60^0 with design span.

(d) Dead end Towers :

Normally 'C' type towers are used as dead end towers. However, in exceptional circumstances a dead end tower may be different from 'C' type tower.

132 KV Narrow Base Tower

(a) 'NBDA' Type Suspension Towers :

The suspension type towers are designed with suspension strings and 2^0 line deviation with design span.

(b) 'NBDB' Type Tension Towers :

To be used for angle of line deviation up to 15^0 with design span and shall also be suitable for section conditions.

(c) 'NBDC' Type Tension Towers :

To be used for angle of line deviation up to 30^0 with design span.

(d) 'NBDD' Type Tension Towers :

- To be used for angle of line deviation up to 60^0 with design span.
- To be used Dead End tower.
- These towers can also be used for longer spans with reduced angle of deviation with limitations of ground clearance and wind/weight span as per tower spotting data.

13.2 SPECIAL TOWERS

13.2.1 In addition to standard towers and extensions specified, erection of special structures, if any, required for major river crossings, power line crossings very long spans etc. shall be carried out

13.2.2 **EXTENSIONS :**

- Extensions in the towers may also be used wherever required.
- Such extension shall be used where ground clearance and inter circuit clearances are found to be inadequate.
- Tower foundations may be suitable with or without extensions depending up[on foundation design.

13.2.3 TOWER LOCATION

13.2.4 SAG TEMPLATES

The TSP shall prepare the sag template for tower spotting.

13.2.5 TOWER SPOTTING

With the help of tower spotting data and approved sag templates, tower locations shall be marked on the profiles. While locating the towers on survey charts, the following points shall be borne in mind –

(a) Towers shall be located within its design parameters.

(b) Towers shall be placed at mid bisection of deviation angle.

(c) Dead end tower shall be square to the line side and may have a deviation upto 15^0 on slack span side.

(d) There shall not be any upward force on suspension towers under normal working conditions and the suspension towers shall support at least the minimum weight span as provided in the designs. In case uplift is unavoidable, it will be examined if the same can be over come by adding standard body extensions to the towers, failing which tension towers designed for the purpose shall be employed at such positions.

(e) An individual span shall be as near to the normal design span as possible. In case an individual span becomes too short with normal supports on account of undulations in ground profile, one or both line supports of the span may be extended by inserting standard body extension, designed for the purpose.

(f) The number of consecutive spans between the section points shall not exceed 15 spans. A sectional point shall be taken to comprise a tension point with a B-type or C-type tower.

(g) ROAD CROSSING

At all important road crossings, the tower shall be located in such manner that the ground clearance at the roads under maximum temperature and in still air shall be such that even with a conductor broken in adjacent span the ground clearance of the conductor from the road surface will not be less than that required under Indian Electricity Rules l956. Road crossing span shall not exceed to 250 meter.

(h) RAILWAY CROSSING

Railway crossings shall be constructed in conformity with the specifications laid down by the Railway Authorities. The angle of crossing shall be as near 90^0 as possible. The railway crossing towers shall have double tension insulator strings.

(i) POWER LINE CROSSING

Where the line under construction is to cross over another line of the same voltage or lower voltage, tower with suitable extensions shall be used. Provision to prevent the possibility of its coming into contact with the other overhead lines, shall be made in accordance with the Indian Electricity Rules, 1956.

(j) TELECOMMUNICATION LINES CROSSING

The angle of crossing between telecommunication line and power line shall be as near 90^0 as possible. However, deviation to the extent of 60^0 may be permitted under exceptionally difficult situations. When the angle of crossing has to be below 60^0 the matter will be referred to the authority in charge of the telecommunication system. Also in the crossing span, power line supports will be as near the telecommunication line as possible, to obtain increased vertical clearance between the wires.

(k) TRANSPOSITION

No transposition of the conductors shall be carried out in the line.

(l) RIVER CROSSING

Small rivers shall be crossed with normal A, B & C towers with or without extension. Major rivers may be crossed either with normal A, B, C towers with or without extension or special river crossing towers.

(m) APPROACH SPANS

On approach line towers upto 1.5 Km from the terminal structures on either end of the line, insulator strings suitable for graded insulation with arcing horns on both sides with the number of insulator discs one less then those in the normal line, suspension and tension insulator strings shall be used.

Latitude and longitude of each location of the lines shall be captured and KML file for each line shall also be prepare and submit for ready reference.

14. CONSTRUCTION OF TOWER FOUNDATION, STUB SETTING & EARTHING

Cement concrete footings shall be used for all types of towers, in conformity with the present day practice followed in the country, and specifications laid herein. RCC foundations may be used for locations where cement concrete footings are not possible to be laid. All the footings of the tower shall be similar.

14.1 FOUNDATION DEPTH

The depth of the foundation may vary from 1.5metres to 3.5 meters.

14.1.1 CLASSIFICATION OF FOUNDATION

- Depending on the type of soil, the sub-soil water table and the presence of surface water, four types of foundation will be used for each type of tower locations, classified in the following manner –

(a)	Normal dry type	To be used for location in normal dry cohesive or non-cohesive soils.
(b)	Wet type Or and	To be used for locations – i) Where sub-soil water is met at 1.5m or more below the ground line. ii) Which are in surface water for long periods with water penetration not exceeding one metre below the ground line. iii) In black cotton soils.
(c)	Partially submerged type	To be used on locations where sub-soil water table is met between 0.75 meter to 1.5 meter below the ground line.
(d)	Fully submerged type	To be used at locations where sub-soil water is met at less than 0.75 meter below the ground line.

- In addition to the above, depending on the site conditions other types of foundations may be introduced suitable for –

i) Intermediate conditions under the above classifications to effect more economy, or

ii) for locations in hilly and rocky areas.

14.2 **EARTHING**

The footing resistance of all towers shall be measured by the TSP in dry weather after their erection before the stringing of earth wire. In case the tower footing resistance exceeds 10 ohms, pipe type earthing/counterpoise earthing, wherever required shall be done in accordance with stipulation made in this contract

14.3 **PIPE EARTHING**

The grounding shall be effected by making about 300mm dia 3750mm deep pit at a distance of not less than 3650mm away from the stubs and filling in the pit with finely broken coke having the granule sizes not more than 25mm and salt in such a way that minimum cover of 125mm thick salt-mixed-coke shall be maintained from the pipe on all sides and that the top edge of the pipe shall be at least 600mm below the ground line. The GS strip shall be buried not less than 600mm from the ground line.

14.4 COUNTERPOISE EARTHING

In place of high resistivity soil, special earthing arrangement shall be employed in the form of counterpoise earth to bring down the tower footing resistance to 10 ohms. The counterpoise earth shall be composed of 7/9 SWG galvanized steel wire having suitable GS lugs soldered or compressed at its one end complete with 16mm dia bolts & nuts, required for connecting the earthing to the tower end. The counterpoise shall be buried radially away from the tower base at 600mm below ground level. The lug should preferably be buried in the chimney portion of the foundation to avoid pilferage.

14.5 STRING OF CONDUCTOR & EARTHWIRE :

14.5.1 The stringing of the conductors and earth wire shall be done in a most standard method used for such lines.

14.5.2 On certain 220KV or 132KV lines, UPPTCL may opt to use earthwire in place of OPGW.In that case TSP will be required to lay Earthwire on 132KV or 220kV towers in place of with all related hardwares.

14.5.3 The TSP shall be entirely responsible for any damage to the towers or the conductors during stringing. The damaged items shall be replaced without extra charges to the UPPTCL.

15. OPGW : TECHNICAL SPECIFICATIONS OF OPGWAND ITS ACCESSORIES

15.1 Introduction, General Information and Requirement - This section describes the technical specifications for procurement of overhead fibre optic cable (OPGW) for 220 & 132 kV SC/DC Transmission system.

15.2 Introduction

UPPTCL is constructing 220KV & 132 kV SC/DC transmission lines with ACSR Zebra/Panther. 24/48 Fibre (DWSM, G.652D) Optical Ground Wire (OPGW) cable shall be laid on these lines. The Installation, Erection, Splicing, Termination, Testing and Commissioning of OPGW cable & OFAC upto end to end connectivity shall also be carried out by the TSP.

Specifications and Functional Description

Table 2-1(a): DWSM Optical Fibre Characteristics	
Fibre Description:	Dual-Window Single-Mode
Mode Field Diameter:	8.6 to 9.5 (m (± 0.6(m)
Cladding Diameter:	125.0 (m ± 1 (m
Mode field concentricity error	0.6(m
Cladding non-circularity	
Cable Cut-off Wavelength λ_{cc}	1260 nm
1550 nm loss performance	As per G.652 D
Proof Test Level	0.69 Gpa
Attenuation Coefficient:	@ 1310 nm 0.35 dB/km @ 1550 nm 0.21 dB/km
Chromatic Dispersion; Maximum: **Zero Dispersion Wavelength:** **Zero Dispersion Slope:**	18 ps/(nm x km) @ 1550 nm 3.5 ps/(nm x km) 1288-1339nm 5.3 ps/(nm x km) 1271-1360nm 1300 to 1324nm 0.092 ps/(nm^{2}xkm) maximum
Polarization mode dispersion coefficient	0.2 ps/km^½
Temperature Dependence:	Induced attenuation 0.05 dB (-60C - +85C)
Bend Performance:	@ 1310 nm (75±2 mm dia Mandrel), 100 turns; Attenuation Rise 0.05 dB/km @ 1550 nm (75±2 mm dia Mandrel), 100 turns; Attenuation Rise 0.10 dB/km @ 1550 nm (32±0.5 mm dia Mandrel, 1 turn; Attenuation Rise 0.50 dB/km

The size of OPGW shall be selected such that max tension and sag at specified temperature and wind condition remain within the limits indicated below:

S. No.	**Parameter**	**For 47 m/sec Wind Zone**

1.	Basic Span	380 m
2.	Wind Pressure	189.64 kg/sq-m
3.	Overall Diameter	0.011010 m
4.	Unit Weight	0.583 kg/m
5.	Ultimate Tensile Strength	7030 kg
6.	Tension at 32° C & Full wind	3200 kg
7.	Sag at 53° C & no wind	9.507 m
8.	Sag at 0° C & no wind	7.745 m

The above cases shall be considered for the spans from 100 m to 600 m in the range of 50 m spans. The full wind load shall be considered as the design wind load for all the specified transmission lines as per relevant IS 802 version and the sag-tension chart shall be submitted considering the transmission lines.

16. Electrical and Mechanical Requirements

Table 2-2(a) provides OPGW Electrical and Mechanical Requirements for the minimum performance characteristics. For the purposes of determining the appropriate Max Working Tension limit for the OPGW cable IS 802:1995 and IS 875: 1987 shall be applied. However the OPGW installation sag & tension charts shall be based on IS 802 version to which the line is originally designed. For the OPGW cable design selection and preparation of sag tension charts, the limits specified in clause 2.1.2.5 shall also be satisfied. The Bidder shall submit sag-tension charts for the above cases with their bids.

Table 2.2(a) : OPGW Electrical and Mechanical Requirements		
(1)	Everyday Tension	20% of UTS of OPGW
(2)	D.C. Resistance at 20C:	< 1.0 ohm/Km
(3)	Short Circuit Current:	6.32 kA for 1.0 second

TECHNICAL PARTICULARS OF CONDUCTOR AND EARTHWIRE

Technical particular of Conductor

S N	Code Name	Zebra	Panther
1	Copper Equivalent Area mm sq.	260	130
2	Total area mm sq.	484.5	261.30
3	No. of Strands	61	37
4	Stranding & wire diameter (mm) Aluminium (mm) Steel (mm)	 54/3.18 7/3.18	 30/3.00 7/3.00
5	Overall dia (mm)	28.62	21.00
6	Ultimate tensile strength (KN)	130.32	89.67
7	Conductor per phase	Single	Single

8	Weight (Kg/km)	1623	974
9	Final modulus of elasticity GN/mm2	69	80
10	Coff. Of linear expansion (0C)	19.3X10-6	17.8X10-6

Technical particular of Earthwire

SN	Code Name	7/9 SWG	7/10 SWG
1	Type (Galvanized steel)	95 kg/mm2	95 kg/mm2
3	No. of Strands	7	7
4	Stranding /diameter (mm) Steel (mm)	 7/3.66	 7/3.25
5	Overall dia (mm)	10.98	9.75
6	Ultimate tensile strength (Kg)	7030	5510
7	Weight (Kg/km)	580.5	460
8	Coff. Of linear expansion (0C)	11.5X10-6	11.5X10-6

TECHNICAL PARTICULARS OF INSULATOR STRING (FOR 132 KV LINES)

SN	String particular	Electro-mech strength(KN)	Weight of each disc (kgs)	Size of brown glazes insulator disc(kgs)
1	9 unit single suspension string	70	5.25	280X145
2	2X9 unit Double suspension string	70	5.25	280X145
3	10 unit single tension string	120	9.00	280X145
4	2X 10 unit double tension string	120	9.00	280X145

SPECIFIC TECHNICAL REQUIREMNETS FOR 220/132/33 kV AIS SUBSTATION

1. GENERAL TECHNICAL REQUIREMENTS OF SPECIFICATIONS

	SYSTEM PARTICULARS			
(i)	Rated System voltage		245KV, 145KV, 36KV	
(ii)	System frequency & Number of phases		50 Hz, This may vary by ± 5% & Three	
(iii)	Neutral		Effectively Earthed	
(iv)	Auxiliary power supply:-		245KV, 145KV, 36KV	
	Auxiliary electrical equipment shall be suitable for operation on the following supply system.			
	(a)	Power device(Like drive motors)	400V, 3Phase, 4Wire 50Hz Effectively earthed AC system.	
	(b)	Lighting fixtures, space heaters, fractional Horse Power motors and control devices.	250V, 2wire, 50Hz, AC supply with one point grounded.	
	(c)	DC alarm, Control and Protective	2wire ungrounded DC supplies	
		Devices from sub station batteries as under		
		(i)	220/132KV S/S : 110V DC	
		(ii)	Communication equipment : 48 V DC	
	The above supply voltage is subject to variation as follows :			
	All devices must be suitable for a continuous operation over the entire range of voltage variations :			
	(i)	AC	Voltage may vary by ± 10%.	
			Frequency by ± 5%	
			Combined Voltage & frequency by ±10%.	
	(ii)	DC		
		a)	220 V may vary between 187& 242 V	
		b)	110 V may vary between 93 & 121 V	
		c)	48 V may vary between 41 & 53 V	
	SYSTEM PARAMETERS: The following system parameters shall prevail.			
	Nominal system voltage	**220KV**	**132 kV**	**33 kV**
	Nominal system voltage	**220KV**	**132 kV**	**33 kV**
	Highest system & Frequency	245KV & 50Hz	145 Kv & 50Hz	36 kV & 50Hz
	Rated short time current	40KA for 3 Sec.	31.5 kA for 3 sec	25 kA for 3 sec

	SYSTEM PARTICULARS			
	Dry and wet one minute power frequency withstand voltage	460KV	275 kV	95 kV
	Dry and wet impulse withstand voltage positive and negative	1050KVp	650 kVp	250 kVp
	System Earthing	Effectively Earthed	Effectively Earthed	Un- effectively

General criteria for using the conductors at 220/132/33 KV substations is as under :

S. No.	**Bus/ Feeder**	**220kV Switch yard**	**132kV Switch yard**	**33kV Switch yard**
1	Main Bus	Tarantulla	Tarantulla	Tarantulla
2	Transfer Bus/Auxiliary bus	Zebra	Zebra	Zebra
3	Jack Bus/Jumpers/Equipment Interconnection for			
A	Feeder	Zebra	zebra	2x Panther
B	160 MVA T/F	zebra	tarantula	
C	60 MVA T/F	Zebra	-	2x Zebra
D	40 MVA T/F		zebra	2x Zebra
E	TBC	Zebra	Zebra	Zebra
Sizes (Diameter in mm) for various conductors are as follows :				
Moose -		31.775	Panther -	21.00
Zebra -		28.575	Tarantulla -	36.61

2. CONTROL CABINETS, JUNCTION BOXES, TERMINAL BOXES & MARSHALLING BOXES FOR OUTDOOR EQUIPMENT

All types of boxes, cabinets etc. shall generally conform to in accordance with IS-5039/ IS-8623, IEC-439, as applicable.

Control cabinets, junction boxes, marshalling boxes & terminal boxes shall be made of sheet steel or aluminum enclosure and shall be dust, water and vermin proof. Sheet steel used shall be at least 2.0 mm thick cold rolled or 2.5 mm hot rolled. The box shall be properly braces to prevent wobbling. There shall be sufficient reinforcement to provide level surfaces, resistance to vibrations and rigidity during transportation and installation. In case of

aluminum enclosed box, the thickness of aluminum shall be such that it provides adequate rigidity and long life as comparable with sheet steel of specified thickness.

3. EARTHING

Positive earthing of the cabinet shall be ensured by providing two separate earthing pads. The earth wire/ strip shall be terminated on to the earthing pad and secured by the use of self etching washer. Earthing of hinged door shall be done by using a separate earth wire.

4. TECHNICAL SPECIFICATION FOR 250 KVA 33/0.4 kV CLASS POWER TRANSFORMERS

The materials shall conform in all respects to the relevant Indian Standard Specifications with latest amendments indicated below:

Indian Standard	Title	International & Internationally Recognized Standard
ISS – 2026	Specification for Power Transformer	IEC 76
ISS – 3347/1967	Specification for Transformer's Porcelain Bushings	DIN 42531,2,3
ISS – 335	Specification for Transformer Oil	BS 148, IEC 296
IS-4237	General requirement for switch-gear & control gear for voltages not exceeding 1000 V.	
ISS-6600/1972	Guide for Loading of Oil immersed transformers	IEC 76
ISS – 1271	Insulating Material	
ISS-2099/1973	Specification for high voltage Porcelain Bushings.	BS 148 IEC 36 A
ISS-2393/1980	Cylindrical pins	
ISS-2633/1986	Methods of testing uniformity of zinc coated articles	
ISS – 5	Colours of Ready Mixed Paints.	

Equipment conforming to other internationally accepted standards, which ensure equal or higher quality than the standards mentioned above would also be acceptable. In case the Bidder who wish to offer material conforming to the other standards, salient points of difference between the standards adopted and the specific standards shall be clearly brought out in relevant schedule. Four copies of such standards with authentic English Translations shall be furnished alongwith the offer.

Principal Parameters

The transformer shall be suitable for outdoor installation with three phase, 50 Hz, conventional type copper wound distribution transformer ,Core type, Oil immersed and naturally cooled (Type ON), 33 kV system in which Neutral is effectively earthed and they should be suitable for service under fluctuation in supply voltage from +10% to – 15%. The transformer shall conform to the following specific parameters.

1. Continuous rated capacity	250 kVA
2. Rated Voltage HV	33 kV
3. Rated Voltage LV	0.4 kV
4. Frequency	50 Hz ±5%
5. No. of phase	Three
6. Method of connection HV	Delta
LV	Star
7. Vector Group	Dyll
8. Type of cooling	ONAN
9. Percentage impedance voltage on normal tap on kVA base corresponding to HV/LV rating and applicable tolerance as per ISS .	% impedance
(a) For 250 kVA (Tolerance ± 10%)	4.75%
10. Permissible temperature rise over ambient.	
i. of top oil measured by thermometer.	40 deg. C.
ii. of winding measured by resistance	50 deg. C
11. Tap changing gear	
i. Type	Off Load
ii. Provided on	HV winding
iii. Tap range	-5% to + 10%
iv. Tap steps	2.5%
12. Insulation Levels for windings	33 kV
a) 1.2/50 micro second wave shape impulse withstand (kVp)	170
b) Power frequency withstand voltage (kV rms)	70
c) Maximum continuous operating system voltage (kV rms)	36
13. Bushings	
(i) Voltage rating (amps)	36

(ii)	Current rating (amps)	As per required
(iii)	Insulation Level	
	(a) Lightening impulse withstand (kVp)	170
	(b) One minute power frequency withstand voltage (kV rms)	70

5. TECHNICAL SPECIFICATION OF 245KV &145 KV SF6 CIRCUIT BREAKERS

Standard	Title
IEC 62271-100 and IS-13118	Specification for alternating current circuit Breakers.
IEC – 376	Specification for acceptance of new supply of SF6.
IEC – 137	Bushing for A.C. Voltage.
IEC – 71	Electrical Clearances.
IEC – 694	Common clause for high voltage switch gear and control gear standard.
IS – 2147	Degree of Protection Provided for enclosures for low voltage switch gear and control gear.
IS – 2516	Specification for circuit Breaker
IS – 5578 & 11353	Making and arrangement for switch gear bus bar, Main Connections and auxiliary wiring.
IS – 2629	Recommended Practice for hot dip galvanizing of iron and steel.
IS – 2099	High voltage Porcelain bushings.
IS – 4379	Identification of the contents of Industrial Gas Cylinders.
IS – 7285	Seamless high carbon steel cylinders for permanent and high pressure liquefiable gas.

PRINCIPAL PARAMETERS

FOR 245 kV SF6 Circuit Breakers	
Rated nominal system voltage	220KV
Rated voltage	245KV
Rating of C.B.	MVA
Rated frequency	50 Hz
System neutral earthing	Effectively earthed
Type of C.B.	SF 6

FOR 245 kV SF6 Circuit Breakers	
No. of poles	3 – (pole operated)
Installation	Outdoor
Rated normal current	3150 Amp.
Rated short circuit breaking	RMS value of A.C. component current of the rated short circuit breaking current 40 kA for 3 Sec.
	D.C. component as per IEC-62210
Rated duration of short circuit	3 Sec.
Transient frequency voltage	The rated transient recovery voltage of the breaker shall be used on 4 parameter method as defined in IEC 62210
Terminal faults	1st pole of clear factor 1.3 value of 4 parameter as per IEC62210
Short line fault	As per IEC
Rated short circuit making capacity (peak)	100 kA
Operation duly cycle	0-t-co-t1 -co
	t = 0.3 Sec.
	t1 = 3 min.
Total breaking time	3 cycles
1.2/50 microsecond lightning impulse withstand voltage to earth	1050 KV (min.)
One minute power frequency dry withstand voltage to earth	460 KV (RMS)
Temperature rise	Final Steady State Temperature rise of current carrying part shall not exceed the limits specified in IEC 62210 with a site reference ambient temperature of 500C
Operating mechanism	Spring/Electro pneumatic.
Type of tripping	Trip free
Number of auxiliary contacts	12 Nos NO. and 12 Nos NC
No. of trip coils	2 Nos.
No. of closing coils	1 No.
Breaking line charging current	125 Amps. at 245KV

FOR 245 kV SF6 Circuit Breakers	
Interrupting capacity in KA for kilometric faults	40 KA (RMS)
Arcing time (at 100% interruption capacity)	25 milliseconds.
Minimum dead time	300 milliseconds.
No. of break per phase	One
Tripping and closing control circuit voltage	110 V.DC
First pole to clear factor	1.3
FOR 145 kV SF6 Circuit Breakers	
Rated nominal system voltage	132KV
Rated voltage	145KV
Rating of C.B.	7900 MVA
Rated frequency	50 Hz
System neutral earthing	Effectively earthed
Type of C.B.	SF 6
No. of poles	3 – (gang operated)
Installation	Outdoor
Rated normal current	1250 Amp.
Rated short circuit breaking	RMS value of A.C. component current of the rated short circuit breaking current 31.5KV for 3 Sec.
	D.C.component as per IEC-62271 – 100
Rated duration of short circuit	3 Sec.
Transient frequency voltage	The rated transient recovery voltage of the breaker shall be used on 4 parameters method as defined in IEC 62271-100
Terminal faults	1st pole of clear factor 1.5 value of 4 parameter as per IEC62210
Short line fault	As per IEC
Rated short circuit making capacity (peak)	80 KA
Operation duly cycle	0-t-co-t1 -co
	t = 0.3 Sec.
	t1 = 3 min.

FOR 245 kV SF6 Circuit Breakers	
Total breaking time	3 cycles
1.2/50 microsecond lightning impulse withstand voltage to earth	650 KV (min.)
One minute power frequency dry withstand voltage to earth	275 KV (RMS)
Temperature rise	Final Steady State Temperature rise of current carrying part shall not exceed the limits specified in IEC 62271-100 with a site reference ambient temperature of 500C
Operating mechanism	Mechanical spring/Electro pneumatic.
Type of tripping	Trip free
Number of auxiliary contacts	12 Nos NO. and 12 Nos NC
No. of trip coils	2 Nos.
No. of closing coils	1 No.
Breaking line charging current	50 Amps. at 145KV
Interrupting capacity in KA for kilometric faults	31.5 KA (RMS)
Arcing time (at 100% interruption capacity)	25 milliseconds.
Minimum dead time	300 milliseconds.
No. of break per phase	One
Tripping and closing control circuit voltage	110 V.DC
AUTOMATIC RAPID RECLOSING	
The operating duty of the circuit breaker shall be "O-Dead Time-CO-Re-closing Time-CO" in accordance with latest edition of IEC-62271-100. The values of dead time and reclaiming time shall be 0.3 second and 3 min. respectively.	

6. TECHNICAL SPECIFICATIONS OF 36 KV VACUUM CIRCUIT BREAKERS

STANDARD

The 36KV Vacuum circuit breaker shall comply with the requirements of latest issue of **IEC-62210** except where specified otherwise in this specification. Equipment having better quality than the standards mentioned may also be considered provided documentary evidences are furnished.

PRINCIPLE PARAMETERS

The 36KV Vacuum circuit breaker shall be suitable for outdoor operation in solidly grounded system under climatic conditions specified and should have the following ratings:-		
i)	Nominal system voltage	33 KV
ii)	Highest system voltage	36 KV
iii)	Rates voltage	36 KV
iv)	Interrupting capacity	1000 KVA
v)	Rated normal current	1250 A
vi)	Rated frequency	50 c/s
vii)	Rated basic insulation level	170 KV
viii)	Rated short circuit current	25 KA
ix)	Rated short circuit making current	35 KA
x)	Rated operating sequence	0-0. 3 Sec.-Co-3 min-Co
xi)	Total break time for any current up to the rated breaking current	5-6 c/s
xii)	Control circuit voltage	110 VDC

GENERAL

The Vacuum circuit breakers shall provide for rapid and smooth interruption of current under all conditions, completely suppressing all undesirable phenomenons, even under the most severe conditions or while interrupting small currents, loading or logging reactive currents. The rate of rise of restriking voltage across the circuit breaker, switching on inductive or capacitive load, should not exceed 2,5 times the normal phase to neutral voltage. The total break time for the circuit breaker throughout the range of their operating duly shall be stated in the Bid and guaranteed particulars of the breaker.

7. **TECHNICAL SPECIFICATION OF 245 KV/145KV/36KV CURRENT TRANSFORMERS**

1.0	**STANDARDS :**		
1.1	Except as modified in this specification, the Current Transformers and accessories shall be in accordance with the latest editions of the following standards :-		
1.	IEC Publication 185	:	Current Transformers
2.	Draft Supplement to IEC publication 185 (1966)	:	CTs for protection system for which transient performance is significant.
3.	IS:2705 (Part-I to IV) 1991 & IEC 60444-1	:	Specification for CTs.
4.	IS : 2099	:	High voltage porcelain bushing.

5.	IS : 3347	:	Dimension for porcelain T/F
6.	IEC : 60-1973	:	High voltage test techniques.
7.	IS : 335	:	Insulating oil for T/F and switchgear.
8.	IS : 3202	:	Code of practice : climate proofing of electrical equipment.
9.	IEC-270-1968	:	Partial discharge measure-ment.
10.	IEC-44(4)-1980	:	Instrument transformers measurement of partial discharge.

TYPE & RATING :

The CTs should be of the outdoor type, single phase, 50 c/s, oil immersed, self cooled, hermetically sealed, suitable for operation in humid atmosphere in the tropical sun with climatic conditions as indicated in Clause 4.0 of General Technical Requirements. The CTs should also be suitable for use in area subject to heavy lightning storms.
The CTs shall comply with requirements indicted below :-

S. No.	Particulars	245 KV CTs	145 KV CTs	36 KV CTs
1.	Nominal system voltage	220 KV (r.m.s.)	132 KV (r.m.s.)	33 KV(r.m.s.)
2.	Highest system voltage	245 KV (r.m.s.)	145 KV (r.m.s.)	36 KV(r.m.s.)
3.	Frequency	50 Hz	50 Hz	50 Hz
4.	Earthing of system	Effective	Effective	Effective
5.	Insulation level (BIL)	1050 KV (peak)	650 KV (peak)	170 KV (peak)
6.	Transformation ratio	1000/800/500/300/1A	800- 500/1A (For160MVA T/F) 400-200-100/1A (For 40 MVA T/F) 800-400-200/1A (For Feeders)	400-200/1A (For Feeders) Two cores. 800-400/1A(For T/F) Three cores.
7.	No. of cores	Five	Three	Two /Three
8.	Short time current rating (Corresponding to 6500 MVA-fault level)	40 KA for 3 sec.	31.5 KA for 3 sec.	25 KA for 3 sec.
9.	Creepage distance of bushing.	6125 mm (min.)	3625 mm (min.)	900 mm (min)
10.	Ratio selection	Primary reconnection & Secondary tapings.	Primary reconnection & secondary tapings	Primary reconnection & secondary tapings.

S. No.	Particulars	245 KV CTs	145 KV CTs	36 KV CTs
11.	Continuous primary current	120% of rated primary current.	125% of rated Primary current.	120% of rated primary current.
12.	Short time primary current.	Twice rated current.	Twice the rated current.	Twice the rated current.
13.	Continuous secondary current rating.	120%	2 Amps.	2 Amps. (min.)
14.	Rated withstand dynamic current (2.5) times of short time current rating.	100 KA (peak)	78.5 KA (peak)	62.5 KA (Peak)
15.	One minute power frequency withstand voltage (KV)	460 KV	275 KV	70 KV

245 KV C.T. REQUIREMENT

Core No.	Application	Current Ratio (A/A)	Output Burden (VA)	Accuracy Class	Values at Maximum Tap		
					Min. Knee point Voltage (Volts)	Max. Exciting current (mA)	Max. CT Secondary winding Resistance (Ohms)
1	2	3	4	5	6	7	8
I	Transformer Diff. I/ Distance Protection Main-I	1000-800-500-300/1	-	PS	1100	80	5 Ω
II	Transformer Diff.II /Distance protection Main-II	- do -	-	PS	1100	80	5 Ω
III	Metering*	- do -	30 VA	0.2	-	-	-
IV	Bus Bar Diff. Main	- do -	-	PS	1100	80	5 Ω
V	Bus Bar Diff.	- do -	-	PS	1100	80	5 Ω

**** Instrument Security Factor for Metering Core should not exceed 5.***

145 KV C.Ts REQUIREMENTS

TYPE- A (For 132 kV Feeders)

Core No.	Application	Current Ratio (A/A)	Output Burden (VA)	Accuracy Class as per IEC-185	Minimum Knee point Voltage (Volts)	Max.Exciting current at half knee point voltage (mA)	Maximum CT secondary winding Resistance at 75 deg C (Ohms)
I	Distance Protection	800/1	-	PS	1100	20 at VK/2	5 Ω
		400 /1	-	PS	1100	20 at VK/2	5 Ω
		200/1	-	PS	550	40 at VK/2	2.5Ω
II	Over Current & E/F Protection	800/1	-	PS	1100	20 at VK/2	5 Ω
		400 /1	-	PS	1100	20 at VK/2	5 Ω
		200/1	-	PS	550	40 at VK/2	2.5Ω
III	Metering*	800/1	20	0.2	-	-	-
		400/1	20	0.2	-	-	-
		200/ 1	20	0.2	-	-	-

***** ***Instrument Security Factor for Metering Core should not exceed 5.***

TYPE- B (For 132 kV side of 160 MVA 220/132 kV Transformers)

1	2	3	4	5	6	7	8
I	Differential Protection	800-500/1	-	PS	1100	20 at VK	5 Ω
II	Over Current & E/F	800-500/1	-	PS	1100	20 at VK	5 Ω
III	Metering*	800-500/1	20 VA	0.2	-	-	-

TYPE- C (For 132 kV side of 40 MVA 132/33kV kV Transformers)

1	2	3	4	5	6	7	8
I	Differential Protection	400/1	-	PS	1100	20 at VK/2	5 Ω
		200 /1	-	PS	550	40 at VK/2	2.5 Ω
		100/1	-	PS	550	40 at VK/2	2.5Ω
II	Over Current & E/F Protn.	400/1	-	PS	1100	20 VK/2	5 Ω
		200 /1	-	PS	550	40 VK/2	2.5 Ω
		100/1	-	PS	550	40 VK/2	2.5 Ω
III	Metering*	400/1	20	0.2	-	-	-
		200/1	20	0.2	-	-	-
		100/ 1	20	0.2	-	-	-

***** ***Instrument Security Factor for Metering Core should not exceed 5.***

36 KV C.T. REQUIREMENTS

TYPE- A (For 40 MVA Transformers)

1	2	3	4	5	6	7	8
I	Metering*	800/1	10	0.2	-	-	-
		400/1	10	0.2	-	-	-
II	Protection	800/1	-	PS	400	30	4 Ω
		400 /1	-	PS	400	30	4 Ω
III	Protection	800/1	-	PS	400	30	4 Ω
		400 /1	-	PS	400	30	4 Ω

TYPE- B (For 33 kV Feeders)

1	2	3	4	5	6	7	8
I	Metering*	400/1	10	0.2	-	-	-
		200/1	10	0.2	-	-	-
II	Protection	400/1	20	5P10	-	-	-
		200 /1	20	5P10	-	-	-

***** ***Instrument Security Factor for Metering Core should not exceed 5.***

8. TECHNICAL SPECIFICATION OF 245 KV CAPACITOR VOLTAGE TRANSFORMERS

STANDARDS:

Unless otherwise specified elsewhere in this specification, the rating as well as performance and testing of the 245 KV Capacitor Voltage Transformers along with associated accessories shall conform but not limited to the latest issues/amendments of standards available at the time of placement of order of all the relevant standards as listed hereunder.

Sl. No.	Standard No.	Title
1.	IS: 3156 (part IV)	Capacitor Voltage Transformers
2.	IS: 2099	High voltage porcelain Bushings
3.	IS: 2071	Method of High voltage testing
4.	IS: 335	Insulating oil for transformers and switching
5.	IS: 2165	Insulation Co-ordination for equipment of 100 kV and above.
6.	IEC-186	Voltage Transformers: Chapter-III Capacitor Voltage Transformers: Chapter-IV
7.	IEC-186A	First supplement to IEC Publication:186
8.	IEC-270	Partial Discharge Measurement.
9.	IEC-171	Insulation co-ordination
10.	IEC-358	Coupling capacitor divider.
11.	IEC-60	High Voltage Testing Techniques.
12.	IS: 9348	Coupling capacitors and capacitor dividers.

PRINCIPAL TECHNICAL PARAMETERS

8.1 The Voltage Transformers shall conform to the following specific parameters:

S. No	Parameters	Specification
1	2	3
1.	Type of installation	Single Phase, Oil filled hermetically sealed and outdoor types
2.	Type of mounting	Pedestal type
3.	Suitable for system frequency	50 Hz ± 5%
4.	Highest system Voltage	245 Kv
5.	Transformation ratio on all windings	$\frac{220,000}{\sqrt{3}} / \frac{110}{\sqrt{3}}$
6.	Method of earthing	Effectively earthed
7.	1.2/50 micro second lightning impulse withstand voltage kV (peak)	1050
8.	1 minute dry power frequency withstand voltage kV (rms)	460
9.	Min. Creepage Distance mm.	6125
10.	Radio interference Voltage at 266 kV	Not exceeding 500 micro volts

9. REQUIREMENT OF 245 KV CVT

S. No.	DETAILS	PARTICULARS		
1.	Transformation ratio on all windings	$\frac{220,000}{\sqrt{3}} / \frac{110}{\sqrt{3}}$ (No. of secondary windings 3)		
2.	Supply frequency	50 Hz.		
3.	Type	Capacitor voltage type.		
4.	Rated voltage factor	1.2 continuous 1.5 for 30 seconds.		
5.	Application	Winding I Protection	Winding II Protection	Winding III Metering/Synchro.
6.	Accuracy	3P	3P	0.2
7.	Phase angle error	--------- As per IS ----------		
8.	Output burden	150 VA	150 VA	50 VA
9.	Rated capacitance	4400 + 10% - 5%		
10.	Rated total thermal burden	750 VA		
11.	Standard reference range of frequency for which the accuracies are valid.	97% to 103% for protection & 99% to 101% for measurement.		
12. a)	One minute power frequency test on secondary winding.	3 KV (r.m.s.)		

S. No.	DETAILS	PARTICULARS
b)	Withstand voltage between low voltage terminal and earth terminal	4 KV (r.m.s.)
(Note : This test voltage shall be 10 KV (r.m.s.) in the low voltage terminal exposed to weather).		
c)	Radio interference voltage of 266 KV (r.m.s.)	Not exceeding 500 microvolts.
13.	Corona extinction voltage.	320 KV (r.m.s.)
15.	Partial discharge level at rated voltage for capacitor divider.	Less than 10 pico coulombs

10. TECHNICAL SPECIFICATION OF 145 KV POTENTIAL TRANSFORMERS

STANDARDS :

Unless otherwise specified elsewhere in this specification, the rating as well as performance and testing of the 145 KV Potential Transformers along with associated accessories shall conform but not limited to the latest issues/ amendments of standards available at the time of placement of order of all the relevant standards as listed hereunder.

Standard No.	Title
IS:3156:1992) Transformers	Specification for Voltage (Part I to III) & IEC 186: 1987
IS:2099	Specification for High Voltage porcelain bushing
IS:335	Specification for Insulating oil for T/F & Switchgear
IS:3202	Code of practice: climate proofing of Electrical equipment
IS:4146: 1983	Application Guide for Voltage Transformers.
IS: 2629	Recommended practice for hot dip galvanizing of iron & steel.

PRINCIPAL TECHNICAL PARAMETERS

The Potential Transformers shall conform to the following specific parameters:

Parameters	Specification 145 kV
Type of installation	Single phase, Oil immersed, self cooled, Hermetically sealed, Outdoor type.
Type of mounting	Mounting on steel structures
Suitable for system frequency	50 Hz ± 5%
Highest system voltage	145 kV
Transformation ratio on all windings	$\frac{132,000}{\sqrt{3}} / \frac{110}{\sqrt{3}}$
Method of earthing	Solidly Grounded

Parameters	Specification 145 kV
1.2/50 micro second lightning impulse withstand voltage kV (peak)	650
1 minute dry power frequency withstand voltage kV (rms)	275
One minute power frequency withstand voltage on secondary	3 kV
Min. Creepage Distance mm.	3625
Voltage ratios and other requirements of the Voltage Transformers shall comply with the requirement indicated in Annexure-I (B) for 145kV PTs respectively.	
Maximum permissible temperature rise of windings of voltage transformers shall be 45 ^{0}C over an ambient of 50^{0}C.	

REQUIREMENT OF 145 KV PT

S. No.	DETAILS	PARTICULARS		
1.	Transformation ratio on all windings	$\frac{132,000}{\sqrt{3}} / \frac{110}{\sqrt{3}}$ (No. of secondary windings 3)		
2.	Supply frequency	50 Hz.		
3.	Type	Single phase, Oil immersed, self cooled, Hermetically sealed, Outdoor type.		
4.	Rated voltage factor	1.2 continuous and 1.5 for 30 seconds.		
5.	Application	Winding I Protection	Winding II Protection	Winding III Metering
6.	Accuracy	3P	3P	0.2 Note : Acc. of 0.2 to be maintained up to and including a total simultaneous burden of 100 VA on all the windings.
7.	Phase angle error	As per relevant IS		
8.	Output burden	50 VA	50 VA	50 VA
9.	Creepage distance of bushing	3625 mm (minimum).		
10.	Total simultaneous burden	100 VA		
11.	One minute power frequency withstand voltage on secondary.	3 KV (r.m.s.)		
12.	Rated Power Factor	0.8		
13.	Class of insulation in windings	A		

11. TECHNICAL SPECIFICATION OF 36KV POTENTIAL TRANSFORMERS

SCOPE :

This Specification covers the design, manufacture, assembling, testing at manufacturers' works, supply and delivery of single phase Potential Transformers with terminal connectors and junction boxes for service in 33 KV, three phase system.

Type & Rating :

The potential transformers shall be outdoor type, single phase, oil immersed, self cooled, suitable for operation on three phase, 50 c/s, 33 KV Solidly Grounded system where the short circuit level of the system is of the order of 1000 MVA under the tropical climate conditions specified under General Requirement of Specification.

The potential transformers should have the following ratings:-

1. Rated Voltage	33 KV
2. Nominal System Voltage	33 KV
3. Highest System Voltage	36 KV
4. Type of Supply	3- Phase A.C.
5. Frequency	50 Cycles/sec.
6. Earthing	Solidly Grounded
7. No. of Secondary Windings	Two
8. Transformation Ratio:	Winding – I & II 33 KV/√3 / 110 Volt/√3
9. Rated Burden:	
Winding – I	50 VA each
Winding –II	50 VA each
10. Accuracy Class:	
Winding – I	0.2 for metering
Winding – II	3P for protection
11. Basic Insulation Level (Impulse)	170 KV (Peak)
12. Creepage distance	900 mm (minimum)
13. Rated Voltage Factor:	
	(a) Continuous 1.1
	(b) 30 seconds 1.5
14. Service Conditions	Outdoor, direct in Sun service.
STANDARDS:	
The potential transformers should confirm in all respects to latest edition of ISS: 3156/1965 except wherein specified otherwise.	
1. Rated Voltage	33 KV
2. Nominal System Voltage	33 KV
3. Highest System Voltage	36 KV
4. Type of Supply	3- Phase A.C.
5. Frequency	50 Cycles/sec.
6. Earthing	Solidly Grounded
7. No. of Secondary Windings	Two
8. Transformation Ratio:	Winding – I & II 33 KV/√3 / 110 Volt/√3

REQUIREMENT OF 36 KV PT

S. No.	DETAILS	PARTICULARS	
1.	Transformation ratio on all windings	33,000/√3 / 110/√3 (No. of secondary windings 2)	
2.	Supply frequency	50 Hz.	
3.	Type	Single Phase wound electromagnetic type PT	
4.	Rated voltage factor	1.1 continuous 1.5 for 30 seconds.	
5.	Application	Winding I Metering	Winding II Protection
6.	Accuracy	0.20 Note : Acc of 0.2 to be maintained up to and including a total simultaneous burden of 75 VA on all the three windings.	3P
7.	Phase angle error	As per relevant IS	
8.	Output burden	50 VA	50 VA
9.	Total simultaneous burden	75 VA	
10.	One minute power frequency withstand voltage on secondary.	3 KV (r.m.s.)	
11.	Rated Power Factor	0.8	
12.	Class of insulation in windings	A	
13.	Method connection which will be adopted		
	-Primary winding	Star/earthed	
	-Secondary winding I	Star/earthed	
	-Secondary winding II	Open delta	

12. **TECHNICAL SPECIFICATION FOR 245 AND 145 KV MOTOR OPERATED ISOLATORS**

STANDARDS

The Isolators shall conform to the latest revisions with amendments available of relevant standards, rules and codes, some of which are listed herein for ready reference.

Sl. No.	Standard	Title
1.	IEC-168	Tests on indoor and outdoor post insulators of ceramic material or glass for systems with nominal voltages greater than 100

2.	IEC-129	Alternating Current disconnectors and earthing switches.
3.	IS-1818	Specification for alternating current isolators (disconnectors) and earthing switches.
4.	IS-9921	Specification for outdoor air break isolators and earthing switches for voltages up to 220 kV.
5.	IS-5561	Electrical power connectors
6.	IS-325	Specification for three phase induction motors.
7.	IS-3202	Code of practice for climate proofing of electrical equipment
8.	IS-2544	Specification for porcelain post insulators (3.3 kV and above)

TECHNICAL SPECIFICATIONS FOR 36 kV ISOLATORS

1.0	**TYPE OF ISOLATORS**	
	a) Three phase, 1250 A, 36 kV manually operated, Standard isolators without earth switch.	
	b) Three phase, 1250 A, 36 kV manually operated, Standard isolators with one earth switch.	
2.0	**PRINCIPAL PARAMETERS**	
Sl. No.	**Details**	**36 kV Isolator**
1	Rated Voltage	36 kV
2	System frequency	50 Hz
3	System Earthing	Effectively earthed
4	Type of Isolator	Outdoor, Horizontal air break suitable for upright mounting
5	Continuous current rating	1250 A
6	Operating mechanism	Manual
7	Phase to phase spacing	1500 mm
8	Rated short time withstand current	25 kA (rms)
9	Rated peak short circuit current	62.5 kA (peak)
10	Temperature rise	As per IEC-129 derated for an ambient of 50^0C
11	Seismic co-efficient	0.3 g.
12.	1.2/50 microsecond full wave positive and negative impulse withstand voltage to earth	70 kV (peak)
13.	One minute power frequency withstand voltage dry & wet to earth	70 kV (rms)

14.	Auxiliary Contacts	4 normally open and 4 normally closed.
15	Insulation level of insulators	
	i) Impulse voltage withstand test (1.2/50 micro second full wave)	170 kV (peak)
	ii) Power frequency withstand voltage to earth (dry & wet)	70 kV (rms)
16	Creepage distance of insulators :	
	i) Total	900 mm
	ii) Protected	450 mm
17	Minimum strength :	Suitable to withstand wind, short circuit and operating forces
	i) Torsional	
	ii) Cantilever	
18	Interlocks with circuit breaker	1 set of electrical and castel type interlocks.
19	Type of contacts	Hard drawn electrolytic copper with silver plating
20	Conductor take off	Horizontal/vertical according to actual requirement.
21.	Phase-to phase clearance	1500 mm

TECHNICAL SPECIFICATION FOR 245/145/36KV SOLID CORE POST INSULATORS

STANDARDS

Insulators should conform to the latest publications of IS 2544 & IEC in all respects except BIL which should be 1050Kvpfor 245 kV, and 650 kVp for 145 kV withstand. Equipment meeting any other authoritative standards which ensures equal or better quality than the IS mentioned above, is also acceptable.

REQUIREMENT FOR INSULATORS

FOR 245 AND 145 KV POST INSULATORS			
Nominal voltage	:	245 KV	145 kV
Highest system voltage	:	245 KV	145 kV
Sytem frequency	:	50Hz.	50 Hz.
Number of phases	:	3 (Three)	3 (Three)
Neutral	:	Effectively earthed	Effectively earthed
Short circuit current	:	40.0 KA	31.5 KA
Phase to phase spacing	:	4.5 meters	3.0 meters

Height of the insulator support structure.	:	2750 mm.	2750 mm
PCD of Top Flange	:	127 mm.	127 mm
PCD of Bottom Flange	:	184 ± .2 mm.	184± .2 mm
BIL	:	1050 KV	650 mm
Height of insulator	:	2300.00mm	1500 mm
FOR 36 KV POST INSULATORS			
Nominal voltage	:	36 KV	
Highest system voltage	:	36 KV	
Sytem frequency	:	50Hz.	
Number of phases	:	3 (Three)	
Neutral	:	Effectively earthed.	
Short circuit current	:	25.0 KA	
Phase to phase spacing	:	1.5 meters	
Height of the insulator support structure.	:	2750 mm.	
PCD of Top Flange	:	127 mm.	
BIL	:	250 KV	
Height of insulator	:	508.00 mm	

13. **TECHNICAL SPECIFICATIONS OF 198 KV/120 KV/30 KV 10KA METAL OXIDE GAPLESS SURGE ARRESTERS**

STANDARDS

The Lightning Arrester shall conform to the latest revision with amendments available of the relevant standards, rules and codes some of which are listed herein for ready reference:

Sl. No.	Standard	Title
1.	IEC 99 – 4	Specification Part – 4 for Lightning Arrester without gap for AC system
2.	IS: 3070	Specification for lightning Arrester for alternating current system Part
3.	IS: 2629	Recommended Practice for hot dip galvanizing of iron and steel
4.	IS: 2633	Method for testing uniformity of coating on Zinc coated articles
5.	IS: 5621	Specification for large hollow porcelain for use in electrical installation
6.	IS: 2174	Degree of protection provided by enclosure for low voltage switch-gear and control
7.	IEC: 71	Electrical Clearances

Sl. No.	Standard	Title		
8.	IS: 12063	Classification of degree of protection provided by enclosure of electrical equipment.		
	PRINCIPAL PARAMETERS			
•	Rated system voltage	245 KV	145 KV	36 KV
•	System neutral earthing	Effectively earthed		
•	Installation	Outdoor		
•	Rated arrester voltage	198 KV	120 KV	30 KV
•	Max. continuous operating voltage (MCOV) at 50^0C	168 KV	102 KV	24 KV
•	Nominal discharge current	10 KA (8/20 microwave)		
•	Rated frequency	50 Hz		
•	Minimum line discharge capacity	2 KJ / KV		
•	Power frequency reference voltage	Not less than MCOV		
•	Max. Residual voltage at nominal discharge current of 10 KA and 8/20 Micro Sec.	550 KV_P	400 KV_P	100 KV_P
•	Peak & value of high current (4/10 Microwave)	100 KA		
•	Creepage distance	25 mm/KV		
•	Partial discharge test on 1.05 MCOV	Net more than 50 Pico coulombs		
•	One minute power frequency voltage of arrester housing	460 KV	275 KV	70 KV
•	Impulse withstand voltage of arrester housing with 1.2/50 micro second wave.	1050 KV_P	650 KV_P	170 KV_P
•	Minimum prospective fault current.	40 KA		
•	Radio interference voltage	Not more than 500 micro volts.		
•	Pressure relief class	Class-A		
•	Current for pressure relief.	40 KA		
•	Seismic acceleration	0.3 g.		
•	Long duration discharge class	Class 3 (as per IEC)		

The details of the equipments to be protected by these surge arresters are as under :-

Equipment	Basic Insulation level		
	220 KV	132 KV	33 KV
Transformer 220 KV side	950 KV_P	550 KV_P	170 KV_P
Switchgears, CTs and CVTs	1050 KV_P	650 KV_P	170 KV_P

RELAYS:

All relays shall conform to the requirements of IS: 3231 or other applicable approved standards. Relays shall be suitable for flush or semi-flush mounting on the front with connections from the rear. Relays shall be rectangular in shape and shall have dust tight, dull black or egg shell black enamel painted cases with transparent cover removable from the front.

TRANSMISSION LINE PROTECTION:

The Line Protection Relays are required to protect the line and clear the faults on line within shortest possible time with reliability, selectivity and full sensitivity to all type of faults on lines. The general concept is to have primary & back up protection having equal performance requirement specially in respect of time as provided by Main protection called Main and Backup Protection.

APPLICABLE STANDARDS

IS 14697: 1999	Specification for A.C Static Transformer operated Watt Hour & VAR – Hour meters, class 0.2S & 0.5S
CBIP Technical Report No. 88 (Revised July 1996 and Amendments & Errata issued in April - 1999 and September'99)	Specification for A.C. Static Electrical Energy Meters.
IEC – 687	Alternating current static watt-hour meters for measurement of active energy, class 0.2
IS- 3202	Climatic proofing of electrical equipment.

STANDARDS:

The design, manufacture and performance of all the equipment and material provided under this specification shall generally conform to the latest issues of the following:-

Indian Standard	Title	International & Internationally Recognized standards
IS: 3231	Electrical Relays for Power system Protection	IEC-255 Part 1 to 3, BS:142
IS: 1248 & IS: 419	Indicating Instruments	BS: 89
IS: 6236	Recorders	BS: 90
IS: 722 (Part-I to IX)	Energy Meters	BS: 37/IEC-521
IS: 6875	Control Switches (LV switching devices for Control and Auxiliary circuits)	IEC: 337 & 337-1
IS: 1885 (Part-I & II)	Electro-Technical Vocabulary, Electrical Relays & Electrical Power System Protection	
IS: 2705	Current Transformers	IEC: 185
IS: 3156	Voltage Transformers	IEC-186

Indian Standard	Title	International & Internationally Recognized standards
IS: 375	Marking & Arrangements for Switchgear, Busbar, Main connection and Auxiliary wiring	
IS: 5	Colours for ready mixed paints and channels stability tests	BS: 142
IS: 1554 (Part)	PVC insulated cables upto and including 1000 Volts.	
IS: 3842 (Part-I to VIII)	Application guide for Protective Relays	
IS: 4483 (Part-I & II)	Preferred Panel Controls and Dimensions	
IS: 9224 (Part-II)	HRC Cartridge fuse links	
IS: 2147	Degrees of Protection provided by enclosures for LV switchgear and control gear	
IS: 6005	Code of Practice for Phosphating Iron and Steel	
IS: 8686	Specification for static protective relays & tests	IEC-255 Part-V & VI, IEC-801-4
IS: 4237	General requirement of switchgear and control gear for voltages not excluding 1.1 kV	
IS: 5578	Guide for marking of insulated conductors	
IS: 11353	Guide for uniform system of marking and identification of conductor & apparatus terminals	
IS: 13010	Energy Meters	
CBIP Pub No.274	Manual on Protection of Generators, Generator Transformers and 220kV & 400kV network	
CBIP Pub No: 296	Manual on Reliable fault clearance and Back up protection of EHV & UHV Transmission Networks	
IEC 60870	Communication Protocol	IEC 60870
IEC 61850	Substation Automation Protocol	IEC 61850

PLCC

Power line carrier communication (PLCC) equipment complete for speech transmission line, tele-protection commands and data channels shall be provided on each 220 kV and 132 kV transmission lines. The protection for transmission line and the line compensated equipment shall have 100% backup communication channels. The PLCC equipments shall in brief include the following :-

Coupling Device, line traps, carrier terminals, protection couplers, HF cables, PABX and maintains and testing instruments.

A telephone exchange (PABX) of 24 lines shall be provided at new substation as meansof effective communication among various buildings of the substation, remote end substation and with controls centres (RLDC/SLDC) etc.

Coupling Devices shall be suitable for 220 kV and 132 kV. Phase to Phase coupling for 220 kV and 132 kV single circuit line shall be provide. For Double circuit line inter circuit coupling can be provided. The pass band of coupling devices shall have sufficient margin for adding communication channel in future if required. Necessary protection devices for safety of personal and low voltage part against power frequency voltages and transient voltage shall also be provided.

The line traps shall be broad band turned suitable for blocking the complete range of carrier frequencies. Line trap shall have the necessary protective devices such as lighting arresters for the protection of tuning device and shall be equipped with corona rings. Decoupling network consisting of line traps and coupling capacitors may also be required at certain substation in case of extreme frequency congestion.

Wherever Fiber Optic/OPGW based telecommunication terminal equipment (i.e. SDH/MUX) are being provided, the same shall be utilized for Data, Voice and line protection applications. For protection purposes, both end Digital ProtectionCouplers (DPCs) shall be included at both ends. However, for line protection application, back up communication channel/link may be considered as perrequirement so as to take care of OPGW/ telecommunication equipment outage.

Addition/Modification/Shifting/Re-commissioning etc. as required of PLCC due to LILO of transmission lines shall be covered under the scope according to element wise detailed given below:-

S. No.	Details of element (line)	Coverage under the scope
1	LILO of one ckt. of 220 kV Sarnath (400) – Gajokhar DC line at Cantt. (Chaukaghat) Varanasi. Construction of 41.5 Km (37 Km overhead line (Zebra Conductor) on Lattice Tower and construction of 4.5 Km 630 mm2 line with copper XLPE cable	Addition/Modification/Shiftin g/Re-commissioning of PLCC shall be covered under the scope
2	LILO of one ckt. of 220 kV Muradnagar (400) – Sahibabad (220) SC line at 220 kV substation Vasundhara (Ghaziabad) (Multi Ckt./Monopole Tower) (Zebra conductor)	Addition/Modification/Shiftin g/Re-commissioning of PLCC shall be covered under the scope

PLCC equipment for the transmission lines at serial 01 & 02 covered under the package (Consisting of one set of analog PLCC channel along with circuit protection coupler and one set of Digital Protection Coupler for both ends of one line segment due to LILO of existing line) shall be provided by the bidder. All other associated equipment for ends cabling, coupling device and HF cable shall be provided by the bidder. 48 kV DC Power supply for PLCC panels shall be provided by the respective substation bay owner. The wave traps, CVTs required for communications from PLCC shall be provided by respective substation owner.

Fire Fighting System

Fire Fighting System is general conforms to fire insurance regulations of India. The fire fighting system is proposed with both AC motor & diesel engine driven pumps housed in a fire fighting pump house building along with water storage tank of adequate capacity. Automatic heat actuated mulsifying system us proposed for transformers & reactors. In addition for alarm system based on heat/smoke detectors are proposed to be installed at sensitive points in a substation e.g. Cable Vault, Control Room building and other building etc. further, adequate water hydrants and portable fire extinguishers shall be provided in the substations. At existing substations the fire fighting system if already available, would be extended for meeting the additional requirements.

Illumination

Adequate normal & emergency AC & DC illumination shall be provided in the control room, GIS hall & other building of the substation. The switchyard shall also be provided with adequate illumination. The entire control room building, fire fighting pump house lighting shall be done by LED based low power consumption luminaries.

Control Room

Substation control room would be provided to house substation work station for station level control along with 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 will be provided in the building as functional requirements.

SPECIFIC TECHNICAL REQUIREMENT FOR COMMUNICATION FOR 220 KV AND 132 KV LINES

In order to meet the requirement for grid management and operation of substations, Transmission Service Provider (TSP) shall conform to the following requirements.

On 220 kV and 132 kV D/C lines one OPGW containing 24 fibers is to be installed in place of conventional earth wire for grid management and substation operationpurpose by STU/CTU and 48 fibers to be installed on LILO lines.

220 kV, 132 kV, 66 kV, 33 kV & 11 kV System

SL No	Description of parameters	220 kV System	132 kV System	66 kV System	33 kV System	11kV System
1.	System operating voltage	220 kV	132 kV	66 kV	33 kV	11 kV
2.	Maximum operating voltage of the system (rms)	245 kV	145 kV	72.5 kV	36 kV	12 kV
3.	Rated frequency	50	50 Hz	50 Hz	50 Hz	50 Hz
4.	No. of phase	3	3	3	3	3
5.	Rated Insulation levels					
	i. Full wave impulse withstand voltage (1.2/50 micro sec.)	1050 kVp	650 kVp	325 kVp	170 kVp	75 kVp
	ii. One minute power frequencydry and wet withstand voltage (rms)	-	275 kV	140 kV	70 kV	28 kV
6.	Corona extinction voltage	156 kV	105 kV	-	-	-
7.	Max. radio interference voltage for frequencybetween 0.5 MHz and 2MHz at 92 kV rms for132 kV system	1000 micro-volts	500 micro-volts	-	-	-
8.	Minimum creepage distance (25mm/kV)	6125mm	3625mm	1813mm	900mm	300mm
9.	Min. Clearances					
	i. Phase to phase	2100mm	1300mm	750mm	320mm	280mm
	ii. Phase to earth	2100mm	1300mm	630mm	320mm	140mm

	iii. Sectional clearances	5000mm	4000mm	3000mm	3000mm	3000mm
10.	Rated short circuit current for1 sec. Duration	40kA/50kA (as applicable)	31.5 kA	31.5 kA	25 kA	25 kA
11.	System neutral earthing	Effectively earthed	Effectively earthed	Effectively earthed	Effectively earthed	Effectively earthed

TECHNICAL SPECIFICATION OF 220/33 kV SUBSTATION CANTT (CHAUKAGHAT), VARANASI & VASUNDHARA (GHAZIABAD)

SYSTEM PARTICULARS

(i) Rated System voltage	245kV, 36kV
(ii) System frequency	50 Hz, This may vary by ± 5%
(iii) Number of phases	Three
(iv) Neutral	Effectively Earthed

(v) **Auxiliary power supply:-**

Auxiliary electrical equipment shall be suitable for operation on the following supply system:

(a) Power device (Like drive motors)	400V, 3Phase, 4Wire 50Hz Effectively earthed AC system.
(b) Lighting fixtures, space heaters, fractional Horse Power motors and control devices.	250V, 2wire, 50Hz, AC supply with one point grounded.
(c) DC alarm, Control and Protective Devices	2wire ungrounded DC supplies from sub station batteries as under
(i) 220/132kV S/S :	110V DC
(ii) Communication : equipment	48 V DC

The above supply voltage is subject to variation as follows:

All devices must be suitable for a continuous operation over the entire range of voltage variations :

(i) AC Voltage may vary by ± 10%.

Frequency by ± 5%

Combined Voltage & frequency by ±10%.

(ii) DC

a) 220 V may vary between 187 & 242 V

b) 110 V may vary between 93 & 121 V

c) 48 V may vary between 41 & 53 V

SYSTEM PARAMETERS

The following system parameters shall prevail:

Sl. No.	Description of Parameters	220 kV System	33 kV System
1	Nominal system voltage	220kV	33kV
2	Maximum operating voltage of the system(rms)	**245kV**	**36kV**
3	Rated frequency	50Hz	50Hz
4	No. of phase	**3**	**3**
5	Rated short time current	40 kA for 3 Sec	25 kA for 3 sec
6	Dry and wet one minute power frequency withstand voltage	460 kV	**95kV**
7	Dry and wet impulse withstand voltage positive and negative	1050 kVp	250 kVp
8	Corona extinction voltage	156 kV	-
9	Max. Radio interference voltage for frequency between 0.5 MHz and 2 MHz at 508 kV rms for 765kV, 320kV rms for 400kV system and 156kV rms for 220kV system & 92kV rms for 132kV system	1000 microvolt	-
10	Minimum total creepage	25mm /kV (6125 mm)	25mm/kV (1300 mm)
11	Min. clearances i. Phase to phase ii. Phase to earth iii) Sectional clearances	 2100 mm 2100 mm 5000 mm	 320 mm 320 mm 3000 mm
12	System neutral earthing	Effectively Earthed	Effectively Earthed

Major technical parameters of bushings/ hollow column/ support insulators are given below:

Sl. No.	Description of Parameters	220 kV System	33 kV System
1	Max. System voltage Um (kV)	245kV	36kV
2	Impulse withstand voltage (dry &	± 1050	± 170

	wet) (kVp)		
3	Switching surge withstand voltage (dry & wet) (kVp)	-	-
4	Power frequency withstand voltage (dry and wet) (kV rms)	460	75
5	Total creepage distance(min) (mm)	6125	900

Insulator shall also meet requirement of IEC- 815 for 245kV, 145kV and 36kV systems, as applicable having alternate long and short sheds.

CONTROL CABINETS, JUNCTION BOXES, TERMINAL BOXES AND MARSHALLING BOXES FOR OUTDOOR EQUIPMENT

All types of boxes, cabinets etc. shall generally conform to in accordance with IS- 5039/ IS-8623, IEC-60439, as applicable.
All doors, removable covers and plates shall be provided gasket all around with suitably profiled EPDM/Neoprene gaskets. The gasket shall be tested in accordance with approved quality plan, IS:11149 and IS:3400. The quality of gasket shall be such that it does not get damaged/cracked during ten years of operation of the equipment or its major overhaul whichever is earlier. All gasketed surfaces shall be smooth straight and reinforced if necessary to minimize distortion and to make a tight seal. Ventilating Louvers, if provided, shall have screen and filters, the screen shall be fine wire mesh made of brass.

BUSHINGS, HOLLOW COLUMN INSULATORS, SUPPORT INSULATORS

Bushings shall be manufactured and tested in accordance with IS: 2099 & IEC-60137 while hollow column insulators shall be manufactured and tested in accordance with IEC- 62155/IS:5621. The support insulators shall be manufactured and tested as per IS:2544/IEC- 60168 and IEC-60273. The insulators shall also conform to IEC-60815 as applicable.

TECHNICAL SPECIFICATION FOR SF6 GAS INSULATED METAL ENCLOSED SWITCHGEARS (GIS)

The GIS shall be double bus bar arrangement and each module shall be complete with SF6 breaker, disconnectors, current and voltage transformers, earthing swithes and all necessary components as detailed in this specification. All parts of the switchgear should be single phase/ three phases (segregated) enclosed for 220 kV GIS and single phase/ three phases encapsulated for 33 kV GIS.

REFERENCE STANDARDS

The metal-enclosed gas-insulated switchgear, including the operating devices, accessories and auxiliary equipment forming integral part thereof, shall be in accordance with the following International Electro-technical Commission (IEC) Publications including their parts and supplements as amended or revised to date:

IEC 62271-203	Gas Insulated metal-enclosed switchgear for rated voltages

	above 52kV
IEC 60376	New sulphur hexafluoride
IEC 62271- 100	High voltage alternating current Circuit breakers
IEC 60694	Common clauses for high voltage Switchgear and control-
	gear standards
IEC 62271-102	Alternating current disconnectors(isolators) and earthing
	switches
IEC 61128	Alternating current disconnectors. Bus-transfer current
	switching by disconnectors.
IEC 61129	Alternating current earthing switches. Induced current
	switching
IEC 66044-1	Current transformers
IEC 66044-2	Voltage transformers
IEC 60137	Bushings for alternating voltages above 1000 V
IEC 60859	Cable connections for gas-insulated switchgear
IEC 60480	Guide to checking of sulphur hexafluoride taken from
	electrical equipment
IEC 60099 -1/4	Non-linear resistor type arresters for AC systems
IEC 60439	Factory-built assemblies of low-voltage switchgear and
	control Gear.
IEC 60427	Report on synthetic testing of high-voltage alternating-
	current breaker.
IEEE 80 (2000)	IEEE Guide for Safety in AC Substation grounding.
CIGRE-44	Earthing of GIS- an application guide. (Electra no.151,Dec'93).
IEC 61639	Direct connection between Power Transformers and gas insulated metal
	enclosed switchgear for rated voltage 72.5 kV and above.

The components and devices which are not covered by the above standards shall conform to, and comply with, the latest applicable standards, rules, codes and regulations of the internationally recognized standardizing bodies.

PRINCIPAL PARAMETERS

The SF6 gas insulated metal enclosed switchgear shall be totally safe against inadvertent touch of any of it's live constituent parts. It should be designed for indoor/outdoor (as specified) application with meteorological conditions at site.

The metal-enclosed gas insulated switchgear, including the operating devices, accessories and auxiliary equipment forming integral part thereof, shall be in accordance with the IEC-62271-203 with latest amendments publications including their parts and supplements as amended or revised to date.

The required overall parameters of GIS are as follows:-

Sl. No.	Technical particulars	220 kV System	132 kV System	33 kV System
I	GIS			
1.	Type of GIS encapsulation	Single Phase /Three Phase encapsulated	Single Phase /Three Phase encapsulated	Single/ Phase Three Phase encapsulated
2.	Location	Indoor	Indoor	Indoor
3.	Rated voltage	245kV rms	145kV rms	36 kV (rms)
4.	Rated frequency	50 HZ	50 HZ	50 HZ
5.	Number of Phases	3	3	3
6.	Grounding	Effectively Earthed	Effectively Earthed	Effectively Earthed
7.	Rated continuous current rating at design ambient temperature i.e. 50 ^{0}C			
	i) Busbar and Bus coupler Bay	2000 Amp.	1600 Amp.	2500 Amp.
	ii) Feeder and Transformer Bay	1600 Amp.	800 Amp.	1250/2500 Amp. (Feeder)/Transf
8.	Rated burn through time of enclosure due to internal arc to short circuit Current	According to IEC	According to IEC	According to IEC
9.	Rated lightning impulse (1.2/50 micro sec.) withstand voltage	± 1050 kV peak	± 650 kV peak	±170 kVp
10.	One minute power frequency withstand voltage	460 kV rms	275 kV rms	70 kV rms
11.	Rated short time withstand current (3 sec)	40 kA rms (As applicable)	40 kA rms (As applicable)	31.5 kA rms
12.	Rated peak withstand current	125/100 kA peak (As applicable)	125/100 kA peak (As applicable)	80 kA peak
13.	Material of enclosure	Aluminium alloy	Aluminium alloy	Aluminium alloy
14.	Minimum thickness of enclosure (mm)	As per IEC/CENELEC Standard	As per IEC/CENELEC Standard	As per IEC/CENELEC Standard
15.	Material of busbar	Aluminium and/or	Aluminium and/or	Aluminium and/or

	conductor	Copper	Copper	Copper
16.	Guaranteed maximum gas losses for complete installation as well as for all individual sections in %.	Less than 0.5% a per IEC-62271-203	Less than 0.5% as per IEC-62271-203	Less than 0.5% as per IEC- 62271-200
17.	Seismic level	Zone- IV, as per IS-1893, Year-2002	Zone- IV, as per IS-1893, Year-2002	Zone- IV, as per IS-1893, Year- 2002
II	**Circuit Breaker (CB)**			
1.	Rated voltage	245kV rms	145kV rms	36 kV rms
2.	Rated frequency	50 HZ	50 HZ	50 HZ
3.	Type of Circuit Breaker	SF6 insulated	SF6 insulated	SF6 insulated
4.	System neutral Earthing	Effectively earthed	Effectively earthed	Effectively earthed
5.	Rated continuous current rating at design ambient temperature i.e. 50 ^{0}C			
	-Feeder Bay	1600 Amp.	800 Amp.	1250 Amp.
	-Transformer Bay	1600 Amp.	800 Amp.	2500 Amp.
	-Bus coupler Bay	2000 Amp.	1600 Amp.	2500 Amp.
6.	No. of poles	3	3	3
7.	Type of operation	Single Phase Operation	Three Phase Gang Operation	Three Phase Gang Operation
8.	Operating Mechanism	Hydro-Mechanical spring drive/Hydraulic/Spring drive	Hydro-Mechanical spring drive/Hydraulic/ Spring drive	Hydro-Mechanical spring drive/Hydraulic/ Spring drive
9.	Auto re-closing duty	Three Phase/ Single Phase	Three Phase	
10.	Rated operating duty cycle	O-0.3 sec-CO-3 min CO	O-0.3 sec-CO-3 min-CO	O-0.3sec-CO-3 min-CO
11.	First pole to clea Factor	1.3	1.3	1.5
12.	Maximum closing time	Not more than 120 ms	Not more than 120 ms	Not more than 120 m
13.	Maximum breaking time at rated breaking capacity	65 ms	65 ms	80 ms
14.	Rated lighting impulse withstand			

	voltage			
	-between line terminals and ground	±1050 kV peak	± 650 kV peak	±170 kV peak
	-between terminals with circuit breaker open	±1050 kV peak	± 650 kV peak	±195 kV peak
15.	One minute power frequency phase to earth voltage (kv rms)			
	- between line terminals and ground	460 kV rms	275 kV rms	As per IEC
	- betwwen terminals with circuit breaker open	530 kV rms	315 kV rms	As per IEC
16.	Rated breaking current capacity			
	i) Rated short circuit current withstand capacity (3 sec)	40 kA (As applicable)	40 kA (As applicable)	31.5 kA
	ii) Line charging curren	50 A rms/ As per IE(	50 A rms/ As per IEC	As per IEC
	iii) Cable charging current	120 A rms	120 A rms	
	iv) Small indutive breaking current	10 A rms	10 A rms	
17.	Rated short time making current capacity	125/100 kA peak (As applicable)	125/100 kA peak (As applicable)	80 kA peak
18.	Max. radio interference voltage for frequency between 0.5 MHz and 2 MHz at 156kV	1000 Micro volts	500 Micro volts	___
19.	Max. difference in the instants of closing/opening of contacts (ms) between poles	As per IEC	As per IEC	As per IEC
20.	Trip coil and closing coil voltage	110 V DC with variation as specified in GTR	110 V DC with variation as specifiec in GTR	110 V DC with variation as specifiec in GTR
21.	Auxiliary Contacts	Each circuit breaker	Each circuit breaker	Each circuit breaker

	Auxiliary switch shall also comply with requirements as given, independent single pole reversible contacts (from NO to NC & vice versa)	pole shall be provided with an auxiliary switch with 20% of spare – NO and 20% spare NC contact for use in future.	pole shall be provided with an auxiliary switch with 20% of spare – NO and 20% spare NC contact for use in future.	pole shall be provided with an auxiliary switch with 20% of spare – NO and 20% spare NC contact for use in future.
	Rating of auxliary contacts	10A at 110V DC	10A at 110V DC	10A at 110V DC
	Breaking capacity of Aux. Contacts less than 20 ms	2A DC with the circuit time constant of not less than 20 ms	2A DC with the circuit time constant of not less than 20 ms	2A DC with the circuit time constant of not less than 20 ms
III	**Disconnectors (DS)**			
1.	Rated voltage	245kV rms	145kV rms	36 kV rms
2.	Rated frequency	50 HZ	50 HZ	50 HZ
3.	Type	SF6 insulated	SF6 insulated	SF6 insulated
4.	System Earthing	Effectively Earthed	Effectively Earthed	Effectively Earthed
5.	Rated short time withstand current (3 sec)	40 kA rms (As applicable)	40 kA rms (As applicable)	31.5 kA rms
6.	Rated short time making current capacity	125/100 kA peak (As applicable)	125/100 kA peak (As applicable)	80 kA peak
7.	No. of poles	3	3	3
8.	Rated continuous current rating at design ambient temperature i.e. 50 ^{0}C			
	Feeder Bay	1600 Amp.	800 Amp.	1250 Amp.
	Transformer Bay	1600 Amp.	800 Amp.	2500 Amp.
	Bus coupler Bay	2000 Amp.	1600 Amp.	2500 Amp.
9.	OperatingMechanism	Motor	Motor	Motor
10.	Operating time	Less than 12 sec.	Less than 12 sec.	Less than 12 sec.
11.	Rated lightning impulse withstand voltage			
	- Phase to earth	±1050 kV peak	±650 kV peak	±170 kV peak
	- Across the open contacts	±1200 kV peak	±750 kV peak	±195 kV peak
12.	One minute power			

	frequency withstand voltage			
	- Phase to earth	460 kV rms	275 kV rms	As per IEC
	- Across the open contacts	530 kV rms	315 kV rms	As per IEC
13.	Rated mechanical terminal load	As per IEC	As per IEC	As per IEC
14.	Rating of auxiliary contacts	10A at 110V DC	10A at 110V DC	10A at 110V DC
15.	Breaking capacity of auxiliary contacts	2 A	2 A	2 A
16.	No. of auxiliary contacts on each isolator	6 NO and 6 NC	6 NO and 6 NC	6 NO and 6 NC
17.	No. of auxiliary contacts on each earthing switch	6 NO and 6 NC	6 NO and 6 NC	6 NO and 6 NC
IV	**Earthig Switches (ES)**			
1.	Rated voltage	245kV rms	145kV rms	36kV rms
2.	Rated frequency	50 HZ	50 HZ	50 HZ
3.	Rated short time withstand current (3 sec)	40 kA rms (As applicable)	40 kA rms (As applicable)	31.5 kA rms
4.	Rated short time making current capacity -For high speed earthing switch	125/100 kA peak (As applicable)	125/100 kA peak (As applicable)	80 kA peak
5.	Rated lightning impulse withstand voltage	±1050 kV peak	±650 kV peak	±170 kV peak
6.	One minute power frequency withstand voltage	460 kV rms	275 kV rms	70 kV rms
7.	Operating Mechanism			
	- For maintenance earthing switch	Motor	Motor	Motor
	-For high speed earthing switch	Motor	Motor	Motor
8.	Operating time			
	-For maintenance earthing switch	Less than 12 sec.	Less than 12 sec.	Less than 12 sec.
	-For high speed earthing switch	Less than 300 m sec	Less than 300 m sec	Less than 300 m sec
V	**Current**			

	Transformer (CT)			
1.	Rated voltage	245kV rms	145kV rms	36kV rms
2.	Rated frequency	50 HZ	50 HZ	50 HZ
3.	System neutral earthing	Effectively earthed	Effectively earthed	Effectively earthed
4.	Maximum temperature rise over an ambient temperature o 50^0C	As per IEC 60044-1	As per IEC 60044-1	As per IEC 60044-1
5.	Radio interference voltage at 1.1 Un/√3 and frequency rang 0.5 to 2 MHz	≤ 1000 micro-volts	≤ 500 micro-volts	-
6.	One minute power frequency withstand voltage between sec. Terminal & earth	5 kV (rms)	5 kV (rms)	5 kV (rms)
7.	Partial discharge level	≤ 10 pico coulombs	≤ 10 pico coulombs	-
8.	Rated insulation level			
	i) 1.2/50 micro second impulse voltage	±1050 kVp	± 650 kVp	± 170 kVp
	ii) 1 Minute power frequency withstand voltage	460 kV (rms)	275 kV (rms)	70 kV (rms)
9.	Current Ratio	1000-800-500-300/1A	800-400-200/1A	400-200/1A
	For Feeders			
	For Transformer	1000-800-500-300/1A	160MVA (800-400/1A), 100MVA (500/1A),	2000-1250/1A
	For bus coupler	1000-800-500-300/1A	800-400-200/1A	2000-1250/1A
10.	Ratio taps	On secondary side	On secondary side	On secondary side
11.	Accuracy Class			
	-For protection	PS	PS	PS
	-For metering	0.2	0.2	0.2
12.	Burden			

	-For protection	20 VA	20 VA	20 VA
	-For metering	20 VA	20 VA	10 VA
13.	Rated short time withstand current	40 kA rms (As applicable) for 3 Second.	40 kA rms (As applicable) for 3Second.	31.5 kA rms for 3 Second.
14.	Rated dynamic withstand current	125/100 kA peak (As applicable)) for 1 Second.	125/100 kA peak (As applicable) for 1 Second.	80 kA peak for 1 Second.
15.	Safety factor for metering	< 5	< 5	< 5
16.	Parameters/ Approval Finalization	Burden, Knee Point Voltage Rct, Excitation Current and other parameters shal be got approved by purchaser as per protection co-ordination/ scheme requirements during detailed engineering based on details/ calculations to be submitted by successful bidder	Burden, Knee Point Voltage Rct, Excitation Current and other parameters shall be got approved by purchaser as per protection co-ordination/ scheme requirements during detailed engineering based on details/ calculations to be submitted by successful bidder	Burden, Knee Point Voltage Rct, Excitation Current and other parameters shall be got approved by purchaser as per protection co-ordination/ scheme requirements during detailed engineering based on details/ calculations to be submitted by successful bidder
VI	**Voltage Transformers**			
1.	Rated System voltage	245kV rms	145kV rms	36kV rms
2.	Rated frequency	50 HZ	50 HZ	50 HZ
3.	Type	Electromagnetic	Electromagnetic	Electromagnetic
4.	System neutral earthing	Effectively earthed	Effectively earthed	Effectively earthed
5.	System fault level	40 kAp. (As applicable) for 3 Second.	40 kAp. (As applicable) for 3 Second.	31.5 kAp for 3 Second.
6.	Rated lightning impulse withstand voltage	± 1050 kV peak	± 650 kV peak	± 170 kV peak
7.	One minute power frequency withstand voltage	460 kV rms	275 kV rms	70 kV rms

8.	One minute power frequency withstand voltage for secondary winding	3 kV rms			3 kV rms			3 kV rms			
9.	Radio interference voltage at 1.1 Un/√3 and frequency range 0.5 to 2 MHz	≤ 1000 micro volts			≤ 500 micro volts			-			
10.	Rated total thermal burden	400 VA			100 VA			75 VA			
11.	Partial discharge level	≤ 10 pico coulombs			≤ 10 pico coulombs			-			
12.	Voltage Ratio	245/√3 :110 V/√3			145/√3 :110 V/√3			36/√3 :110 V/√3			
13.	Number of secondary winding	3			3			2 or 3			
14.	Rated voltage facto	1.5 for 30 seconds 1.2 continuous			1.5 for 30 seconds 1.2 continuous			1.5 for 30 seconds 1.2 continuous			
15.	Phase angle error	± 10 min (for metering core)			± 10 min (for metering core)			± 20 min (for metering core)			
16.	Rated voltage	Sec-I	Sec-II	Sec-III	Sec-I	Sec- II	Sec-III	Sec-I	Sec-II		
		110/√3	110/√3	110/√3	110/√3	110/√3	110/√3	110/√3	110/√3		
		Prot.	Prot.	Metering	Prot.	Prot.	Metering	Metering	Prot.		
	Accuracy	3P	3P	0.2	3P	3P	0.2	0.2	3P		
	Output Burden (Min.) VA	50	50	50	50	50	50	10	10		
VII	**Lightning Arresters (LA)**										
1.	Highest system voltage	245 kV rms			145 kV rms			36 kV rms			
2.	Rated arrester voltage	198 kV rms			120 kV rms			30 kV rms			
3.	Continuous operating voltage at 50 ^{0}C	168 kV			102 kV			25 kV			
4.	Type (Tank Type)	Gapless type/ Metal Zinc Oxide type			Gapless type/ Metal Zinc Oxide type			Gapless type/ Meta Zinc Oxide type			
5.	Long duration Discharge Class	Class 3			Class 3			Class 3			
6.	Nominal discharge current	10 kA rms			10 kA rms			10 kA rms			

	corresponding to 8/20 microsec wave shape			
7.	Rated frequency	50 HZ	50 HZ	50 HZ
8.	Minimum discharge capability voltage corresponding to minimum discharge characterstic	5 kJ/kV (referred to rated arrester	5 kJ/kV (referred to rated arrester)	5 kJ/kV (referred to rated arrester)
9.	System neutral earthing	Effectively earthed	Effectively earthed	Effectively earthed
10.	Max. switching surge residual voltage(1 kA)	500 kVp	280 kVp	-
11.	Max. residual voltage at			
	i) 5 kA	560 kVp	310 kVp	-
	ii) 10 kA nominal discharge current	600 kVp	330 kVp	100 kVp
	iii) 20 kA nominal discharge current	-	-	-
12.	High current short duration test value (4/10 micro second wave)	100 kVp	100 kVp	100 kVp
13.	Current for pressur relief test	40 kA rms	40 kA rms	40 kA rms
14.	Prospective symmetrical fault current	40 kA rms for 0.2 Sec	40 kA rms for 0.2 Sec	40 kA rms
15.	Pressure relief class	A	A	A
16.	RIV at 1.1 Un/√3 kV rms	Less than 500 (micro volts)	Less than 500 (micro volts)	-
17.	Partial discharge at 1.05 COV	Not more than 50 pc	Not more than 50 pc	Not more than 50 pc
18.	Low current long duration test value (2000 micro sec.)	As per IEC	As per IEC	As per IEC
19.	Discharge counter and leakage curren meter to be provided	Yes	Yes	Yes
VIII	**Busbar**			
1.	Rated voltage	245kV rms	145kV rms	36kV rms
2.	Rated frequency	50 HZ	50 HZ	50 HZ
3.	Rated current	2000 A rms	1600 A rms	2500 A rms
4.	Rated short time	40.0 kA rms/3sec	40.0 kA rms/3sec	31.5 kA rms

	withstand current			
5.	Temperature rise			
	-For enclosure	According to IEC	According to IEC	According to IEC
	-For conductor	According to IEC	According to IEC	According to IEC
6.	Rated lightning impulse withstand voltage	±1050 kV peak	±650 kV peak	±170 kVp
7.	One minute power frequency withstand voltage	460 kV (rms)	275 kV (rms)	70 kV (rms)
IX	**Bus Coupler**			
1.	Rated voltage	245kV rms	145kV rms	36kV rms
2.	Rated frequency	50 HZ	50 HZ	50 HZ
3.	Rated current	2000 A rms	1600 A rms	2500 A rms
4.	Rated short time withstand current	40.0 kA rms/3sec	40.0 kA rms/3sec	31.5 kA rms
5.	Temperature rise			
	-For enclosure	According to IEC	According to IEC	According to IEC
	-For conductor	According to IEC	According to IEC	According to IEC
6.	Rated lightning impulse withstand voltage	±1050 kV peak	±650 kV peak	±170 kV peak
7.	One minute power frequency withstand voltage	460 kV (rms)	275 kV (rms)	70 kV (rms)
X	**Cable Head (CHD)**			
1.	Rated voltage	245kV rms	145kV rms	36kV rms
2.	Rated frequency	50 HZ	50 HZ	50 HZ
3.	Rated current	2000 A rms	1600 A rms	2500 A rms
4.	Rated short time withstand current	40.0 kA rms	40.0 kA rms	31.5 kA rms
5.	Rated lightning impulse withstand voltage	±1050 kV peak	±650 kV peak	±170 kV peak
6.	One minute power frequency withstand voltage	460 kV (rms)	275 kV (rms)	70 kV (rms)
7.	Interface with power cable sealing end	According to IEC	According to IEC	According to IEC
XI	**SF6 Bus Interconnection Duct Termination Head**			
1.	Rated voltage	245kV rms	145kV rms	36kV rms
2.	Rated frequency	50 HZ	50 HZ	50 HZ
3.	Rated current	2000 A rms	1600 A rms	2500 A rms

4.	Rated short time withstand current	40.0 kA rms	40.0 kA rms	31.5 kA rms
5.	Rated lightning impulse withstand voltage	±1050 kV peak	±650 kV peak	±170 kV peak
6.	One minute power frequency withstand voltage	460 kV (rms)	275 kV (rms)	70 kV (rms)
7.	Interface with SF6 Duct end	According to IEC	According to IEC	According to IEC
XII	**Bus Sectionalizers**			
1.	Rated voltage	-	-	36kV rms
2.	Rated frequency	-	-	50
3.	Rated current	-	-	2500 A rms
4.	Rated short time withstand current	-	-	31.5 kA rms
5.	Temperature rise -For enclosure -For conductor	-	-	According to IEC
6.	Rated lightning impulse withstand voltage	-	-	±170 kV peak
7.	One minute power frequency withstand voltage	-	-	70 kV (rms)

CIRCUIT BREAKERS

GENERAL

The circuit breakers and accessories shall conform to IEC: 62271-100, IEC: 62271-01 and other relevant IEC standards.

245/145/36 kV circuit breakers offered would be of sulphur hexafluoride (SF6) type only and of class C2-M2 as per IEC.

The support structure of circuit breaker as well as that of control cabinet shall be hot dip galvanised. All other parts shall be painted as per shade 697 of IS-5.

DISCONNECTORS (ISOLATORS)

General

Disconnectors shall be of the single-pole, group operated type, installed in the switchgear to provide electrical isolation of the circuit breakers, the transformers, double bus and transmission lines. The disconnectors shall conform to IEC-62271-102.

INSTRUMENT TRANSFORMERS

Current Transformers

The current transformers and accessories shall conform to IEC : 60044-1 and other relevant standards.

Voltage Transformers

The voltage transformers shall conform to IEC- 60044-2 and other relevant standards.

SURGE ARRESTERS

The surge arresters shall confirm in general to latest IEC –60099-4.

a) The surge arresters are being provided to protect the followings whose insulation levels are indicated in the table given below:-

Equipment to be protected	Lightning impulse (kVp) for 245 kV system	Lightning impulse (kVp) for 145 kV system	Lightning impulse (kVp) for 36 kV system
Power Transformer	± 950	± 550	± 170
Instrument Transformer	± 1050	± 650	± 170
CB/Isolator Phase to ground	± 1050	± 650	± 170
Across open contacts	± 1200	± 750	± 195

220/132/33KV GIS BUILDING

The buildings shall house 220kV, 132kV and 33kV Gas Insulated Switchgear (GIS) separately and other associated equipments inside in each of the GIS building. The building shall have arrangement to maintain pressurised air in order to prevent the ingress of dust in the GIS Hall.

The GIS hall shall have an independent ventilation system. Each ventilation system shall consist of two 100% capacity systems, one operating and one stand-by.

To ensure that the air being supplied to the GIS hall is free from dust particles, a minimum **two** stage dust filtration process shall be supplied. This shall consist of at least the following:

3.3.2 **Pre Filters:** To remove dust particles down to10 micron in sizewith at least95% efficiency.

3.3.3 **Fine Filters:** To remove dust particles down to5 microns in sizewith at least99% efficiency.

QUALITY OF SF6 GAS

a) The SF6 gas insulated metal-clad switchgear shall be designed for use with SF6 gas complying with the recommendations of IEC 376, 376A & 376B, at the time of the first charging with gas. All SF6 gas supplied as part of the contract shall comply with the requirements of IEC as above as a minimum & should be suitable in all respects for use in the switchgear under all operating conditions.

b) The high pressure cylinders in which SF6 gas is supplied & stored at site shall comply with the requirements of following standards & regulations:

IS: 4379	Identification of the contents of industrial gas cylinders.
IS: 7311	Seamless high carbon steel cylinders for permanent & high pressure liquefiable gases. The cylinders shall also meet Indian Boilers Regulations. (Mandatory)

CIRCUIT BREAKERS

The circuit breakers and accessories shall conform to IEC: 62271-100, IEC: 62271-01 and other relevant IEC standards.

SULPHUR HEXAFLUORIDE GAS (SF6 GAS)

a) The SF6 gas shall comply with IEC 60376, 60376A and 60376B and shall be suitable in all respects for use in the switchgear under the operating conditions.

b) The high pressure cylinders in which the SF6 gas is shipped and stored at site shall comply with requirements of the relevant standards and regulations.

INSULATORS

All hollow insulators shall conform to IEC-62155.

INTERPOLE CABLING

All cables to be used shall be armoured and shall be as per IS – 1554/ IEC-502 (1100 Volts Grade).

TECHNICAL PARAMETERS

I. 245 kV CIRCUIT BREAKER

1.	Rated continuous current(A) at design ambient temperature.	1600 (as applicable) -2000 for bus coupler bay.
2.	Rated short circuit current breaking capacity at rated voltage	40 kA (as applicable) with percentage DC component as per IEC: 62271-100 corresponding to minimum opening time under operating conditions specified.
3.	Symmetrical interrupting capability (kArms)	40 (as applicable)
4.	Rated short circuit making current (kAp)	125/ 100 (as applicable)
5.	Short time current carrying capability for 3 second (kArms)	40 (as applicable)
6.	Rated operating duty	O-0.3sec-CO-3min-CO cycle
7.	Reclosing	Single phase & three phase autoreclosing
8.	First pole to clear factor	1.3
9.	Rated line/cable charging	As per IEC

	interrupting current at 90 deg. leading power factor angle (A. rms) (The breaker shall be able to interrupt the rated line/cable charging current with test voltage immediately before opening equal to the product of U/√3 & 1.4 as per IEC: 62271-100)	
10.	Temperature rise over the design ambient temperature	As per IEC: 62271-100
11.	i) Total break time as per Cl.3.0 of this specification (ms)	65
	ii) Rated break time as per IEC (ms)	60
12.	Total closing time (ms)	Not more than 120
13.	Operating mechanism	spring/hydraulic or a combination of these
14.	Max. difference in the instants of closing/ opening of contacts (ms) i) Between poles (opening) 3.3 ii) Between poles (closing) 5.0 The above shall be at rated control voltage and rated operating and quenching media pressures.	
15.	Trip coil and closing coil voltage	110V DCwith variation as specified
16.	Noise level at base and upto 50 m (distance from base of breaker)	140 dB (Max.)
17.	Rated terminal load	As per IEC or as per the value calculated by GTR, whichever is higher.
18.	Auxiliary contacts	Besides requirement of specification, the bidder shall wire up 5 NO+5 NC

		contacts for future use of Purchaser.
19.	No of Terminals in common Control cabinet	All Contacts & control circuits to be wired out upto common control cabinet plus 24 terminals exclusively for Purchaser's use.
20.	Maximum allowable switching As per IEC overvoltage under any switching condition	(Auxiliary switch shall also comply with requirements stipulated under GTR).

DISCONNECTORS (ISOLATORS)

Disconnectors shall be of the single-pole, group operated type, installed in the switchgear to provide electrical isolation of the circuit breakers, the transformers, double bus and transmission lines/cables. The disconnectors shall conform to IEC: 62271-102 (or IS: 9921).

SAFETY GROUNDING SWITCHES

Three-pole, group operated, safety grounding switches shall be operated by electric motor for use on 110V DC ungrounded system and shall be equipped with a manual operating mechanism for emergency use. The motor shall be protected against over-current and short circuit.

The safety grounding switches shall conform to the requirements of IEC- 62271- 102

HIGH SPEED MAKE PROOF GROUNDING SWITCHES

Grounding switches located at the beginning of the feeder bay modules shall be of the high speed, make proof type and will be used to discharge the respective charging currents, in addition to their safety grounding function. These grounding switches shall be capable of interrupting the inductive currents and to withstand the associated TRV.

Single phase switches shall be provided with operating mechanism suitable for operation from a 110V DC.

The short circuit making current rating of each ground switch shall be at least equal to its peak withstand current rating. The switches shall have inductive/ capacitive current switching capacity as per IEC-62271-102.

The high speed make proof grounding switches shall conform to the requirements of IEC-62271- 102.

INSULATOR

The insulator shall conform to IS: 2544 and/or IEC-60168.

TECHNICAL PARAMETERS

2. 245 kV ISOLATORS

1.	Type	SF6 insulated
2.	Rated current at 50ºC ambient temperature	1600/2000 (As applicable). -1600 for line and

		Transformer bays. - 2000 bus coupler bay.
1.	Rated short time withstand current of isolator and earth switch (for 3 Sec.)	40 kA / 50 kA (as applicable)
2	Rated dynamic short circuit withstand current of isolator and earth switch	IEC-694.
100 kAp / 125 kAp (as applicable)		IEC-62271-102
3	Temperature rise over design ambient temperature	
4	Rated mechanical terminal load	A.C. Motor operated
5	Operating mechanism of isolator/earth switch	12 sec. or less
6	Operating time	

INSTRUMENT TRANSFORMERS

The instrument transformers and accessories shall conform to the latest version of the standards specified below:-

Current transformers IEC: 60044-1 (or IS: 2705) Inductive Voltage Transformers IEC: 60044-

Insulating Oil

a) Insulating oil to be used for instrument transformers shall be of EHV grade and shall conform to IS-335/ IEC-60296 (required for first filling).

b) The SF6 gas shall comply with IEC-60376, 60376A and 60376B and shall be suitable in all respects for use in the switchgear under operating conditions. Suitable valve shall be provided for SF6 gas filling in the instrument transformers in live condition. A suitable Rupture Disc shall be provided on the SF6 filled instrument transformers to prevent any chance of explosion.

TECHNICAL PARAMETERS

A.	**245 kV CURRENT TRANSFORMERS**	
1.	Rated Primary current	
2.	Rated short time thermal current	1000A (as applicable)
3.	Rated dynamic current kA (peak)	40 kA for 3 sec./50 kA for 3 sec. (as applicable)
4.	Maximum temperature rise over design ambient temperature	100 / 125 (as applicable)
5.	One minute power frequency withstand voltage sec. terminal & earth	As per IEC:60044-1
6.	Number of terminals	All terminals of control circuits are to be wired upto marshaling box plus 20% spare terminals evenly distributed on all TBs.
7.	Type of insulation	Class A
B.	**245 KV INDUCTIVE VOLTAGE TRANSFORMERS**	
1.	System fault level(for 3 second)	40 kA / 50 kA (as applicable)
2.	Standard reference range of frequencies for which the accuracies are valid	96% to 102% for protection and 99% to 101% for measurement
3.	One minute power frequency withstand voltage :	
	i) For secondary winding	3 kV (rms)

4.	Maximum temperature rise over design ambient temperature	As per IEC:60044-2
5.	Number of terminals	All terminals of are wired upto marshaling box plus 12 terminals exclusively for Purchaser's use.
6.	Rated Total Thermal burden (VA)	300 (100VA/winding)

SURGE ARRESTERS

The Surge Arresters shall conform to IEC: 60099-4.
The surge arresters are being provided to protect the following equipment whose insulation levels are indicated in the table given below:-

Equipment to be protected	Lightning Impulse (kVp) for 245 kV system	Lightning Impulse (kVp) for 145 kV system	Lightning Impulse (kVp) for 36 kV system
Power transformer	± 950	± 550	± 170
Instrument Transformer	± 1050	± 650	± 170
CB/Isolator Phase to ground	± 1050	± 650	± 170
CB/Isolator Across open contacts	±1050 (for CB) ± 1200 (for Isolator)	± 750	± 195

TECHNICAL PARAMETERS:

A. 245 kV CLASS SURGE ARRESTER

(a)	Rated arrester voltage	198 kV
(b)	Nominal discharge current	10 kA of 8/20 microsecond wave
(c)	Minimum discharge capability	5kJ/kV (referred to rated arrester voltage corresponding to minimum discharge characteristics.
(d)	Continuous operating voltage at 50 deg.C	168 kV rms
(e)	Max. switching surge	500 kVp

	residual voltage (1kA)		
(f)	Max. residual voltage at		
	i)	5 kA	560 kVp
	ii)	10 kA nominal discharge current	600 kVp
(g)	Max. steep current impulse residual voltage at 10 kA.		650 kVp
(h)	Long duration discharge Class		3
(i)	High current short duration test value (4/10 micro second wave)		100 kAp
(j)	Current for pressure relief test		40 kA rms / 50 kA rms (as applicable)
(k)	Low current long duration test value (2400 micro sec)		As per IEC.
(l)	Pressure relief class		40 kA / 50 kA (as applicable)

B. 36 kV and 11 kV CLASS SURGE ARRESTER

		36 KV	**11 kV**
(a)	Rated arrester voltage	30 kV	9 kV
(b)	Nominal discharge Current	---10 kA of 8/20 microsecond wave ---	
(c)	Minimum discharge capability	5kJ/kV (referred to rated arreste voltage corresponding to minimum discharge characteristics.)	
(d)	Continuous operating voltage at 50 deg.C	25 kV rms	7.2 kV rms
(e)	Max. switching surge residual voltage (1kA)	72 kVp	22.4 kVp
(f)	Max. residual voltage at		

	i)	5 kA	85 kVp	26 kVp
	ii)	10 kA nominal discharge current	90 kVp	28 kVp
(g)	Long duration discharge Class		2	2
(h)	Pressure relief class		25kA	25 kA

TECHNICAL SPECIFICATION FOR 220 kV XLPE CABLE

STANDARDS

IEC-60228 Conductor for insulated cable. IEC-60229 Tests on cable over sheaths.

IEC-60230 Impulse tests on cables and their accessories.

IEC-60270 Partial discharge measurements.

IEC-60287-1-1 Calculation of continuous current carrying capacity.

IEC-60502 Power Cables with extruded insulation and their accessories.

IEC-60067 Tests for Power cables with extruded insulation for rated voltage upto 500 kV.

BIS: 7098 XLPE Cable specification for working voltages from 66 kV upto and including 220 kV.

IEEE:48 Tests procedures and requirements for high voltage cable terminations.

DESIRED TECHNICAL PARTICULARS OF XLPE CABLE

S.NO.	PARTICULARS	TECHNICAL DETAILS
1.	Cable Applicable Standard	Single Core, Copper Conductor XLPE cable. Conforming to IEC 60502 – 2 and IEC 60840: 2004-04 or IS 7098 (Part - 3) amended up to date.
2.	System voltage & frequency	220 ± 10% kV, 50Hz ± 3%
3.	Rated & Highest System Voltage	245 kV
4.	Suitable for earthed system	Yes
5.	**CONDUCTOR**	
(i)	Material	Annealed Plain Copper wires Conforming

S.NO.	PARTICULARS	TECHNICAL DETAILS
		to IEC 60228/ IS 8130 with latest amendments
(ii)	Nominal cross-sectional area	800 Sq. mm
(iii)	Construction of conductor / flexibility class	Class -2, IEC 228/ IS: 8130 with latest amendments
(iv)	Shape and formation	Circular, stranded & very well compacted
(v)	Approx. overall diameter of conductor	To be indicated
6.	**CONDUCTOR SCREENING**	
(i) (ii)	Material & Type Grade	Extruded, semi conducting compound layer As per IEC/ IS
(iii)	Thickness	1.0 mm
7.	**INSULATION**	
(i)	Material	Cross linked polyethylene (XLPE)
(ii)	Special Super clean grade Normal thickness of insulation	As per IEC 6207/ IS 7098 (Part-3) with latest amendments
8.	**INSULATION SCREENING**	
A.	Non-metallic part (extruded)	
(i)	Material	Extruded semi conducting compound layer
(ii)	Grade	As per IEC/ IS 7098 (Part-3) with latest amendments
(iii)	Min. Thickness	0.8 mm
B (i)	Non-metallic part (taped) longitudinal water barrier over insulation screen Material	Synthetic Non-woven semi conducting Water swell-able tape
(ii)	Min thickness	As per standard
C	**METALLIC SHEATH**	
(i)	Material	Corrugated Aluminium/ Lead alloy "E" sheath IS 692 with latest amendments
(ii)	Min. Thickness(mm)	Conforming to IEC 60502-2/ IS 7098
(iii)	Short Circuit Current Withstand (Metallic sheath, together with copper screen (if required)	40 kA for three second
(D)	Bedding over lead sheath	Semi conducting tape(s)
(E)	**CONCENTRIC COPPER WIRE SCREEN (IF REQUIRED)**	
(i)	Material and type	Annealed plain copper wires applied helically with gap followed by open helix

S.NO.	PARTICULARS	TECHNICAL DETAILS
		of copper tape binder.
(ii)	Min. area (sq. mm.)	This and lead alloy E sheath shall meet earth fault current of 40 kA for a duration of 3 second
9.	**OUTER SHEATH**	
(i)	Material	Extruded Layer of Black PE or PVC type ST-2 as per IEC 62067/ IS 7098 (Part-3)
(ii)	Min. thickness of outer sheath	As per standard
10.	Conducting layer over outer sheath	Graphite coating
11.	Approx. weight overall diameter of cable (mm)	To be indicated
12.	Approx. weight per meter of cable (kg/m)	To be indicated
13.	Recommended minimum installation radius.	To be indicated
14.	Maximum D.C. Resistance of conductor at 90°C in ohm/km	As per standard
15.	Minimum continuous current rating for each circuit when laid in ground in trefoil formation and other condition given in specification.	**1100 / 843 Amps. As applicable after all de-rated factors**.
16.	Maximum allowable temperature for cable and accessories.	
(i)	At rated full load and at site conditions.	90° C
(ii)	The conductor temperature after a short circuit for one second shall not exceed (with conductor temperature at start of short circuit as 90°C).	250°C
17.	Basic impulse insulation level (1.2 /	650 kV

S.NO.	PARTICULARS	TECHNICAL DETAILS
	50 micro second wave)	
18.	Power frequency withstand voltage	As per standard
19.	Symmetrical Short circuit rating for one second duration for lead sheath and copper screened combined	40 kA for 3 sec.
20.	Drum Length	500-600 mtr. / As per requirement.
21.	Expected cable life.	35 years.

TECHNICAL SPECIFICATION FOR 245kV CABLE TERMINATION AND JOINTINGKITS FOR 1 x 800 SQ. MM& 1x1000SQ.MM. XLPE CABLE

STANDARDS

IEC: 62067	Tests for power cables with extruded insulation for rated voltage above 150kV upto 500kV.
IEC: TS 60859	Cable connection for Gas insulated metal enclosed switchgear for rated voltages of 72.5 kV and above.
IEC: 62271-203	Gas-insulated metal enclosed switchgear for rated voltages of 72.5 kV and above.
IEC: 60228	Conductor for insulated cable
IEC: 60229	Tests on cable over sheaths
IEC: 60230	Impulse tests on cables and their accessories
IEC: 60270	Partial discharge measurements
IEC: 60287	Calculation of continuous current carrying capacity
IEC: 60502	Power Cables with extruded insulation and their accessories.
BIS: 7098 (Part-3)	XLPE cable specification for working voltages from 66 kV up to and including 220 kV.
IEEE 48- 1990	IEEE Standard Test, Procedure & requirement for high voltage alternating current cable terminations.

SYSTEM CONFIGURATION

The 220kV systems will be solidly grounded. Cables will be protected from over voltages caused by lighting strikes or switching surges by means of station type lighting arrestors located at terminal point/ substations. The terminal substation yard equipment and all overhead 220kV transmission lines will be shielded against direct lighting strokes by

overhead ground wires.

EARTHING

Earthing of sheath/ screen at both of termination ends of 245kV cable using insulation sheath bonding (earthing) cable of required size through Link box with/ without surge limiter at terminations.

Earthing shall be as per relevant standards.

The sheath/ screen shall bound in the earth station through disconnecting type link boxes.

DESIRED TECHNICAL PARTICULARS OF XLPE CABLES KITS AND ACCESSORIES

A.	**OUTDOOR CABLE END TERMINATION**	
1.	Nominal System Voltage	220 kV (rms)
2.	Rated/ Highest System Voltage Um	245 kV (rms)
3.	Rated frequency & No. of phase	50 Hz ± 3%, Three (3)
4.	Installation	Outdoor
5.	Name and address of manufacturer of end termination	
6.	Nomenclature of kit	To be indicated
7.	Type of kit	Pre-molded
8.	Suitable for Single Core Copper Conductor XLPE cable Conforming to IEC 62067/ IS 7098 (pert-3) amendedupto date and as per specification.	Yes
9.	Maximum conductor size	To be indicated
10.	Rated continuous current	Maximum current of the cable
11.	Applicable standard for testing	IEC 62067
12.	Maximum allowable Pd-level	As per IEC
13.	Type o Insulator	Silicone/ Composite
14.	Creepage distance	25 mm/KV
15.	Colour	Brown
16.	Maximum allowable temperature for cable and accessories i) At rated full load and at site condition ii) The conductor temperature after a short circuit for one second shall not exceed (with conductor temperature at start of short circuits as 90°C).	 90°C 250°C
17.	Basic impulse insulation level (1.2/50 micro second wave)	1050 kV

A.	**OUTDOOR CABLE END TERMINATION**	
18.	Power frequency withstand voltage	As per standard
19.	Symmetrical Short circuit rating	40 kA for 3 sec.
20.	Power frequency withstand voltage (a) Dry (kV rms.) (b) Wet (kV rms.)	To be indicated
21.	Flashover voltage: (a) Dry (kV rms.) (b) Wet (kV rms.)	To be indicated
22.	Stress relief cone made of	Silicone rubber
23.	Net dimensions of kit (Length x Breadth x Width and Weight)	To be indicated
24.	Craft sensitivity and reliability	To be indicated
25.	Time required for energisation after completing the joint (curing period)	To be indicated
26.	Special storage condition. If any, upto an ambient temperature of 50 degree C and period.	To be indicated
27.	Whether provision made for: a) Stress relief b) Track resistance c) Sealing	Yes
28.	Whether any additional support is required for kit?	If so, give details
29.	Make, Type and Material of lugs provided with kits.	Details to be given by bidder.
30.	Class of Kits.	Details to be given by bidder
31.	Sectional Drawing Showing constructional details along with each item material, description enclosed.	Yes.
32.	Expected life of cable joint and cable.	35 years
33.	(a) Shelf life of the kit (years) (b) Design life of the kit (years)	To be indicated To be indicated
34.	Guarantee of kit.	Five (5) years from date of commissioning
35.	Details of terminal connector	
B.	**SF6 SWITCHGEAR TYPE CABLE END TERMINATION**	
1.	Nominal System Voltage U	220 kV (rms.)
2.	Rated/ Highest System Voltage Um	245 kV (rms.)
3.	Rated frequency & No. of phase	50 Hz ±3%, Three (3)
4.	Installation	Indoor/ Outdoor
5.	Name and address of manufacturer of end termination	
6.	Nomenclature of kit	To be indicated
7.	Type of kit	Premoulded, Plug in type
8.	Suitable for Single Core Copper Conductor XLPE cable Conforming to IEC 62067/ IS 7098 (Part-3)	Yes

A.	**OUTDOOR CABLE END TERMINATION**	
	amendedupto date and as per specification.	
9.	Maximum conductor size	To be indicated
10.	Rated continuous current	Maximum current of the cable
11.	Applicable standard for testing	IEC 62067
12.	Maximum allowable Pd-level	As per IEC
13.	Type of Insulator	Silicone/ Composite
14.	Creepage distance	25 mm/KV
15.	Colour	Brown
16.	Maximum allowable temperature for cable and accessories (i) At rated full load and at site condition (ii) The conductor temperature after a short circuit for one second shall not exceed (with conductor temperature at start of short circuits as 90°C).	 90°C 250°C
17.	Basic impulse insulation level (1.2 / 50 micro second wave)	1050 kV
18.	Power frequency withstand voltage	As per standard
19.	Symmetrical Short circuit rating	40 KA for 3 sec.
20.	Power frequency withstand voltage (a) Dry (kV rms.) (b) Wet (kV rms.)	To be indicated
21.	Flashover voltage: (a) Dry (kV rms.) (b) Wet (kV rms.)	To be indicated
22.	Stress relief cone made of	Silicon rubber
23.	Details of terminal connector	As applicable
24.	Net dimensions of kit (Length x Breadth x Width and Weight)	To be indicated
25.	Craft sensitivity and reliability	To be indicated
26.	Time required for energisation after completing the joint (curing period)	To be indicated
27.	Special storage condition. If any, upto an ambient temperature of 50°C and period.	To be indicated
28.	Whether provision made for: Stress relief Track resistance Sealing	Yes
29.	Whether any additional support is required for kit?	If so, give derails.
30.	Make, Type and Material of lugs provided with kits.	Details to be given by bidder.

A.	**OUTDOOR CABLE END TERMINATION**	
31.	Class of Kits.	Details to be given by bidder.
32.	Sectional Drawing Showing constructional details along with each item material, description enclosed.	Yes
33.	Expected life od Cable joint and cable.	30 years
34.	(a) Shelf life of the kit (years) (b) Design life of the kit (years)	To be indicated To be indicated
35.	Details of terminal connector	
36.	Guarantee of kit	Five (5) years from date of commissioning.
C.	**LINK BOX ROR EARTHING CABLE WITH PVC INSULATION**	
1.	Make	
2.	Type	
3.	Detailed dimension and internal arrangement of Single/ Three phase Link boxes with direct grounding	To be submitted
4.	Detailed dimension and internal arrangement o Three Phase Link boxes for cross bonding with SVL	To be submitted
5.	Earthing of sheath/ screen at cross bonding points and termination ends	Yes
6.	PVC insulated single core/ concentric/ coaxial cable to be used for sheath bonding (earthing) suitable for 40 kA for 3 second	Size, Type to be indicated
7.	Insulation of above a earthing cable	To be indicated (3 kV / 6 kV)
8.	Voltage rise of the insulation sheath controlled within voltage	65 Volts.
9.	Surge voltage limiter	Required (3 kV / 6 kV)
D.	**SUPPORTING STRUCTURE & ANGLE BRACKET SUPPORTS FOR CABLE**	
1.	Detail drawing enclosed	Yes
2.	Overall height of structure	Shall be as per approved drawing.

33KV XLPE CABLE & ACCESSORIES

33 KV XLPE Cable

33KV XLPE cable shall be in accordance with the Internationally accepted standard and also conform to the requirement of IEC Publication 502.

TECHNICAL SPECIFICATION FOR 60 MVA 220/33 KV 3 PHASE POWER TRANSFORMER

STANDARDS

The transformer should conform in all respect to latest addition of IS:2026 & CBIP.

PRINCIPAL PARAMETERS

The transformers shall be of core type constructions, three phase, oil immersed for outdoor service as both step up and step down transformers, with types of cooling mentioned below. The rating and electrical characteristics of transformers shall be as below :-

(i) Maximum continuous capacity	60MVA
(ii) Frequency	50 Hz
(iii) No. of Phase	Three
(iv) Rated Voltage of HV winding	220KV
(v) Rated Voltage of LV winding	33KV
(vi) Rated Voltage of Tertiary winding	11KV
(vii) Percentage impedance	
(viii) HV to LV at Normal tap No. 13 at 100% rating	12.5%
(ix) HV to Tertiary at Normal tap	12.5% (min.)
(x) LV to Tertiary at Normal tap	12.5% (min.)
(xi) a. No load loss at rated voltage and frequency at Principal Tap (KW)	25 (max)
b. No load loss at voltage corresponding to the highest tap (KW)	35 (max)
c. Tolerance if any on the above value	No tolerance
(xii) a. Load loss at rated output, rated frequency and corrected for 75 Deg C winding temperature at -Principal Tap (KW) - Highest Tap (KW) -Lower Tap (KW)	 150 KW (max) at 220/33 KV 126 KW (approx.) at 220/37.95 KV 161 KW (approx.) at 220/31.35 KV
b. Tolerance, if any, on the above value	No tolerance
(xiii) a. Auxiliary losses at rated output, normal, rated voltage, rated frequency and ambient temperature (KW)	3.0 KW (max)
b. Tolerance, if any, on the above value	NIL

(xix) Total Loss at normal ratio inclusive of auxiliary component losses (KW)	178 KW (Max.) at 220/33 KV@60MVA Base

NOTE : No reactor either inside or outside the tank shall be used to achieve above percentage impedance value.

(xx) Connections for :-	
a) HV Winding /LV Winding	Star / Star
b) Tertiary winding	Delta
(xxi) Reference Voltage group and terminal markings	HV/LV/Tertiary -YNynOd11
(xxii) On load tap on HV side neutral	- 5% to +15% in equal steps. of 1.25 % each for IV variations.
(xxiii) Type of cooling	ONAN/ONAF/OFAF.
(xxiv) Rating corresponding to cooling system :-	
a) ONAN Cooling	30 MVA
b) ONAF Cooling	42 MVA
c) OFAF Cooling	60 MVA
(xxv) Rated capacity of tertiary winding	18 MVA
(xxvi) D.C. Voltage for relays etc.	110V
(xxvii) Maximum Noise Level	75 dB

INSULATION

The di-electric strength of winding insulation and of the bushing shall conform to the value given in IS:2026-1977.

For rated system, Voltage of 245 KV, 36 KV and 11 KV following test voltage shall be provided.

SYSTEM VOLTAGE	IMPULSE TEST VOLTAGE	ONE MINUTE POWER FREQUENCY TESTS
245 KV	950 KV	395 KV
36 KV	170 KV	70 KV
11 KV	95 KV	38 KV

The HV and LV windings of transformers shall have graded insulation. The insulation class of the neutral of the winding shall be graded to 95 KV impulse and 38 KV Power frequency withstand.

FREQUENCY

The normal frequency of the system is 50 Hz. It may vary ±5%. The transformers shall be suitable for continuous operation at rated capacity without exceeding the specified temperature rise within this frequency range.

PARALLEL OPERATION

The transformer shall operate satisfactorily in parallel with similar units of different make having following parallel operation details:-

Sl.No.	Variable	Details
1	HV to IV %impedance of tap No.1(ëxtreme) of 100% rating	12.5%
2	HV to IV %impedance of tap No.13(Normal) of 100% rating	12.5%
3	HV to IV %impedance of tap No.17(2nd ëxtreme) of 100% rating	12.5%
4	Location of Tap Changer	HV side neutral
5	Voltage variation	-5% to + 15%
6	Step Voltage	1.25%
7	Vector group	YNyn0d11

CONSTRUCTION DETAILS

The features and construction details of power transformers shall be in accordance with the requirements stated hereunder:-

TANK AND TANK ACCESSORIES

TANK :-

Tank shall be of welded construction and fabricated from tested quality low carbon steel of adequate thickness.

All seams and those joints not required to be opened at site shall be factory welded and wherever possible, they shall be double welded. After completion of tank construction and before painting, dye penetration test shall be carried out on welded parts of jacking bosses, lifting lugs and all load bearing members.
Tank stiffeners shall be provided for general rigidity and these shall be designed to prevent retention of water.
The tanks shall be designed to withstand :

i) Mechanical shocks during transportation.

ii) Vacuum filling of oil.

iii) Continuous internal pressured of 35 kN/m² over normal hydrostatic pressured of oil.

iv) Short circuit forces.

Wherever possible, the transformer tank and its accessories shall be designed without pockets, wherein, gas may collect. Where pockets can not be avoided, pipes shall be provided to vent the gas in to the main expansion pipes.

Adequate space shall be provided at the bottom of the tank for collection of sediments.

Lifting lug & eye bolts shall be so located that a safe clearance is obtained between slings and transformer bushings without use of spreader.

When transformers are provided with separately mounted radiators, flexible joints shall be provided on the main oil pipes connecting the transformer tank to the radiator banks to reduce vibration and facilitate erection and dismantling.

Transformer tank shall be of bell shape construction with an oil tight bolted flange joint near the base, such that during inspection or maintenance, it is possible to lift the upper portion of the tank to provide access to the core and coils.

The transformer tank shall be equipped with the following valves :-

One drain and lower filter valve located on low voltage side of transformer and placed to completely drain the tank.

One value at the top and one at the bottom of the tank mounted diagonally opposite to each other for filtration purpose.

One relief valve to operate at the pressure below the test pressure for the tank.

One oil filling valve (inlet).

One oil sampling valve with plug.

Two nos. stop valves for each pump.

TANK COVER :-

- The tank cover shall be sloped to prevent retention of rain water and shall not distort when lifted.

- At least two adequately sized inspection openings, one at each end of the tank shall be provided for easy access to bushings and earth connections. The inspection covers shall not weigh more that 25 Kg. The inspection covers shall be provided with two handles.

- The tank covers shall be fitted with pockets at the position of maximum oil temperature of MCR (Maximum Continuous Rating) for bulbs of oil and winding temperature indicators. It shall be possible to remove these bulbs without lowering the oil in the tank.

- Bushings, turrets, covers of inspection openings, thermometer, pockets, etc. shall be designed to prevent ingress of water into or leakages of oil from the tank.

- All bolted connections shall be fitted with weather proof, hot oil resistant gasket in between, for complete oil tightness. If gasket is compressible, metallic stops shall be provided to prevent over compression.

AXELS AND WHEELS

- Transformer shall be provided with flanged bi-directional wheels for moving the transformer on rail tracks in directions parallel (X-X) and perpendicular (Y-Y) to the axis of HV bushings. Rail gauge for movement along the axis of HV bushing (i.e., X-X) shall be 1676.4 mm. The movement in direction perpendicular to transformer HV bushing (i.e., Y-Y axis) direction of rail gauge is 3048 mm.

- The transformer shall be rigidly mounted on wheels resting on rails in concrete foundations. The complete transformers shall be rigidly anchored through wheel assemblies to the foundation using anti-earthquake clamping and locking devices. Rails would be mounted flush with top surface of the foundations.
- Ladders with suitable locking arrangement shall be provided on the side of each transformer for purpose of maintenance.

ANTI EARTQUAKE CLAMPING DEVICE

- To prevent transformer movement during earthquake, clamping device shall be provided for fixing transformer to the foundation. The Supplier shall supply necessary bolts for embedding in the concrete foundation. The arrangements shall be such that the transformer can be fixed to or unfastened from these bolts as desired. The fixing of the transformers to the foundations shall be designed to withstand seismic events to the extent that a static co-efficient of 0.3 g., applied in the direction of least resistance to that loading will not cause the transformer or clamping devices as well as bolts to be over stressed.
- The details of the device used and its adequacy shall be brought out in the additional information schedule.

CONSERVATOR TANK

- The conservator tank shall have adequate capacity between highest and lowest visible level to meet the requirement of expansion of the total cold oil volume in the transformer and cooling equipment from minimum ambient temperature to 90 deg.C.

  a) The conservator tank shall be bolted into position, so that it can be removed for cleaning purposes.

  b) The conservator shall be fitted with magnetic oil level gauge with low level electrically alarm contact..
  c) Conservator shall be provided in such a position as not to obstruct the electrical connections of the transformer.
  d) Separate conservator shall be provided for OLTC.

PRESSURE RELIEF DEVICE

02Nos. of pressure relief devices may be provided at suitable locations, which shall be of sufficient size for rapid release of any pressure that may be generated in the tank and which may result in damage to the equipment. The device shall operate at a static pressure of less than the hydraulic test pressure of transformer tank, it shall be mounted direct on the tank. One set of electrically insulated contact shall be provided for alarm / tripping. Separate contact for N2 fire prevention system shall also be provided.

BUCHHOLZ RELAY

A double float type Buchholz relay shall be provided. All the gases evolved in the transformer shall collect in this relay. The relay shall be provided with a test cock suitable for flexible pipe connection for checking its operation and taking gas sample. A copper or stainless steel tube, shall be connected from the gas collector to a valve located about 1200 mm above ground level to facilitate sampling, with the transformer in service. The device shall be provided with two electrically independent ungrounded contacts, one for alarm on gas accumulation and the other for tripping on sudden rise of pressure. Separate contact for N2 fire prevention system shall also be provided.

TEMPERATURE INDICATOR

a) Oil Temperature Indicator (OTI)

Transformer shall be provided with a 150mm dial type thermometer for top oil temperature indication. The thermometer shall have adjustable, electrically independent ungrounded alarm and trip contacts, maximum reading pointer and resetting device mounted in the cooler control cabinet. A temperature sensing element suitably located in

a pocket on top oil shall be furnished. This shall be connected to the OTI by means of capillary tubing. Accuracy class of OTI shall be plus or minus 1.0% or better.

b) Winding Temperature Indicator (WTI)

A device for measuring the hot spot temperature of each of the windings shall be provided (HV, IV, Tertiary). It shall comprise of the following :-

i) Temperature sensing element.
ii) Image Coil.

iii) Auxiliary CTs, if required to match the image coil, shall be furnished and mounted in the cooler control cabinet.

iv) 150 mm dia local indicating instrument with maximum reading pointer mounted in cooler control cabinet and with two adjustable electrically independent ungrounded contacts (besides that required for control of cooling equipment), one for high winding temperature alarm and one for trip.

v) Calibration device.

vi) In addition to the above, the following indication equipment shall be provided for each winding.
   a) Signal transmitter.
   b) Remote winding temperature indicator, it shall be suitable for flush mounting on RTCC panel (this shall not be repeater dial of local WTI and shall operate by signal transmitter). The difference between local and remote WTI indication at any given time shall not exceed 1 deg. C. One RWTI with four point selector.

   c) Switch shall be provided for all the three windings (HV, IV and Tertiary).

vii) Auxiliary supply, if required, in RTCC panel, for RWTI, shall be 110V DC only.

viii) Accuracy class of WTI shall be plus or minus 1.0% or better.

ix) Any special cables required for shielding purpose for connection between cooler control cabinet and remote winding temperature indicator control circuit shall be in supplier's scope of work.
x) Provide current transducer with OTI & WTI to monitor these parameters on SCADA.

EARTHING TEMINALS

Two(2) earthing pads (each complete with two(2) Nos. tapped holes, M 10 bolts, plain and spring washers) suitable, for connection to 75 x 10 galvanized steel flat shall be provided each at position close to the two(2) diagonally bottom corners of tank. Earthing strip upto the ground level shall be provided by the Bidder.

CORE

- Core shall be constructed from high grade, non-ageing cold-rolled low loss and high Permeability grain oriented silicon steel laminations.

- Each lamination shall be insulated with a material that will not deteriorate due to pressure and the action of hot oil.

- Every care shall be exercised in the selection, treatment and handling core steel to ensure that as far as practicable the lamination are flat and the finally assembled core is free from distortion.

- Oil ducts shall be provided where necessary to ensure adequate cooling. The winding structure and major insulation shall not obstruct the free flow of oil through such ducts. Where the magnetic path is divided into packets by cooling ducts parallel to the plane of lamination or by insulating material above 0.254 mm thick, tinned copper strip bridging pieces shall be inserted to maintain electrical continuity between packets.

- All parts of the core shall be of robust design capable of withstanding any shocks to which they may be subjected to during lifting, transport. Installation and service. The bolts used in assembly of the core shall be suitably insulated and clamping structure shall be so constructed that the eddy currents are minimum.

- The core shall be provided with lugs suitable for lifting the complete core, coil, assembly of the transformers.

- Adequate provision shall be made to prevent movement of the transformer relative to the tank during transport and installation or while in service.

- The supporting frame work of the cores shall be so designed as to avoid the presence of pocket, which would prevent complete emptying of the tank through drain valve or trapping of air during filling.

- The maximum flux density in any part of the core and yoke at normal voltage and frequency and ratio must not exceed 1.53 Tesla.

WINDING

- The winding shall be so designed that all coil assemblies of identical voltage rating shall be inter-changeable and field repairs to the winding can be made readily without special equipment and also to reduce to a minimum the out of balances forces in transformer at all voltage ratios. The coils shall be supported between adjacent section by insulating spacers and the barriers, bracing and insulation used in the assembly of the windings shall be arranged to ensure a free circulation of oil and to reduced hot spots in the windings.

- Insulation of the coils shall be treated with a suitable insulating varnish or equivalent compound to develop the full electrical strength of the winding. All material used in the insulations and assembly of winding shall be insoluble, non-catalytic and chemically inactive in the hot transformer oil and shall be free from insulating composition liable to soften, doze out, shrink or collapse during service.

- All threaded connections shall be provided with locking facilities.

- All leads from the windings to the terminal Board and bushings shall be rigidly supported to prevent injury from vibration. Guide tubes shall be used where practicable.

- The windings shall be clamped securely in place, so that they will not displaced or deformed during transit or short circuits. The assembled core & winding shall be vacuum dried and suitably impregnated before removal from treating tank. The copper conductor used in the coil structure should be best suited to the requirements and all permanent current carrying joints in the windings and the leads shall be as per best manufacturing practice to given trouble free service.

- Any metal pieces in contact with laminated rings shall be so designed that they do not weaken the electrical or mechanical properties of the rings.

- Gasket joints shall be provided with mechanical steps to prevent crashing.

- It is desirable that the impulse voltage distribution is measured after the coils are wound (with the help of a surge oscilloscope) and compared with the design values and suitable modifications be done, if deviation found, so as to get stress relieved construction.

- To avoid damage to tertiary winding due to high stress at the time of severe short circuit, it is desirable the some special constructional features like encasing the tertiary winding in some epoxy compound etc., is done as per bidder practices. Suppliers shall elucidate the constructional features adopted by them for the same. Special constructional and design features adopted for avoiding displacement of coils / clamping structures during dynamic short circuit condition be given.

INSULATING OIL

a) The quality of the oil supplied with transformer shall conform to the oil parameters specified below. No inhibitors shall be used in the oil. The oil used shall be non- PCB (Poly Chlorinated Biphenyl) type. The oil samples will be drawn as follows :-

i) Prior to filling.
ii) Before and after heat run test.
iii) Before energizing.

All tests as per IS: 335 shall be conducted on all samples.

NEUTRAL BUSHING CTs

CT	RATIO	PROTECTION	BUR-DEN	ACCURACY CLASS	MIN. KNEE POINT VOLTAGE	MAX. EXCITING CURRENT	MAX. SEC. RESIS-TANCE IN OHMS
1	2	3	4	5	6	7	8
220 KV	500 / 1 A	REF (Restricted earth fault).	-	PS	300 V	40mA at Vk/2	5.0
33 KV	2000 / 1 A	Earth Fault Protection	-	PS	300 V	40mA at Vk/4	5.0

1 All 60 MVA transformers are to be provided with bushing CT's of following ratio and Particulars :

2. The metering core of all CT's shall be of 30 VA burden, class of accuracy (as per BSS).

3. Over voltage protection devices shall be provided for all the cores of each CT to protect them against heavy current in CT primary, open circuiting or heavy burden of secondary.

4. All CTs shall have bar primaries.

5. Only molded epoxy terminations shall be provided on all the CTs secondary terminals with suitable terminal and cable glands.

SPECIFICATIONS

250 KVA 33/0.415 KV Station Transformers

STANDARDS

The transformers shall conform in all respects to IS:1180 (Part-1):-2014 subject to latest amendment and modifications. In case the provisions of ISS are not clear the provisions of IEC shall apply.

TECHNICAL SPECIFICATION FOR 245/145/36KV SOLID CORE POST INSULATORS

STANDARDS

Insulators should conform to the latest publications of IS 2544 & IEC in all respects except BIL which should be 1050Kvpfor 245 kV, and 650 kVp for 145 kV withstand. Equipment meeting any other authoritative standards which ensures equal or better quality than the IS mentioned above, is also acceptable.

REQUIREMENT FOR INSULATORS

FOR 245 AND 145 KV POST INSULATORS

(1)	Nominal voltage	:	245 KV	145 kV
(2)	Highest system voltage	:	245 KV	145 kV
(3)	Sytem frequency	:	50Hz.	50 Hz.
(4)	Number of phases	:	3 (Three)	3 (Three)
(5)	Neutral	:	Effectively earthed	Effectively earthed
(6)	Short circuit current	:	40.0 KA	31.5 KA
(7)	Phase to phase spacing	:	4.5 meters	3.0 meters
(8)	Height of the insulator support structure.	:	2750 mm.	2750 mm
(9)	PCD of Top Flange	:	127 mm.	127 mm
(10)	PCD of Bottom Flange	:	184 + .2 mm.	184+ .2 mm
(11)	BIL	:	1050 KV	650 mm
(12)	Height of insulator	:	2300.00mm	1500 mm
2.2	FOR 36 KV POSTINSULATORS			
(1)	Nominal voltage	:	36 KV	
(2)	Highest system voltage	:	36 KV	
(3)	Sytem frequency	:	50Hz.	
(4)	Number of phases	:	3 (Three)	
(5)	Neutral	:	Effectively earthed.	
(6)	Short circuit current	:	25.0 KA	
(7)	Phase to phase spacing	:	1.5 meters	
(8)	Height of the insulator support structure.	:	2750 mm.	
(9)	PCD of Top Flange	:	127 mm.	
(10)	BIL	:	250 KV	
(11)	Height of insulator	:	508.00 mm	

TECHNICAL SPECIFICATIONS OF 198 KV/120 KV/30 KV 10KA METAL OXIDE GAPLESS SURGE ARRESTERS

PRINCIPAL PARAMETERS

•	Rated system voltage	245 KV	**145 KV**	**36 KV**
•	System neutral earthing	Effectively earthed		
•	Installation	Outdoor		
•	Rated arrester voltage	198 KV	**120 KV**	**30 KV**
•	Max. continuous operating voltage (MCOV) at 50^0C	168 KV	**102 KV**	**24 KV**
•	Nominal discharge current	10 KA (8/20 microwave)		
•	Rated frequency	50 Hz		
•	Minimum line discharge capacity	2 KJ / KV		
•	Power frequency reference voltage	Not less than MCOV		
•	Max. Residual voltage at nominal discharge current of 10 KA and 8/20 Micro Sec.	550 KV_P	**400 KV_P**	**100 KV_P**
•	Peak & value of high current (4/10 Microwave)	100 KA		
•	Creepage distance	25 mm/KV		
•	Partial discharge test on 1.05 MCOV	Net more than 50 Pico coulombs		
•	One minute power frequency voltage of arrester housing	460 KV	**275 KV**	**70 KV**
•	Impulse withstand voltage of arrester housing with 1.2/50 micro second wave.	1050 KV_P	**650 KV_P**	**170 KV_P**
•	Minimum prospective fault current.	40 KA		
•	Radio interference voltage	Not more than 500 micro volts.		
•	Pressure relief class	Class-A		
•	Current for pressure relief.	40 KA		
•	Seismic acceleration	0.3 g.		
•	Long duration discharge class	Class 3 (as per IEC)		

The details of the equipments to be protected by these surge arresters are as under:-

Equipment Basic Insulation level

		220 KV	**132 KV**	**33 KV**
i)	**Transformer 220 KV side**	950 KV_P	550 KV_P	170 KV_P
ii)	**Switchgears, CTs and CVTs**	1050 KV_P	650 KV_P	170 KV_P

TECHNICAL SPECIFICATION OF 198 KV, 10 KA POLYMER HOUSED, METAL OXIDE GAPLESS SURGE ARRESTERS:

CONTROL AND RELAY PANELS

Control and Relay Panels shall consist of separate vertical stationary front panels with equipment mounted thereon and having wiring access from the rear. Each cubicle assembly shall be provided with doors on the rear having handles with built in locking facility. It shall have double leaf doors with lift off hinges at the back for panels of width more than 800 mm.

These panels shall be of the following approximate dimensions: -

Height: 2250mm + 15mm ant vibration pad + 50 mm (base)
Depth: 800mm to 1000mm
Width: 800 mm to 1000 mm

Metering Instruments:

APPLICABLE STANDARDS

The CT PT operated HT energy meter shall be of accuracy Class 0.2s and conform to following standards-

- IS 14697: 1999 — Specification for A.C Static Transformer operated Watt Hour & VAR – Hour meters, class 0.2S & 0.5S
- CBIP Technical Report No. 88 (Revised July 1996 and Amendments & Errata issued in April - 1999 and September'99) — Specification for A.C. Static Electrical Energy Meters.
- IEC – 687 - Alternating current static watt-hour meters for measurement of active energy, class 0.2.
- IS- 3202 Climatic proofing of electrical equipment.
- CBIP technical report – 111 where ever applicable.

PRINCIPAL PARAMETERS

The energy meters shall be indoor/ out door type connected with the secondary side of out door current and voltage transformers.

Sl. No.	Item	Specification

i.	Type of Installation	Indoor (non AC) /Outdoor
ii.	CT secondary	1 A
iii.	VT secondary	110 V/ √ 3 Volts
iv.	Auxiliary AC Supply	230 V+ 10 % to –15%
v.	Auxiliary DC Supply	110 V/220V/ + 10%
vi.	System frequency	50HZ + 5%
vii.	Earthing System	Solidly Grounded

GENERAL TECHNICAL REQUIREMENT

i) Application: 3 phase 4 wire, -/01A

ii) Rated Secondary Voltage: -/110V AC, 63.5 Volts (Phase to Neutral)

iii) Rated secondary Current (I Basic): 1 Amp balanced & unbalanced load

iv) Maximum Current : 2 Amps.

v) Rated Frequency: 50 Hz.

vi) Accuracy class: 0.2s

vii) Power Factor: Unity to Zero (all power factor lag to lead).

viii) Power Consumption: Not more than 1.5Watt per phase(Active)

10 VA (Apparent) Apparent power consumption in each current circuit at basic current and reference frequency shall not exceed 1.0 VA

ix) Phase Sequence Immunity: Shall be unaffected to phase sequence.

x) Data Transfer Speed from meter to MRI and from MRI to BCS: at least 19200 kbps.

xi) Communication Port: Optical port for MRI and communication port for remote data transfer.

xii) Degree of protection of encapsulation : shall be at IP 51/IP 54 or better.

xiii) Minimum Starting Current – 0.1% of I basic.

RELAYS:

All relays shall conform to the requirements of IS: 3231 or other applicable approved standards. Relays shall be suitable for flush or semi-flush mounting on the front with connections from the rear. Relays shall be rectangular in shape and shall have dust tight, dull black or egg shell black enamel painted cases with transparent cover removable from the front.

TECHNICALSPECIFICATIONS FOR 110/30A BATTERY CHARGERS AND 110V/30A DC DISTRIBUTION BOARDS

REQUIREMENT OF BATTERY CHARGER

TYPE & RATING

Each battery charger shall be of 3 phase type which must be able to meet the above requirement plus 20 Amps station load current on both float and boost charging modes with a voltage variation from 350 V to 470 V A.C. 50 Hz $\pm$ 5% separately or simultaneously.

The charger shall be stand-alone, floor mounted indoor type. The panels shall consist of fabricated sheet steel enclosures on the sides, front, rear and top. The rear door of panel shall be in the form of lockable, hinged tight fitting flap door which should close and open without keys. The front and rear sheets shall be folded construction for providing rigidity and strength (without using any frame works or screwed & bolted sheet steel sections) of not less than 14 SWG. All the switches, knob should be such mounted that only their operating handles protrude out of the panel. Suitable support channels shall be provided inside the cubicle. The charger unit will be completely vermin proof and neoprene gaskets will be provided around the edges of the door.

Important identifications/ markings shall be made on anodized plate with etching process (not with screening process) which shall be riveted.

All screws, nuts and bolts shall be rust proof and spring washers shall be provided wherever required.

Terminal blocks should be easily accessible and transparent flexible top covers (easily removable) shall be provided to cover the live parts.

TECHNICAL SPECIFICATIONS OF D.C. DISTRIBUTION BOARDS

The D.C. distribution board shall be similar in construction to the charger having preferably the same height using 14SWG sheet steel. The DCDB shall have single aluminum bus bar arrangement and arrangement for connecting the out put of charger. Automatic switching of D.C.emergency light circuit in the event of A.C. failure shall also be provided.

TECHNICAL SPECIFICATION OF DISC INSULATORS AND CONDUCTORS ETC

STANDARDS

The supply of accessory items covered by this specification shall comply with the latest editions of the Indian standards / IEC and codes of practice. Some of the applicable standards are given below :-

I.S.S No.	Particulars	Remarks
IS.731	Disc insulators	Or any other equivalent International standard
IS. 2544	Porcelain Insulators	- do -
IS. 6005	Code of practice for phosphating Iron & Steel	- do -
IS. 398	ACSR Conductor	- do -
IS. 226	M. S. Bars	- do -

REQUIREMENT OF ANTI-FOG TYPE DISC INSULATORS

A) 220 kV SWITCHYARD

(i) Single suspension string shall be complete with 14 nos. anti-fog type disc insulators and without suspension clamps & fittings.

(ii) Single strain string shall be complete with 16 nos. anti-fog type disc insulators and without strain clamps & fittings.

B) 132 kV SWITCHYARD (For 220 kV & 132 kV Substations)

(i) Single suspension string shall be complete with 9 nos. anti-fog type disc insulators and without suspension clamps & fittings.

(ii) Single strain string shall be complete with 10 nos. anti-fog type disc insulators & without strain clamps & fittings.

PARAMETERS OF DISC INSULATORS

These are required for 220 kV, 132 kV and 33 kV tension and suspension strings. The minimum guaranteed requirements of one unit of each type of insulators shall be as follows :

Anti-fog type insulators shall be of ball and socket type.

For 220 kV &132 kV Busbar Strings

i)	Types of insulator	Anti-fog type
ii)	Electromechanical strength (kN)	70
iii)	Size of Insulator (mm)	280 x 146
iv)	Creepage distance	
	a) Total mm	430
	b) protected mm	290
v)	Power Frequency Flashover Voltage	
	a) Dry kV	100
	b) Wet kV	60
vii)	Power frequency with stand Test voltage	
	a) Dry kV.	85
	b) Wet kV.	50
vii)	50% Impulse 1.2/50 micro sec. Flashover voltage (dry)	
	a) Positive polarity / kV.	175
	b) Negative polarity/ kV.	170
viii)	Impulse 1.2 / 50 micro sec. withstand test voltage.	155
ix)	Power Frequency Puncture Voltage kV.	140
x)	Size of in ball shank in mm	16
xi)	Minimum corona extinction voltage kV. R.M.S.	18
xii)	Max. RIV at 10 kV. RMS.	50 micro Volt

BUS BAR CONDUCTORS

Aluminum strands for ACSR and all aluminum conductors shall be hard drawn from 99.5% pure electrolytic aluminum rods with 61% conductivity.

The steel wire for ACSR conductor shall be manufactured from high tensile steel of 134 to 143 kg. / Sq. mm. quality produced either by the acid or basic open hearth process or by electric process. It shall not contain sulphur or phosphorous exceeding 0.05 percent and total of sulphur or phosphorous shall not exceed 0.085 percent. No wires drawn from Bessemer process steel shall be used.

The surface of the conductor shall be clear and dry . The surface strands shall be smooth and free from burrs and other projections which may cause in creasing corona losses above those occurring on perfectly smooth conductor when used on extra high voltage lines.

TECHNICAL SPECIFICATIONS FOR 63KVA DIESEL GENERATOR

ELECTRICAL SUPPLY SPECIFICATIONS

Nominal voltage : 415V ±10%
No. of Phases : 3 + Neutral
Frequency : 50Hz ± 5%
Neutral earthing : Solidly Grounded
Control supply : 12 / 24V, 2-wire DC

PRINCIPAL TECHNICAL PARAMETERS

The Voltage Transformers shall conform to the following specific parameters:

Sl. No	Parameters	Specification
1	**2**	**3**
1.	Type of installation	Single Phase, Oil filled hermetically sealed and outdoor types
2.	Type of mounting	Pedestal type
3.	Suitable for system frequency	50 Hz ± 5%
4.	Highest system Voltage	245 Kv
5.	Transformation ratio on all windings	**220,000 / 110** **√3 √3**
6.	Method of earthing	Effectively earthed
7.	1.2/50 micro second lightning impulse withstand voltage kV (peak)	1050
8.	1 minute dry power frequency withstand voltage kV (rms)	460
9.	Min. Creepage Distance mm.	6125
10.	Radio interference Voltage at 266 kV	Not exceeding 500 micro volts

REQUIREMENT OF 245 KV CVT

S.No.	DETAILS	PARTICULARS		
1.	Transformation ratio on all windings	220,000 / 110 √3 √3 (No. of secondary windings 3)		
2.	Supply frequency	50 Hz.		
3.	Type	Capacitor voltage type.		
4.	Rated voltage factor	1.2 continuous 1.5 for 30 seconds.		
5.	Application	Winding I Protection	Winding II Protection	Winding III Metering/Synchro.
6.	Accuracy	3P	3P	0.2
7.	Phase angle error	--------- As per IS ----------		
8.	Output burden	150 VA	150 VA	50 VA
9.	Rated capacitance	4400 + 10% - 5%		
10.	Rated total thermal burden	750 VA		
11.	Standard reference range of frequency for which the accuracies are valid.	97% to 103% for protection & 99% to 101% for measurement.		
12. a)	One minute power frequency test on secondary winding.	3 KV (r.m.s.)		
b)	Withstand voltage between low voltage terminal and earth terminal	4 KV (r.m.s.)		
(Note : This test voltage shall be 10 KV (r.m.s.) in the low voltage terminal exposed to weather).				
c)	Radio interference voltage of 266 KV (r.m.s.)	Not exceeding 500 microvolts.		
13.	Corona extinction voltage.	320 KV (r.m.s.)		
15.	Partial discharge level at rated voltage for capacitor divider.	Less than 10 pico coulombs		

TECHNICAL SPECIFICATION FOR 160 MVA, 220/132/11KV, AUTOTRANSFORMERS.

STANDARDS

The transformers shall conform in all respect to latest edition of IS 2026 and CBIP specification.

TYPE RATING AND QUANTITY

The auto transformers shall be of core type constructions, three phase, oil immersed for outdoor service as both step up and step down transformers, with types of cooling mentioned below. The rating and electrical characteristics of transformers shall be as follows :-

i)	Maximum continuous capacity	160 MVA
ii)	Frequency	50 C/s
iii)	No. of phase	3
iv)	Rated Voltage of HV winding	220 KV
v)	Rated Voltage of IV winding	132 KV
vi)	Rated voltage of Auxiliary winding	11 KV
vii)	% age impedance	
	a) HV to IV at normal tap no. 13 at 100% rating.	10%
	b) HV to IV at tap no. 1 at 100% rating.	11%
	c) HV to IV at Tap no. 17 at 100% rating.	11%
	d) HV to tertiary	60% (min.) ---------- (Offers with lower % impedance will not be considered)
	e) IV to tertiary	50% (min.) (Offers with lower % impedance will not be considered)

Note: No reactor either inside or outside the tank shall be used to achieve above %age impedance value.

viii)	Connections	
a)	Series and common winding	------Star-----
b)	Auxiliary winding	--------delta------
ix)	Reference voltage group and terminal markings	---HV/LV/Tertiary-- -----YNaod11.

x)	On load taps of	---(-5%) to (+15%) 1.25% each for IV	in equal steps variation.
xi)	Polarity	----Subtractive----	
xii)	Type of Cooling	ONAN/ONAF/OFAF	
		80/ 112/ 160 MVA	
xiii)	Rated capacity of auxiliary winding	45 MVA	
xiv)	D.C. Voltage for relays etc.	110 V /220 Volt DC	

All the transformers shall be oil immersed, weather proof Auto-type for outdoor installation in lightening areas. The windings of 3 phase transformers shall be connected Star/Star to conform to vector symbol YNaod11 group no. in accordance with IS 2026-1977 and any amendment thereof.

TECHNICAL SPECIFICATIONS FOR 36 kV ISOLATORS

TYPE OF ISOLATORS

a) Three phase, 1250 A, 36 kV manually operated, Standard isolators without earth switch.

b) Three phase, 1250 A, 36 kV manually operated, Standard isolators with one earth switch.

PRINCIPAL PARAMETERS

DETAILS	**36 kV Isolator**
Rated Voltage	36 kV
System frequency	50 Hz
System Earthing	Effectively earthed
Type of Isolator	Outdoor, Horizontal air break suitable for upright mounting
Continuous current rating	1250 A
Operating mechanism	Manual
Phase to phase spacing	1500 mm
Rated short time withstand current	25 kA (rms)
Rated peak short circuit current	62.5 kA (peak)
Temperature rise	As per IEC-129 derated for an ambient of 50^0C

Seismic co-efficient	0.3 g.
1.2/50 microsecond full wave positive and negative impulse withstand voltage to earth	70 kV (peak)
One minute power frequency withstand voltage dry & wet to earth	70 kV (rms)
Auxiliary Contacts	4 normally open and 4 normally closed.
Insulation level of insulators	
i) Impulse voltage withstand test (1.2/50 micro second full wave)	170 kV (peak)
ii) Power frequency withstand voltage to earth (dry & wet)	70 kV (rms)
Creepage distance of insulators :	
i) Total	900 mm
ii) Protected	450 mm
Minimum strength :	Suitable to withstand wind, short circuit and operating forces
i) Torsional	
ii) Cantilever	
Interlocks with circuit breaker	1 set of electrical and casteltype interlocks.
Type of contacts	Hard drawn electrolytic copper with silver plating
Conductor take off	Horizontal/vertical according to actual requirement.
Phase-to phase clearance	1500 mm

TECHNICAL SPECIFICATIONS FOR 10 MVAR,33KV CAPACITOR BANK

CAPACITOR BANKS

Capacitor banks detailed above shall be complete with the Capacitor unit controlling breaker, manually operated OFF load isolators without earthing switch at bus bar side and with earthing switch at capacitor side, CT, NCT, VT, switching reactors, control & relay panel, necessary mounting racks, insulators, interconnecting materials, bi-metallic terminal connectors, junction boxes and any other material required for satisfactory operation and installation. As per system condition, switching reactor for harmonic suppression are not required.

General arrangements

The capacitor banks shall be out door type suitable for operation in the climatic conditions as detailed on page S-2 Mounting steel racks to be supplied by the tenderer shall be suitable for mounting on plinth. The Tenderers should offer compact design to occupy minimum ground area with least possible height. The bank shall suitable for mounting under the bus bars drawn on ganturies having height as mentioned in clause 3.1.6 of technical specification with due consideration for required clearances. The tender shall be complete with drawing showings the arrangements.

Each capacitor bank shall be in two double star groups of 5MVAR each with separate one number manually operated, OFF load type isolator with earthing switch for each group. Each group of 5MVAR shall be connected in double star formation with their neutral point ungrounded and protected through separate one number NCT. Each star formation shall be of 2.5 MVAR rating at 33KV.

Each capacitor bank shall be complete with all auxiliaries accessories and the following associated equipments:-

Sl. No.	Name of associated equipment	Qty. required for Bank
1	36KV, 3-ph, Circuit Breaker	1 No
2	36KV, 3-ph Isolator without earthing switch	1 No
3	36KV, 3-ph. Isolator with earthing switch	2 No
4	36KV, 1-ph. Current Transformer	3 No
5	36KV, 1-ph Neutral Current Transformer	2 No
6	3-ph. Switching reactor	4 Nos.
7	Control & Relay panel with relays	1 No
8	36KV, 3-ph/ 1-ph voltage Transformers	1/3 Nos.

The number of parallel units in each series group shall be such that failure of one unit shall not preferable creating.

i) More than 5% voltage rise with internal fuse on other units in the bank.

INDIVIDUAL CAPACITOR UNIT

Individual Capacitor Units of 5.485 KV, 276.25 KVAR, rating of Bank shall be self contained, outdoor types, having two bushing to give the required total Bank Capacity at 50Hz. And the Bank compact to occupy minimum ground area with least possible height. The bushing should be of metal coated porcelain and shall be joined to the case by solder sealing method. The Creepage distance of bushing shall not be less than 25mm/KV of voltage stress appearing

between the terminal and the case. The bushing shall be suitable for heavily polluted. Atmospheric condition.

The impregnant used shall be non-PCB and the impregnation shall be carried out under high degree of vacuum and the unit shall be of totally sealed type.

Each capacitor unit shall be provided with internal discharge resistors designed to drain out the residual charge up- to 50 volts within less than 10 minutes after disconnection from supply.

Each capacitor unit shall be individually protected by fuse suitably rated for load current. Capacitor to be provided with additional external fuse should have arrangement for visual indication for detection of faulty units.

Each unit shall satisfactorily operate at 130% rated KVAR including the factor of over voltage (referred to rated voltage), harmonic currents and manufacturing tolerance.

Terminal and mounting arrangement may be in accordance with manufacturer's standard practice, but should be amply proportioned with adequate safety margins.

The Containers of capacitor units shall be of sufficiently thick sheet painted with suitable anti-rust synthetic enamel primer paint and the finishing coats of paint as per the standard practice.

The Capacitor banks shall conform to latest edition of IS: 13925(Part-I: 1998/ IEC-70).

ISOLATORS (WITH AND WITHOUT EARTH SWITCH)

The isolators (with and without earthing switch both) shall be outdoor, manually gang operated, double break, OFF load type, 36kV, 800 amps, 1000MVA, 3 phase, 50 Hz triple pole complying in all respects with the requirements of the latest edition of IS: 9921-1981 and complete with insulators, mechanical and electrical inter locks, bi-metallic terminal connectors suitable for ACSR panther conductor all auxiliaries and accessories.

Current Transformers

The current transformers shall be of the outdoor dead tank type single phase, 50Hz, oil immersed self cooled.

The current transformers shall have following ratings:-

a	Nominal system voltage	33 KV
b	Highest system voltage	36 KV
c	No. of cores	Two
d	system earthing	Effective
e	Transformation ratio	400-200/1/1/A

f	Basic insulation level	170 KV (peak)
g	Short time current rating	25 KA
h	Fault level	1000 MVA
i	Rated output of each core	15 VA
j	Class of accuracy	5-P for protection, 1for metering
k	Max. resistance of secondary winding	5 ohms
l	Accuracy limit factor (protection core)	10
m	Instrument security factor (metering core)	5
n	Cree page distance a) Total b) Protected	 900 mm (Min) 450 mm (min)

The core shall be of high grade, non- ageing electrical silicon laminated steel of low hysteresis loss and high permeability to ensure high accuracy at both normal and over current.

Voltage Transformers

The voltage transformer shall be of outdoor type, three phase / single phase, 50 Hz, oil immersed, self cooled.

The voltage transformer shall have the following ratings:-

a	Nominal system voltage	33 KV
b	Highest system voltage	36 KV
c	Frequency	50 Hz
d	System earthing	Effective
e	No. of secondary windings per phase	One
f	Ratio	33000/110 volts $\sqrt{3}$ / $\sqrt{3}$
g	Basic insulation level	170KV (peak)
h	Rated burden	100 VA
i	Rated voltage factor (continuous)	1.1.
j	Rated voltage factor (30sec.)	1.5
k	Class of accuracy	3.p
l	Creepage distance a) Total b) Protected	 900 mm (min) 450 mm (min)

The VTs shall conform to the latest edition of IS: 3156. The bushing shall comply with the latest edition of IS: 2099 and IS: 5347.

Neutral Current Transformer

Two NCT shall be required for one set of capacitor bank.

The neutral current transformer shall be as per specifications of CT except that it shall have single core, transformer ration 5/1 and accuracy class for the protection core shall 5 P 10.

Required number of suitable and matching bimetallic terminal connectors along- with required number of cable glands shall be supplied along- with the NCTs. And accordingly the prices may be quoted.

Control & Relay Panel (SAS Based)

The control and relay panels shall conform in all respects to relevant Indian standards. Equipment meeting any other authoritative standard which ensures an equal or better standard than mentioned above may also be considered.

The control and relay panel shall be of floor mounted, indoor free, standing cubicle type. The panels shall consist of fabricated sheet enclosures on the sides, front, rear and top.

The rear of the panels shall be in the form of lockable hinged flap door. The front and rear sheets shall be of folded construction for providing rigidity and strength without using any frame work or screwed or bolted sheet steel sections. The front of the panels which accommodates most of the mountings shall be fabricated with sheet steel of thickness not less than 10 SWG. For the rest of the panel which carries no weight of the mountings, sheet steel of thickness not less than 14 SWG should be used.

FIBRE OPTIC EQUIPMENTS

Network Configuration and Equipment Characteristics

Introduction

This section describes the Fibre Optic Communication network configuration and the equipment characteristics for communication system to be installed under the project. The sub-systems addressed within this section are:

(1) Fibre Optic Transmission System (FOTS)
(2) Termination equipment Subsystems
(3) Network Management System (NMS)
(4) MDF, DDF and Cabling

Digital Tele-Protection Coupler (Stand (Stand-Alone type)

Protection coupler shall be of modular type having independent Command interfaces.

- Each coupler shall have redundant power supply source.
- Protection command signals shall be suitable for 110/220V DC (site programmable) directly from station battery without involving any intermediate converter. **Opto-coupler Interface shall be provided suitable for 110Volt & 220Volt DC.**
- **Power supply source 110V DC with additional provision for operation on 48V DC.**

BUS SCHEME FOR SUBSTATIONS			
400/220kV Jewar	**220/33kV Cantt (Chaukaghat)**	**220/33kV Vasundhara**	**220/132/33kV Khaga**
400- Double Main Bus Scheme 220- Double Main Bus Scheme	220- DoubleMain Bus Scheme 33- Single Main & Transfer Bus Scheme	220- Double main Bus scheme 33- Single Main & Transfer Bus Scheme	220- Double main Bus & Transfer Scheme 132- Double main Bus & Transfer Scheme 33- Single Main & Transfer Bus Scheme.

SPECIFIC TECHNICAL REQUIREMENT FOR COMMUNICATION IN 220 kV, 132 kV and 33 kV SUBSTATION

In order to meet the requirement for grid management and operation of substations, Transmission Service Provider (TSP) shall conform to the following requirements.

On 220 kV and 132 kV D/C lines one OPGW containing 24 fibers is to be installed in place of conventional earth wire for grid management and substation operation purpose by STU/CTU and 48 fibers to be installed on LILO lines.

220 kV, 132 kV, 66 kV, 33 kV & 11 kV System

SL No	Description of parameters	220 kV System	132 kV System	66 kV System	33 kV System	11kV System
1.	System operating voltage	220 kV	132 kV	66 kV	33 kV	11 kV
2.	Maximum operating voltage of the system (rms)	245 kV	145 kV	72.5 kV	36 kV	12 kV
3.	Rated frequency	50	50 Hz	50 Hz	50 Hz	50 Hz
4.	No. of phase	3	3	3	3	3
5.	Rated Insulation levels					
	i. Fullwave impulse withstand voltage (1.2/50 micro sec.)	1050 kVp	650 kVp	325 kVp	170 kVp	75 kVp
	ii. One minute power frequency dry and wet withstand voltage (rms)	-	275 kV	140 kV	70 kV	28 kV
6.	Corona extinction voltage	156 kV	105 kV	-	-	-
7.	Max. radio interference voltage for frequency between 0.5 MHz and 2 MHz at 92 kV rms for132 kV system	1000 micro- volts	500 micro-volts	-	-	-
8.	Minimum creepage distance (25mm/kV)	6125mm	3625mm	1813mm	900mm	300mm
9.	Min. Clearances					
	i. Phase to phase	2100mm	1300mm	750mm	320mm	280mm

SL No	Description of parameters	220 kV System	132 kV System	66 kV System	33 kV System	11kV System
	ii. Phase to earth	2100mm	1300mm	630mm	320mm	140mm
	iii. Sectional clearances	5000mm	4000mm	3000mm	3000mm	3000mm
10.	Rated short circuit currentfor1 sec. Duration	40kA/50kA (as applicable)	31.5 kA	31.5 kA	25 kA	25 kA
11.	System neutral earthing	Effectively earthed	Effectively earthed	Effectively earthed	Effectively earthed	Effectively earthed

APPENDIX

FOR

TRANSMISSION LINES

&

400/220 KV GIS SUBSTATION

&

COMMUNICATION SYSTEM

SPECIFIC TECHNICAL REQUIREMENTS FOR 400 KV TRANSMISSION LINES

1.0 The Tower shall be fully galvanized using mild steel or/and high tensile steel sections. Bolts and nuts with spring washer are to be used for connection.

2.0 IS Steel section of tested quality in conformity with IS 2062:2011, grade E 250 (Designated Yield Strength 250 Mpa) and/or grade E 350 (Designated Yield Strength 350 MPa) are to be used in towers, extensions, gantry structures and stub setting templates. However, use of steel grade having designated yield strength more than 350 MPa is not permitted. The steel used for fabrication of towers shall be manufactured by primary steel producers only.

3.0 Towers shall be designed as per IS-802:1995 considering wind zone 4. However, 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

As per Clause 12.1.2.1 b) 2) of IS 802:1995, Under security condition for tension and dead end towers, the transverse loads due to line deviation shall be the component of 100 percent mechanical tension of conductor and ground wire/ OPGW corresponding to 100% of design wind pressure at everyday temperature or 36% design wind pressure at minimum temperature after accounting for drag coefficient and gust response factor.

As per CEA's technical standards for construction of lines Regulation 2010, Transmission Service Provider (TSP) may adopt any additional loading/ design criteria for ensuring reliability of the line, if so desired and/ or deemed necessary.

4.0 The conductor configuration shall be as follows:-

4.1 For transmission lines with ACSR conductor:-

Transmission line	ACSR Conductor specified	Sub-conductor Spacing
400kV D/C (Twin Moose) transmission lines	Moose : Stranding 54/3.53mm-Al + 7/3.53 mm-Steel, 597sq mm, Total Sectional Area, 31.77mm diameter	450 mm
400kV D/C (Twin HTLS) transmission lines	HTLS. type- INVAR/ GAP/ Composite Core/ ACSS, 1596A ampacity, 28.62 mm diameter, 0.05552 (Ω/km) resistance	450 mm

Note*: The transmission lines shall have to be designed for a maximum operating conductor temperature of 85 deg C for ACSR only.*

5.0 The required phase to phase spacing and horizontal spacing for 400 kV D/C line shall be governed by the tower design as well as minimum live metal clearances for 400kV voltage level respectively under different insulator swing angles.

a) **<u>For 400 kV transmission lines:</u>**

The minimum live metal clearances for 400kV D/C transmission lines may be considered as follows:

(i) Under stationary conditions
From tower body:
For 400 kV D/C: 3.05 m

(i) Under swing conditions

Wind pressure Condition	Minimum electrical clearance
a) Nil	3.05 mtrs
b) Swing angle (22º)	3.05 mtrs
c) Swing angle (44º)	1.86 mtrs

However the phase to phase spacing for 400kV D/C line shall not be less than 8.0 m

6.0 The minimum ground clearance for 400 kV D/C transmission lines shall be 8.84 m so that maximum electric field does not exceed 10kV/m within the ROW and does not exceed 5kV/m at the edge of the ROW as per international guidelines.

7.0 The minimum mid span separation between earth wire and conductor shall be 9.0 m for 400 kV D/C transmission lines. Shielding angle shall not exceed 20 deg for 400 kV D/C line D/C transmission lines.

8.0 Transposition is to be done for all transmission lines whose length is greater than 100 km. Transposition should be carried out at 1/3 and 2/3 of the line length tower positions. Transposition of the transmission line after the construction of LILO shall be maintained by the developer. Transposition disturbed from construction of LILO will be set right by the TSP in the resulting Loop in and Loop out Lines as per regulation issued by the competent authority.

9.0 The switching impulse withstands voltage (wet) for 400 kV line shall be 1050 kVp. Lightning impulse withstand voltage (dry) for 400kV line shall be 1550 kVp.

10.0 The Fault current for design of line shall be 63 kA for 1 sec for 400 kV.

11.0 The lines shall be designed for very heavy pollution level (creepage of 31mm/kV as per IEC-60815). Porcelain/ glass/ polymer insulators shall be used in the line as per requirement and site conditions for the transmission lines.

12.0 Each tower shall be earthed such that tower footing resistance does not exceed 10 ohms. Pipe type or Counterpoise type earthing shall be provided in accordance with relevant IS. If the value (before stringing) has been recorded higher than 10 ohm, earthing shall be changed to Counterpoise type. Additional earthing shall be provided on every 7 to 8 kms distance at tension tower for direct earthing of both shield wires.

13.0 The required grade of concreate and mix design for foundation of transmission line tower shall be as per relevant IS.

14.0 Technical specification for 400kv line on Monopole

i) The monopoles are of the following types:

400 kV Double Circuit (PA, PB, PC & PD)

Classification of Monopole/Towers

The Pole for 400 kV Lines are classified as given below:-

a) For Suspension Pole PA (0-2 deg.)

Normal Span : 200m
Wind Span : 200m
Weight Span : 300m

b) For Tension Pole PB (2-15 deg.)

Normal Span : 200m
Wind Span : 200m
Weight Span : 300m

c) For Tension Pole PC (15-30 deg.)

Normal Span : 200m
Wind Span : 200m
Weight Span : 300m

d) For Tension Pole PD (30-60 deg.)

Normal Span : 200m
Wind Span : 200m
Weight Span : 300m

ii) **Broken wire Conditions**:

For Suspension pole (PA)	:	One Earthwire or One Conductor broken at a time, whichever is more stringent for a particular section.
For Tension pole (PB)	:	One Earthwire and any One Conductor broken or any two conductor broken at a time on same side, whichever is more stringent for a particular section.
For Tension pole (PC)	:	One Earthwire and any One Conductor broken or any two conductor broken at a time on same side, whichever is more stringent for a particular section.
For Tension pole (PD)	:	One Earthwire and any Two Conductor broken or any Three conductor broken at a time on same side, whichever is more stringent for a particular section.

Code Reference

Load Calculation : IS 802

Sag & Clearance : IS: 5613 CBIP Manual

Deflection Criteria: 5% of height of pole @ ultimate load conditions and 2% of the height of pole @ everyday condition (safety normal)

iii) **Ground Clearance**

The minimum ground clearance from the bottom conductor shall not be less than 8840 mm for 400KV lines at the maximum sag conditions i.e. at 85° C and still air.

An allowance of 150mm shall be provided to account for errors in stringing.

Conductor creep shall be compensated by over tensioning the conductor at a temperature of 26°C lower than the stringing temperature for ACSR ,MOOSE conductor.

iv) **Electrical System Data for 400 kV line**

1.	Nominal Voltage	kV	400
2.	Maximum system voltage	kV	420
3.	BIL (Impulse)	kV (Peak)	1550
4.	Power frequency withstand voltage (Wet)	kV (rms)	680
5.	Switching surge withstand voltage (Wet)	kV (rms)	1050
6.	Minimum Corona extinction voltage at 50 Hz AC system under dry condition	kV (rms) phase to earth.	320(Min)

7.	Radio interference voltage at one MHz for phase to earth voltage of 305 KV under dry condition.	Micro Volts	1000 (Max)

v) **Details of line Material: earthwire & OPGW**

Sl. No.	Description	Earthwire	OPGW (tentative)
1.	Type	7/3.66mm GS Earthwire	24 fibre OPGW
2.	Stranding and wire diameter		
	Aluminium	-	
	Steel	7/3.66	
3.	Conductor per phase	NA	NA
4.	Spacing between conductor of same phase(sub conductor spacing)(mm)	NA	NA
5.	Configuration	One continuously to run horizontally on top of the towers and conductors.	One continuo-usly to run on top of the towers and conductors
6.	Overall Diameter (mm)	10.98	≈ 10.98
7.	Unit mass (kg/km)	583	≈ 583
8.	Min. UTS (kN)	68.4	Equivalent to earthwire

15.0 For crossings design, installation and maintenance of overhead power lines shall be as per IS:5613 or latest amendments.

SPECIFIC TECHNICAL REQUIREMENTS FOR 400/220 KV SUBSTATION

The proposed 400/220 kV Jewar (2x500 MVA) substation shall be Gas Insulated Switchgear (GIS) type generally confirming to the requirement of CEA regulation for construction of sub-station.

1.0 Salient features of 400/220kV GIS Substation Equipment and Facilities

The design and specification of substation equipment are to be governed by the following factors:

2.0 Insulation Coordination

400kV System would be designed to limit the Switching overvoltage to 2.5 pu and is expected to decay to 1.5 p.u. in 5 to 6 cycles. Consistent with these values and protective levels provided by lightning arrestors, the following insulation levels are proposed to be adopted for 400 KV & 220kV systems:

Sl. No.	Particulars	400kV	220kV
a.	Impulse withstand voltage for - Transformer and reactors - for Other Equipment - for insulator strings	 1300kVp 1425 kVp 1550kVp	 950kVp 1050 kVp 1050 kVp
b.	Switching surge withstand voltage	1050 kVp	-NA-
c.	Minimum creepage distance - for insulator strings - for other equipment	 13020mm 13020mm	 7595 mm 7595 mm
d.	Max. fault current	63 kA	40 kA
e.	Duration of fault	1 Sec	1 Sec
f.	Corona extinction voltage	320kV rms	156kV rms

3.0 Switching Schemes

It is essential that the system should remain secured even under conditions of major equipment or bus-bar failure. Sub-stations being the main connection points have large influence on the security of the system as a whole. The selection of the bus switching scheme is governed by the various technical and other related factors. One & Half breaker bus scheme has been considered for 400kV side of the substation due to their merits in terms of reliability, security, operational flexibility and ease of maintenance of equipment.

Substation	Bus Scheme
400/220 kV (2×500 MVA) GIS Substation at Jewar	400 kV- Double Main Bus Scheme 220 kV- Double Main Bus Scheme

4.0 Substation Equipment and Facilities

The switchgear shall be designed and specified to withstand operating conditions and duty requirements. All equipments shall be designed considering the transmission line capacity.

Current rating for various feeders & bus bar are as follows

Sl. No	Description of bay	400 kV	220 kV
1	Bus Bar	4000A	3000A
2	Line bays	3150	1600A
3	ICT bays	3150	1600A
4	Bus Reactor bays	3150	NA
5	Bus coupler bays	NA	2500A

4.1 400/220KV GIS Substation equipment

GIS (Gas Insulated Switchgear) shall be indoor type and in accordance to IEC: 62271-203. The switchgear shall be designed and specified to withstand operating conditions and duty requirements. All the switchgear such as Circuit Breaker, isolator, earth switch including CT, PT etc. shall be GIS type. Surge Arrestors used for transformer/Reactor connections will be AIS or GIS type. 400kV scheme shall be designed in such a way that it shall be possible to use line reactors (if provided) as bus reactors, in case of outage of line, to control bus voltage. Local control cabinets (LCC) shall be provided as per requirement. The alarm & annunciation of GIS equipment shall be wired to SCADA System.

4.1.1 Circuit Breakers

GIS Circuit breakers shall in general be of C2-M2 class and comply to IEC- 62271-100. The rated break time shall not exceed 40 ms for 420KV breaker and 60 ms for 245kV breaker. 420 kV & 245 kV Circuit breakers shall be provided with single phase and three phase auto reclosing. The Circuit breakers controlling 400kV lines of more than 200km length shall also be provided with pre insertion closing resistor of about 400 ohms maximum with 9 ms minimum insertion time. 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 short line fault capacity shall be same as the rated capacity and this is proposed to be achieved without use of opening resistors. Control switching device shall be provided in Circuit breaker of switchable line reactor and in Main & Tie circuit breakers of Transformers, line with non-switchable line reactors and Bus reactors. Further, it shall be possible to use line reactors as bus reactors, in case of outage of line.

4.1.2 Isolators

The isolators shall comply to IEC 62271-102 in general. Isolators shall be motor (DC powered) operated. Earth switches are provided at various locations to facilitate maintenance. Main blades and earth blades shall be interlocked and interlock shall be fail safe type. All earth switches shall be motor operated type.

4.1.3 Current Transformers

Current Transformers shall comply with IEC 61869 in general. All ratios shall be obtained by secondary taps. Generally, Current Transformers (CT) shall have five cores (four for protection and one for metering) whereas; CT in Tie bays shall have six cores (four for protections & two for metering) suitably distributed on both sides of CB. 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.

4.1.4 Voltage Transformer

The voltage transformers shall conform to IEC- 61869 Voltage transformers shall be of the electromagnetic type with SF6 gas insulation. The earth end of the high voltage winding and the ends of the secondary winding shall be brought out in the terminal box. The voltage transformers shall be located as a separate bay module and will be connected phase to ground and shall be used for protection, metering and synchronization. The voltage transformers shall be of inductive type, nonresistant and shall be contained in their own- SF6 compartment, separated from other parts of installation. The voltage transformers shall be effectively shielded against high frequency electromagnetic transients. The voltage transformers shall have three secondary windings. The voltage transformer should be thermally and dielectrically safe when the secondary terminals are loaded with the guaranteed thermal burdens. The accuracy class for core –I & II for 400 kV shall be 0.5/3P and for 220 kV shall be 3P. The accuracy of 0.2 on secondary III should be maintained throughout the entire burden range up to 50VA on all the three windings without any adjustments during operation.

4.1.5 SF6 to Air Bushing

Outdoor bushings, for the connection of conventional external conductors to the SF6 metal enclosed switchgear, shall be provided. Bushings shall generally be in accordance with the requirements of IEC -60137. The creepage distance over the external surface of outdoor bushings shall not be less than 31 mm/kV considering polluted area. SF6 to air Bushing shall be of Polymer / composite type and shall be robust and designed for adequate cantilever strength to meet the requirement of seismic condition. The electrical and mechanical characteristics of bushings shall be in accordance with IEC: 60137. Polymer / composite insulator shall be seamless sheath of a silicone rubber compound. The housing & weather sheds should have silicon content of minimum 30% by weight. It should protect the bushing against environmental influences, external pollution and humidity. The hollow silicone

composite insulators shall comply with the requirements of the IEC publications IEC 61462 and the relevant parts of IEC 62217.

4.1.6 Capacitor Voltage Transformers

Capacitive Voltage transformers shall comply to IEC 61869-1 & 61869-5 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 and 220kV shall be of 4400/8800 pF depending on PLCC requirements.

4.1.7 Surge Arresters

Station class current limiting, heavy duty gapless type Surge arresters conforming to IEC 60099-4 in general shall be provided.

The rated voltage of Surge arrester and other characteristics are chosen in accordance with system requirements. Surge arresters shall be provided near line entrances, transformers so as to achieve proper insulation coordination. Surge arrester should be providing with porcelain / polymer housing.

4.1.8 Power Transformers

CODES AND STANDARDS

The latest revisions of the following Codes and Standards shall be applicable for the equipment/material covered in this Specification. In case of conflict, the manufacturer may propose equipment/material conforming to one group of Industry Codes and Standards quoted hereunder without jeopardizing the requirement of this specification:

IEC60044	Instruments transformers
IEC60076	Power transformers
IEC60137	Insulating bushing for alternating voltages above 1000 V
IEC60214	On-load tap-changers
IEC60273	Characteristics of indoor and outdoor post insulators for systems with nominal voltages greater than 1000V
IEC 60282-2	High-voltage fuses
IEC60289	Reactors
IEC60529	Degrees of protection provided by enclosures (IPCode)
IEC60815	Guide for the selection of insulators in respect of polluted conditions
IEC60947	Low-voltage switchgear and control gear

Design and Construction Requirements

Core

1. The core shall be assembled with oriented grain steel, cold rolled sheet, and treated with an insulating layer heat and oil resistant.
2. The core supports shall be designed to counter the effects of marine and overland transport under poor conditions. The air core reactance of the core shall be less than 20%.

Over Fluxing

The transformer shall withstand without injurious heating combined voltage and frequency fluctuations which produce the following overfluxing conditions and give desired performance:

- 105% for 10minutes
- 125% for 1minute
- 140% for 5seconds
- Bidder shall provide the overvoltage withstand time for 150% and 170% over fluxing

(a) Transformer shall conform to IEC 60076 in general. The transformer and all its accessories including bushing/ built in CTs etc shall be designed to withstand thermal and mechanical stresses caused by symmetrical or asymmetrical faults on any terminals. Mechanical strength of the transformer shall be such that it can withstand 3-phase and 1- phase through fault for transformer rated voltage applied to HV and / or IV terminals of transformer. The short circuit shall alternatively be considered to be applied to each of the HV, IV and tertiary (LV) transformer terminals. Tertiary is not considered to be connected to source.

Core shall be constructed from high grade, non-ageing cold rolled super grain oriented silicon steel laminations (HI-B or better grade). The maximum flux density in any part of the core and yoke at the rated MVA, voltage and frequency shall not exceed 1.9 Tesla at all tap positions during 10% continuous over voltage condition. Transformers shall withstand without damage and over-heating due to over fluxing conditions of 110 % for continuous, 125 % for 1 minute and 140 % for 5seconds.

All the windings shall be capable of withstanding the Dielectric, mechanical and thermal stresses which may be caused by switching, dead short circuit on its terminals. Transfer surge at tertiary shall not exceed 250kVp during impulse and switching impulse from HV & IV Terminals. The tertiary windings shall be suitable for connection of reactors or capacitors which would be subjected to frequent switching and shall be suitable for connection to LT

Transformer for auxiliary supply. The air core reactance of HV winding of transformer shall not be less than 20% for 400kV class Transformer. External or internal reactors shall not be used to achieve the specified HV/LV and IV/LV impedances.

Transformers shall be fitted with two cooler banks, each capable of dissipating 50 per cent of the loss at continuous maximum rating. Transformer shall be capable of operating at full load for 20 minutes in the event of failure of the oil circulating pump or blowers associated with one cooler bank and for at least ten (10) minutes in the event of total failure of power supply to cooling fans and oil pumps, without winding hot spot temperature exceeding 140 deg C. Transformer shall be designed so that tank hotspot shall not exceed 130 deg C, considering maximum ambient temperature of 50ºC.

The transformer shall be complete with all required accessories, Bushing CTs, Neutral CT (outdoor type), cooler control cabinet, individual and common marshalling box, RTCC etc as required for satisfactory operations of transformer. The transformer shall be provided with IEC 61850 compliant digital RTCC relay having automatic voltage regulating features to operate OLTC including parallel operation of transformers. Neutral of the transformer shall be solidly grounded.

HV and IV bushing shall be RIP (Resin Impregnated Paper)/RIS (Resin Impregnated Synthetic) with composite insulator type. LV bushing shall be OIP/RIP/RIS. 36kV Neutral bushing shall be solid porcelain or oil communicating type.

The major technical particulars / parameters of transformer are given below:

(A) 500MVA, 400/220/33kV, 3-Phase Auto transformer (applicable standard: IEC-60076)

Sl. No.	Description	Unit	Technical Parameters
1.	Rated Capacity: HV/IV/LV (Tertiary)	MVA	500/500/167 (Active loading of tertiary: 5 MVA)
2.	Voltage ratio (Line to Line)		400/220/33
3.	Frequency	Hz	50
4.	No. of Phase	Nos	3
5.	Vector Group (unless specified differently elsewhere)		YNa0d11
6.	Cooling		ONAN/ONAF/(OFAF or ODAF) OR ONAN/ONAF1/ONAF2
7.	Rating at different cooling above	%	60/80/100
8.	Type of Transformer		Constant Ohmic impedance type
9.	Impedance at 75 Deg C		

Sl. No.	Description	Unit	Technical Parameters
a)	HV – IV (with tolerance as per IEC)	%	At Max./ Principal/ Min. Voltage Tap: 10.3/12.5/15.4
b)	HV - LV	%	At Principal tap(minimum) : 60
c)	IV - LV	%	At Principal tap (minimum):
			45
10.	Losses		
a)	Maximum No-Load Loss at rated voltage and frequency	kW	90
b)	Maximum Load Loss at rated current and 75^0C	kW	500
c)	Maximum I^2R Loss at rated current and frequency and at 75^0C for HV and IV windings	kW	375
d)	Maximum Auxiliary Loss at rated voltage and frequency	kW	15
11.	Max. Temperature rise over 50 deg C ambient Temp	Deg. C	Top oil: 50 & Winding: 55
12.	Windings		
i)	Insulation Level (LI/SI/PF)		kVp/kVp/kVrms
	HV		1300/1050/570
	IV		950/-/395
	LV		250/-/95
	Neutral		95/-/38
ii)	Tan delta of winding	%	< 0.5
13.	Tap Changer & Tappings		OLTC with range ± 10% for HV variation in the step of 1.25%, 17 steps, on 220kV side of series winding
14.	Maximum Partial discharge (PD) level at 1.58*Ur/√3	pC	100
15.	Noise level at rated voltage and at principal tap at no load and all cooling active	dB	< 80
16.	Bushing		
i)	Rated voltage (HV/IV/LV/Neutral)	kV	420/245/52/36
ii)	Rated current(Min.) HV/IV/LV/Neutral	A	1250/2000/3150/2000
iii)	Insulation Level (LI/SI/PF)		kVp/ kVp/ kVrms
	HV		1425/ 1050/ 630

Sl. No.	Description	Unit	Technical Parameters
	IV		1050/ -/ 460
	LV		250/ -/ 95
	Neutral		170/ -/ 75
iv)	Tan delta of bushings HV/IV/LV	%	< 0.4
v)	Max. PD of bushings at level @ 1.5 pu	pC	100
17.	Insulating Oil		virgin high grade inhibited, conforming to IEC-60296

4.1.9 125 MVAR Bus Reactors

Reactor shall conform to IS:5553 and IEC 60076-6 in general.

The Technical Particulars / Parameters of Shunt Reactor are given below:

REACTOR (3-Phase)

(i)	Power	125 MVAR Bus Reactor
(ii)	Rated voltage	420 kV(1.0 p.u)
(iii)	System fault level	50 kA
(iv)	Connection	Star with neutral brought out
(v)	**Winding Insulation level**	
a)	Lightning impulse 1.2/50microseconds withstand voltage	1300 kV (peak)
b)	Switching surge withstand voltage	1050 kV (peak)
)`	One minute power frequency withstand voltage	NA
(vi)	Maximum admissible Temperature Rise over an ambient temp of 50 deg. C and at highest Voltage	
a)	Winding measured by resistance method	45 degree C
b)	Top oil measured by thermometer	40 degree C
(vii)	Cooling system	ONAN
(viii)	**Insulation level of Neutral**	
a)	Impulse withstand voltage	550 kV (peak)
b)	Power frequency voltage	230 kV (rms)
c)	Whether neutral is to be brought out	Yes (through 145kV class bushing)

(ix)	Ratio of zero sequence reactance to positive reactance (X0/X1)	Between 0.9 and 1.0 (The bidder must clearly specify the exact figure)
(x)	Range of constant impedance	Upto1.5p.u.voltage (The bidder shall furnish complete saturation characteristics of the reactor up-to 2.5 p.u. voltage).
(xi)	Tolerance on current	0 to +5%
(xii)	Harmonic content in phase	The crest value of the third harmonic current component in phase current not to exceed 3% of the crest value of fundamental, when reactor is energized at rated voltage with sinusoidal wave form.
(xiii)	Permissible current unbalance among different phases	±2%
(xiv)	Minimum clearance in air at rated voltage of 420 kV with terminal connector	
a)	Phase to Phase	4000mm
b)	Phase to ground	3500mm
(xv)	Noise level at rated voltage and frequency	80 db.
(xvi)	Vibration level at rated voltage and frequency	Not more than 200 microns peak. Average vibration shall not exceed 60 microns peak to peak Tank stresses shall not exceed 2.0 kg/mm² at any point on the tank

(xvii)

Bushings	Line side	Neutral side
a) Rated voltage	420 kV	145 kV
b)Creepage distance (total)	10500 mm	3625 mm

c)Mounting	Tank Cover	Tank Cover
d)Lightning impulse withstand voltage (kVp)	1425	650
e)Switching impulse withstand voltage (kVp	1175	-
f) Power frequency with stand voltage (kV) (rms)	630	275
g) Rated current (Amps)	800	800

4.1.10 Protection and Control

The protective relaying system proposed to be provided for transmission lines, auto-transformers, reactors and bus bars to minimize the damage to the equipments 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. All numerical relays shall have built in disturbance recording feature.

a) Transmission Line Protection

400 kV, 220 kV and 132 kV lines shall have MAIN-I numerical three zone distance protection scheme with carrier aided inter-tripping feature. 400 kV, 220 kV and 132 kV lines shall also have MAIN-II numerical distance protection scheme like Main-I but from different make that of MAIN-I. Line Current Differential as Main–I & Main-II may be considered, for short lines (line length below 30 km) having Fibre Optic communication link. 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.

All 400 kV lines shall also be provided with two stages over voltage protection. Further, all 400 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.

b) These shall have the following protections:

i) Numerical Differential protection
ii) Numerical Restricted earth fault protection
iii) Numerical Over-current and earth fault protection on HV & MV side
iv) Numerical Over fluxing protection on HV & MV side
v) Numerical Overload alarm

Besides these, power transformers shall also be provided with BUCHOLZ relay, protection against high oil and winding temperature and pressure relief device etc.

c) 420kV 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 Bucholz relay, protection against oil and winding temperatures & pressure relief device etc.

d) Numerical Bus Bar Protection

The high speed 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 400kV, 220kV and 132kV buses. Duplicated busbar protection is envisaged for 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 the provision for future expansion. For existing substations, the existing bus bar protection shall be augmented wherever required.

e) Numerical Local Breaker Back up Protection

This shall be provided for each 420 kV, 245 kV and 145 kV breakers and will be connected to de-energize the affected stuck breaker from both sides.

f) Substation Automation System

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 132kV and above. All bay control units as well as protection units are normally connected through an Optic fibre 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. SAS shall be equipped with the facility of remote operation and by providing remote HMI and suitable communication link, the substation can be controlled from a remote location. Necessary gateway & modems (as required) shall be provided to send data to RLDC/SLDC.
The functions of control, annunciation, disturbance recording, event logging and measurement of electrical parameters shall be integrated in Substation Automation System. The Automation System shall be provided with the facility of communication and control for remote end operation. In existing Substations where Substation automation is not provided, control functions shall be done through control panels.

g) Time Synchronization 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. This equipment shall be used to synchronize SAS & IEDs etc.

4.1.11 Control Concept

All the EHV breakers in substation/switching stations shall be controlled and

synchronized from the switchyard control room and remote control centre. Each breaker would have two sets of trip circuits which would be connected to separately fused DC supplies for greater reliability. All the isolators shall have control from remote/local whereas the earth switches shall have local control only.

4.1.12 PLCC

Power line carrier communication (PLCC) equipment complete for speech transmission line, tele-protection commands and data channels shall be provided on each 400 KV , 220 kV and 132 kV transmission line. The protections for transmission line and the line compensating equipment shall have hundred percent back up communication channels. The PLCC equipment shall in brief include the following:-

Coupling device, line traps, carrier terminals, protection couplers, HF cables, PABX and maintenance and testing instruments.

A telephone exchange (PABX) of 24 lines shall be provided at new substations as means of effective communication among various buildings of the substation, remote end substations and with control centres (RLDC/SLDC) etc.

Coupling devices shall be suitable for 4400pF 400kV , 220 kV and 132 kV CVT. Phase to phase coupling for 400 kV line , 220 kV and 132 kV single circuit line shall be provided. For D/c line Inter circuit coupling can be provided. The pass band of coupling devices shall have sufficient margin for adding communication channel in future if required. Necessary protection devices for the 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 the necessary protective devices such as lightning arresters for the protection of tuning device and shall be equipped with corona rings. 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 terminal & Protection coupler shall be considered at both ends of line.

Wherever Fiber Optic/OPGW based telecommunication terminal equipment (i.e. SDH/MUX) are being provided; the same shall be utilized for Data, Voice and line protection applications. For protection purposes, both end Digital Protection Couplers (DPCs) shall be included at both ends. However, for line protection application, back up communication channel/link may be considered as per requirement so as to take care of OPGW/Telecommunication equipment outage.

Addition /Modification /shifting/re-commissioning etc. as required of PLCC due to LILO of transmission lines shall be covered under the scope according to element wise detailed given below:-

Sr. No	Detail of element (line)	Coverage under the scope
1	LILO of one ckt. of 400 kV Gr. Noida (765 kV) – Sector-148 (400) Noida DC line at 400/220 kV GIS substation Jewar (GautamBudh Nagar) (for LILO, twin HTLS conductor and OPGW stringing work on Narrowbase multi circuit towers)	Addition/Modification/ shifting/re-commissioning of PLCC shall be covered under the scope.

PLCC equipment for the transmission lines at serial 01 covered under the package (Consisting of one set of analog PLCC channel along with circuit protection coupler and one set of Digital Protection Coupler for both ends of one line segment due to LILO of existing line) shall be provided by the bidder. All other associated equipment for ends cabling, coupling device and HF cable shall also be provided by the bidder. 48 V DC Power supply for PLCC panels shall be provided by the respective substation bay owner. The wave traps, CVT's required for communications from PLCC shall be provided by respective substation owner.

4.1.13 Substation Support Facilities

Certain facilities required for operation & maintenance of substations as de- scribed below shall be provided in new substation. In existing substation, these facilities have already been provided and would be extended/ augmented, wherever required.

4.1.14 AC & DC Power Supplies

For catering to the requirements of three phase & single phase AC supply and DC supply for various substation equipment, the following arrangement is envisaged:-

i) For LT Supply at each new Substation, two (2) nos. 630 kVA LT Transformers shall be provided out of which one shall be connected with SEB supply and other one shall be connected to tertiary of 400/220 kV transformer.

ii) SEB supply at 33kV level shall be connected to 630kVA LT transformer through 33kV AIS equipments i.e. LA, CT, PT, Isolators and breaker where as tertiary supply of 400/220kV transformer shall be connected to LT transformer through 72.5kV AIS equipments.

iii) 2 Nos. batteries of 220V for control & protection and 2 Nos. 48V batteries for PLCC/ Communication equipment shall be provided at each new Substation. Each battery bank would have a float-cum-boost charger. Battery shall be of VRLA type.

iv) Suitable AC & DC distribution boards and associated LT Switchgear would be provided at new Substations. For Substation Extensions, existing facilities shall be augmented as required. For new substations following switch boards with minimum rating as is specified here under shall be considered with duplicate supply

a) 415V Main switch board – 1no.

b) AC distribution board – 1no.

c) Main lighting distribution board –1no.

d) Emergency lighting distribution board –1no.

e) 220 volt DC distribution board –2nos.

f) 48 volt DC distribution board –2nos.

v) In new Substations, one No. 250 KVA DG set shall be provided for emergency applications Sizing of Auxiliary system (like battery, charger, LT switchgear) may be done considering future bay requirements to avoid replacement in future with higher sizes.

4.1.15 Fire Fighting System

Fire fighting system in general conforms to fire insurance regulations of India. The fire fighting system is proposed with both AC motor & diesel engine driven pumps housed in a fire fighting pump house building along with water storage tank of adequate capacity. Automatic heat actuated mulsifying system is proposed for transformers & reactors. In addition for alarm system based on heat/smoke detectors are proposed to be installed at sensitive points in a substation e.g. Cable Vault, Control Room building and other buildings etc. Further, adequate water hydrants and portable fire extinguishers shall be provided in the substations. At existing substations the fire fighting systems if already available, would be extended for meeting the additional requirements.

4.1.16 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 tanks of adequate capacities for storage of transformer oil would be provided.

4.1.17 Illumination

Adequate normal & emergency AC & DC illumination shall be provided in the control room, GIS hall & other buildings of the substation. The switchyard shall also be provided with adequate illumination. The entire control room building, fire fighting pump house lighting shall be done by LED based low power consumption luminaries

4.1.18 Control Room

Substation control room would be provided to house substation work station for station level control (SAS) along with its peripheral and recording equipments, AC & DC distribution boards, DC batteries & associated battery chargers, Fire Protection panels, Telecommunication panels & other panels as per requirements. Air conditioning will be provided in the building as functional requirements.

4.1.19 GIS Hall

The Gas Insulated Switchgear (GIS) of each voltage other associated equipment shall be housed separately and inside in the GIS buildings. The panels i.e. Bay level units, bay mimic, relay and protection panels, RTCC panels, PLCC panels etc. are to be placed in a separate room in the GIS building. The size of the room shall be such that all the panels for the future bays/ diameters shall be accommodated in the above room. The panel room shall be air-conditioned. Further, the temperature of the room shall be monitored through substation automation system by providing necessary temperature transducers.

One EOT Crane each for GIS hall of suitable capacity shall be provided for erection & maintenance of largest GIS component/assembly and all plant installed in the GIS switchgear room. The crane shall capable of fulfilling all special requirements for erection & maintenance of GIS equipment The capacity of the crane shall be sized to lift the heaviest GIS switchgear component.

SPECIFIC TECHNICAL REQUIREMENT FOR 400 KV and 220 KV COMMUNICATION

In order to meet the requirement for grid management and operation of substations, Transmission Service Provider (TSP) shall conform to the following requirements.

On 400 kV D/C transmission lines one earth wire and one OPGW containing 24 fibers is to be installed by the TSP in place of conventional earth wire during the construction of line for grid management and substation operation purpose by STU/CTU and 48 fibers to be installed on LILO lines. The installation of OPGW shall be done from gantry of one substation up to gantry of another substation and shall be terminated in a joint box by the TSP at both ends.

On 220 kV and 132 kV D/C lines one OPGW containing 24 fibers is to be installed in place of conventional earth wire for grid management and substation operation purpose by STU/CTU and 48 fibers to be installed on LILO lines.

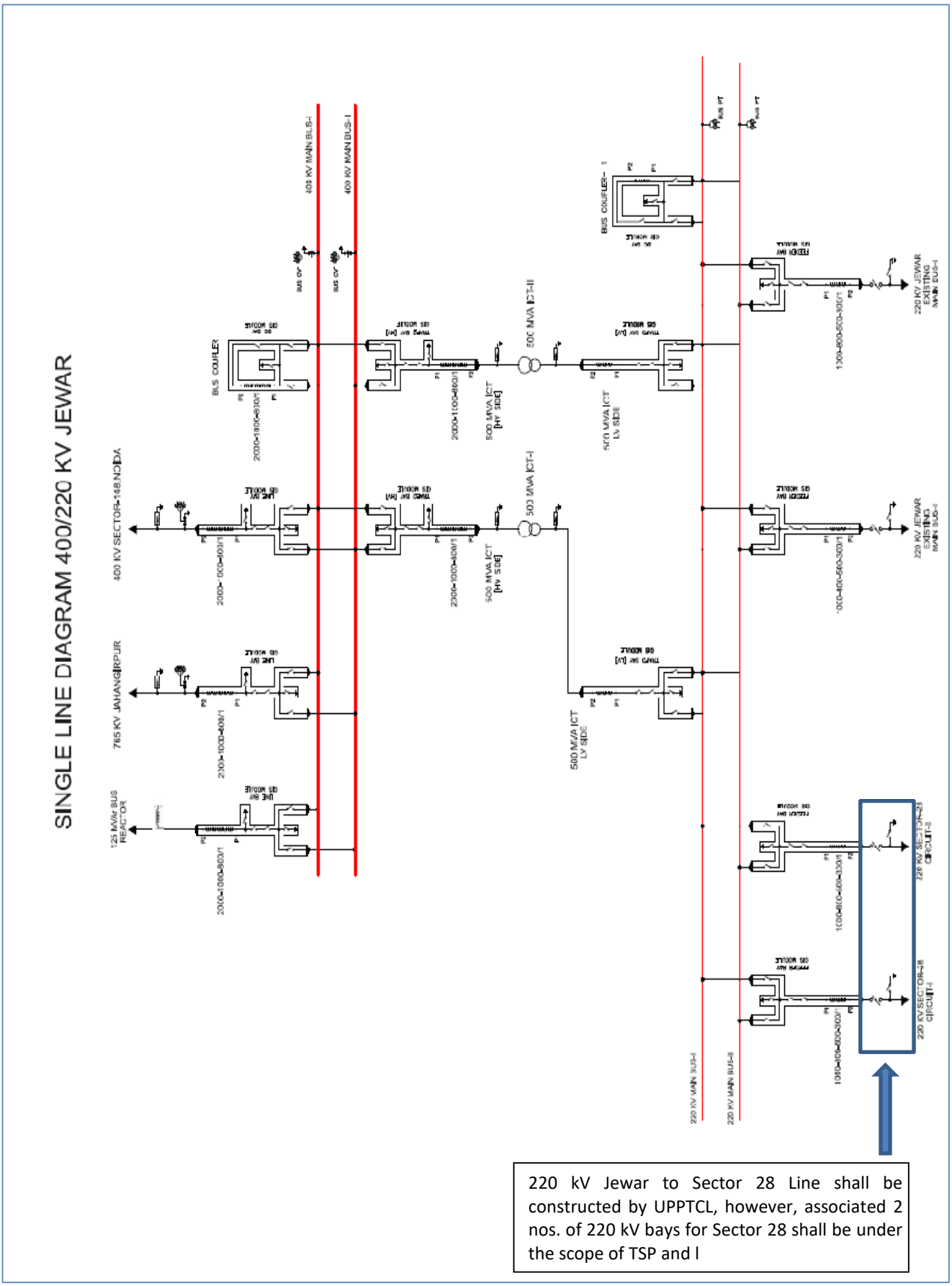
400 kV & 220 kV System Parameters

Sr. No	Description of parameters	400 kV System	220 kV System
1.	System operating voltage	400 kV	220 kV
2.	Maximum operating voltage of the system	420 kV	245 kV
3.	Rated frequency	50 HZ	50 HZ
4.	No. of phase	3	3
5.	Rated Insulation levels		
	i. Full wave impulse withstand voltage (1.2/50 micro sec.)	1550 kVp	1050 kVp
	ii. Switching impulse withstand voltage (250/2500 micro sec.) dry and wet	1050 kVp	-
	iii. One minute power frequency dry withstand voltage (rms)	630 kV	-
	iv. One minute power frequency dryand wet withstand voltage (rms)	-	460 kV
6.	Corona extinction voltage	320 kV	156 kV
7.	Max. radio interference voltage for frequency between 0.5 MHz and 2 MHz at 508 kV rms for 765 kV system, 266kV rms for 400kV system and156kV rms for 220 kV system	1000 micro-volts	1000 micro-volts

8.	Minimum Creepage distage (25mm/kV)	10500 mm	6125 mm
9.	Min. Clearances		
	i. Phase to phase	4000mm	
		(for conductor-conductor configuration) 4200 mm (for rod- conductor configuration)	2100 mm
	ii. Phase to earth	3500 mm	2100mm
	iii. Sectional clearances	6500mm	5000mm
10.	Rated short circuit current for 1 sec. duration	40kA/50kA /63kA(as applicable)	40kA/50kA (as applicable)
11.	System neutral earthing	Effectively earthed	Effectively earthed
12.	DC Voltage	220V	110V

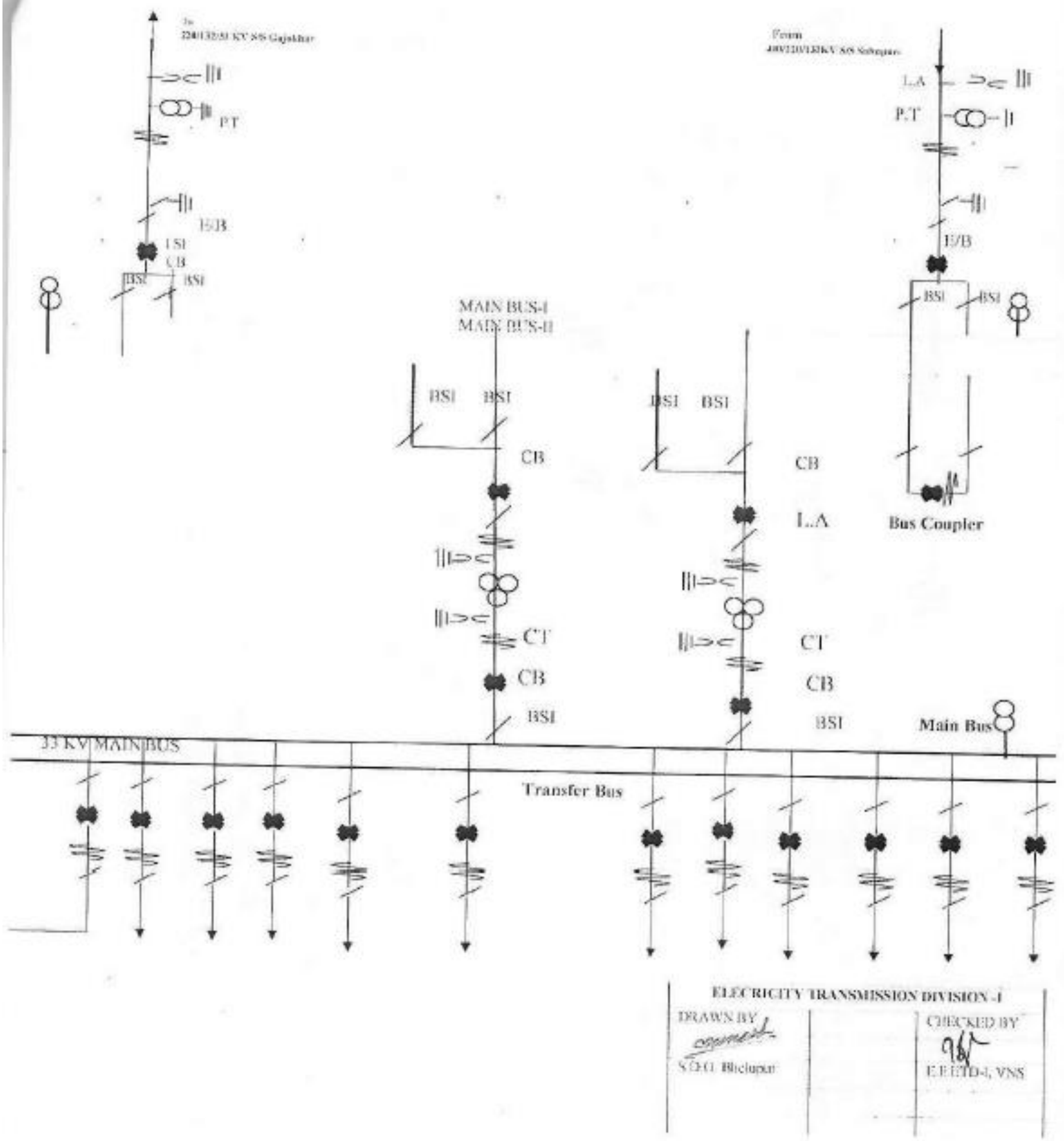
Note:

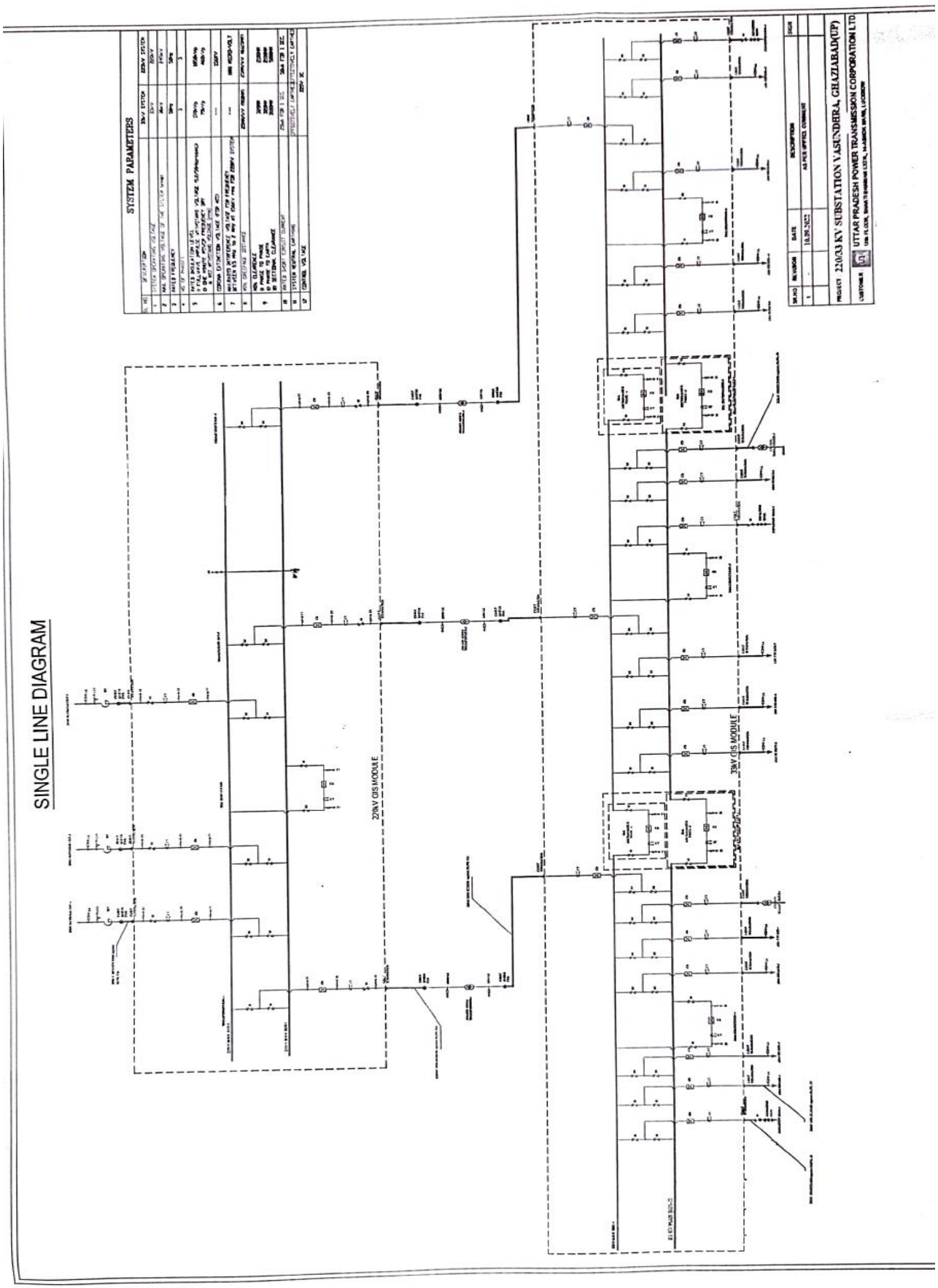
1. The above parameters are applicable for installations up to an altitude of 1000m above mean sea level. For altitude exceeding 1000m, necessary altitude correction factor shall be applicable.
2. The insulation and RIV levels of the equipments shall be as per values given in the respective chapter of the equipments.

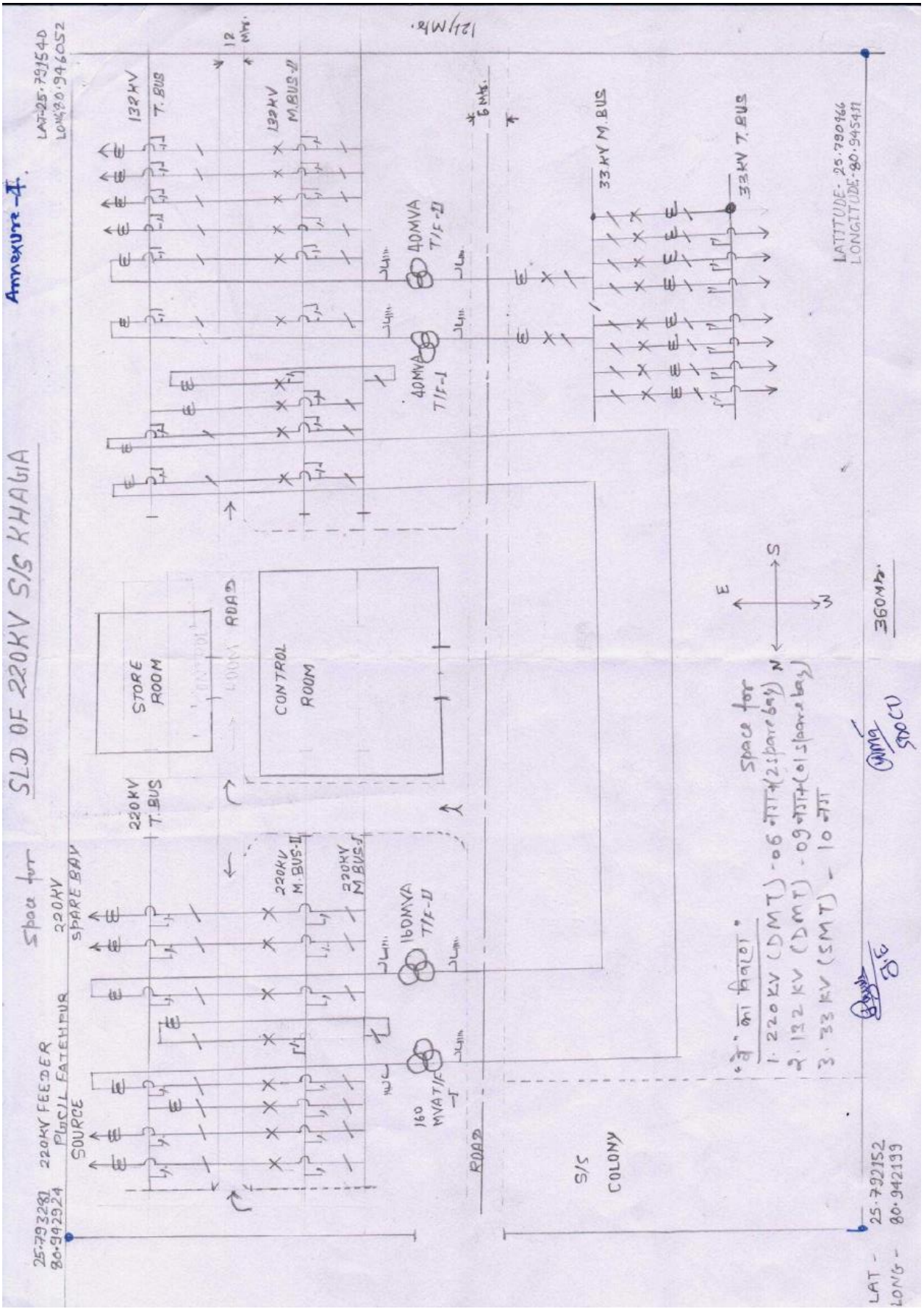


220 kV Jewar to Sector 28 Line shall be constructed by UPPTCL, however, associated 2 nos. of 220 kV bays for Sector 28 shall be under the scope of TSP and I

SINGLE LINE DIAGRAM FOR CONSTRUCTION OF 220/33 KV, 2 x 60MVA GIS SUB STATION CANTT CHAUKAGHAT WITH DOUBLE MAIN SCHEME




SINGLE LINE DIAGRAM
SYSTEM PARAMETERS
220KV GIS MODULE
33KV GIS MODULE
PROJECT 220/33 KV SUBSTATION VASUNDHRA, GHAZIABAD(UP)
UTTAR PRADESH POWER TRANSMISSION CORPORATION LTD.


Annexure -I
SLD OF 220KV S/S KHAGIA
LAT-25.791540
LONG-86.946052
132KV T.BUS
132KV M.BUS-II
12 MVA
40MVA T/F-II
40MVA T/F-I
6 MVA
33 KV M.BUS
33KV T.BUS
LATITUDE- 25.790166
LONGITUDE-86.945411
STORE ROOM
CONTROL ROOM
ROAD
220KV T.BUS
220KV M.BUS-II
220KV M.BUS-I
160 MVA T/F-I
160MVA T/F-II
Space for 220KV SPARE BAY
220KV FEEDER PUSCIL FATEHPUR SOURCE
25-79 3281
86-94 2924
S/S COLONY
Space for
1. 220 KV (DMT) - 06 नग (2 spare bay)
2. 132 KV (DMT) - 09 नग (01 spare bay)
3. 33 KV (SMT) - 10 नग
360 Mtr.
LAT - 25.792152
LONG - 86.942199