

NOTICE INVITING TENDER (NIT)
FOR
RATE CONTRACT FOR SUPPLY, INSTALLATION,
TESTING & COMMISSIONING
OF
11KV SMART PACKAGED SUBSTATION WITH
1000KVA DRY TYPE TRANSFORMER (PSS Type – 9)

NIT NO: CMC/BY/22-23/RS/SV/23

Due Date for Submission: 18.07.2022, 14:00 HRS

BSES YAMUNA POWER LIMITED (BYPL)
CONTRACTS & MATERIALS DEPT.,
SHAKTI KIRAN BUILDING, KARKARDOOMA,
DELHI-110032
CIN: U40109DL2001PLC111525
WEBSITE: www.bsesdelhi.com

This document is a property of BYPL. This document is meant for the exclusive purpose of bidding against this NIT Number /Specification and shall not be transferred, reproduced, or otherwise used for purposes other than that for which it is specifically issued.

INDEX

S NO	DOCUMENT DESCRIPTION	PAGE NO
VOLUME – I		
1	INFORMATION TO BIDDER (ITB)	1 To 16
1.0	APPENDIX I	1 To 9
1.1	FORMAT FOR EMD BANK GUARANTEE	
1.2	BID FORM	
1.3	ACCEPTANCE FORM FOR PARTICIPATION IN REVERSE AUCTION EVENT	
1.4	SCHEDULE OF CLARIFICATIONS/DEVIATIONS	
1.5	TECHNICAL BID SUBMISSION CHECK LIST	
1.6	VENDOR CODE OF CONDUCT	
2	GENERAL CONDITION OF CONTRACT-SUPPLY	1 To 28
2.0	APPENDIX II	1 To 7
2.1	FORMAT FOR PERFORMANCE BANK GUARANTEE	
2.2	BENEFICIARY'S BANK DETAIL WITH IFSC CODE	
2.3	FORMAT OF WARRANTY/GUARANTEE CERTIFICATE	
2.4	SUMMARY OF COMMERCIAL TERMS AND CONDITIONS	
VOLUME – II - PRICE BID FORMAT		1 To 3
VOLUME – III – TECHNICAL SPECIFICATIONS		1 To 77

VOLUME – I: INFORMATION TO BIDDER (ITB)

SECTION – I: REQUEST FOR QUOTATION

1.00 EVENT INFORMATION

- 1.01 BSES Yamuna Power Ltd (hereinafter referred to as "**BYPL**") invites sealed tenders in 2 envelopes for establishing Rate Contract from reputed manufacturers valid for a period of one year.

Sl. No.	Item Description	Estimated Cost (₹)	Cost of EMD (₹)	Delivery at
1	RATE CONTRACT FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF 11KV SMART PACKAGED SUBSTATION WITH 1000KVA DRY TYPE TRANSFORMER (PSS Type – 9)	1.91 Crore	3.82 Lakh	Delhi Stores

The bidder must qualify the requirements as specified in clause 2.0 stated below.

All envelopes shall be duly super scribed "**BID FOR RATE CONTRACT FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF 11KV SMART PACKAGED SUBSTATION WITH 1000KVA DRY TYPE TRANSFORMER (PSS Type – 9)**" "NIT NO: CMC/BY/22-23/RS/SV/23 DUE ON 18.07.2022, 14:00 Hr."

Bid shall be submitted in two (02) parts. Details of part are as follow:

Part A – Techno Commercial Bid

Part B – Price Bid

- 1.1. The schedule of specifications with detail terms & conditions can be obtained from address given below against submission of non-refundable demand draft of ₹ 1,180/- drawn in favour of BSES Yamuna Power Ltd, payable at Delhi or Online transfer of requisite amount through IMPS/ NEFT/ RTGS. The tender documents & detail terms and conditions can also be downloaded from the website www.bsesdelhi.com --> **BSES YAMUNA POWER LTD --> Tender --> Open Tenders** In case tender papers are downloaded from the above website, then the bidder has to enclose a demand draft covering the cost of bid documents.
- 1.2. Bids will be received up to **18.07.2022, 14:00 Hr.** at the address given below.
Part A of the Bid shall be opened on **18.07.2022, 17:00 Hr.**

Part B of the Bid will be opened in case of Techno-Commercially Qualified Bidders and the date of opening of same shall be intimated in due course. It is the sole responsibility of the bidder to ensure that the bid documents reach this office on or before the last date.

**Head of Department
Contracts & Materials Deptt.
BSES Yamuna Power Ltd
Reception, Ground Floor
Shaktikiran Building, Karkardooma
Delhi 110032**

- 1.3 BSES Yamuna Power Ltd reserves the right to accept/reject any or all tenders without assigning any reason thereof in the event of following:
- a) Tender is received after due date and time.

- b) Tender fee of requisite value is not submitted.
- c) Earnest Money Deposit (EMD) of requisite value & validity is not submitted in shape of Bank Guarantee drawn in favor of BSES Yamuna Power Ltd, payable at Delhi or Online transfer of requisite amount through NEFT/RTGS.
- d) Price Bid as per the Price Schedule mentioned in Annexure-I.
- e) Incomplete Bids.
- f) Necessary documents against compliance to Qualification Requirements mentioned at Section 1 Clause 2.0 of this Tender Document.
- g) Complete Technical details are not enclosed as per the Technical Bid Submission Checklist.
- h) Filled in Schedule of Deviations as per Annexure.

2.00 QUALIFICATION CRITERIA

The prospective bidder must qualify all of the following requirements and shall be eligible to participate in the bidding who meets following requirements and management has a right to disqualify those bidders who do not meet these requirements.

2.01 Technical Criteria:

SI No.	Criteria	Documents to be submitted by bidder
1	The bidder should have own manufacturing/Assembly base facility in India for PSS of similar rating or higher since last 3 years.	manufacturing and factory incorporation certificate / Undertaking The details of manufacturing units, locations and works from where supply against this tender shall be proposed to be furnished.
2	The bidder should be the OEM and should be manufacturer of at least one major equipment out of two i.e., 11KV RMU and Transformer and offer the same.	Confirmation on the offered equipment's
3	The Bidder should have supplied at least 50 Nos of PSS of 990/1000KVA (Dry/Oil DT) rating or higher in last 5 years from the date of bid opening to any utilities/ SEB's/ PSU's/ reputed company wherein the end user shall be utilities/ SEB's/ PSU's.	i. Summary list of executed Purchase orders ii. Purchase order copies iii Material delivery clearance certificate copy or Delivery completion certificates or Invoice Copies
4	Performance certificate for minimum 2 year satisfactory performance for PSS of 990/1000KVA (Dry/Oil DT) or higher rating supplied in last 5 years from the date of bid opening from at least two utilities/ SEB's/ PSU's/ reputed company wherein the end user shall be utilities/ SEB's/ PSU's. In case of bidder has a previous association with BRPL/BYPL for similar product and service, the performance feedback for that bidder by BRPL/BYPL	Performance certificates

	shall only be considered irrespective of performance certificate issued by any third organization.	
5	The bidder should have servicing , repairing, testing & refurbishment facility in INDIA with necessary spares and testing equipments for providing prompt after sales service for Dry Distribution Transformer.	Relevant Details/certificates/Undertaking (Details of the set-up available shall be brought out in the offer. the bidder shall also submit undertaking along with the bid confirming the infrastructure details submitted)
6	The bidder should have plant installed capacity to supply minimum 8 nos of PSS per month.	Installed Capacity Certificate
7	The Bidder must possess valid ISO 9001:2015 certification.	Valid copy of Certification

2.02 Commercial Criteria:

SI No.	Criteria	Documents to be submitted by bidder
1	Bidder should have Average Annual Sales Turnover of Rs 500 Crores or more in last three (3) Financial Years (i.e., FY 2018-19, 2019-20 & 2020-21).	Balance Sheet and Duly certified CA certificate to be submitted
2	The Bidder shall submit an undertaking that "No Litigation" is pending with the BYPL or its Group/Associates Companies.	Undertaking
3	An undertaking (self-certificate) that the bidder has not been blacklisted/debarred by any central/state government institution/Electricity utilities.	Undertaking
4	The bidder must have valid PAN No., GST Registration Number, in addition to other statutory compliances. The bidder must submit the copy of registrations and submit an undertaking that the bidder shall comply all the statutory compliances as per the laws/rules etc. before the start of the supply/work.	Relevant Statutory Documents Copy/ Undertaking

Notwithstanding anything stated above, BYPL reserves the right to assess bidder's capability to perform the contract, assess the capability and installed capacity of the Bidder for carrying out the supplies, should the circumstances warrant such assessment in the overall interest of the purchaser. In this regard the decision of the purchaser is final.

3.00 BIDDING AND AWARD PROCESS

Bidders are requested to submit their offer strictly in line with this tender document. Normally, the deviations to tender terms are not admissible and the bids with deviation are liable for rejection. Hence, the bidders are advised to refrain from taking any deviations on this Tender. Still in case of any deviations, all such deviations shall be set out by the Bidders, clause by clause in the 'Annexure - Schedule of Deviations' and same shall be submitted as a part of the Technical Bid.

3.01 BID SUBMISSION

Please mention our NIT Number: - on the Tender and drop the same in our Tender Box placed at:

INFORMATION TO BIDDER (ITB) NIT NO: CMC/BY/22-23/RS/SV/23	Page 4 of 16	Bidders seal & Signature
--	--------------	--------------------------

BSES Yamuna Power Ltd, Reception, Ground Floor, Shaktikiran Building, Karkardooma, Delhi 110032

The bids and the outer envelope shall be addressed to:

Head of Department

Contracts & Materials Deptt.

BSES Yamuna Power Ltd, Shaktikiran Building, Karkardooma, Delhi 110032

Kindly Note:

- Bidder will inform BYPL through email immediately after the submission or before the due date & time of submission to TPC & Buyer:
 1. Mr Rakesh Sharma, E-mail: Rakesh.Ku.Sharma@relianceada.com
 2. Mr Sumit Verma, E-mail: sumit.ra.verma@relianceada.com
- Tender documents shall be submitted at main gate in tender box.
- Authorized person of TPC will collect the documents from tender box at scheduled time of tender submission and verify the bid documents with mails received. A confirmation of receipt shall be sent to bidder through mail by TPC on the same day.
- Bidder has to ensure that tender copy is dropped in correct box designated for tender submission only.
- BYPL shall not be responsible for any wrong placement of tender document by bidder.

PART A :: TECHNICAL **BID** comprising of following:

Sr. No	Descriptions	Type of Documents
Commercial :		
1	Tender Fee - Demand Draft (Rs.1180/-) (Incl GST)	Non-refundable demand draft for Rs 1180/- in case the forms are downloaded from website
2	EMD	In prescribed stamp paper & format
3	Power-of-Attorney	In prescribed stamp paper & format
4	PQR Compliances	Documentary evidence in support of qualifying criteria like: <ol style="list-style-type: none">1. Details of constitution of the company (Proprietary/Limited/etc along with the details), Memorandum of Association of the company2. Bidders shall submit the certified annual Balance sheets for the last completed three (3) financial years3. Supportive document on Positive Net worth. Credit rating/solvency certificate from competent authority.4. Copies of Orders, Execution /Performance Certificate & Other Documents to support qualification Criteria
5	Signed Tender document	Original Tender documents duly stamped & signed on each page as token of acceptance
6	Black listing undertaking	Bidder should submit a Self-undertaking signed by its Authorized Signatories that the Bidder or any of their sub-contractor has not been blacklisted/barred by any Govt. Organization or Regulatory Agencies in India or abroad.

INFORMATION TO BIDDER (ITB)
NIT NO: CMC/BY/22-23/RS/SV/23

Page **5** of **16**

Bidders seal & Signature

S. No.	Events	Due date & Time
		bidders through our website / e-mail

Note :- In the event of last date specified for submission of bids and date of opening of bids is declared as a closed holiday for BSES office, the last date of submission of bids and date of opening of bids will be the following working day at appointed times.

This is a two part bid process. Bidders are to submit the bids in 2(Two) parts

Both these parts should be furnished in separate sealed covers super scribing NIT no. DUE DATE OF SUBMISSION, with particulars as **PART-A TECHNICAL BID & COMMERCIAL TERMS & CONDITIONS** and **Part-B FINANCIAL BID** and these sealed envelopes should again be placed in another sealed cover which shall be submitted before the due date & time specified.

Part – A:: Technical Bid should not contain any cost information whatsoever and shall be submitted within the due date.

PART B:: This envelope will be opened internally after techno-commercial evaluation and only of the qualified bidders.

Bidder has to submit the item wise price bifurcation in bid. Un priced copy must be attached with the Part A (Technical Bid). Reverse Auction will be carried out on individual item wise rates.

REVERSE AUCTION CLAUSE :: Purchaser reserves the right to use reverse auction as optional tool through SAP – SRM as an integral part of the entire tendering process. All techno-commercially qualified bidders shall participate in reverse auction.

Notwithstanding anything stated above, the Purchaser reserves the right to assess bidder's capability to perform the contract, should the circumstances warrant such assessment in the overall interest of the purchaser. In this regard the decision of the purchaser is final. Bidder to submit their acceptance as per format attached ANNEXURE-C

BIDS RECEIVED AFTER DUE DATE AND TIME MAY BE LIABLE TO REJECTION

4.00 AWARD DECISION

- 4.01 Purchaser intends to award the business on a lowest bid basis, so suppliers are encouraged to submit the bid competitively. The decision to place purchase order/LOI solely depends on purchaser on the cost competitiveness across multiple lots, quality, delivery and bidder's capacity, in addition to other factors that Purchaser may deem relevant.
- 4.02 In the event of your bid being selected by purchaser (and / or its affiliates) and you subsequent DEFAULT on your bid; you will be required to pay purchaser (and / or its affiliates) an amount equal to the difference in your bid and the next lowest bid on the quantity declared in NIT/RFQ.
- 4.03 In case any supplier is found unsatisfactory during the delivery process, the award may be cancelled and BYPL reserves the right to award other suppliers who are found fit.
- 4.05 Rate Contract: The rate contract shall have a validity period of 12 months from the date of LOI/PO issued to the responsive, techno-commercially acceptable and evaluated to be the lowest bidder. Purchase Order (PO) shall be placed as per the requirement of BYPL.

- 4.06 Quantity Variation: The purchaser reserves the rights to vary the quantity by (\pm) 30% of the tender quantity during the execution of the rate contract.
- 4.07 Quantity Splitting: The purchaser reserves the right to distribute the procurable quantity on one or more than one of the eligible tenders. If the quantity is to be split, quantity distribution shall be in the manner detailed below:
- If the quantity is to be split among 2 bidders, it will be done in the ratio of 70:30 on L1 price.
 - If the quantity is to be split among 3 bidders, it will be done in the ratio of 50:30:20 on L1 price.
- Note: In case quantity needs to be distributed and order splitting is required, distribution of quantity shall be maximum among three (3) bidders

5.00 MARKET INTEGRITY

We have a fair and competitive marketplace. The rules for bidders are outlined in the Terms & Conditions. Bidders must agree to these rules prior to participating. In addition to other remedies available, we reserve the right to exclude a bidder from participating in future markets due to the bidder's violation of any of the rules or obligations contained in the Terms & Condition. Bidders who violate the marketplace rules or engage in behavior that disrupts the fair execution of the marketplace restricts a bidder to length of time, depending upon the seriousness of the violation. Examples of violations include, but are not limited to:

- Failure to honor prices submitted to the marketplace.
- Breach of the terms of the published in Request for Quotation/NIT.

6.00 SUPPLIER CONFIDENTIALITY

All information contained in this RFQ is confidential and shall not be disclosed, published or advertised in any manner without written authorization from BYPL. This includes all bidding information submitted.

All RFQ documents remain the property of BYPL and all suppliers are required to return these documents to BYPL upon request.

Suppliers who do not honor these confidentiality provisions will be excluded from participating in future bidding events.

7.00 CONTACT INFORMATION

Technical clarification, if any, as regards this RFQ shall be sought in writing and sent by e-mail/post/courier to following addresses. The same shall not be communicated through phone

Address	Name/ Designation	E-mail Address
Technical		
CES Dept. 3 rd Floor, B-Block, BSES Yamuna Power Ltd Shaktikiran Building, Karkardooma, Delhi 110032	Jeena Borana DGM (CES)	jeena.borana@relianceada.com
	Srinivas Gopu GM (CES)	srinivas.gopu@relianceada.com
	Gaurav Sharma AVP (HOD-CES)	gaurav.a.sharma@relianceada.com
Commercial		
C&M Dept. 3 rd Floor, A-Block, BSES Yamuna	Sumit Verma GM (C&M)	sumit.ra.verma@relianceada.com

Power Ltd Shaktikiran Building, Karkardooma, Delhi 110032	Santosh Singh Addl. VP (Head-Procurement)	santosh.kum.singh@relianceada.com
	Robin Sebastian VP (HOD-C&M)	robin.sebastian@relianceada.com

SECTION – II: INSTRUCTION TO BIDDERS

A. GENERAL

- 1.00 BSES Yamuna Power Ltd, hereinafter referred to as "The Purchaser" are desirous of implementing the various Systems Improvement/Repair & Maintenance works at their respective licensed area in Delhi The Purchaser has now floated this tender for procurement of material notified earlier in this bid document.

2.00 SCOPE OF WORK

The scope shall include Design, Manufacture, testing at works conforming to the Technical Specifications/IS along with Packing, Forwarding, Transportation and Unloading and proper stacking at Purchaser's stores/site.

3.0 DISCLAIMER

- 3.01 This Document includes statements, which reflect various assumptions, which may or may not be correct. Each Bidder/Bidding Consortium should conduct its own estimation and analysis and should check the accuracy, reliability and completeness of the information in this Document and obtain independent advice from appropriate sources in their own interest.
- 3.02 Neither Purchaser nor its employees will have any liability whatsoever to any Bidder or any other person under the law or contract, the principles of restitution or unjust enrichment or otherwise for any loss, expense or damage whatsoever which may arise from or be incurred or suffered in connection with anything contained in this Document, any matter deemed to form part of this Document, provision of Services and any other information supplied by or on behalf of Purchaser or its employees, or otherwise arising in any way from the selection process for the Supply.
- 3.03 Though adequate care has been taken while issuing the Bid document, the Bidder should satisfy itself that Documents are complete in all respects. Intimation of any discrepancy shall be given to this office immediately.
- 3.04 This Document and the information contained herein are Strictly Confidential and are for the use of only the person(s) 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).

4 COST OF BIDDING

The Bidder shall bear all cost associated with the preparation and submission of its Bid and Purchaser will in no case be responsible or liable for those costs.

B. BIDDING DOCUMENTS

- 5.01 The Scope of Work, Bidding Procedures and Contract Terms are described in the Bidding Documents. In addition to the covering letter accompanying Bidding Documents, the Bidding Documents include:

INFORMATION TO BIDDER (ITB) NIT NO: CMC/BY/22-23/RS/SV/23	Page 9 of 16	Bidders seal & Signature
--	----------------------------	--------------------------

- (a) Request for Quotation (RFQ)
- (b) Instructions to Bidders
- (c) General Terms & Conditions of Contract (T&C)
- (d) Delivery schedule
- (e) Price Formats & Summary T&C
- (f) Bid Form
- (g) Acceptance Format – RA
- (h) EMD BG Format
- (i) Vendor code of conduct
- (j) Appendix
- (k) Technical Specifications (TS)

5.02 The Bidder is expected to examine the Bidding Documents, including all Instructions, Forms, Terms and Specifications. Failure to furnish all information required by the Bidding Documents or submission of a Bid not substantially responsive to the Bidding Documents in every respect will may result in the rejection of the Bid.

6.0 **AMENDMENT OF BIDDING DOCUMENTS**

6.01 At any time prior to the deadline for submission of Bids, the Purchaser may for any reasons, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Documents by Amendment.

6.02 The Amendment shall be part of the Bidding Documents, pursuant to Clause 5.01, and it will be notified in web site www.bsedelhi.com and the same will be binding on them.

6.03 In order to afford prospective Bidders reasonable time in which to take the Amendment into account in preparing their Bids, the Purchaser may, at its discretion, extend the deadline for the submission of Bids. The same shall be published as a corrigendum in website www.bsedelhi.com

6.04 Purchaser shall reserve the rights to following:

- a) extend due date of submission,
- b) modify tender document in part/whole,
- c) cancel the entire tender

6.05 **Bidders are requested to visit website regularly for any modification/clarification/corrigendum/addendum of the bid documents.**

C. **PREPARATION OF BIDS**

7.0 **LANGUAGE OF BID**

The Bid prepared by the Bidder, and all correspondence and documents relating to the Bid exchanged by the Bidder and the Purchaser, shall be written in the English Language. Any printed literature furnished by the Bidder may be written in another Language, provided that this literature is accompanied by an English translation, in which case, for purposes of interpretation of the Bid, the English translation shall govern.

8.0 **DOCUMENTS COMPRISING THE BID**

The Bid prepared and submitted by the Bidder shall comprise the following components:

- (a) Bid Form, Price & other Schedules (STRICTLY AS PER FORMAT) and Technical Data Sheets

completed in accordance with Technical Specification.

- (b) All the Bids must be accompanied with the required EMD as mentioned in the Section-I against each tender.
- (c) Tender documents duly stamped and signed on each page by authorized signatory.

9.0 **BID FORM**

- 9.01 The Bidder shall submit Bid Form and the appropriate Price Schedules and Technical Data Sheets duly filled in as per attached specification enclosed with the Bidding Documents.

9.02 **EMD**

Pursuant to Clause 8.0(b) above, the bidder shall furnish, as part of its bid, a EMD amounting to as specified in the Section-I. The EMD is required to protect the Purchaser against the risk of Bidder's conduct which would warrant forfeiture.

The EMD shall be denominated in any of the following form:

- (a) Bank Guarantee drawn in favour of BSES Yamuna Power Ltd, payable at Delhi.
- (b) EMD shall be valid for One Hundred Twenty (120) days after due date of submission drawn in favour of BSES Yamuna Power Ltd

The EMD may be forfeited in case of:

- (a) the Bidder withdraws its bid during the period of specified bid validity
- or
- (b) the case of a successful Bidder, if the Bidder does not
 - (i) Accept the Purchase Order, or
 - (ii) Furnish the required performance security BG.

10.0 **BID PRICES**

- 10.01 Bidders shall quote for the entire Scope of Supply with a break-up of prices for individual items. The total Bid Price shall also cover all the Supplier's obligations mentioned in or reasonably to be inferred from the Bidding Documents in respect of Design, Supply, Transportation to site, all in accordance with the requirement of Bidding Documents the Bidder shall complete the appropriate Price Schedules included herein, stating the Unit Price for each item & total Price.
- 10.02 The prices offered shall be inclusive of all costs as well as Duties, Taxes and Levies paid or payable during execution of the supply work, breakup of price constituents, should be there.

Prices quoted by the Bidder shall be "**Firm**" and not subject to any price adjustment during the performance of the Contract. **A Bid submitted with an adjustable price/ Price Variation Clause will be treated as non -responsive and rejected.**

11.0 **BID CURRENCIES**

- 11.01 Prices shall be quoted in Indian Rupees Only.

12.0 PERIOD OF VALIDITY OF BIDS

- 12.01 Bids shall remain valid for 120 days from the due date of submission of the Bid.
- 12.02 Notwithstanding Clause 12.01 above, the Purchaser may solicit the Bidder's consent to an extension of the Period of Bid Validity. The request and the responses thereto shall be made in writing and sent by post/courier

13.0 ALTERNATIVE BIDS

- 13.01 Bidders shall submit Bids, which comply with the Bidding Documents. Alternative Bids will not be considered. The attention of Bidders is drawn to the provisions regarding the rejection of Bids in the terms and conditions, which are not substantially responsive to the requirements of the Bidding Documents.

14.0 FORMAT AND SIGNING OF BID

- 14.01 The original Bid Form and accompanying documents (as specified in Clause 5.0), clearly marked "Original Bid" plus Duplicate Soft copy in USB flash drive must be received by the Purchaser at the date, time and place specified pursuant to Clauses 15.0 and 16.0. In the event of any discrepancy between the original and the copies, the original shall govern.
- 14.02 The original and copy of the Bid shall be typed or written in indelible ink and shall be signed by the Bidder or a person or persons duly authorized to sign on behalf of the Bidder. Such authorization shall be indicated by written Power-of-Authority accompanying the Bid. The Bid submitted on behalf of companies registered with the Indian Companies Act, for the time being in force, shall be signed by persons duly authorized to submit the Bid on behalf of the Company and shall be accompanied by certified true copies of the resolutions, extracts of Articles of Association, special or general Power of Attorney etc. to show clearly the title, authority and designation of persons signing the Bid on behalf of the Company. Satisfactory evidence of authority of the person signing on behalf of the Bidder shall be furnished with the bid. A bid by a person who affixes to his signature the word 'President', 'Managing Director', 'Secretary', 'Agent' or other designation without disclosing his principal will be rejected.

The Bidder's name stated on the Proposal shall be the exact legal name of the firm.

- 14.03 The Bid shall contain no interlineations, erasures or overwriting except as necessary to correct errors made by the Bidder, in which case such corrections shall be initialed by the person or persons signing the Bid.

D. SUBMISSION OF BIDS

15.0 SEALING AND MARKING OF BIDS

- 15.01 Bid submission: One original (hard copies) & One Duplicate Soft copy in USB flash drive of all the Bid Documents shall be sealed and submitted to the Purchaser before the closing time for submission of the bid.
- 15.02 The Technical Documents and the EMD shall be enclosed in a sealed envelope and the said envelope shall be superscribed with — "Technical Bid & EMD". The price bid shall be inside another sealed envelope with superscribed "Financial Bid". Both these envelopes shall be sealed inside another big envelope. All the envelopes should bear the Name and Address of the Bidder and marking for the Original and Copy. The envelopes should be superscribed with — "Tender Notice No. & Due date of opening".

15.03 The Bidder has the option of sending the Bids in person. Bids submitted by Email/Telex/Telegram /Fax will be rejected. No request from any Bidder to the Purchaser to collect the proposals from Courier/Airlines/Cargo Agents etc shall be entertained by the Purchaser.

16.0 DEADLINE FOR SUBMISSION OF BIDS

16.01 The original Bid, together with the required copies, must be received by the Purchaser at the address on or before the due date & time of submission.

16.02 The Purchaser may, at its discretion, extend the deadline for the submission of Bids by amending the Bidding Documents in accordance with Clause 6.0, in which case all rights and obligations of the Purchaser and Bidders previously subject to the deadline will thereafter be subject to the deadline as extended

17.0 ONE BID PER BIDDER

17.01 Each Bidder shall submit only one Bid by itself. No Joint venture is acceptable. A Bidder who submits or participates in more than one Bid will cause all those Bids to be rejected.

18.0 LATE BIDS

18.01 Any Bid received by the Purchaser after the deadline for submission of Bids prescribed by the Purchaser, pursuant to Clause 16.0, will be declared "Late" and may be rejected and returned unopened to the Bidder.

19.0 MODIFICATIONS AND WITHDRAWAL OF BIDS

19.01 The Bidder is not allowed to modify or withdraw its Bid after the Bid's submission subject to any corrigendum/addendum/modifications in the tender documents uploaded in website.

E. EVALUATION OF BID

20.0 PROCESS TO BE CONFIDENTIAL

Information relating to the examination, clarification, evaluation and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process. Any effort by a Bidder to influence the Purchaser's processing of Bids or award decisions may result in the rejection of the Bidder's Bid.

21.0 CLARIFICATION OF BIDS

To assist in the examination, evaluation and comparison of Bids, the Purchaser may, at its discretion, ask the Bidder for a clarification of its Bid. All responses to requests for clarification shall be in writing and no change in the price or substance of the Bid shall be sought, offered or permitted.

22.0 PRELIMINARY EXAMINATION OF BIDS / RESPONSIVENESS

22.01 Purchaser will examine the Bids to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the Bids are generally in order. Purchaser may ask for submission of original documents in order to verify the documents submitted in support of qualification criteria.

22.02 Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price per item that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price per item will be corrected. If there is a discrepancy between the Total Amount and the sum of the total price per item, the sum of the total price per item shall prevail and the Total Amount will be corrected.

22.03 Prior to the detailed evaluation, Purchaser will determine the substantial responsiveness of each Bid to the Bidding Documents including production capability and acceptable quality of the Goods offered. A substantially responsive Bid is one, which conforms to all the terms and conditions of the Bidding Documents without material deviation.

22.04 Bid determined as not substantially responsive will be rejected by the Purchaser and/or the Purchaser and may not subsequently be made responsive by the Bidder by correction of the non - conformity.

23.0 **EVALUATION AND COMPARISON OF BIDS**

23.01 The evaluation of Bids shall be done based on the delivered cost competitiveness basis.

23.02 The evaluation of the Bids shall be a stage-wise procedure. The following stages are identified for evaluation purposes: In the first stage, the Bids would be subjected to a responsiveness check. The Technical & qualifying Proposals and the Conditional ties of the Bidders would be evaluated.

Subsequently, the Financial Proposals along with Supplementary Financial Proposals, if any, of Bidders with Techno-commercially Acceptable Bids shall be considered for final evaluation.

23.03 The Purchaser's evaluation of a Bid will take into account, in addition to the Bid price, the following factors, in the manner and to the extent indicated in this Clause:

(a) Delivery Schedule

(b) Conformance to Qualifying Criteria

(c) Deviations from Bidding Documents

Bidders shall base their Bid price on the terms and conditions specified in the Bidding Documents.

The cost of all quantifiable deviations and omissions from the specification, terms and conditions specified in Bidding Documents shall be evaluated. **The Purchaser will make its own assessment of the cost of any deviation for the purpose of ensuring fair comparison of Bids.**

23.04 Any adjustments in price, which result from the above procedures, shall be added for the purposes of comparative evaluation only to arrive at an "Evaluated Bid Price". Bid Prices quoted by Bidders shall remain unaltered.

F. AWARD OF CONTRACT

24.0 **CONTACTING THE PURCHASER**

24.01 If any Bidder wishes to contact the Purchaser on any matter related to the Bid, from the time of Bid opening to the time of contract award, the same shall be done in writing only.

24.02 Any effort by a Bidder to influence the Purchaser and/or in the Purchaser's decisions in respect of

Bid evaluation, Bid comparison or Contract Award, will result in the rejection of the Bidder's Bid.

25.0 THE PURCHASER'S RIGHT TO ACCEPT ANY BID AND TO REJECT ANY OR ALL BIDS

Submission of bids shall not automatically construe qualification for evaluation. The Purchaser reserves the right to accept or reject any Bid and to annul the Bidding process and reject all Bids at anytime prior to award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the Purchaser's action.

26.0 AWARD OF CONTRACT

The Purchaser will award the Contract to the successful Bidder whose Bid has been Determined to be the lowest-evaluated responsive Bid, provided further that the Bidder has been determined to be qualified to satisfactorily perform the Contract. Purchaser reserves the right to award order to other bidders in the tender, provided it is required for timely execution of project & provided he agrees to come to the lowest rate. Purchaser reserves the right to distribute the entire tender quantity at its own discretion without citing any reasons thereof.

27.0 THE PURCHASER'S RIGHT TO VARY QUANTITIES

The Purchaser reserves the right to vary the quantity i.e. increase or decrease the numbers/quantities without any change in terms and conditions during the execution of the Order.

28.0 LETTER OF INTENT/ NOTIFICATION OF AWARD

The letter of intent/ Notification of Award shall be issued to the successful Bidder whose bids have been considered responsive, techno-commercially acceptable and evaluated to be the lowest (L1). The successful Bidder shall be required to furnish a letter of acceptance within 7 days of issue of the letter of intent /Notification of Award by Purchaser.

29.0 PERFORMANCE BANK GAURANTEE

To be submitted within fifteen (15) days from the date of issuance of the Letter of Award/PO, supplier shall establish a performance bond in favor of BYPL in an amount not less than One percent (1%) of the total price of the Rate Contract (the "Performance Bond"). Bidder shall initially submit the PBG for 1% of RC Value valid till RC validity period plus one month. Thereafter bidder shall submit PBG on Purchase Order (PO) basis for 9% of the PO value valid for a period of 24 months from the date of Commissioning or 30 months from the date of last receipt whichever is earlier plus 3 months claim period.

30.0 CORRUPT OR FRADULENT PRACTICES

30.01 The Purchaser requires that the Bidders observe the highest standard of ethics during the procurement and execution of the Project. In pursuance of this policy, the Purchaser:

(a) Defines, for the purposes of this provision, the terms set forth below as follows:

- (i) "Corrupt practice" means behavior on the part of officials in the public or private sectors by which they improperly and unlawfully enrich themselves and/or those close to them, or induce others to do so, by misusing the position in which they are placed, and it includes the offering, giving, receiving, or soliciting of anything of value to influence the action of any such official in the procurement process or in contract execution; and
- (ii) "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Purchaser, and includes collusive

practice among Bidders (prior to or after Bid submission) designed to establish Bid prices at artificial non -competitive levels and to deprive the Purchaser of the benefits of free and open competition .

- (b) Will reject a proposal for award if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;
- (c) Will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a contract.

30.02 Furthermore, Bidders shall be aware of the provision stated in the Terms and Conditions of Contract.

BIDDER

APPENDIX I

(FORMAT FOR EMD BANK GUARANTEE)

(To be issued in a Non Judicial Stamp Paper of Rs.50/-purchased in the name of the bank)

Whereas [name of the Bidder] (herein after called the "Bidder") has submitted its bid dated [date of submission of bid] for the supply of [name and/or description of the goods] (here after called the "Bid").

KNOW ALL PEOPLE by these presents that WE [name of bank] at [Branch Name and address], having our registered office at [address of the registered office of the bank] (herein after called the "Bank"), are bound unto BSES Yamuna Power Ltd., with its Corporate Office at Shaktikiran Building, Karkardooma, Delhi - 110032, (herein after called —the "Purchaser") in the sum of Rs..... (Rupees..... only) for which payment well and truly to be made to the said Purchaser, the Bank binds itself, its successors, and assigns by these presents.

Sealed with the Common Seal of the said Bank this _____ day of _____ 20_____.

The conditions of this obligation are:

- 1 If the Bidder withdraws its Bid during the period of bid validity specified by the Bidder on the Bid Form; or
2. If the Bidder, having been notified of the acceptance of its Bid by the Purchaser during the period of bid validity:
 - (a) fails or refuses to execute the Contract Form, if required; or
 - (b) fails or refuses to furnish the performance security, In accordance with the Instructions to Bidders/ Terms and Conditions;

We undertake to pay to the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that is its demand the purchaser will note that amount claimed by it is due to it, owing to the occurrence of one or both of the two condition(s), specifying the occurred condition or condition(s).

This guarantee will remain in force up to and including One Hundred Twenty (120) days after the due date of submission bid, and any demand in respect thereof should reach the Bank not later than the above date.

(Stamp & signature of the bank)

Signature of the witness

BID FORM

To

Head of Department
Contracts & Material Deptt.
BSES Yamuna Power Ltd
Shaktikiran Building, Karkardooma,
Delhi 110032

Sir,

1 We understand that BYPL is desirous of procuring..... for it's licensed distribution network area in Delhi

2 Having examined the Bidding Documents for the above named works, we the undersigned, offer to deliver the goods in full conformity with the Terms and Conditions and technical specifications for the sum indicated in Price Bid or such other sums as may be determined in accordance with the terms and conditions of the contract. The amounts are in accordance with the Price Schedules attached herewith and are made part of this bid.

3 If our Bid is accepted, we under take to deliver the entire goods as) as per delivery schedule mentioned in Section IV from the date of award of purchase order/letter of intent.

4 If our Bid is accepted, we will furnish a performance bank guarantee for an amount of 10% (Ten)percent of the total contract value for due performance of the Contract in accordance with the Terms and Conditions.

5 We agree to abide by this Bid for a period of 120 days from the due date of bid submission and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

6 We declare that we have studied the provision of Indian Laws for supply of equipments/materials and the prices have been quoted accordingly.

7 Unless and until Letter of Intent is issued, this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.

8 We understand that you are not bound to accept the lowest, or any bid you may receive.

9 There is provision for Resolution of Disputes under this Contract, in accordance with the Laws and Jurisdiction of Contract.

Dated this..... day of..... 20XX

Signature..... In the capacity of

.....duly authorized to sign for and on behalf of

(IN BLOCK CAPITALS)

APPENDIX I NIT NO: CMC/BY/22-23/RS/SV/23	Page 2 of 9	Bidders seal & Signature
---	-------------	--------------------------

ACCEPTANCE FORM FOR PARTICIPATION IN REVERSE AUCTION EVENT

(To be signed and stamped by the bidder)

BSES Yamuna Power Ltd (hereinafter referred to as **"BYPL"**) intends to use the reverse auction through SAP-SRM tool as an integral part of the entire tendering process. All the bidders who are found as techno commercial qualified based on the tender requirements shall be eligible to participate in the reverse auction event.

The following terms and conditions are deemed as accepted by the bidder on participation in the bid event:

1. BYPL shall provide the user id and password to the authorized representative of the bidder. (Authorization letter in lieu of the same be submitted along with the signed and stamped acceptance form)
2. BYPL will make every effort to make the bid process transparent. However, the award decision by BYPL would be final and binding on the bidder.
3. The bidder agrees to non-disclosure of trade information regarding the purchase, identity of BYPL, bid process, bid technology, bid documentation, bid details, and etc.
4. The bidder is advised to understand the auto bid process to safeguard themselves against any possibility of non-participation in the auction event.
5. In case of bidding through internet medium, bidders are further advised to ensure availability of the entire infrastructure as required at their end to participate in the auction event. Inability to bid due to telephone line glitch, internet response issues, software or hardware hangs; power failure or any other reason shall not be the responsibility of BYPL.
6. In case of intranet medium, BYPL shall provide the infrastructure to bidders, further, BYPL has sole discretion to extend or restart the auction event in case of any glitches in infrastructure observed which has restricted the bidders to submit the bids to ensure fair & transparent competitive bidding. In case of an auction event is restarted, the best bid as already available in the system shall become the start price for the new auction.
7. In case the bidder fails to participate in the auction event due any reason whatsoever, it shall be presumed that the bidder has no further discounts to offer and the initial bid as submitted by the bidder as a part of the tender shall be considered as the bidder's final no regret offer. Any offline price bids received from a bidder in lieu of non-participation in the auction event shall be out rightly rejected by BYPL.
8. The bidder shall be prepared with competitive price quotes on the day of the reverse auction event.
9. The prices as quoted by the bidder during the auction event shall be inclusive of all the applicable taxes, duties and levies and shall be FOR Landed Cost basis at BYPL site.
10. The prices submitted by a bidder during the auction event shall be binding on the bidder.
11. No requests for time extension of the auction event shall be considered by BYPL.
12. The original price bids of the bidders shall be reduced on pro-rata basis against each line item based on the final all-inclusive prices offered during conclusion of the auction event for arriving at contract amount.

Signature & seal of the Bidder

ANNEXURE - SCHEDULE OF DEVIATIONS

Vendor shall refrain from taking any deviations on this TENDER. Still in case of any deviations, all such deviations from this tender shall be set out by the Bidder, Clause by Clause in this schedule and submit the same as a part of the Technical Bid.

Unless **specifically** mentioned in this schedule, the tender shall be deemed to confirm the BYPL's specifications:

Technical Deviations:-

SL No.	Clause No.	NIT Page No.	NIT Clause descriptions	Details of Clarification/deviation with justifications

Commercial Deviations:-

SL No.	Clause No.	NIT Page No.	NIT Clause descriptions	Details of Clarification/deviation with justifications

By signing this document we hereby withdraw all the deviations whatsoever taken anywhere in this bid document and comply to all the terms and conditions, technical specifications, scope of work etc. as mentioned in the standard document except those as mentioned above.

Seal of the Bidder:

Signature:

Name:

APPENDIX I NIT NO: CMC/BY/22-23/RS/SV/23	Page 4 of 9	Bidders seal & Signature
---	---------------------------	--------------------------

Technical Bid Submission Check List

S. No.	Description	BYPL Requirement	Bidder's Compliance
1	Tender No.	Required	
2	Technical Specification reference number	Required	
3	Communication Details		
3.1	Name of the Bidder	Required	
3.2	Name of Authorized contact person	Required	
3.3	Contact No. of Authorized contact person	Required	
3.4	E-mail id of Authorized contact person	Required	
4	Document Submission Format		
4.1	Documents shall be submitted in Box file/spiral binding. Any other format is not acceptable	Required	
4.2	Index of documents with page numbers for each document	Required	
4.3	Separator with document description shall be provided before each document	Required	
5	Qualifying Requirement Compliance		
5.1	Summary of compliance of qualifying criteria in tabular form along with summary of documentary proof provided	Required	
5.2	Detailed Documents supporting compliance of qualifying criteria	Required	
6	Drawings/ Documents as per Technical Specification.		
6.1	Signed copy of technical specification	Required	
6.2	Type Test reports of offered model/ type/ rating	Required	
6.3	Guaranteed Technical particulars (GTP)	Required	
6.4	Deviation Sheet	Required	
6.5	Detailed Drawings	Required	
6.6	Manufacturer's quality assurance plan	Required	
6.7	Other drawing/ documents mentioned in technical specification	Required	
7	Soft copy of complete technical bid in pen drive	Required	
8	Samples as per technical specification	Required	

Note: Submission of Technical bid check list along with all items mentioned in the check list is mandatory. Order of documents shall be strictly as per the technical bid check list. Bids with incomplete/ wrong information are liable for rejection.

APPENDIX I NIT NO: CMC/BY/22-23/RS/SV/23	Page 5 of 9	Bidders seal & Signature
---	---------------------------	--------------------------

VENDOR CODE OF CONDUCT

Purchaser is committed to conducting its business in an ethical, legal and socially responsible manner. To encourage compliance with all legal requirements and ethical business practices, Purchaser has established this Vendor Code of Conduct (the "Code") for Purchaser's Vendors. For the purposes of this document, "Vendor" means any company, corporation or other entity that sells, or seeks to sell goods or services, to Purchaser, including the Vendor's employees, agents and other representatives.

Fundamental to adopting the Code is the understanding that a business, in all of its activities, must operate in full compliance with the laws, rules and regulations of the countries in which it operates. This Code encourages Vendors to go beyond legal compliance, drawing upon internationally recognized standards, in order to advance social and environmental responsibility.

I. Labour and Human Rights

Vendors must uphold the human rights of workers, and treat them with dignity and respect as understood by the international community.

- Fair Treatment - Vendors must be committed to a workplace free of harassment. Vendors shall not threaten workers with or subject them to harsh or inhumane treatment, including sexual harassment, sexual abuse, corporal punishment, mental coercion, physical coercion, verbal abuse or unreasonable restrictions on entering or exiting company provided facilities.

- Antidiscrimination - Vendors shall not discriminate against any worker based on race, colour, age, gender, sexual orientation, ethnicity, disability, religion, political affiliation, union membership, national origin, or marital status in hiring and employment practices such as applications for employment, promotions, rewards, access to training, job assignments, wages, benefits, discipline, and termination. Vendors shall not require a pregnancy test or discriminate against pregnant workers except where required by applicable laws or regulations or prudent for workplace safety. In addition, Vendors shall not require workers or potential workers to undergo medical tests that could be used in a discriminatory way except where required by applicable law or regulation or prudent for workplace safety.

- Freely Chosen Employment - Forced, bonded or indentured labour or involuntary prison labour is not to be used. All work will be voluntary, and workers should be free to leave upon reasonable notice. Workers shall not be required to hand over government-issued identification, passports or work permits as a condition of employment.

- Prevention of Under Age Labor - Child labor is strictly prohibited. Vendors shall not employ children. The minimum age for employment or work shall be 15 years of age, the minimum age for employment in that country, or the age for completing compulsory education in that country, whichever is higher. This Code does not prohibit participation in legitimate workplace apprenticeship programs that are consistent with Article 6 of ILO Minimum Age Convention No. 138 or light work consistent with Article 7 of ILO Minimum Age Convention No. 138.

- Juvenile Labor - Vendors may employ juveniles who are older than the applicable legal minimum age for employment but are younger than 18 years of age, provided they do not perform work likely to jeopardize their health, safety, or morals, consistent with ILO Minimum Age Convention No. 138.

- Minimum Wages - Compensation paid to workers shall comply with all applicable wage laws, including those relating to minimum wages, overtime hours and legally mandated benefits. Any Disciplinary wage deductions are to conform to local law. The basis on which workers are being paid is to be clearly conveyed to them in a timely manner.

- Working Hours - Studies of good manufacturing practices clearly link worker strain to reduced productivity, increased turnover and increased injury and illness. Work weeks are not to exceed maximum set by local law. Further, a work week should not be more than 60 hours per week, including overtime, except in emergency or unusual situations. Workers should be allowed at least one day off per seven-day week.

. Freedom of Association - Open communication and direct engagement between workers and management are the most effective ways to resolve workplace and compensation issues. Vendors are to respect the rights of workers to associate freely and to communicate openly with management regarding working conditions without fear of reprisal, intimidation or harassment. Workers' rights to join labour unions seek representation and or join worker's councils in accordance with local laws should be acknowledged.

II. Health and Safety

Vendors must recognize that in addition to minimizing the incidence of work-related injury and illness, a safe and healthy work environment enhances the quality of products and services, consistency of production and worker retention and morale. Vendors must also recognize that ongoing worker input and education is essential to identifying and solving health and safety issues in the workplace.

The health and safety standards are:

- . Occupational Injury and Illness - Procedures and systems are to be in place to prevent, manage, track and report occupational injury and illness, including provisions to: a) encourage worker reporting; b) classify and record injury and illness cases; c) provide necessary medical treatment; d) investigate cases and implement corrective actions to eliminate their causes; and e) facilitate return of workers to work.
- . Emergency Preparedness - Emergency situations and events are to be identified and assessed, and their impact minimized by implementing emergency plans and response procedures, including: emergency reporting, employee notification and evacuation procedures, worker training and drills, appropriate fire detection and suppression equipment, adequate exit facilities and recovery plans.
- . Occupational Safety - Worker exposure to potential safety hazards (e.g., electrical and other energy sources, fire, vehicles, and fall hazards) are to be controlled through proper design engineering and administrative controls, preventative maintenance and safe work procedures (including lockout/tagout), and ongoing safety training. Where hazards cannot be adequately controlled by these means, workers are to be provided with appropriate, well-maintained, personal protective equipment. Workers shall not be disciplined for raising safety concerns.
- . Machine Safeguarding - Production and other machinery is to be evaluated for safety hazards. Physical guards, interlocks and barriers are to be provided and properly maintained where machinery presents an injury hazard to workers.
- . Industrial Hygiene - Worker exposure to chemical, biological and physical agents is to be identified, evaluated, and controlled. Engineering or administrative controls must be used to control overexposures. When hazards cannot be adequately controlled by such means, worker health is to be protected by appropriate personal protective equipment programs.
- . Sanitation, Food, and Housing - Workers are to be provided with ready access to clean toilet, facilities potable water and sanitary food preparation, storage, and eating facilities. Worker dormitories provided by the Participant or a labour agent are to be maintained clean and safe, and provided by the Participant or a labour agent, hot water for bathing and showering, and adequate heat and ventilation and reasonable personal space along with reasonable entry and exit privileges.
- . Physically Demanding Work - Worker exposure to the hazards of physically demanding tasks, including manual material handling and heavy or repetitive lifting, prolonged standing and highly repetitive or forceful assembly tasks is to be identified, evaluated and controlled.

III. Environmental

Vendors should recognize that environmental responsibility is integral to producing world class products. In manufacturing operations, adverse effects on the environment and natural resources are to be minimized while safeguarding the health and safety of the public.

The environmental standards are:

- . Product Content Restrictions - Vendors are to adhere to applicable laws and regulations regarding prohibition or restriction of specific substances including labeling laws and regulations for recycling and disposal. In addition, Vendors are to adhere to all environmental requirements specified by Purchaser.
- . Chemical and Hazardous Materials -Chemical and other materials posing a hazard if released to the environment are to be identified and managed to ensure their safe handling, movement storage, recycling or reuse and disposal.
- . Air Emissions - Air emissions of volatile organic chemicals, aerosols, corrosives, particulates, ozone depleting chemicals and combustion by-products generated from operations are to be characterized, monitored, controlled and treated as required prior to discharge.
- . Pollution Prevention and Resource Reduction -Waste of all types, including water and energy, are to be reduced or eliminated at the source or by practices such as modifying production, maintenance and facility processes, materials substitution, conservation, recycling and re-using materials.
- . Wastewater and Solid Waste - Wastewater and solid waste generated from operations industrial processes and sanitation facilities are to be monitored, controlled and treated as required prior to discharge or disposal.
- . Environmental Permits and Reporting - All required environmental permits (e.g. discharge monitoring) and registrations are to be obtained, maintained and kept current and their operational and reporting requirements are to be followed.

IV. Ethics

Vendors must be committed to the highest standards of ethical conduct when dealing with workers, Vendors, and customers.

- . Corruption, Extortion, or Embezzlement - Corruption, extortion, and embezzlement, in any form, are strictly prohibited. Vendors shall not engage in corruption, extortion or embezzlement in any form and violations of this prohibition may result in immediate termination as an Vendor and in legal action.
- . Disclosure of Information - Vendors must disclose information regarding its business activities, structure financial situation, and performance in accordance with applicable laws and regulations and prevailing industry practices.
- . No Improper Advantage - Vendors shall not offer or accept bribes or other means of obtaining undue or improper advantage.
- . Fair Business, Advertising, and Competition - Vendors must uphold fair business standards in advertising, sales, and competition.
- . Business Integrity - The highest standards of integrity are to be expected in all business interactions. Participants shall prohibit any and all forms of corruption, extortion and embezzlement. Monitoring and enforcement procedures shall be implemented to ensure conformance.
- . Community Engagement - Vendors are encouraged to engage the community to help foster social and economic development and to contribute to the sustainability of the communities in which they operate.
- . Protection of Intellectual Property - Vendors must respect intellectual property rights; safeguard customer information; and transfer of technology and know-how must be done in a manner that protects intellectual property rights.

V. Management System

Vendors shall adopt or establish a management system whose scope is related to the content of this Code. The management system shall be designed to ensure (a) compliance with applicable laws, regulations and customer requirements related to the Vendors' operations and products; (b) conformance with this Code; and (c) identification and mitigation of operational risks related to this Code. It should also facilitate continual improvement.

The management system should contain the following elements:

APPENDIX I NIT NO: CMC/BY/22-23/RS/SV/23	Page 8 of 9	Bidders seal & Signature
---	---------------------------	--------------------------

- . Company Commitment - Corporate social and environmental responsibility statements affirming Vendor's commitment to compliance and continual improvement.
- . Management Accountability and Responsibility - Clearly identified company representative[s] responsible for ensuring implementation and periodic review of the status of the management systems.
- . Legal and Customer Requirements - Identification, monitoring and understanding of applicable laws, regulations and customer requirements.
- . Risk Assessment and Risk Management - Process to identify the environmental, health and safety and labour practice risks associated with Vendor's operations. Determination of the relative significance for each risk and implementation of appropriate procedural and physical controls to ensure regulatory compliance to control the identified risks.
- . Performance Objectives with Implementation Plan and Measures - Areas to be included in a risk assessment for health and safety are warehouse and storage facilities, plant/facilities support equipment, laboratories and test areas, sanitation facilities (bathrooms), kitchen/cafeteria and worker housing /dormitories. Written standards, performance objectives, and targets an implementation plans including a periodic assessment of Vendor's performance against those objectives.
- . Training - Programs for training managers and workers to implement Vendor's policies, procedures and improvement objectives.
- . Communication - Process for communicating clear and accurate information about Vendor's performance, practices and expectations to workers, Vendors and customers.
- . Worker Feedback and Participation - Ongoing processes to assess employees' understanding of and obtain feedback on practices and conditions covered by this Code and to foster continuous improvement.
- . Audits and Assessments - Periodic self-evaluations to ensure conformity to legal and regulatory requirements, the content of the Code and customer contractual requirements related to social and environmental responsibility.
- . Corrective Action Process - Process for timely correction of deficiencies identified by internal or external assessments, inspections, investigations and reviews.
- . Documentation and Records - Creation of documents and records to ensure regulatory compliance and conformity to company requirements along with appropriate confidentiality to protect privacy.

The Code is modeled on and contains language from the Recognized standards such as International Labour Organization Standards (ILO), Universal Declaration of Human Rights (UDHR), United Nations Convention against Corruption, and the Ethical Trading Initiative (ETI) were used as references in preparing this Code and may be useful sources of additional information

GENERAL CONDITIONS OF CONTRACT (GCC-SUPPLY)

GENERAL CONDITIONS OF CONTRACT (GCC)-SUPPLY

The General Condition of Contract shall form a part of specifications, contract document.

1.0 General Instructions

- 1.01** All the Bids shall be prepared and submitted in accordance with these instructions.
- 1.02** Bidder shall bear all costs associated with the preparation and delivery of its Bid, and the Purchaser will in no case shall be responsible or liable for these costs.
- 1.03** The Bid should be submitted by the Bidder in whose name the bid document has been issued and under no circumstances it shall be transferred/sold to the other party.
- 1.04** The Purchaser reserves the right to request for any additional information and also reserves the right to reject the proposal of any Bidder, if in the opinion of the Purchaser, the data in support of RFQ requirement is incomplete.
- 1.05** The Bidder is expected to examine all instructions, forms, terms & conditions and specifications in the Bid Documents. Failure to furnish all information required in the Bid Documents or submission of a Bid not substantially responsive to the Bid Documents in every respect may result in rejection of the Bid. However, the Purchaser's decision in regard to the responsiveness and rejection of bids shall be final and binding without any obligation, financial or otherwise, on the Purchaser.

2.0 Definition of Terms

- 2.01** "Purchaser" shall mean BSES Yamuna Power Limited, on whose behalf this bid enquiry is issued by its authorized representative / officers.
- 2.02** "Bidder" shall mean the firm who quotes against this bid enquiry issued by the Purchaser. "Supplier" or "Supplier" shall mean the successful Bidder and/or Bidders whose bid has been accepted by the Purchaser and on whom the "Letter of Acceptance" is placed by the Purchaser and shall include his heirs, legal representatives, successors and permitted assigns wherever the context so admits.
- 2.03** "Supply" shall mean the Scope of Contract as described.
- 2.04** "Specification" shall mean collectively all the terms and stipulations contained in those portions of this bid document known as RFQ, Commercial Terms & Condition, Instructions to Bidders, Technical Specifications and the Amendments, Revisions, Deletions or Additions, as may be made by the Purchaser from time to time.
- 2.05** "Letter of Acceptance" shall mean the official notice issued by the Purchaser notifying the Supplier that his proposal has been accepted and it shall include amendments thereto, if any, issued by the Purchaser. The "Letter of Acceptance" issued by the Purchaser shall be binding on the "Supplier" The date of Letter of Acceptance shall be taken as the effective date of the commencement of contract.
- 2.06** "Month" shall mean the calendar month and "Day" shall mean the calendar day.
- 2.07** "Codes and Standards" shall mean all the applicable codes and standards as indicated in the Specification.

- 2.08** "Offer Sheet" shall mean Bidder's firm offer submitted to BYPL in accordance with the specification.
- 2.09** "Contract" shall mean the "Letter of Acceptance/Purchase Order" issued by the Purchaser.
- 2.10** "Contract Price" shall mean the price referred to in the "Letter of Acceptance/Purchase Order".
- 2.11** "Contract Period" shall mean the period during which the "Contract" shall be executed as agreed between the Supplier and the Purchaser in the Contract inclusive of extended contract period for reason beyond the control of the Supplier and/or Purchaser due to force majeure.
- 2.12** "Acceptance" shall mean and deemed to include one or more of the following as will be stipulated in the specification:
- a) The written acceptance of material by the inspector at suppliers works to ship the materials.
 - b) Acceptance of material at Purchaser site stores after its receipt and due inspection/ testing and release of material acceptance voucher.
 - c) Where the scope of the contract includes supply, acceptance shall mean issue of necessary equipment / material takeover receipt after installation & commissioning and final acceptance.

3.0 Contract Documents & Priority

- 3.01** Contract Documents: The terms and conditions of the contract shall consist solely of these RFQ conditions and the offer sheet.

4.0 Scope of Supply -General

- 4.01** The "Scope of Supply" shall be on the basis of Bidder's responsibility, completely covering the obligations, responsibility and supplies provided in this Bid enquiry whether implicit or explicit.
- 4.02** Bidder shall have to quote for the Bill of quantities as listed in Section – IV of this RFQ.
- 4.03** Quantity variation and additional requirement if any shall be communicated to successful bidder during project execution.
- 4.04** All relevant drawings, data and instruction manuals.

5.0 Quality Assurance and Inspection

- 5.01** Immediately on award of contract, the bidder shall prepare detailed quality assurance plan / test procedure identifying the various stages of manufacture, quality checks performed at each stage, raw material inspection and the Customer hold points. The document shall also furnish details of method of checking, inspection and acceptance standards / values and get the approval of Purchaser before proceeding with manufacturing. However, Purchaser shall have right to review the inspection reports, quality checks and results of suppliers in house inspection department which are not Customer hold points and the supplier shall comply with the remarks made by purchaser or his representative on such reviews with regards to further testing, rectification or rejection, etc.
- 5.02** Witness and Hold points are critical steps in manufacturing, inspection and testing where the supplier is obliged to notify the Purchaser in advance so that it may be witnessed by the Purchaser. Final inspection is a mandatory hold point. The supplier to proceed with the work past a hold point only after clearance by purchaser or a witness waiver letter from BYPL.
- 5.03** The performance of waiver of QA activity by Purchaser at any stage of manufacturing does not relieve the supplier of any obligation to perform in accordance with and meet all the requirements

of the procurement documents and also all the codes & reference documents mentioned in the procurement document nor shall it preclude subsequent rejection by the purchaser.

5.04 On completion of manufacturing the items can only be dispatched after receipt of dispatch Instructions issued by the Purchaser.

5.05 All in-house testing and inspection shall be done with out any extra cost. The in-house inspection shall be carried out in presence of BSES/BSES authorized third party inspection agency. Cost of Futile/abortive visit(s) shall be debited from the invoices.

5.06 Purchaser reserves the right to send any material being supplied to any recognized laboratory for testing, wherever necessary and the cost of testing shall be borne by the Bidder. In case the material is found not in order with the technical requirement / specification, the charges along with any other penalty which may be levied is to be borne by the bidder. To avoid any complaint the supplier is advised to send his representative to the stores to see that the material sent for testing is being sealed in the presence of bidder's representative.

6.0 Inspection & Test Charges

6.01 GOODS shall be inspected by BUYER and/or third party inspection agency nominated by BUYER. Inspection shall carry out stage wise/final inspection as per agreed QA /QC procedure. In addition, inspection of GOODS shall be carried out at our Site/stores. SELLER shall, however, repair/replace the damaged/rejected GOODS to the satisfaction of BUYER at no extra cost.

6.02 Inspection charges are included in total order value, however BUYER will bear third party inspection charges. In case of futile/abortive visit of BUYER's inspector at SELLER'S works, the cost towards the same shall be debited from the SELLER's invoices.

6.03 GOODS covered by this PURCHASE ORDER shall not be dispatched in whole or in part until SELLER has received a written Release for Shipment Notice from BUYER or their designated representative.

6.04 Inspection call shall be raised minimum 15(fifteen) days in advance from delivery schedule mentioned in PO and duly filled Format issued by BYPL

7.0 Handling and Storage

7.01 Material Safety Data Sheet (MSDS), detail handling & storage instruction sheet/manual, wherever applicable, to be furnished before commencement of supply and one copy is to be submitted in store/site with First Lot.

8.0 Packing, Packing List & Marking

8.01 **Packing:** Supplier shall pack or shall cause to be packed all Commodities in crates/boxes/drums/containers/cartons and otherwise in such a manner as shall be reasonably suitable for shipment by road or rail to BYPL, Delhi/New Delhi stores/site without undue risk of damage in transit. All the packaging materials as prescribed shall be supplied preferably with bio-degradable packing- materials.

8.02 **Packing List:** The contents of each package shall be itemized on a detailed list showing the exact weight, extreme outside dimensions (length, width & weight) of each container/box/drum/carton, Item SAP Code, PO No & date. One copy of the packing list shall be enclosed in each package delivered.

9.0 Prices/Rates/Taxes

9.01 Price basis for supply of materials

- a) Bidder to quote their prices on Landed Cost Basis and separate price for each item for supply to BYPL Delhi/New Delhi stores inclusive of packing, forwarding, loading at manufacturer's premises, payment of GST, Freight, any other local charges. **Octroi is presently not applicable in Delhi and however if applicable shall be reimbursed at actuals.**
- b) The above supply prices shall also include unloading at BYPL Delhi/New Delhi stores/site.
- c) Transit insurance will be arranged by Bidder

10.0 Taxes & Duties

- 10.01 Prices for Goods are on Ex- Works basis. For the Goods covered under the GST laws, all taxes that are applicable under CGST, SGST, UGST, IGST and GST Compensation Cess shall be payable extra.
- 10.02 For the Goods not covered in the GST laws, the applicable ED, VAT / CST shall be payable extra at applicable rates.
- 10.03 GSTIN of BSES YAMUNA POWER LTD - 07AABCC8569N1Z0
CST No of BSES YAMUNA POWER LTD -07740254593
TIN NO of BSES YAMUNA POWER LTD - 07740254593
PAN NO of BSES YAMUNA POWER LTD - AABCC8569N
- 10.04 At the end of each month, the SELLER must submit their detail of invoices and amount thereof to the concerned officer in charge, within 07 days after the close of the respective month of which supply relates. Non submission of the said request would be treated as good as that the SELLER has no requirement of reconciliation.

11.0 Invoicing Instructions

- 11.01 Invoices in triplicate [1) Original for recipient, 2) Duplicate for Transporter, 3) Triplicate for supplier] shall be made out and delivered to the following address: BSES YAMUNA POWER LIMITED, SHAKTI KIRAN BUILDING, KARKARDOOMA, DELHI-110032.
MDCC will be released separately for Capex & Opex. Invoice will be submitted by supplier as per the MDCC.
- 11.02 Vendor shall obtain GST registration in the State from where the supply will be carried out. Vendors supplying Goods to the Purchaser shall have a valid GST registration number and shall submit GST Tax Invoice and other documents as per SGST Act, CGST Act, IGST Act, UTGST Act, GST Compensation Cess Act and Rules made there under. Failure to submit GST Tax Invoice shall be liable for withholding SGST, CGST, IGST, UTGST, GST Compensation Cess amount charged by the vendor while releasing the payment.
- 11.03 Invoice will be in the name of BSES YAMUNA POWER LIMITED & address of the store/site mentioned in the MDCC. Invoice should contain all information as required under GST Invoice, Debit Note and Credit Rules. The government has notified rules of invoicing under GST along with a template of invoice(GST INV-01) covering the elements such as supplier's details, GSTIN No, HSN Codes, item details, GST tax rates, etc that need to be presented by the supplier.
- 11.04 Vendor to carefully examine and charge relevant CGST / SGST, UGST, IGST and GST compensation cess as applicable to the transactions.
- 11.05 Timely provision of invoices / Debit Notes / Credit Notes:

- 11.05.1 Vendor to timely provide invoice / Debit note / Credit note to enable Purchaser to claim tax benefit on or before stipulated time period. All necessary adjustment entries (Credit Note, Purchase Returns, Debit Notes) shall be made within the time lines prescribed under the GST Laws.
- 11.05.2 In case of receipt of advance, the Vendor undertakes to raise the tax invoice. Purchaser, upon payment of advance, shall issue payment voucher as per applicable GST laws and rules. Four copies of the invoices need to be provided by suppliers and wherever the law requires, an Electronic Reference Number for each invoice.
Documents and devices to be carried by a person-in-charge of a conveyance under.
- 11.06 E Way Bills / transit documents for movement of Goods:
Wherever applicable, the Vendor shall be responsible to issue required transit documents / E Way Bills for movement of Goods and the logistic partner / transporter shall not be liable for any loss arising due to confiscation of goods by government agencies on account of lack of proper documents or any mis-declaration. The Supplier is responsible to comply with rules applicable for E-way bill. Any violation in provision of E-way Bill will attract penalty and seizure of Transit Material. Any Penalty and Pre-Deposit due to violation of rules/provision shall be paid and borne by Supplier. Also, Supplier is responsible for releasing of goods from Authority whether CGST/SGST. Delay in supply from the contractual date due to seizure of goods shall also attract liquidated damages.

12.0 Terms of payment and billing

- 12.01 For Supply of Equipment's (PSS wise):
Part 1) 90% of basic value with 100% taxes and duties shall be made within 45 days from the date of receipt & acceptance of material at site on against submission of following documents against dispatch of each consignment at our Vendor Support Cell (VSC):
- Signed copy of accepted Rate Contract / Purchase Order (for first payment)
 - LR / RR / BL as applicable
 - Challan as applicable
 - Two (02) copies of Supplier's detailed Recipient Invoice showing Commodity description, quantity, unit price, total price and basis of delivery, and being 100% of the value of the consignment claimed.
 - Two (02) copies of Supplier's transporter invoice duly receipted by BYPL Stores & Original certificate issued by BYPL confirming receipt of the subject material at Stores/Site and acceptance of the same as per the provisions of the contract.
 - Two (02) copies Packing List / Detailed Packing List
 - Approved Test certificates / Quality certificates, if applicable
 - Certificate of Origin, if applicable
 - Material Dispatch Clearance Certificate (MDCC)
 - Insurance Policy / Certificate, if applicable
 - Warranty / Guarantee Certificate, if applicable
 - Check list for bill submission.
- Part 2)** Balance 10% of basic value shall be paid in 30 days from the date of successful testing, commissioning and handing over of individual Package Substation duly certified by BYPL Engineer-in-Charge.

In case of receipt of material at store, Balance 10% of basic value shall also be released against the GRN.

- 12.02 Purchaser has the right to recover tax loss, interest and penalty suffered due to any non-compliance of tax laws by the Vendor. In the event, Purchaser is not able to avail any tax credit due to any short coming on the part of the Vendor (which otherwise should have been available to Purchaser

in the normal course), then the Vendor at his own cost and effort will get the short coming rectified. If for any reason the same is not possible, then the Vendor will make 'good' the loss suffered by Purchaser due to the tax credit it lost . In such event, any amount paid to the Vendors shall be first attributable to the tax (GST) charged in the invoice and the balance shall be considered towards the 'value' of supply of goods/ services.

- 12.03 Purchaser shall deduct "Tax Deducted at Source" wherever applicable and at the rate prescribed under the GST Laws or any other Indian law and remit the same to the Government. Necessary TDS certificates as per law shall be issued by the purchase to the vendor.
- 12.04 Any liability arising out of dispute on the tax rate, classification under HSN, calculation and payment of tax to the Government will be to the Vendor's account.
- 12.05 Where the supply of Goods are liable to GST under reverse charge mechanism, then the supplier should clearly mention the category under which it has been registered and also that "the liability of payment of GST is on the Recipient of Supply".

13.0 Tax Indemnity Clause

- 13.01 Vendor (along with its affiliates in India or overseas including any agent/ third party contractor or any other person appointed by such affiliates for the purpose of this agreement) agrees that it will be solely responsible for performing all compliances and making payments of all taxes (direct tax or indirect tax including but not limited to income-tax, transfer pricing, value added tax, SGST, CGST, IGST, UTGST, GST Compensation Cess custom duty, excise duty, Research and Development Cess, etc.), cesses, interest, penalties or any other tax/ duty/ amount/ charge/ liability arising either out of laws/ regulations applicable in India and overseas or because of a demand/ recovery initiated by any revenue authority under laws/ regulations applicable in India or overseas.
- 13.02 In case any tax liability (including but not limited to income-tax, transfer pricing, value added tax, SGST, CGST, IGST, UTGST, GST Compensation Cess custom duty, excise duty, Research and Development Cess, etc.), cesses, interest, penalties or any other tax/ duty/ amount/ charge/ liability becomes payable by Purchaser due to failure of the Vendor, or any of its affiliates in India or overseas including any agent/ third party contractor or any other person appointed by such affiliates for the purpose of this agreement, to comply with the relevant laws/ regulations applicable in India or overseas, Vendor undertakes to indemnify Purchaser for an amount equal to amount payable by Purchaser.
- 13.03 Further, Vendor undertakes to keep Purchaser indemnified at all times against and from all other actions, proceedings, claims, loss, damage, costs and expenses which may be brought against Purchaser or suffered or incurred by Purchaser and which shall have arisen either directly or indirectly out of or in connection with failure of The Vendor, or any of its affiliates in India or overseas including any agent/ third party contractor or any other person appointed by such affiliates for the purpose of this agreement, to comply with relevant obligations/ compliance under any law/ regulations applicable in India and overseas.
- 13.04 The parties agree to follow the following process in case any communication of demand, arising out non-compliance by Vendor (along with its affiliates in India or overseas including any agent/ third party contractor or any other person appointed by such affiliates for the purpose of this agreement), is received by Purchaser:
- 13.04.1 On Purchaser receiving any communication from a competent authority demanding tax liability (including but not limited to income-tax, transfer pricing, value added tax, SGST, CGST, IGST,

UTGST, GST Compensation Cess custom duty, excise duty, Research and Development Cess, etc.), cesses, interest, penalties or any other tax/ duty/ amount/ charge/ liability, Purchaser shall, within 5 common working days from the date of receipt of such communication (save where the period to respond to the relevant authority is less than five days, in which case, as soon as reasonably possible) inform Vendor in writing of such communication.

13.04.2 Pursuant to receiving communication from Purchaser, Vendor shall suggest to accept the communication and pay the demand amount to the competent authority. In such an event, Vendor shall reimburse such amount paid to Purchaser within 5 working days from the date of payment by Purchaser to the competent authority.

13.04.3 If Vendor advises in writing and Purchaser agrees to dispute the demand, then Purchaser shall dispute the matter with competent authority as per due process prescribed under the regulations and Purchaser shall not pay the Tax Demand. In such scenario, cost of litigation including but not limited to Counsel cost, filing fees, other related charges, should be reimbursed by Vendor to Purchaser. Additionally, If any coercive steps of recovery are initiated by the department, then Purchaser would pay such amount (including by way of adjustment of refunds due to it) and the same would be reimbursed by Vendor within 5 working days from date of such recovery from Purchaser. Purchaser will take all necessary steps to avoid such recovery measures.

13.04.4 On determination of the demand through an Order issued by a Tribunal or any other similar Authority, by whatever name called, under any law applicable in India or overseas, if the demand or any part thereof becomes payable and is paid by Purchaser, then Vendor undertakes to reimburse such amount to Purchaser within 10 days from the date of payment. Alternatively, if on determination of the demand through an Order, no amount is payable by Purchaser then any refund arising to Purchaser due to such an Order shall be passed on to Vendor within 10 days from the date of receipt of refund.

14.0 The Micro, Small and Medium Enterprises (MSME)

14.01 If the SELLERS establishment is covered under the purview of The Micro, Small and Medium Enterprises Development Act, 2006 and its amendments, he shall declare so within the bid of its status failing which it will be presumed that it is a non-MSME unit. Also submit a copy of Udyog Aadhaar (UA) & Udyam Registration Number.

15.0 Price Validity

15.01 All bids submitted shall remain valid, firm and subject to unconditional acceptance by BYPL Delhi for 120 days from the due date of submission. For awarded suppliers, the prices shall remain valid and firm till contract completion.

16.0 Performance Guarantee

16.01 To be submitted within fifteen (15) days from the date of issuance of the Letter of Award/PO, supplier shall establish a performance bond in favor of BYPL for an amount not less than One percent (1%) of the total price of the Rate Contract (the "Performance Bond"). Bidder shall initially submit the PBG for 1% of RC Value valid till RC validity period plus one month. Thereafter bidder shall submit PBG on Purchase Order (PO) basis for 9% of the PO value valid for a period of 24 months from the date of Commissioning or 30 months from the date of last receipt whichever is earlier plus 3 months claim period.

16.02 Bank guarantee shall be drawn in favour of BSES Yamuna Power Ltd as applicable. The performance Bank guarantee shall be in the format as specified by BYPL.

17.0 Forfeiture

- 17.01 Each Performance Bond established under Clause 10.0 shall contain a statement that it shall be automatically and unconditionally forfeited without recourse and payable against the presentation by BYPL of this Performance Bond, to the relevant bank referred to above, together with a simple statement that supplier has failed to comply with any term or condition set forth in the Contract.
- 17.02 Each Performance BG established under will be automatically and unconditionally forfeited without recourse if BYPL in its sole discretion determines that supplier has failed to comply with any term or condition set forth in the contract.

18.0 Release

- 18.01 All Performance Bonds will be released without interest within seven (7) days from the last date up to which the Performance Bond has to be kept valid (as defined in Clause 16.0) except for the case set forth in Clause 22.0.

19.0 Defects Liability Period/Guarantee/Warranty

- 19.01 The bidder to Guarantee the materials / items supplied against any defect of failure, which arise due to faulty materials, workmanship or design for the entire defects liability period. The Defect liability period shall be 60 months from the date of commissioning or 66 months from the date of delivery whichever is earlier.
- 19.02 If during the Defects Liability Period any GOODS are found to be defective, they shall be promptly replaced or rectified by BIDDER at its own cost (including the cost of dismantling and (reinstallation) on the instructions of BUYER and if removed from SITE for such purpose, shall be removed and re-delivered to SITE by BIDDER at its own cost.

20.0 Return, Replacement or Substitution

- 20.01 BYPL shall give Supplier notice of any defective Commodity promptly after becoming aware thereof. BYPL may in its discretion elect to return defective Commodities to Supplier for replacement, free of charge to BYPL, or may reject such Commodities and purchase the same or similar Commodities from any third party. In the latter case BYPL shall furnish proof to Supplier of the cost of such substitute purchase. In either case, all costs of any replacement, substitution, shipping, labour and other related expenses incurred in connection with the return and replacement or for the substitute purchase of a Commodity hereunder should be for the account of Supplier. BYPL may set off such costs against any amounts payable by BYPL to Supplier. Supplier shall reimburse BYPL for the amount, if any, by which the price of a substitute Commodity exceeds the price for such Commodity as quoted in the Bid. BUYER at its sole discretion shall have the opinion to dispose the material or GOODS so rejected and not taken back within forty-five days from the date of intimation of rejection.

21.0 Effective Date of Commencement of Contract

- 21.01 The date of the issuance of the Letter of Acceptance/Purchase Order shall be treated as the effective date of the commencement of Contract.

22.0 Time – The Essence Of Contract

- 22.01 The time and the date of completion of the "Supply" as stipulated in the Letter Of Acceptance / Purchase order issued to the Supplier shall be deemed to be the essence of the "Contract". The

Supply has to be completed not later than the aforesaid Schedule and date of completion of supply.

23.0 The Laws and Jurisdiction of Contract:

23.01 The laws applicable to this Contract shall be the Laws in force in India.

23.02 All disputes arising in connection with the present Contract shall be settled amicably by mutual consultation failing which shall be finally settled as per the rules of Arbitration and Conciliation Act, 1996 at the discretion of Purchaser. The venue of arbitration shall be at Delhi in India

24.0 Events of Default

24.01 Events of Default. Each of the following events or occurrences shall constitute an event of default ("Event of Default") under the Contract:

- (a) Supplier fails or refuses to pay any amounts due under the Contract;
- (b) Supplier fails or refuses to deliver Commodities conforming to this RFQ/ specifications, or fails to deliver Commodities within the period specified in P.O. or any extension thereof
- (c) Supplier becomes insolvent or unable to pay its debts when due, or commits any act of bankruptcy, such as filing any petition in any bankruptcy, winding-up or reorganization proceeding, or acknowledges in writing its insolvency or inability to pay its debts; or the Supplier's creditors file any petition relating to bankruptcy of Supplier;
- (d) Supplier otherwise fails or refuses to perform or observe any term or condition of the Contract and such failure is not remediable or, if remediable, continues for a period of 30 days after receipt by the Supplier of notice of such failure from BYPL.

25.0 Consequences of Default.

- (a) If an Event of Default shall occur and be continuing, BYPL may forthwith terminate the Contract by written notice.
- (b) In the event of an Event of Default, BYPL may, without prejudice to any other right granted to it by law, or the Contract, take any or all of the following actions;
 - (i) present for payment to the relevant bank the Performance Bond;
 - (ii) purchase the same or similar Commodities from any third party; and/or
 - (iii) recover any losses and/or additional expenses BYPL may incur as a result of Supplier's default.

26.0 Penalty for Delay

26.01 If supply of items / equipments is delayed beyond the supply schedule as stipulated in purchase order then the Supplier shall be liable to pay to the Purchaser as penalty for delay, a sum of 1% (one percent) of the basic (ex-works) price for every week delay of undelivered units or part thereof for individual mile stone deliveries.

- 26.02 The total amount of penalty for delay under the contract will be subject to a maximum of ten percent (10%) of the basic (ex-works) price of total undelivered units.
- 26.03 The Purchaser may, without prejudice to any method of recovery, deduct the amount for such damages from any amount due or which may become due to the Supplier or from the Performance Bond or file a claim against the supplier.
- 26.4 If Penalty is levied as per the Order terms & conditions; BYPL will raise Invoice of the penalty amount along with applicable GST rates. Accordingly, after set off of the penalty Invoice amount, net payment shall be made.

27.0 Variation in Taxes, Duties & Levies

- 27.1 The total order value shall be adjusted on account of any variations in Statutory Levies imposed by Competent Authorities by way of fresh notification(s) within the stipulated delivery period only. In case of reduction in taxes, duties and levies, the benefits of the same shall be passed on to BUYER.
- 27.2 No other Taxes, Duties & Levies other than those specified above will be payable by BUYER except in case of new Levies, Taxes & Duties imposed by the Competent Authorities by way of fresh notification(s) subsequent to the issue of PURCHASE ORDER but within the stipulated delivery period.
- 27.3 Notwithstanding what is stated above, changes in Taxes, Duties & Levies shall applied only to that portion of PURCHASE ORDER not executed on the date of notification by Competent Authority. Further, changes in Taxes, Duties & Levies after due date of Delivery shall not affect PURCHASE ORDER Terms and Value.
- 27.4 PURCHASE ORDER value shall not be subject to any variation on account of variation in Exchange rate(s).

28.0 Taxes & Duties on raw materials & bought out components

- 28.01 Taxes & Duties on raw materials & bought out components are included in Order Value and are not subject to any escalation or variation for any reason whatsoever.
- 28.02 Taxes & Duties on raw materials & bought out components procured indigenously are included in Order Value and are not subject to any escalation or variation for any reason whatsoever.

29.0 Force Majeure

- 29.01 General

An "Event of Force Majeure" shall mean any event or circumstance not within the reasonable control directly or indirectly, of the Party affected, but only if and to the extent that:

- (i) Such event or circumstance materially and adversely affects the ability of the affected Party to perform its obligations under this Contract, and the affected Party has taken all reasonable precautions, due care and reasonable alternative measures in order to prevent or avoid the effect of such event on the affected party's ability to perform its obligations under this Contract and to mitigate the consequences thereof.
- (ii) For the avoidance of doubt, if such event or circumstance would not have materially and adversely affected the performance of the affected party had such affected party followed good industry practice, such event or circumstance shall not constitute force majeure.

- (iii) Such event is not the direct or indirect result of the failure of such Party to perform any of its obligations under this Contract.
 - (iv) Such Party has given the other Party prompt notice describing such events, the effect thereof and the actions being taken in order to comply with above clause.
- 29.02 Specific Events of Force Majeure subject to the provisions of above clause, Events of Force Majeure shall include only the following to the extent that they or their consequences satisfy the above requirements :
- (i) The following events and circumstances :
 - a) Effect of any natural element or other acts of God, including but not limited to storm, flood, earthquake, lightning, cyclone, landslides or other natural disasters.
 - b) Explosions or fires
 - (ii) War declared by the Government of India.
 - (iii) Dangers of navigation, perils of the sea.
- 29.03 Notice of Events of Force Majeure If a force majeure event prevents a party from performing any obligations under the Contract in part or in full, that party shall:
- i) Immediately notify the other party in writing of the force majeure events within 7(seven) working days of the occurrence of the force majeure event
 - ii) Be entitled to suspend performance of the obligation under the Contract which is affected by force majeure event for the duration of the force majeure event.
 - iii) Use all reasonable efforts to resume full performance of the obligation as soon as practicable
 - iv) Keep the other party informed of all such efforts to resume full performance of the obligation on a regular basis.
 - v) Provide prompt notice of the resumption of full performance or obligation to the other party.
- 29.04 Mitigation of Events of Force Majeure Each Party shall:
- (i) Make all reasonable efforts to prevent and reduce to a minimum and mitigate the effect of any delay occasioned by an Event of Force Majeure including recourse to alternate methods of satisfying its obligations under the Contract;
 - (ii) Use its best efforts to ensure resumption of normal performance after the termination of any Event of Force Majeure and shall perform its obligations to the maximum extent practicable as agreed between the Parties; and
 - (iii) Keep the other Party informed at regular intervals of the circumstances concerning the event of Force Majeure, with best estimates as to its likely continuation and what measures or contingency planning it is taking to mitigate and or terminate the Event of Force Majeure.
- 29.05 Burden of Proof In the event that the Parties are unable in good faith to agree that a Force Majeure event has occurred to an affected party, the parties shall resolve their dispute in accordance with the provisions of this Agreement. The burden of proof as to whether or not a force majeure event has occurred shall be upon the party claiming that the force majeure event has occurred and that it is the affected party.
- 29.06 Termination for Certain Events of Force Majeure. If any obligation of any Party under the Contract is or is reasonably expected to be delayed or prevented by a Force Majeure event for a continuous period of more than 3 months, the Parties shall promptly discuss in good faith how to proceed with a view to reaching a solution on mutually agreed basis. If a solution on mutually agreed basis cannot be arrived at within a period of 30 days after the expiry of the period of three months, the Contract shall be terminated after the said period of 30 days and neither Party shall be liable to the other for any consequences arising on account of such termination.
- The Purchaser may terminate the contract after giving 7 (seven) days' notice if any of following occurs:

- i. Bidder fails to complete execution of works within the approved schedule of works, terms and conditions.
- ii. In case the Bidder commits any Act of Insolvency, or adjudged insolvent
- iii. Has abandoned the contract
- iv. Has failed to commence work or has suspended the progress of works
- v. Has failed to proceed the works with due diligence and failed to make such due progress

29.07 Limitation of Force Majeure event. The Supplier shall not be relieved of any obligation under the Contract solely because cost of performance is increased, whether as a consequence of adverse economic consequences or otherwise.

29.08 Extension of Contract Period due to Force Majeure event The Contract period may be extended by mutual agreement of Parties by way of an adjustment on account of any period during which an obligation of either Party is suspended due to a Force Majeure event.

29.09 Effect of Events of Force Majeure. Except as otherwise provided herein or may further be agreed between the Parties, either Party shall be excused from performance and neither Party shall be construed to be in default in respect of any obligations hereunder, for so long as failure to perform such obligations shall be due to and event of Force Majeure."

29.10 Severability
If any provision of this Agreement is or becomes invalid or unenforceable by the courts of any jurisdiction to which it is subject, such invalidity or unenforceability shall not prejudice the remaining provisions of this Agreement, which shall continue in full force and effect.

30.0 Transfer and Sub-Letting

30.01 The Supplier shall not sublet, transfer, assign or otherwise part with the Contract or any part thereof, either directly or indirectly, without prior written permission of the Purchaser.

31.0 Recoveries

31.01 Whenever under this contract any money is recoverable from and payable by the bidder, the purchaser shall be entitled to recover such sum by appropriating in part or in whole by detecting any sum due to which any time thereafter may become due from the supplier in this or any other contract. Should the sum be not sufficient to cover the full amount recoverable the bidder shall pay to the purchaser on demand the remaining balance.

32.0 Waiver

32.01 Failure to enforce any condition herein contained shall not operate as a waiver of the condition itself or any subsequent breach thereof.

33.0 Indemnification

33.01 Notwithstanding contrary to anything contained in this RFQ, Supplier shall at his costs and risks make good any loss or damage to the property of the Purchaser and/or the other Supplier engaged by the Purchaser and/or the employees of the Purchaser and/or employees of the other Supplier engaged by the Purchaser whatsoever arising out of the negligence of the Supplier while performing the obligations under this contract.

34.00 Documentation

34.01 The Bidder shall procure all equipment from BYPL approved sources as per attached specifications. The Bidder's shall submit 5 copies of Material/Type Test Certificates, O&M Manuals, and Approved

& As-built drawings, related to various equipment. The Bidder's shall ensure for the strict compliance to the specifications and Field Quality Procedures issued by BYPL Engineer in-charge.

35.0 Transit Insurance

35.01 Transit Insurance shall be arranged by the Bidder.

35.02 DAMAGE / LOSS OF CARGO IN TRANSIT: Vendor shall be solely responsible for coordinating with the concerned insurance company for procuring insurance for material and/or Goods, processing claim lodgment and settlement. Notwithstanding the insurance cover, in case of loss / damage to material and/or Goods, in any manner and for any cause whatsoever, Vendor shall cause the damaged cargo to be replaced and delivered to the Purchaser with new material and/or Goods within 30 days of such loss / damage. The Vendor shall be solely responsible for all expenses in relation to the replacement and delivery in such circumstances.

36.0 Limitation of Liability

36.01 Except as provided otherwise in the Contract and except for willful misconduct or gross negligence, neither Party shall be liable to the other Party for loss of use of any Works, loss of profit, loss of any contract or any other indirect or consequential loss or damage which may be suffered by the other Party in connection with the Contract. The total liability of the Supplier to the Purchaser under the Contract shall not exceed the Contract Value. Except that this Clause shall not limit the liability of the Supplier:

- (a) Under any other provisions of the Contract which expressly impose a greater liability,
- (b) In cases of fraud, willful misconduct or illegal or unlawful acts, or
- (c) In cases of acts or omissions of the Supplier which are contrary to the most elementary rules of diligence which a conscientious Supplier would have followed in similar circumstances.

37.0 Liability of Suppliers

37.1 Subject to the due discharge of its obligations under the Contract and except in case of gross negligence or willful misconduct on the part of the Supplier or on the part of any person acting on behalf of the Supplier, with respect to any loss or damage caused by the Supplier to the Purchaser's property or the Site, the Supplier shall not be liable to the Purchaser for the following:

- (a) For any indirect or consequential loss or damage; and
- (b) For any direct loss or damage that exceeds:
 - (i) The total payments made and expected to be made to the Supplier under the Contract including reimbursements, if any; or
 - (ii) The insurance claim proceeds which the Supplier may be entitled to receive from any insurance purchased by the Supplier to cover such a liability, whichever is higher.

37.2 This limitation of liability shall not affect the Supplier's liability, if any, for damage to any third party, caused by the Supplier or any Person or firm acting on behalf of the Supplier in executing the Works.

37.3 Notwithstanding anything contained in the Contract, the Supplier shall not be liable for any gross negligence or willful misconduct on the part of the Purchaser or any of its affiliates, any vendor, or any party, other than Supplier and/or, its directors, officers, agents or representatives or its affiliates, or SubSupplier, or the vendor or any third party engaged by it.

37.4 Notwithstanding anything contained in the Contract, including but not limited to approval by the Purchaser of any drawings, documents, vendor list, supply of information or data or the participation of the Purchaser in any meeting and/or discussion or otherwise, shall not absolve the Supplier from any of its liabilities or responsibilities arising in relation to or under the Contract.

38.0 Intellectual Property Rights and Royalties

- 38.1 The Supplier shall indemnify the Purchaser and the Purchaser's Representative from and against all claims and proceedings on account of infringement (or alleged infringement) of any patent rights, registered designs, copyright, design, trademark, trade name, know-how or other intellectual property rights (hereinafter collectively referred to as "**Intellectual Property Rights**") in respect of the Works, Supplier's Equipment, machines, Works method, Plant, Materials, or anything whatsoever required for the execution of the Works and from and against all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto. In the event of infringement of any Intellectual Property Rights of any third party as a result of the execution of the Works (or any part thereof) by the Supplier, the Supplier shall rectify, modify or replace, at its own cost, the Works, Plant or Materials or anything whatsoever required for the Works so that infringement ceases to exist or, in the alternative, the Supplier shall procure necessary rights/ licenses from the affected third party so that there is no infringement of Intellectual Property Rights.
- 38.2 The Supplier shall be promptly notified of any claim made against the Purchaser. The Supplier shall, at its cost, conduct negotiations for the settlement of such claim, and any litigation or arbitration that may arise from it. The Purchaser or the Purchaser's Representative shall not make any admission which might be prejudicial to the Supplier, unless the Supplier has failed to take over the conduct of the negotiations, litigation or arbitration within a reasonable time after having been so requested. In the event of Supplier failing to act at the Purchaser's Representative's notice, the Purchaser shall be at full liberty to deduct any such amount of pending claim from any amount due to the Supplier under the Contract or any other contract and the balance portion of claim shall be treated as debt due from the Supplier.
- 38.3 All Intellectual Property Rights in respect of any Plant, Materials, Drawings and Designs, plans, documents, specifications, data, materials, know how, charts, information, etc., provided to the Supplier by the Purchaser pursuant to this Contract for the execution of the Works, belongs to and shall continue to belong to the Purchaser and the Supplier shall not have any rights in the same other than the limited right for its use for the purpose of execution of the Works.
- 38.4 Intellectual Property Rights in respect of any Plant, Materials, Drawings and Designs, plans, calculations, drawings, documents, know-how and information relating to the Works which are proprietary to the Supplier and/ or its third party licensors ("**Supplier's IPR**") shall continue to vest with the Supplier and/ or its third party licensors and the Supplier shall grant and/ or procure from its third party licensors, at its own cost, a worldwide, perpetual, royalty free, non-exclusive license (along with the right to sub-license) to use and reproduce such Supplier's IPR for the use, operation, maintenance and repair of the Works.
- 38.5 If any patent, trademark, trade name, registered design or software is developed by the Supplier or its SubSupplier specifically for the execution of the Works, then all Intellectual Property Rights in respect of such design, trademark, trade name or software shall be the absolute property of the Purchaser and shall not be utilized or retained by the Supplier (or its SubSuppliers) for any purpose other than with the prior written consent of the Purchaser.
- 38.6 If the Supplier uses proprietary software (whether customized or off the shelf) for the purpose of storing or utilizing records in relation to the Works, the Supplier shall obtain at its own expense, the grant of a worldwide, royalty-free, perpetual licence or sublicense (including the right to sublicense) to use such software, in favour of the Purchaser provided that the use of such software under the licence or the sublicense may be restricted to use any such software only for the design, construction, reconstruction, manufacture, installation, completion, reinstatement, extension, repair and operation of the Works or any part thereof.
- 38.7 If any software is used by the Supplier for the execution of the Works over which the Supplier or a

third party holds pre-existing title or other rights, the Supplier shall obtain for the Purchaser, a worldwide, royalty free, perpetual license for the right to use and apply that software (together with any modifications, improvements and developments thereof).

39.0 Acceptance

- 39.01 Vendor confirms to have gone through the Policy of BYPL on legal and ethical code required to be followed by vendors encapsulated in the "Vendor Code of Conduct" displayed on the official website of BYPL (www.bsesdelhi.com) also, which shall be treated as a part of the contract/PO/WO. Vendor undertakes that he shall adhere to the Vendor code of Conduct and also agrees that any violation of the Vendor Code of Conduct shall be treated as breach of the contract/PO/WO. In event of any such breach, irrespective of whether it causes any loss/damage, Purchaser (BYPL) shall have the right to recover loss/damage from Vendor. The Contractor/Vendor hereby indemnifies and agrees to keep indemnified the Purchaser (BYPL) against any claim/litigation arising out of any violation of Vendor Code of Conduct by the Contractor/Vendor or its officers, agents & representatives etc.
- 39.02 Acceptance of the CONTRACT implies and includes acceptance of all terms and conditions enumerated in the CONTRACT in the technical specification and drawings made available to Contractor consisting of general conditions, detailed scope of work, detailed technical specification, detailed equipment drawing and complete scope of work.
- 39.03 Contractor and Company contractual obligation are strictly limited to the terms set out in the CONTRACT. No amendments to the concluded CONTRACT shall be binding unless agreed to in writing for such amendment by both the parties
- 39.04 We expect your services and supplies are aligned to our Vision, Mission and Values. Please refer to the following link to know about our Vision, Mission and Values; <https://www.bsesdelhi.com/web/bypl/about-bses>

**GENERAL CONDITIONS OF CONTRACT
(GCC- INSTALLATION, TESTING, &
COMISSIONING)**

GENERAL CONDITIONS OF CONTRACT (GCC)- INSTALLATION, TESTING, & COMISSIONING

The General Condition of Contract shall form a part of specifications, contract document.

1. DEFINITIONS and INTERPRETATION:

The following terms shall have the following meanings:

1.1 "Company": means BSES Yamuna Power Ltd, a company incorporated under the Companies Act 1956 and having its office at BSES Yamuna Power Limited having its office at Shaktikiran Building, Karkardooma, Delhi -110032, which expression shall include its authorized representatives, agents, successors and assigns.

1.2 "Contractor": shall mean the successful Tenderer / vendor to whom the contract has been awarded

1.3 "Rate": The unit rates for the work to be carried out at site shall be as per finalized unit rates through tender. The finalized rates shall be firm for the entire duration of work to be carried out by the Contractor under the work order and are not subject to escalation for any reason whatsoever.

1.4. CONTRACT SPECIFICATION: The terms "CONTRACT Specification" shall mean the Technical specification of the work as agreed by you and description of work as detailed in Annexure-I enclosed herewith and all such particulars mentioned directly/referred to or implied as such in the contract.

1.5 SITE: The terms "Site" shall mean the working location in BYPL area. Under this tender, working location shall be as mentioned elsewhere.

1.6 ENGINEER IN CHARGE: "Engineer In-charge" means the Company's authorized representative for the purpose of carrying out the work.

2. EXAMINATION OF SITE AND LOCAL CONDITIONS:

The contractor is deemed to have visited the site of the work and ascertained therefore all site conditions and information pertaining to his work. The company shall not accept any claim whatsoever arising out of the difficult site/terrain/local conditions, if any.

3. LANGUAGE AND MEASUREMENT:

The CONTRACT issued to the contractor by the company and all correspondence and documents relating to the CONTRACT placed on the Contractor shall be written in English language.

Metric System shall be followed for all dimension, units etc.

4. SCOPE OF WORK:

The scope of work shall be "Installation Testing and commissioning of PSS at site(s), Delhi.

SCOPE OF WORK

GENERAL CONDITIONS OF CONTRACT (GCC-SITC) NIT NO: CMC/BY/22-23/RS/SV/23	Page 18 of 28	Bidders seal & Signature
---	-----------------------------	--------------------------

Assembly, Installation, Testing & Commissioning of PSS Includes:

- 1) Construction of concrete foundation/plinth or prefabricated foundation/plinth
- 2) Installation of Package Substation at the designated site.
- 3) Assembling of standard fittings and all accessories (glands, lugs etc).
- 4) Complete testing and commissioning and submission of testing reports/results.
- 5) Earthing of PSS with GI Strip of size 50x6 mm.
- 6) Making cable end terminations. (Note: End Terminations Kits will be provided by the contractors as per approved make of BSES)
- 7) All the labour, cranes tools, and tackles, testing instruments/kit and technical supervision etc. are included in the vendor scope of work.
- 8) The cost of transit insurance, freight, loading/unloading of materials/equipments during its handling/erection at site is included in the vendor scope of work.
- 9) Obtaining EIC (BSES Electrical Inspector) shall be in the scope of bidder, all the necessary documents like drawings, test reports and any other relevant documents shall be provided by the supplier.
- 10) Against this contract individual framework order / intimation of site will be issued and work shall be completed within 30 days from the date of issue or order / intimation.
- 11) Transportation of PSS from Store to site (i.e., loading, Transportation & Unloading), if required.

A Separate order will be placed for supply & ETC which inter-alia includes the Scope of Work as mentioned/required for satisfactory operation of the Scheme shall be in Bidder's scope. Bidder(s) must provide goods and services that conform to these specifications for the entire term of the agreement.

All the labour, cranes, tool and tackles, and technical supervision etc. are including in your scope of work. Adequate number of engineers, supervisors and labours shall be posted at site and the list of the same along with certificate of Qualification of technical staff should be submitted by the Contractor to the Engineer In Charge for checking the adequacy immediately (with in seven days) after award of contract.

All loading/unloading, of materials at work-site shall be your responsibility. Involvement of Crane/Hydra/Tractor/Trailer for this type of work shall be in your scope.

5. RATES:

The rates finalized for this order shall be firm for the entire duration of work carried out by the Contractor under the order and are not subject to any variation and escalation for any reason whatsoever.

Rate for all the extra items shall be mutually negotiated and fixed on the basis of cost of materials, consumables, labour and T&P expenses plus overhead expenses and profit upto maximum 10%.

The cost of insurance during loading/unloading of materials/ equipments during its storage and handling/erection at site for installation is included in the contractor's scope and value is included in the unit rates finalized.

6. TAXES AND DUTIES:

Prices are inclusive of all taxes and duties including labour cess and GST as applicable. However, IT as per applicable rate will be deducted from your bills as Tax Deduction at Source (TDS).

The total order value shall remain **FIRM** and shall only be adjusted on account of any variations in Statutory Taxes, duties and Levies imposed by Competent Authorities by way of fresh notification(s) within the stipulated delivery period.

7. BILL SUBMISSION PROCEDURE:

All bills shall be submitted to the Engineer In charge / Package Engineer for certification. Bills shall be complete in all respect including ESI / HR compliance, Quality compliance, HSE compliance, Store compliance, Finance compliance etc. An established procedure is followed at site. Incomplete bills / invoices will not be considered for processing payments.

8. TERMS OF PAYMENT:

Payment shall be made as under (PSS wise):

i) 100% payment shall be due after 30 days of submission of your bills, after installation of material at site, along with work completion certificate at our office. The work completion certificate shall be issued by Engineer-In-Charge by certifying that the work has been completed in full satisfaction.

9. COMPLETION PERIOD:

The contract shall remain valid for the period of one year.

The rates of E/T/C shall be valid for the quantity ordered against this tender only.

10. CLEANLINESS:

All debris shall be removed and disposed of at assigned areas on daily basis. Surplus excavated earth shall be disposed of in an approved manner. In short, you shall be fully responsible for keeping the work site clean at all times. In case of non-compliance, company shall get the same done at Contractor's risk and costs.

11. COMMISSIONING & ACCEPTANCE TEST:

After completion of the work, the Contractor shall conduct trial run/ operation in the presence of Engineer In charge. During such trial run the system shall be operated under the supervision of the Contractor. If any rectification/modification required during this period the Contractor shall do all necessary measures. On satisfactory completion of above, the system shall be deemed to have energized and placed in commercial operation. The Engineer In Charge will issue an acceptance certificate.

12. WORK COMPLETION CERTIFICATION, HANDING OVER:

The work carried out by the Contractor under this order has to be certified by Engineer In-charge for satisfactory completion of work allotted to the contractor with respect to specifications / Field Quality Procedures as per applicable standards. In case of modification/correction to be carried out, contractor shall carry out the said modifications/correction without additional cost. The Contractor shall remain in close contact with Engineer In-Charge at site to report the general findings of the fieldwork during the initial as well as later stage of the work at site.

13. PENALTY AND LIQUIDATED DAMAGES:

14.1 Penalty: A penalty of 2.5% of bill amount shall be levied in each case of non-compliance of safety practices and site cleanliness.

GENERAL CONDITIONS OF CONTRACT (GCC-SITC) NIT NO: CMC/BY/22-23/RS/SV/23	Page 20 of 28	Bidders seal & Signature
---	-----------------------------	--------------------------

14.2 Liquidated Damages: In the event of any delay in completion of the work beyond the stipulated time given by in order due to reasons solely attributable to the Contractor, the Contractor shall pay to the Company liquidated damages.

If the Contractor failed perform the services within the time period specified in the order, the Company shall, without prejudice to its other remedies under the contract, deduct liquidated damages a sum equivalent to 0.5 % of the basic order value for each week or part there of delay until the actual date of completion up to a maximum deduction of 5% of basic order value. Once the maximum is reached to Company may consider termination of contract without any liabilities to Company.

Engineer In charge should specifically mention the amount of LD levied on the bill of contractor.

14. SAFETY CODE:

The Contractor shall ensure adequate safety precautions at site as required under the law of the land and shall be entirely responsible for the complete safety of their workman as well as other workers at site and premises. The contractor shall not deploy any worker below the age of 18 years.

The contractor shall observe the safety requirements as laid down in the contract and in case of sub-contract (only after written approval of company), it shall be the responsibility of main contractor that all safety requirements are followed by the employees and staff of the sub-contractor.

The contractor employing two hundred employees or more, including contract workers, shall have a safety co-ordinator in order to ensure the implementation of safety requirements of the contract and a contractor with lesser number of employees, including contract workers, shall nominate one of his employees to act as safety co-ordinator who shall liaise with the safety officer on matters relating to safety and his name shall be displayed on the notice board at a prominent place at the work site.

The contractor shall be responsible for non-compliance of the safety measures, implications, injuries, fatalities and compensation arising out of such situations or incidents.

In case of any accident, the contractor shall immediately submit a statement of the same to the owner and the safety officer, containing the details of the accident, any injury or casualties, extent of properly damage and remedial action taken to prevent recurrence and in addition, the contractor shall submit a monthly statement of the accidents to the owner at the end of each month.

15. STATUTORY OBLIGATIONS:

The Contractor shall take all steps as may be necessary to comply with various Acts, Rules, including but not limited to The Child Labour (Prohibition & Regulation) Act, 1986, The Contract Labour (Regulation & Abolition) Act, 1970. The Employees Pension scheme , The Employees Provident Funds and miscellaneous provisions Act, 1952 ,The Employees state Insurance Act,1948,The Equal Remuneration Act, The Industrial Dispute Act,1947, The Maternity Benefit Act , 1961, The Minimum Wages Act, 1948, The payment of Bonus Act ,1965, The Payment of Gratuity Act,1972, The Payment of wages Act, 1936, The Shops & Establishment Act, The Workmen's Compensation Act , 1923, Building and Other Construction Workers (Employment and Regulations) Act 1996, Building and Other Construction Workers (Cess) Act 1996, The Employers Liability Act,1938, Indian Electricity Act, 2003 and Indian Electricity Rules, VAT and Service tax etc., and all other applicable laws as amended and rules framed there under including any statutory approval required from the Central/State Govt. Ministry of Labour. Broadly, the compliance shall be as detailed below, but not limited to:

- a) An Electrical license.
- b) PF Code No. and all employees to have PF A/c No. under PF every Act, 1952.
- c) All employees to have a temporary or permanent ESI Card as per ESI Act.
- d) ESI Registration No.
- e) Sales Tax registration number, if applicable.

- f) PAN No.
- g) Work Contract Tax Registration Number/ VAT Registration.
- h) Labour License under Contract Labour Act (R & A) Act 1970.
- i) Delhi Building and other Construction Worker (Regulation of Employment and Conditions of Services) Rules, 2002(B.O.C.W.)

(Bidder responsible for execution of the job should obtain a copy of Labour License before start of the work by the contractor.)

The Contractor must follow:

- a) Third party Insurance Policy before start of work.
- b) To follow Minimum Wages Act prevailing in the state.
- c) The Salary/wages to all deployed manpower is to be distributed through ECS only into the bank accounts of all individuals and not later than 7th of succeeding month. In case of unavoidable circumstances the payment may be made through crossed cheques in the name of the individual and information of all such cases need to be submitted to HR(CMC).
- d) To maintain Wage- cum - Attendance Register.
- e) To maintain First Aid Box at Site.
- f) Latest P.F. and E.S.I. challans pertaining to the period in which work was undertaken along with a certificate mentioning that P.F. and E.S.I. applicable to all the employees has been deducted and deposited with the Authorities within the time limits specified under the respective Acts.
- g) Workman Compensation Policy. {If applicable}.
- h) Labour license before start of work. {If applicable}.

Before commencing the work it would be mandatory for the Contractor to furnish the Company the permanent PF code no and ESI of the employees.

16. WORKMAN COMPENSATION:

The Contactor shall take insurance policy under the Workman Compensation Act to cover such workers who are not covered under ESI and PF by the Contractor however engaged to undertake the jobs covered under this order and a copy of this insurance policy will be given to Company for reference and records. This insurance policy shall be kept valid at all times. In case there are no worker involve other than those who are covered under ESI and PF by the Contractor, the Contractor shall certify for the same.

The contractor shall keep the company indemnified at all times, against all claims of compensation under the provision of Workmen Compensation Act 1923 and as amended from time to time or any compensation payable under any other law for the time being workman engaged by the contractor/sub-contractor/sub-agent in carrying out the job involved under this work order and against costs and expenses, if any, incurred by the company in connection therewith and without prejudice to make any recovery.

The company shall be entitled to deduct from any money due to or to become due to the Contractor, moneys paid or payable by way of compensation as aforesaid or cost or expenses in connection with any claims thereto and the Contractor shall abide by the decision of the Company as to the sum payable by the Contractor under the provisions of this clause.

17. STAFF AND WORKMAN:

(I) It shall be responsibility of contractor:

- (a) To obtain Contract Labour License from the concerned authorities and maintain proper liaison with them. Necessary Forms for obtaining Labour License would be issued by the company. However you will bear all expenses for obtaining Labour license and registration in PF Department for your scope of work. You will deposit PF of your staff/laborer each month and all related documents should be furnished to us.

(b) To obtain workman insurance cover against deployment of workers etc.

(II) To maintain, proper records relating to workmen employed, in the form of various Registers, namely.

- (a) Register of workmen.
- (b) Register of muster roll.
- (c) Register of overtime.
- (d) Register of wages.
- (e) Any other register as per latest amendment Labour Act.

(III) To disburse monthly wages to your workers/ supervisors in time and in the presence of Company representatives or as directed by the Labour authorities.

(IV) To maintain proper liaison with the Project authorities, local police and all other government and local bodies.

(V) To pay your workmen at least not less than the minimum prescribed wages as per state/Central Labour laws as may be, applicable. The contractor shall, be responsible for compliance of all the provisions of minimum Wages Act, PF, ESIC Act workmen Compensation Act and Contract Labour Regulation & Abolition Act the rules made there under. In case of non- Compliance of the statutory requirements. The company would take necessary action at the risk and cost of the Contractor.

(VI) To employ required number of skilled/semi-skilled and unskilled workmen as per site requirement to complete the entire project as per schedule. To provide safety shoes, safety helmets, safety belts, gloves etc. to your worker/staff as per requirement during erection work.

(VII) To employ necessary engineering and supervisory staff for completion of the Project in time. While day-to-day management of the site and supervision of the works shall be the responsibility of your Engineer - In charge, he will report to the our Engineer in charge to assist him to discharge the overall responsibility of the execution of the project.

18. THIRD PARTY INSURANCE:

Before commencing the execution of the work the Bidder shall take third party insurance policy to insure against any damage or loss or injury which may occur to any property / public property or to any person or any employee or representative of any outside Agency/ the company engaged or not engaged for the work of the company, by or arising out of the execution of the work or temporary work or in carrying out of this Agreement. For third party insurance policies, the Bidder shall be responsible for settlement of claims with the underwriters without any liability on the purchaser / owner and will arrange replacements / rectification expeditiously without a waiting settlement by insurance claim at Bidder's own cost.

19. ENVIRONMENTAL, HEALTH & SAFETY PLAN:

Contractor will make ensure that the Environment, Health & Safety (EHS) requirements are clearly understood and faithfully implemented at all levels at site as per instruction of Company. Contractors must comply with these requirements:

- a) Comply with all of the elements of the EHS Plan and any regulations applicable to the work.
- b) Comply with the procedures provided in the interests of Environment, Health and Safety.
- c) Ensure that all of their employees designated to work are properly trained and competent.
- d) Ensure that all plant and equipment they bring on to site has been inspected and serviced in accordance with legal requirement and manufacturer's or suppliers' instructions.
- e) Make arrangements to ensure that all employees designated to work on or visit the site present themselves for site induction prior to commencement of work.
- f) Provide details of any hazardous substances to be brought onsite.
- g) Ensure that a responsible person accompanies any of their visitors to site.

All contractor's staff are accountable for the following:

1. Use the correct tools and equipment for the job and use safety equipment and protective clothing supplied, e.g. helmets, goggles, ear protection, etc. as instructed.
2. Keep tools in good condition.
3. Report to the Supervisor any unsafe or unhealthy condition or any defects in plant or equipment.
4. Develop a concern for safety for themselves and for others.
5. Prohibit horseplay.
6. Not to operate any item of plant unless they have been specifically trained and are authorized to do so.

20. TEST CERTIFICATE & QUALITY ASSURANCE:

The Contractor shall procure all equipment from genuine sources as approved by the Company and as per Company specifications. The Contractor shall submit all the test certificates and joint inspection reports related to major equipment wherever applicable. The contractor shall ensure for the strict compliance to the specifications and Field Quality Procedures issued by company / Engineer in-charge.

21. SUB-CONTRACTING / SUBLETTING:

CONTRACTOR shall not assign or transfer the whole or any part of this Work Order or any other benefits accruing there from nor shall it subcontract / sublet the whole or any part of the Works without the prior written consent of COMPANY.

In the event the contractor assigns this work order, contractor's assignees shall be bound by the terms and conditions of this work order and shall, if deemed necessary by COMPANY at the time of such assignment, undertake in writing to be so bound by this Work Order.

Notwithstanding the subletting / subcontracting of any portion of the works, contractor shall remain wholly responsible for the carrying out, completion and satisfactory execution of Works in all respects in accordance with this Work Order, specification, approved drawings and data sheets.

22. INDEMNITY:

Contractor shall indemnify and save harmless COMPANY against and from any and all liabilities, claims, damages, losses or expenses arising due to or resulting from:

- a) Any breach non-observance or non-performance by contractor or its employees or agents of any of the provisions of this Work Order.
- b) Any act or omission of contractor or its employees or agents.
- c) Any negligence or breach of duty on the part of contractor, its employees or agents including any wrongful use by it or them of any property or goods belonging to or by COMPANY.

Contractor shall at all times indemnify COMPANY against all liabilities to other persons, including he employees or agents of COMPANY or contractor for bodily injury, damage to property or other loss which may arise out of or in consequence of the execution or completion of Works and against all costs charges and expenses that may be occasioned to COMPANY by the claims of such person.

23. EVENTS OF DEFAULTS:

COMPANY may, without prejudice to any of its other rights or remedies under the Work Order or in law, terminate the whole or any part of this Work Order by giving written notice to the Contractor, if in the

opinion of COMPANY, contractor has neglected to proceed with the works with due diligence or commits a breach of any of the provisions of this work order including but not limited to any of the following cases.

- a) Failing to complete execution of work within the terms specified in this work order.
- b) Failing to complete works in accordance with the approved schedule of works.
- c) Failing to meet requirements of specifications, drawings, and designs as approved by COMPANY.
- d) Failing to comply with any reasonable instructions or orders issued by COMPANY in connection with the works.
- e) Failing to comply with any of the terms or conditions of this work order.

In the event COMPANY terminates this work order, in whole or in part, on the occurrence of any event of default, COMPANY reserves the right to engage any other subcontractor or agency to complete the work or any part thereof, and in addition to any other right COMPANY may have under this work order or in law including without limitation the right to penalize for delay under clause 15.0 of this work order, the contractor shall be liable to COMPANY for any additional costs that may be incurred by COMPANY for the execution of the Work.

24. RISK & COST:

If the Contractor fails to execute the work as per specification / as per the direction of Engineer's In-charge within the scheduled period and even after the extended period, the contract shall get cancel and company reserves the right to get the work executed from any other source at the Risk & Cost of the Contractor. The Extra Expenditure so incurred shall be debited to the Contractor.

25. ARBITRATION:

To the best of their ability, the parties hereto shall endeavor to resolve amicably between themselves all disputes arising in connection with this LOA. If the same remain unresolved within thirty (30) days of the matter being raised by either party, either party may refer the dispute for settlement by arbitration. The arbitration to be undertaken by two arbitrators, one each to be appointed by either party. The arbitrators appointed by both the parties shall mutually nominate a person to act as presiding arbitrator before entering upon the reference in the event of a difference between the two arbitrators and the award of the said presiding arbitrator in such a contingency shall be conducted in accordance with this provisions of the Indian Arbitration & Conciliation Act, 1996 and the venue of such arbitration shall be in the city of New Delhi only.

26. FORCE MAJEURE:

27.1 General:

An "Event of Force Majeure" shall mean any event or circumstance not within the reasonable control, of the Party affected, but only if and to the extent that:

(i) Such event or circumstance, despite the exercise of reasonable diligence, could not have been prevented, avoided or reasonably foreseen by such Party;

(ii) Such event or circumstance materially and adversely affects the ability of the affected Party to perform its obligations under this Contract, and the affected Party has taken all reasonable precautions, due care and reasonable alternative measures in order to prevent or avoid the effect of such event on the affected parties ability to perform its obligations under this Contract and to mitigate the consequences thereof. For the avoidance of doubt, if such event or circumstance would not have materially and adversely affected the performance of the affected party had such affected party followed good industry practice, such event or circumstance shall not constitute force majeure.

(iii) Such event is not the direct or indirect result of the failure of such Party to perform any of its obligations under this Contract; and

(iv) Such Party has given the other Party prompt notice describing such events, the effect thereof and the actions being taken in order to comply with above clause

27.2 Specific Events of Force Majeure:

Subject to the provisions of above clause, Events of Force Majeure shall include only the following to the extent that they or their consequences satisfy the above requirements: The following events and circumstances:

(i) Effect of any natural element or other acts of God, including but not limited to storm, flood, earthquake, lightning, cyclone, landslides or other natural disasters, and

(ii) Explosions or fires

(iii) Declaration of the Site as war zone

Any order, regulation, directive, requirement from any Governmental, legislative, executive or judicial authority.

27.3 Notice of Events of Force Majeure:

If a force majeure event prevents a party from performing any obligations under the Contract in part or in full, that party shall:

(i) Immediately notify the other party in writing of the force majeure events within 2 working days of the occurrence of the force majeure event

(ii) Be entitled to suspend performance of the obligation under the Contract which is affected by force majeure event for the duration of the force majeure event

(iii) Use all reasonable efforts to resume full performance of the obligation as soon as practicable

(iv) Keep the other party informed of all such efforts to resume full performance of the obligation on a regular basis.

(v) Provide prompt notice of the resumption of full performance or obligation to the other party.

27.4 Mitigation of events of force majeure:

The Contractor shall:

(i) Make all reasonable efforts to prevent and reduce to a minimum and mitigate the effect of any delay occasioned by an Event of Force Majeure, including applying other ways in which to perform the Contract;

(ii) Use its best efforts to ensure resumption of normal performance after the termination of any Event of Force Majeure and shall perform its obligations to the maximum extent practicable as agreed between the Parties; and

(iii) Keep the Company informed at regular intervals of the circumstances concerning the event of Force Majeure, with best estimates as to its likely continuation and what measures or contingency planning it is taking to mitigate and or terminate the Event of Force Majeure.

27.5 Burden of proof:

GENERAL CONDITIONS OF CONTRACT (GCC-SITC) NIT NO: CMC/BY/22-23/RS/SV/23	Page 26 of 28	Bidders seal & Signature
---	-----------------------------	--------------------------

In the event that the Parties are unable in good faith to agree that a Force Majeure event has occurred to an affected party, the parties shall resolve their dispute in accordance with the provisions of this Contract. The burden of proof as to whether or not a force majeure event has occurred shall be upon the party claiming that the force majeure event has occurred and that it is the affected party.

27.6 Terminations for certain events of force majeure:

If any obligation of any Party under the Contract is or is reasonably expected to be delayed or prevented by a Force Majeure event for a continuous period of more than 1 (one) month during the Term of the Contract the Contract shall be terminated at the discretion of the Company and neither Party shall be liable to the other for any consequences arising on account of such termination.

27. SECRECY CLAUSE:

The technical information, drawing and other related documents forming part of work order and the information obtained during the course of investigation under this work order shall be the Company's executive property and shall not be used for any other purpose except for the execution of the work order. The technical information drawing, records and other document shall not be copied, transferred, or divulged and/ or disclosed to third party in full/part, not misused in any form whatsoever except to the extent for the execution of this work order.

This technical information, drawing and other related documents shall be returned to the Company with all approved copies and duplicates including drawing/plans as are prepared by the Bidder during the executions of this work order, if any, immediately after they have been used for agreed purpose.

In the event of any breach of this provision, the Bidder shall indemnify the Company against any loss, cost or damage or claim by any party in respect of such breach.

28. TERMINATION:

During the course of the execution, if at any time BSES observe and form an opinion that the work under the order is not being performed in accordance with the terms of this Agreement, BSES reserves its right to cancel this Agreement giving 15 days notice mentioning the reason for the termination of the agreement and BSES will recover all damages including losses occurred due to loss of time from Contractor.

29. QUALITY:

Contractor shall ensure that strict quality is maintained and execution of works under this Work Order and Works are executed in conformity with the Specification.

All tools, tackles, instruments and other equipments used in the execution of the Works shall be duly calibrated as required and Contractor shall maintain proper records of such tools, tackles, instruments and / or equipment.

30. ACCEPTANCE:

Acceptance of this work order implies and includes acceptance of all terms and conditions enumerated in this work order in the technical specification and drawings made available to you consisting of general conditions, detailed scope of work, detailed technical specification & detailed equipment, drawing. Complete scope of work and the Bidder's and Company's contractual obligation are strictly limited to the terms set out in the work order. No amendments to the concluded work order shall be binding unless agreed to in writing for such amendment by both the parties.

However, during the course of the execution of the work order, if at any time the Company's representative observe and form an opinion that the work under the work order is not being performed in accordance with the terms of this work order, the company reserves its right to cancel this work order forthwith without assigning any reason and the Company will recover all damages including losses occurred due to loss of time from the Bidder.

We request you to please sign the duplicate copy of this work order as a token of your acceptance and return to us.

QUANTITY AND DELIVERY REQUIREMENTS

Sl. No.	BYPL SAP Code	Item Description	Specification	Total Qty. (Nos)	Tentative Delivery Schedule	Destination
1	-	SITC OF 11KV SMART PACKAGED SUBSTATION WITH 1000KVA DRY TYPE TRANSFORMER (PSS Type – 9)	BSES-TS-122-SPSS-R0	3	Delivery shall be completed within 04 Month from the LOI/PO date.	BYPL Stores/Sites Delhi

The delivery schedule shown above is tentative. PO(s) will be released as per the actual requirement. However, supplier has to deliver the material within the delivery schedule provided. Schemes may be executed in the phased manner.

APPENDIX II

FORMAT OF PERFORMANCE BANK GUARANTEE **(To be executed on a Non-Judicial Stamp Paper of appropriate value)**

This Guarantee made at _____ this [____] day of [____] 20XX

1. WHEREAS M/s BSES Yamuna Power Limited, a Company incorporated under the provisions of Companies Act, 1956 having its Registered Office at Shaktikiran Building, Karkardooma, Delhi 110032, India hereinafter referred to as the " Owner ", (which expression shall unless repugnant to the context or meaning thereof include its successors, administrators, executors and assigns).
2. AND WHEREAS the Owner has entered into a contract for _____ (Please specify the nature of contract here) vide Contract No. _____ dated _____ (hereinafter referred to as the "Contract") with M/s. _____, (hereinafter referred to as "the Supplier", which expression shall unless repugnant to the context or meaning thereof be deemed to mean and include each of their respective successors and assigns) for providing services on the terms and conditions as more particularly detailed therein.
3. AND WHEREAS as per clause _____ of conditions of Contract, the Suppliers are obliged to provide to the Owners an unconditional bank guarantee for an amount equivalent to ten percent (10%) of the total Contract Value for the timely completion and faithful and successful execution of the Contract from [_____] *pl. specify the name of Bank*) having its head/registered office at [_____] through its branch in _____ (*pl. specify the name of Branch through which B.G is issued*) hereinafter referred to as "the Bank", (which expression shall unless it be repugnant to the context or meaning thereof be deemed to include its successors and permitted assigns).
4. NOW THEREFORE, in consideration inter alia of the Owner granting the Suppliers the Contract, the Bank hereby unconditionally and irrevocably guarantees and undertakes, on a written demand, to immediately pay to the Owner any amount so demanded (by way of one or more claims) not exceeding in the aggregate [Rs.].....(*in words*) without any demur, reservation, contest or protest and/or without reference to the Supplier and without the Owner needing to provide or show to the Bank ,grounds or reasons or give any justification for such demand for the sum/s demanded.

5. The decision of the Owner to invoke this Guarantee and as to whether the Supplier has not performed its obligations under the Contract shall be binding on the Bank. The Bank acknowledges that any such demand by the Owner of the amounts payable by the Bank to the Owner shall be final, binding and conclusive evidence in respect of the amounts payable by the Supplier to the Owner. Any such demand made by the Owner on the Bank shall be conclusive and binding, notwithstanding any difference between the Owner and the Supplier or any dispute raised, invoked, threatened or pending before any court, tribunal, arbitrator or any other authority.
6. The Bank also agrees that the Owner at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor without proceeding against the Suppliers notwithstanding any other security or other guarantee that the Owner may have in relation to the Supplier's liabilities.
7. The Bank hereby waives the necessity for the Owner first demanding the aforesaid amounts or any part thereof from the Suppliers before making payment to the Owner and further also waives any right the Bank may have of first requiring the Owner to use its legal remedies against the Suppliers, before presenting any written demand to the Bank for payment under this Guarantee.
8. The Bank's obligations under this Guarantee shall not be reduced by reason of any partial performance of the Contract. The Bank's obligations shall not be reduced by any failure by the Owner to timely pay or perform any of its obligations under the Contract.
9. The Bank further unconditionally and unequivocally agrees with the Owner that the Owner shall be at liberty, without the Bank's consent and without affecting in any manner its rights and the Bank's obligation under this Guarantee, from time to time, to:
- (i) vary and/or modify any of the terms and conditions of the Contract;
 - (ii) Forebear or enforce any of the rights exercisable by the Owner against the Suppliers under the terms and conditions of the Contract; or
 - (iii) Extend and/or postpone the time for performance of the obligations of the Suppliers under the Contract;

and the Bank shall not be relieved from its liability by reason of any such act or omission on the part of the Owner or any indulgence shown by the Owner to the Suppliers or any other reason whatsoever which under the law relating to sureties would, but for this provision, have the effect of relieving the Bank of its obligations under this Guarantee.

10. This Guarantee shall be a continuing bank guarantee and shall not be discharged by any change in the constitution or composition of the Suppliers, and this Guarantee shall not be affected or discharged by the liquidation, winding-up, bankruptcy, reorganisation, dissolution or insolvency of the Suppliers or any of them or any other circumstances whatsoever.
11. This Guarantee shall be in addition to and not in substitution or in derogation of any other security held by the Owner to secure the performance of the obligations of the Suppliers under the Contract.
12. NOTWITHSTANDING anything herein above contained, the liability of the BANK under this Guarantee shall be restricted to _____ *(insert an amount equal to ten percent (10%) of the Contract Value)* and this Guarantee shall be valid and enforceable and expire on _____ *(pl. specify date)* or unless a suit or action to enforce a claim under this Guarantee is filed against the Bank on or before the date of expiry.
13. On termination of this Guarantee, all rights under the said Guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities hereunder.
14. The Bank undertakes not to revoke this Guarantee during its validity except with the prior written consent of the Owner and agrees that any change in the constitution of the Bank or the Suppliers shall not discharge our liability hereunder.
15. Owner may assign this Guarantee to any Person or body whether natural, incorporated or otherwise under intimation to the Bank. The Bank shall be discharged of its obligations hereunder by performance in accordance with the terms hereof to such assignee without verifying the validity / legality / enforceability of the assignment.
16. This Guarantee shall be governed by the laws of India. Any suit, action, or other proceeding arising out of, connected with, or related to this Guarantee or the subject matter hereof shall be subject to the exclusive jurisdiction of the courts of **Delhi**, India.

Dated this day of 20XX at

(Signature)

.....
(Name)

.....
(Designation with Bank Stamp)

Attorney as per

Power of Attorney No.....

Date.....

BYPL BANK DETAIL WITH IFSC CODE:

1. Name of the Bank: Axis Bank Limited
2. Branch Name & Full Address: C-58, Basement & Ground Floor, Preet Vihar, Main Vikas Marg,
New Delhi 110092
3. Branch Code: 055
4. Bank Account No: 911030003596085
5. IFSC Code: UTIB0000055
6. Swift Code: AXISINBB055

BSE

FORMAT OF WARRANTY/GUARANTEE CERTIFICATE

BSES YAMUNA POWER LIMITED Shaktikiran Building, Karkardooma, Delhi -110032.

Ref. Purchase Order No. :

Dear Sir,

We hereby confirm that the.....dispatched to BSES YAMUNA POWER LTD vide invoice no.....
DT.....is exactly of the same nature and description as per above mentioned Purchase Order.

We further confirm that we will replace/repair our.....free of cost If found any manufacturing defect
during.....months from the date of dispatch of material or.....months from the data of commissioning
whichever is earlier.

Vendors Name & Signature

UNDERTAKING GST

The Vendor shall give an undertaking in the following words on each invoice in the absence of which tax
payment as on the Vendor's invoice may be withheld.

"The tax component as mentioned in the invoice shall be deposited with GST Department as per law by
way of actual payment or by way of legal set off as per law. The turnover billed shall be duly declared in
my GST returns a copy of which shall be filed with the Purchaser. Should the input tax credit to the
Purchaser be denied by way of any lapse on the part of the Vendor, the same shall be paid on demand and
in any case the Purchaser is authorized to deduct the tax equivalent amount from the amount payable to
the Vendor"

SUMMARY OF COMMERCIAL TERMS AND CONDITIONS - SUPPLY

SI No	Item Description	AS PER BYPL	BIDDER'S CONFIRMATION
1	Validity	120 days from the date of submission of bid	
2	Price basis	a) "Firm" , FOR Delhi store basis. Prices shall be inclusive of all taxes & duties, freight upto Delhi stores/sites. b) Unloading at stores/sites shall be in vendor's scope c) Transit insurance in Bidders scope	
3	Payment terms	Part 1) 90% of basic value with 100% taxes and duties shall be paid in 45 days from the date of receipt and acceptance of GOODS at store/site against submission of documents. Part 2) Balance 10% of basic value shall be paid in 30 days from the date of successful testing, commissioning and handing over of individual Package Substation duly certified by BYPL Engineer-in-Charge.	
4	Delivery schedule	GTP/Drawings/QAP/etc to be submitted within 15 days to the concern official in BYPL for Transmittal approval. BYPL shall approve/ provide comments on the submitted drawings within 15 days of first submission. Delivery shall be completed within 16 Weeks from the LOI/PO date or completion as per the schedule	
5	Defect Liability period	60 months after commissioning or 66 months from the last date of dispatch, whichever is earlier	
6	Penalty for delay	1% (One) of the basic value (ex-works value) of undelivered units per week of delay or part thereof, subject to maximum of 10% (Ten) of the total basic value (ex-works value) of undelivered units.	
7	Performance Bank Guarantee	To be submitted within fifteen (15) days from the date of issuance of the Letter of Award/PO, supplier shall establish a performance bond in favor of BYPL in an amount not less than One percent (1%) of the total price of the Rate Contract (the "Performance Bond"). Bidder shall initially submit the PBG for 1% of RC Value valid till RC validity period plus one month. Thereafter bidder shall submit PBG on PO basis for 9% of the PO value valid for a period of 24 months after commissioning or 30 months from the last date of dispatch, whichever is earlier plus 3 months towards claim period	

SUMMARY OF COMMERCIAL TERMS AND CONDITIONS SUMMARY -I/T/C

Sl No	Item Description	AS PER BYPL	BIDDER'S CONFIRMATION
1	Validity	120 days from the due date of submission	
2	Price basis	a) Firm, basis. Prices shall be inclusive of all taxes & duties b) GST shall be paid extra at actual	
3	Payment terms	100% payment will be due after 30 days of submission of bills along with work completion certificate.	
4	Validity of Contract/Schedule of completion	Valid for one year/ each site completion within 30 days from the date of issue or order / intimation of site.	
5	Penalty for delay	0.5 % of the basic order value for each week or part there of delay until the actual date of completion up to a maximum deduction of 5% of basic order value	

VOLUME – II

PRICE BID FORMAT

GRAND SUMMARY

ALL PRICES IN INR (₹)

Package Name	Quantity (Nos) (Q)	Supply Prices- Landed (A)	Erection, Testing and commissioning prices (B)	Unit Package Cost (C=A+B)	Total Package Cost (D=C*Q)
SITC OF 11KV SMART PACKAGED SUBSTATION WITH 1000KVA DRY TYPE TRANSFORMER (PSS Type – 9)	03				

NOTE: Cost of all tests as per technical specification is to be included. No separate charges will be paid.

The Un-priced bid should be marked as **"Quoted"** and to be submitted with Part – A

We declare that the following are our quoted prices in INR for the entire packages.

Date:

Bidders Name:

Place:

Bidders Address:

Signature:

Designation:

Printed Name:

SUPPLY

ALL PRICES IN INR (₹)

S. No.	DESCRIPTION OF GOODS	HSN CODE (8 Digit Mandatory)	UoM	QTY (A)	UNIT BASIC PRICE INCL FREIGHT (₹) (B)	UNIT GST & CESS AS APPLICABLE (CGST & SGST/UTGST or IGST) (₹) (C)		UNIT LANDED RATE (All Inclusive) (₹) (D = B+C)	TOTAL LANDED VALUE (₹) (E = DXA)
						%	AMT		
1	SUPPLY OF 11KV SMART PACKAGED SUBSTATION WITH 1000KVA DRY TYPE TRANSFORMER (PSS Type – 9)		Nos	3					
GRAND TOTAL LANDED VALUE (₹)									
In words									

I/T/C

ITEM DESCRIPTION/ WORK	SAC CODE	QTY (A)	UoM	UNIT RATE (B)	UNIT GST AS APPLICABLE (C)	UNIT LANDED RATE (All Inclusive) (₹) (D = B+C)	TOTAL LANDED COST (₹) (E = DXA)
I/T/C – PSS with Dry DT OF 1000KVA including Plinth Making, Earthing with GI Strip & making of end terminations as per SOW		3	Nos				
Transportation of PSS from stores to site may also be furnished in case the site is not ready (i.e., Loading, Transportation & Unloading)		01	PU				

NOTE

- 1) Item-wise cost for Installation, erection, testing & Commissioning for the items indicated in BOQ- SUPPLY and as per Scope of Work
- 2) In addition, Unit Rates shall be submitted as indicated in BOQ-ERECTION

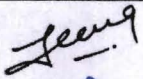



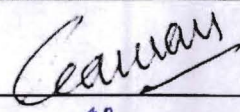

VOLUME – III

TECHNICAL SPECIFICATIONS

BSES

Specification of 11 kV Dry type Smart Package Substation

Specification no – BSES-TS-122-SPSS-R0

Rev	0	
Date:	23/06/2022	
Pages	77	
Prepared by	Jeena Borana	
	Rohit Patil	
Reviewed by	Srinivas Gopu	
	Amit Tomar	
Approved by	Gaurav Sharma	
	Gopal Nariya	

Index

#

Record of Revision	3#
1.0# Scope	4#
2.0# Codes & standards	4#
3.0# Electrical Distribution System Data.....	5#
4.0# PSS Configuration	6#
5.0# PSS Enclosure	7#
6.0# 11KV Ring Main Unit.....	8#
7.0# 11KV XLPE Cable & termination kit.....	18#
8.0# Dry Type Transformer	19#
9.0# LV Switchgear Panel.....	27#
10.0# Automatic Power Factor Correction system	32#
11.0# Energy Meter Box	34#
12.0# Other Provisions: illumination, Hooter & Fire extinguisher	35#
13.0# PSS Enclosure Earthing	36#
14.0# Labels & painting.....	36#
15.0# Approved makes	37#
16.0# Quality assurance Inspection & testing.....	38#
17.0# Shipping, Handling and Site support	41#
18.0# Deviations	42#
19.0# Drawings Submission	42#
Annexure A Service Conditions.....	43#
Annexure B Guaranteed Technical Particulars (Data by Supplier).....	44#
Annexure D Recommended spares (Data by supplier).....	59#
Annexure E Specification of 4G Ethernet Modem for FRTU.....	60#
Annexure F Specification for FRTU.....	62#

BSES	BSES-TS-122-SPSS-R0
Technical Specification of 11 KV Dry type Smart Packaged Substation	

Record of Revision

Revision No	Item / clause no.	Nature of Change	Approved By

Technical Specification of 11 KV Dry type Smart Packaged Substation**1.0 Scope**

- 1.1 Design, manufacture, testing at manufacturer works before dispatch, packing, and delivery of Packaged Substation (PSS) as per this specification and supply of commissioning spares.
- 1.2 Supply of all installation/commissioning accessories for PSS.
- 1.3 Submission of documentation of PSS with operating manuals of each equipment.
- 1.4 Installation testing & commissioning of PSS at site along with interconnection of all components DI/DO/AI signals, status monitoring signals and wireless sensors signals to FRTU. Integration of FRTU with SCADA.
- 1.5 FRTU Licensed software for programming, configuration, troubleshooting and diagnosis of FRTU shall be provided.
- 1.6 Supplier scope includes training of BSES team – 4 batches (each batch with 4-5 engineers) for minimum 3 days at factory for erection, commissioning, maintenance trouble shooting of complete PSS including Transformer, RMU, FRTU, Modem, LT Panel, APFC.
- 1.7 If any item not specifically mentioned in scope but necessary for successful operation of substation shall be deemed to be included in bidder's scope.

2.0 Codes & standards

Materials, equipment and methods used in the manufacture of 11kV Packaged Substation shall conform to the latest edition of following –

S.no	Standard	Title
2.1	Indian Electricity Rules	With latest amendments
2.2	Indian electricity act	IE act 2003
2.3		CBIP manual on transformers
2.4	IEC 60076	Power transformers
2.5	IEC:60616	Terminal and Tapping Markings for Power Transformers
2.6	IEC: 60529	Degrees of Protection Provided by Enclosures (IP Code).
2.7	IEC 60694	Specification for high voltage switchgear
2.8	IEC 60439-1	Low voltage switchgear & control gear assemblies
2.9	IEC 60529	Degree of enclosures provided by enclosures
2.10	IEC 60664-1	Insulation coordination for low voltage systems
2.11	IEC 62262	Degree of protection provided by enclosure against mechanical shocks
2.12	IEC 62271-202	High voltage switchgear & control gear - prefabricated substation
2.13	IEC 60044	Instrument transformers - Current & voltage transformers
2.14	IEC 60225	Electrical relays
2.15	IEC 60625	High voltage switches
2.16	IEC 60502	Power cables

Technical Specification of 11 KV Dry type Smart Packaged Substation

2.17	IEC 60947-2	Low-voltage switchgear and control gear :Circuit breakers
2.18	IS 2026 part 11	Power transformers-Dry type Transformer
2.19	IS 11171	Dry type transformers
2.20	IS 2026	Loading of power transformers
2.21	IS 13947	Low voltage switchgear & control gear
2.22	IS 2099	Bushings for voltages above 1000V
2.23	IS 3156	Voltage transformers
2.24	IS 2705	Current transformers
2.25	IS 1554	PVC cables
2.26	IS 7098	XLPE cables
2.27	IS 2629	Recommended Practice for Hot-Dip Galvanizing of Iron and Steel
2.28	IS 4759	Hot-dip zinc coatings on structural steel and other allied products
2.29	IS 13585	Shunt capacitors
2.30	IS 13340	Shunt capacitors
2.31	IS 3043	Code of practice for Earthing
2.32	IS 8130	Conductors for insulated cables
2.33	IS 5	Ready mixed paints

In the event of direct conflict between various order documents, the precedence of authority of documents shall be as follows -

- i. Guaranteed Technical Particulars (GTP)
- ii. Specification including applicable codes & standards
- iii. Approved Vendor Drawings
- iv. Other documents

3.0 Electrical Distribution System Data

3.1.1	HT supply System	3 phase AC, 3 wire
3.1.2	Voltage	11000 volt $\pm 10\%$
3.1.3	Frequency	50 Hz $\pm 5\%$
3.1.4	Fault level	350MVA – 18.5kA
3.1.5	System neutral	Earthed at upstream 11kV source
3.2.1	LT supply system	3 phase AC, 4 wire
3.2.2	Rated voltage	415V $\pm 10\%$
3.2.3	Rated frequency	50 Hz $\pm 5\%$
3.2.4	Fault level	35MVA – 50kA

Technical Specification of 11 KV Dry type Smart Packaged Substation**4.0 PSS Configuration****4.1 Types of PSS- General**

S.no	PSS type	DT rating, kVA	RMU	LT Panel						APFC rating, kVAr @400V
				Incomer, ACB		Buscoupler, ACB		Outgoing, MCCB		
				Rating, Amps	Qty, no's	Rating, Amps	Qty, no's	Rating, Amps	Qty, no's	
4.1.1	Type 1	2000	3Way	3200	1	NA	NA	630	12	600
4.1.2	Type 2	2000	4Way	3200	1	NA	NA	630	12	600
4.1.3	Type 3	2000	3Way	3200	1	3200	1	630	10	600
4.1.4	Type 4	2000	4Way	3200	1	3200	1	630	10	600
4.1.5	Type 5	1600	3Way	3200	1	NA	NA	630	10	500
4.1.6	Type 6	1600	4Way	3200	1	NA	NA	630	10	500
4.1.7	Type 7	1600	3Way	3200	1	3200	1	630	8	500
4.1.8	Type 8	1600	4Way	3200	1	3200	1	630	8	500
4.1.9	Type 9	1000	3Way	2000	1	NA	NA	630	7	300
4.1.10	Type 10	1000	4Way	2000	1	NA	NA	630	7	300
4.1.11	Type 11	1000	3Way	2000	1	2000	1	630	5	300
4.1.12	Type 12	1000	4Way	2000	1	2000	1	630	5	300
4.1.13	Type 13	630	3Way	1250	1	NA	NA	630	5	200
4.1.14	Type 14	630	4Way	1250	1	NA	NA	630	5	200
4.1.15	Type 15	630	3Way	1250	1	1250	1	630	5	200
4.1.16	Type 16	630	4Way	1250	1	1250	1	630	5	200
4.1.17	Type 17	400	3Way	800	1	NA	NA	630	3	200
4.1.18	Type 18	400	4Way	800	1	NA	NA	630	3	200
4.1.19	Type 19	400	3Way	800	1	800	1	630	3	200
4.1.20	Type 20	400	4Way	800	1	800	1	630	3	200

BSES	BSES-TS-122-SPSS-R0
Technical Specification of 11 KV Dry type Smart Packaged Substation	

4.2 Type of PSS- Multistoried building

S.no	PSS type	DT rating, kVA	RMU	LT Panel								APFC rating, kVAr @400V
				Incomer, ACB		Buscoupler, ACB		Outgoing				
								ACB		MCCB		
Rating, Amps	Qty, no's	Rating, Amps	Qty , no's	Rating, Amps	Qty, no's	Rating, Amps	Qty, no's					
4.2.1	Type 21	2000	3Way	3200	1	NA	NA	2000	2	630	2	600
4.2.2	Type 22	2000	4Way	3200	1	NA	NA	2000	2	630	2	600
4.2.3	Type 23	1600	3Way	3200	1	3200	1	2000	2	630	2	500
4.2.4	Type 24	1600	4Way	3200	1	3200	1	2000	2	630	2	500

5.0 PSS Enclosure

5.1	Service conditions	For outdoor use
5.2	Material for enclosure	Galvanised Sheet steel 2mm thick with painting
5.3	Enclosure construction	Frame supported construction with all doors, covers welded with steel channel ribs at every 1000mm minimum
5.4	Lifting lugs for site handling / lifting by crane	Four numbers on top to enable lifting of total package unit without any problem
5.5	PSS enclosure door	a) Doors to be provided for all LT, HT and Transformer compartment. b) The door arrangement should be folded type design, the width of each folding section door is limited to 600mm. c) The doors should be internal anti theft hinge with minimum opening angle of 120°, minimum 3 nos. with lockable handle & with padlocking facility d) The door limits switch to be provided for status of door.
5.6	Top & other side walls of package substation enclosure	Welded sheet metal to main frame
5.7	Removable canopy above top cover	2mm thick sheet metal with 10° slope
5.8	Enclosure integral steel base frame	'I' section of suitable size to support total static and dynamic load

Technical Specification of 11 KV Dry type Smart Packaged Substation

5.9	Base frame bottom support pads for fixing by bolt to foundation	Minimum six numbers to rest on foundation
5.10	Enclosure compartments	Separate compartments for RMU, transformer & LV switchgear/APFC
5.11	Separation between RMU & transformer compartment	By sheet steel 2mm thick
5.12	Separation between transformer compartment & LV compartment	By sheet steel 2mm thick
5.13	Degree of ingress protection against solids & water as per IS12063	IP53 for RMU compartment IP23 for transformer compartment IP33 for LV compartment
5.14	Louvers on side covers of transformer compartment & side walls of LV compartment	To be provided with steel wire mesh welded from inside so as to meet IP requirement
5.15	Louver area on cover / side wall	1500mm height x 1500mm desirable
5.16	Exhaust Fans	Mounted in LV compartment to discharge air in transformer compartment & Controlled by SPMCB & thermostat to operate above 35 deg C, 2x150CFM, 220V DC. Rectifier to be provided for exhaust fan supply.
5.17	Gland plate for RMU compartment	3 mm thick MS plate suitable for 3x3c300sqmm AYFY 11kv cable
5.18	Gland plate for LV compartment	3 mm thick MS plate suitable for rated LT outgoing as per the PSS type. Each LT outgoing is suitable for 2X4CX300 sq mm cable.
5.19	Class of enclosure as per IEC 62271-202	10K
5.20	Internal Arc classification	IAC AB 20 KA, 1s
5.21	Limiting dimensions of package enclosure	
5.21.1	Type 1 to Type 8 and Type 21 to 24 configuration	4200(L) x 3000(W) x 3200(H)
5.21.2	Type 9 to Type 20 configuration	3400(L) x 2600(W) x 2600(H)

6.0 11KV Ring Main Unit

6.1.1	RMU Configuration	As per the PSS type
6.1.1.1	3 Way RMU, all are VCB modules.	
6.1.1.1.1	Cable feeder 1	Motorized VCB with manual operation facility. FPI and CBCT to be provided.
6.1.1.1.2	Cable feeder 2	Motorized VCB with manual operation facility. FPI and CBCT to be provided.

Technical Specification of 11 KV Dry type Smart Packaged Substation

6.1.1.1.3	Transformer feeder	Motorized VCB with manual operation facility. Self power relay with protection CTs to be provided.
6.1.1.2	4 Way RMU, all are VCB modules.	
6.1.1.2.1	Cable feeder 1	Motorized VCB with manual operation facility. FPI and CBCT to be provided.
6.1.1.2.2	Cable feeder 2	Motorized VCB with manual operation facility. FPI and CBCT to be provided.
6.1.1.2.3	Transformer feeder 1	Motorized VCB with manual operation facility. Self power relay with protection CTs to be provided.
6.1.1.2.4	Transformer feeder 2	Motorized VCB with manual operation facility. Self power relay with protection CTs to be provided.
6.1.2	Extensibility	Non extensible type
6.1.3	Insulation Medium	
6.1.3.1	For panel	SF6 gas in sealed metallic tank
6.1.3.2	Breakers	Vacuum type (with disconnecter & earth switch)
6.1.4	Arc interruption chamber for breaker	Arc interruption chamber of breakers shall be separate from the main insulated tank.
6.1.5	Maximum dimensions of RMU	1250 mm(W) X 800 mm (D) X 2000 mm (H)
6.2.0	RMU Panel Construction	
6.2.1	Panel type	Metal enclosed, framed, Compartmentalized panel construction
6.2.2	Service Location	Indoor, non air conditioned environment
6.2.3	Mounting	Free Standing
6.2.4	Overall Enclosure Protection	IP4X minimum, vermin proof
6.2.5	Doors	Front access with internal anti theft hinge arrangement with minimum opening angle of 120°, minimum three hinges (desirable)
6.2.6	Covers	Bolted for rear access, with handles. Support for handle shall be provided at suitable place on RMU body. All the accessible bolts / screws shall be vandal proof. One set of required Special tools per RMU (if any) shall be in the scope of supply.
6.2.7	Construction	Sheet metal 2.5mm thick CRCA
6.2.8	Base frame	a) Made of CRCA steel b) Base frame height should be 300 mm
6.2.9	Power Cable Clamping Arrangement	Shall be provided for each power cable alongwith HDPE cable clamps (to suit the cable size from 150 to 400 sq mm PILC / XLPE cable. Exact size shall be provided during drawing approval stage.)
6.2.10	Lifting lugs	Four numbers

Technical Specification of 11 KV Dry type Smart Packaged Substation

6.2.11	Cable Entry	Bottom
6.2.12	Gland plate	Separate for control cable & power cable 3mm metallic, removable type & split type in two parts, with 1 no ,90mm diameter knockout punch/ hole in the centre.
6.2.13	Cable termination	
6.2.13.1	Cable type & size	3C X 150 / 240 / 300 /400 sq mm Aluminium conductor XLPE/ PILC with armour & PVC outer sheath
6.2.13.2	Terminals for 11kV cable termination	.
6.2.13.2.1	Terminals	M16 size Set of required size of stud suitable for M 16 size Ring type lug & bimetallic washers.
6.2.13.2.2	Bimetallic washers	Required
6.2.13.2.3	Right angled boots	Minimum 20mm spacing between boots preferred. Type test reports, maintenance replacement plan shall be submitted.
6.2.13.2.4	Cable Test Plug	Preferred with cable test plug facility, without opening of cable compartment
6.2.13.3	Termination type	Suitable for heat shrinkable type
6.2.13.4	Termination height	700mm minimum, from gland plate
6.2.14	Bus bar	Tinned copper with sleeve (Sizing Calculation to be submitted in support of its Guaranteed S.C. rating / Capability)
6.2.14.1	Bus bar continuous rated current	630amp
6.2.14.2	Bus bar short time withstand capacity	20 KA for 3 sec
6.2.14.3	Bus bar support insulator material	SMC / DMC resin
6.2.14.4	Maximum temperature rise above reference ambient	In line with Table 3 of IEC60694
6.2.15	Earth bus bar	Aluminum / Copper sized for rated fault duty for 1 sec
6.2.15.1	Earth bus internal connection to all noncurrent carrying metal parts	By 2.5 sq mm copper flexible wire, Earth connection point maximum 1 meter away from cable test facility
6.2.15.2	Earth bus external connection to owners earth	Studs on both sides with holes for M10 bolt + hardware to readily receive purchaser earth connection
6.2.16	Cooling arrangement	By natural air without fan
6.2.17	Panel internal wiring	a) Multi strand flexible color coded PVC insulated Cu wire 1 sq mm (SCADA) b) 1.1KV , PVC insulated 2.5 sq mm cu cable for CT connection. c) Colour of wire (R phase - Red, Y phase –

Technical Specification of 11 KV Dry type Smart Packaged Substation

		Yellow, B phase – Blue, AC- black, DC – grey, Earth – green) with ferrules at both ends. All the internal control / auxiliary wiring shall be routed through proper conduit.
6.2.18	Hardware (Nut, bolts & handle)	Stainless steel (Except termination nut-bolts which are Brass / Tinned Copper)
6.2.19	Gasket	Neoprene rubber
6.2.20	Marshalling terminal blocks	Terminal block size should be suitable for 2.5 Sq mm, Nylon 66 material, screw type + 20% spare in each row of TB.
6.2.21	Panel cover fixing bolts	Allen head 6mm with hexagonal slot
6.2.22	Padlock facility	Required for all earth switches & all handles
6.2.23	Internal Arc classification	
6.2.23.1	Explosion vents	To ensure operator's safety, design should ensure that gases / flames generated during flash over / blast in any of the compartment, must not come out from the front of RMU as well shall not go to adjacent cable compartment. Internal arc test report (for Cable compartment & other compartments) must be submitted to support above, along with RMU GA drawing indicating these vents. There shall not be any type of holes, gaps etc on the walls of cable termination compartment.
6.2.23.2	Internal Arc rating	20 kA for 1s
6.2.23.3	Internal arc classification	Shall comply to the requirements of IEC 62271-200, Accessibility type AFLR. Operators of equipment shall be protected against the effects of an arcing fault in any of the MV compartment at all times , including while carrying out the maintenance works on other compartments
6.2.23.3	SF6 Gas Annual Loss	< 0.1% of total mass. Pressure of SF6 gas shall be above the operating limit throughout the life of the equipment.
6.3.0	Circuit breaker	
6.3.1	Type	Three pole, operated simultaneously by a common shaft
6.3.2	Arc interruption medium	Vacuum Bottle
6.3.3	Operating mechanism	Motorized spring charged stored energy type with facility for manual charging
6.3.4	Motor rated voltage	24V DC
6.3.5	Emergency trip / open push button	On panel front with Protective flap to prevent any accidental tripping of breaker.

Technical Specification of 11 KV Dry type Smart Packaged Substation

6.3.6	Continuous rating	630amp
6.3.7	Short time withstand capacity	20 KA for 3 sec
6.3.8	Minimum number of operations at rated current (as per IEC 62271-100)	Mechanical Endurance – Class M1(2000 operations) Electrical Endurance – Class E2
6.3.9	Fault making capacity	50 KA peak
6.3.10	Fault breaking capacity	20 KA Minimum
6.3.11	Maximum number of operations at rated Fault current (as per IEC 62271-100)	Electrical Endurance – Class E2. To be guaranteed by manufacturer with authorized lab test reports
6.3.12	Breaker status auxiliary contact	2NO + 2NC wired to terminal block
6.4	Earth switch	
6.4.1	Type	Three Pole, operated simultaneously by a common shaft for each Circuit breaker.
6.4.2	Dielectric medium	SF6 gas
6.4.3	Operating mechanism for close & open	Manual
6.4.4	Fault making capacity	50 kA (Desirable)
6.4.5	Auxiliary contacts	1NO+1NC wired to terminal block
6.4.6	Disconnect switch (if provided in series with vacuum bottle)	Desirable to be located on purchaser cable connection side of vacuum bottle
6.4.7	Minimum number of operations at no load (as per IEC 62271-102)	Mechanical Endurance – Class M0(1000 operations)
6.4.8	Making capacity endurance of earth switch (as per IEC 62271-102)	Class E2 (Min 10 operations)
6.5	For Cable Feeder circuit breaker module (Module 1& Module 2)	
6.5.1	Self powered relay	Not required
6.5.2		
6.5.3	Fault passage indicator (FPI)	To be provided cable feeders
6.5.4	Fault passage indicator (FPI) (Earth fault and over current protection type)	a) To be provided on each and every cable feeder for RMU. FPI shall be earth fault and over current protection type and shall be suitable for remote load monitoring at SCADA for cable feeders. b) CBCT – Split open type suitable for mounting without disconnection of cable for EF.

Technical Specification of 11 KV Dry type Smart Packaged Substation

		c) Phase sensor – 3 Nos. split open type for short ckt. purpose with mounting arrangement
6.5.5	Connection of CBCT with FPI	Cable connection of FPI with CBCT shall be of pre moulded type on the CBCT side. Cable shall be 2.5 sq.mm cu cable or fiber cable.
6.5.6	Fault Passage Indicator	<p>a) Digital type and shall operate as the current exceeds the set value. Flash indication for identifying faults with red LED with one flash for every one sec. Test & reset button 1 NO + 1 NC potential free contact for remote indication FPI power supply unit shall use lithium battery with minimum life of 1000 blinking hours , so that FPI shall continue to function even after main feeder has tripped. FPI shall be powered with 24V DC in all motorized RMU.</p> <p>b) FPI shall be suitable for remote load monitoring at SCADA for Cable feeder. FPI shall be provided with Remote communication capability with SCADA on Modbus Protocol. The Load current as measured by FPI shall be communicated to SCADA.</p>
6.5.6.1	Earth Fault Indicator	
6.5.6.1.1	Sensing Current	50 to 400A
6.5.6.1.2	Sensing Time	30 to 100 ms in steps of 10ms.
6.5.6.1.3	Reset Time	0.5 -1-2-3-4 hr
6.5.6.1.4	Resetting Facility	<p>a) Self rest after reset time</p> <p>b) Self rest after restoration of voltage</p> <p>c) Manual</p> <p>d) Remote resetting</p>
6.5.6.1.5	Contact Rating	1A at 230 V
6.5.6.1.6	Degree of Protection	IP 54
6.5.6.1.7	Mounting Arrangement	Surface or Flush Mounting
6.5.6.1.8	Ambient Temperature	-20 to 55 Deg C
6.5.6.2	Short Ckt indicator	
6.5.6.2.1	Sensing Current	200 to 1200 A
6.5.6.2.2	Sensing Time	30 to 100 ms in steps of 10 ms
6.5.6.2.3	Reset time	0.5-1-2-3-4 hr
6.5.7	Data by Purchaser	
6.5.7.1	System Fault Level	2kA – 8.75kA

Technical Specification of 11 KV Dry type Smart Packaged Substation

6.5.7.2	Type of Grounding	Solidly Grounded
6.5.7.3	Fault clearing time	100ms
6.5.7.4	Cable Type	XLPE , 70 sq.mm to 400 sq.mm
6.6	For Transformer circuit breaker module (Module 3)	
6.6.1	Current transformer	<ul style="list-style-type: none">a) 75-150-400 / 1 ampb) Resin Cast Ring typec) Considering three core cable terminations, mounting flexibility shall be provided for CT's (in horizontal & vertical direction both). Additionally, CAUTION marking (by sticker/ paint) shall be provided to avoid CT's installation above the screen of cable. (i.e. earth potential point.)d) Disconnecting type terminal block shall be provided for CT Circuit.e) Change in CT ratio shall be possible from the disconnecting type TB. Any change in CT ratio from CT secondary will not be acceptable.
6.6.2	CT accuracy class	5P10 minimum
6.6.3	CT burden	CT burden should be 20% higher than the connected relay burden.
6.6.4	Protection relay	<ul style="list-style-type: none">a) Self powered, Microprocessor based Numerical relay (with backlit LCD display), IDMT over current / earth fault protection with high set element, manual reset type, flush mounted on panel frontb) Relay Setting 10 % to 250% In insteps of 1%c) The relay should record atleast 10 fault events on FIFO basisd) Relay should have event recordere) Relay auxiliary supply shall be 24V DC for all motorized RMU. For non Motorized RMU relay shall be with 240V AC auxiliary for remote trippingf) RS-485 Port to be provided on the Relay for remote communication of the parameters to the SCADA through FRTU over IEC103 Protocol. Necessary internal wiring also shall be done between Relay and FRTU.g) Licensed software shall be provided for Relay communication with Laptop along with necessary cables for interconnection between Laptop and Relay (Based on requirement).h) Appropriate wiring to be done to connect all the relays to the FRTU.
6.6.5	Relay auxiliary contacts for remote indication	Potential free contact 1NO + 1NC wired to terminal block

Technical Specification of 11 KV Dry type Smart Packaged Substation

6.6.6	Shunt trip 24V DC (for WTI trip & door limit switch & for remote trip from SCADA.)	To be wired to terminal blocks
6.7	FRTU and Associated equipment battery, BHMU and battery charger	
6.7.1	Battery	
6.7.1.1	Battery type	SMF lead acid battery
6.7.1.2	Rating	24V DC, 26AH (min). It shall be rated for 10 close & 10 open operations of RMU CBs motor as well as 3 hrs back up for all equipment install inside FRTU cabinet (mini FRTU load shall be consider 50 W). However the actual battery and battery charger sizing shall be finalize by owner during detail engineering and bidder has to supply the finalized size of battery and battery charger without any price implication.
6.7.1.3	Location	Battery shall be kept in shielded compartment in FRTU panel and fixed with rivet and nut bolt. Individual battery terminal shall be wired upto terminal blocks mounted in FRTU cabinet.
6.7.2	Battery Health Monitoring Unit (BHMU)	<ol style="list-style-type: none">1. BHMU will have Auto / Manual test facility. In Auto Mode it ensures battery automatic discharge at preset set period with 100W discharge resistor along with suitable algorithm to check the healthiness based on rate of discharge.2. In manual Mode PB provided for battery testing.3. Provision for Bypass mode of BHMU shall also be provided.4. Output contacts :230V/24V DC -5A<ol style="list-style-type: none">a. Battery Fail: 1 COb. Test In process5. Indications:<ol style="list-style-type: none">a. BHMU healthy.b. Battery Failc. Battery Lowd. Test On.
6.7.3	Battery charger	2 no's chargers with auto change over using 10A diodes.
6.7.3.1	MCBs at charger input & output supply	Required 2nos DP MCB for AC Incoming supply All the MCBs shall be easily accessible for operation, with proper labeling. All AC MCB shall be 2 poles. MCB location shall be preferably away from Battery charger location.
6.7.3.2	Charger temperature rise at heat sink at full load for 2 hours	Maximum 55 deg C above ambient of 40 deg C

Technical Specification of 11 KV Dry type Smart Packaged Substation

6.7.3.3	Battery charger cooling method	Natural without any fans
6.7.3.4	Individual CBs DC control	Required with MCB
6.7.4	FRTU	FRTU shall be provided and integrated with RMU and LV compartment with completely wired along with Modem suitable for communicating over GSM network and also have facility to communicate with fibre network. Bidder shall demonstrate the data communication of FRTU modem with MCC/BCC for the proposed modem for approval of owner in the Pre Order technical evaluation stage. For detailed specification of FRTU, I/O requirements , refer standard specification of Annexure F
6.7.5	Modem	Modem should be dual sim 4G and shall also have compatibility of 3G/2G network. For detailed technical specification of modem, please refer Annexure E
6.7.6	Transducer	DC voltage transducer (4-20mA) for monitoring of DC battery bus voltage.
6.8	Requirements of sealed housing live parts (RMU SF6 gas chamber)	
6.8.1	Enclosure	Stainless steel enclosure suitable for IP67
6.8.2	SF6 gas pressure low alarm	To be given
6.8.3	Provision for SF6 gas filling	To be given (For 'sealed for life' design of RMU, this is not applicable)
6.8.4	Provision for SF6 gas pressure indication	Manometer with non return valve
6.8.5	Arc interruption method for SF6 breaker / Load break switch	Puffer type / rotating arc type
6.8.6	Potential free contacts for SF6 gas pressure low	1NO +1NC (Desirable)
6.9	RMU operation interlocks	
6.9.1	Circuit breaker & respective earth switch	Only one in 'close' condition at a time
6.9.2	Prevent the removal of respective cable covers if circuit breaker is 'ON'	Electrical / Mechanical
6.9.3	Prevent the closure circuit breaker if respective cable cover is open	Electrical / Mechanical
6.9.4	Cable test plug for CB accessible only if Earth switch connected to earth	Mechanical
6.9.5	Prevent motorized operation of CB during manual operation	Electrical / Mechanical Electrical signal shall cut-off completely during manual operation. If CB fail to operate, the supply to motor shall be disconnected after certain time period

Technical Specification of 11 KV Dry type Smart Packaged Substation

		to prevent burning of motor due to continuous supply.
6.9.6	Prevent motorized operation of more than one CB at a time	Necessary feature (Electrical)
6.10.1	Indication & signals	Local
6.10.1.1	Operation counter on front / Inside the RMU LT chamber	To be provided for each Circuit breaker, with minimum four digits & non resettable type
6.10.1.2	Cable charge status indication for all CB	Capacitor type voltage indicators with LED on all the phases (Shall be clearly visible in day light)
6.10.1.3	Spring charge status indication	On front for breaker
6.10.1.4	Circuit breaker On/OFF indication	Green for OFF / Red for ON
6.10.1.5	Earth switch closed indication (For Each CB)	On front
6.10.1.6	Circuit breaker protection relay operated on fault	Flag
6.10.1.7	Fault passage indication on CB	Flag
6.10.2	Status signals to SCADA-to be wired to marshalling terminal block	2NO + 2NC
6.10.2.1	CB close / open	potential free contacts
6.10.2.2	CB Earth Switch close /open	potential free contacts
6.10.2.3	Battery charger Fail	potential free contacts
6.10.2.4	CB close / open	potential free contacts
6.10.2.5	Protection relay operated	potential free contacts
6.10.2.6	FPI operated	potential free contacts
6.10.2.7	SF6 gas pressure low	potential free contacts
6.10.2.8	Ready to close signal to control centre to indicate all interlocks are OK	Potential free contacts. Signal to indicate Ready for remote operation from Scada required for entire closing and entire tripping ckt. with all interlocks accounted for (Make : Gogate with P Card / Eqvt after approvals)
6.10.2.9	Local / Remote Switch	a) A manual Local / Remote selector switch shall be provided for each FRTU to disable all control outputs by breaking the power supply connection to the control outputs. b) When in the "Local" position, the Local/ remote switch shall allow testing of all the control outputs of FRTU without activating the control outputs to field devices. A status input indication shall be

BSES	BSES-TS-122-SPSS-R0
Technical Specification of 11 KV Dry type Smart Packaged Substation	

		provided for the Local/ Remote switch to allow the SCADA system to monitor the position of the switch. c) The status of Local/ Remote switch should be wired and configured in FRTU.
6.10.2.7	Commands from SCADA- to be wired to marshalling terminal block	Cable feeder close / open
		Cable feeder close / open
		FPI Reset
		Transformer feeder Trip
6.11.0	Mimic diagram, labels & finish	a) Mimic diagram (Shall not be accepted with Stickers) b) On panel front with description of function & direction of operation of handles/buttons
6.11.1	Operating Instructions	Operating instruction chart and Do's & Don'ts in Hindi / local language to be displayed on left / front side of panel enclosure on anodized Al Sheet 16SWG, duly affixed on panel.
6.11.2	Name plate on panel front	Fixing by rivet only
6.11.2.1	Material	Anodized aluminum 16SWG / SS
6.11.2.2	Background	SATIN SILVER
6.11.2.3	Letters, diagram & border	Black
6.11.2.4	Process	Etching
6.11.2.5	Name plate details	Month & year of manufacture, equipment type, input & output rating, purchaser name & order number, guarantee period
6.11.3	Labels for meters & indications	Anodized aluminum with white character on black background OR 3 ply lamicaid
6.11.4	Danger plate on front & rear side	Anodized aluminum 16 SWG with white letters on red background
6.11.5	Painting surface preparation	Shot blasting or chemical 7 tank process
6.11.6	Painting external finish	Powder coated epoxy polyester base grade A, shade -RAL 7032, uniform thickness 60 micron minimum
6.11.7	Painting internal finish	Powder coated epoxy polyester base grade A, shade -white, uniform thickness 60 micron minimum

7.0 11KV XLPE Cable & termination kit

The 11kV XLPE cable connection from RMU to distribution transformer shall be conforming to IS 7098 and shall have all the following features –

Technical Specification of 11 KV Dry type Smart Packaged Substation

7.1	Cable type & size	XLPE insulated armoured / un armoured cable 3C x 150 sqmm Aluminium conductor
7.2	Cable voltage grade	11KV
7.3	XLPE insulation thickness	3.14 mm minimum
7.4	Aluminium conductor no of strands	As per Table 2 of IS 8130
7.5	Insulation screen	With semi conducting extrusion, copper tape & water swellable tape
7.6	Type of armour	GI flat as per table 4 of 7098 part 2
7.7	11KV end termination at RMU	By 11kv grade end termination kit, heat shrink type
7.8	11KV end termination at Distribution transformer	By 11kv grade end termination kit, heat shrink type
7.9	Cable support from RMU to transformer HT side cable box	GI cable tray 300mm wide

8.0 Dry Type Transformer

8.1.0	Major Design criteria	
8.1.1	Voltage variation on supply side	+ / - 10 %
8.1.2	Frequency variation on supply side	+/- 5 %
8.1.3	Transient condition	- 20 % or + 10 % combined variation of voltage and frequency
8.1.4	Service Condition	Refer Annexure B, the transformer enclosure in PSS is to be designed for outdoor location with service condition as specified, but its full rating shall be available if located indoor in poorly ventilated atmosphere
8.1.5	Insulation Level	
8.1.5.1	One minute power frequency withstand voltage	28KV for 11KV system & 3KV for 415 V system
8.1.5.2	Lightning impulse withstand voltage	75KV peak for 11KV system
8.1.6	Short Circuit withstand Capacity of the transformer	
8.1.6.1	Three phase dead short circuit at secondary terminal with rated voltage maintained on the other side	For 3 secs.

Technical Specification of 11 KV Dry type Smart Packaged Substation

8.1.6.2	Single phase short circuit at secondary terminal with rated voltage maintained on other side voltage maintained on other side	For 3 secs.				
8.1.7	Overload capability	As per IEC 60905				
8.1.8	Noise level	Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard				
8.1.9	Radio Influence Voltage	Maximum 250 Microvolt				
8.1.10	Harmonic currents	Transformer to be designed for suppression of 3rd, 5th, 7th harmonic voltages and high frequency disturbances.				
8.1.11	Partial Discharges	Transformer to be free from partial discharge upto 120 % of rated voltage as the voltage is reduced from 150 % of rated voltage i.e. there shall be no significant rise above background level				
8.1.12	Parallel operation	Shall be designed to operate in parallel with existing transformer. Details of existing transformers shall be forwarded to the bidder on request				
8.1.13	Fire Protection class	Class F1 shall be required				
8.1.14	Climate class	Class C2 shall be required				
8.1.15	Environment class	Class E2 shall be required				
8.2.0	Major Parameters					
8.2.1	Rating	2000kVA/1600kVA/1000KVA/ 630KVA/ 400KVA				
8.2.2	Voltage Ratio	11kV / 433 volts				
8.2.3	Vector Group	Dyn11				
8.2.4	Impedance	a) 5% for 400kVA/630kVA &1000kVA, tolerance as per IS b) 6% for 400kVA/630kVA &1000kVA, tolerance as per IS				
8.2.5	Losses at 130 deg C					
8.2.5.1	No load Loss –Max in KW	2000 KVA	1600 KVA	1000 KVA	630 KVA	400 KVA
		3.56	3.2	1.78	1.2	0.9
8.2.5.2	Load losses at principal tap- Max in KW	2000 KVA	1600 KVA	1000 KVA	630 KVA	400 KVA
		15.25	12	7.5	5.4	3.4
8.2.6	Temperature rise winding	Outside PSS without enclosure			Inside PSS max.	
		80°C			90°C	

Technical Specification of 11 KV Dry type Smart Packaged Substation

8.2.7	Flux density	Maximum flux density at 10 % over excitation /overfluxing-1.9 Tesla maximum	
8.2.8	Tapping on HV winding	Off Circuit taps on HV winding , + / - 10 % in steps of 2.5 % , change of taps by link	
8.2.9	Design Clearances	Phase – phase	Phase - earth
8.2.9.1	11KV system	180mm	120mm
8.2.9.2	415V system	25mm	25mm
8.2.9.3	415V system	25mm	25mm
8.3	Construction & Design		
8.3.1	Core		
8.3.1.1	Material	High grade , non ageing, low loss, high permeability, grain oriented, cold rolled silicon steel lamination	
8.3.1.2	Grade	Premium grade minimum M3 or better	
8.3.1.3	Lamination thickness	0.23mm (Max)	
8.3.1.4	Design Flux Density at rated conditions at principal tap	1.7 Tesla	
8.3.1.5	Maximum Flux Density at 10 % over excitation / over fluxing	1.9 Tesla maximum allowed	
8.3.1.6	Core Design Features	a. All steel sections used for supporting the core shall be thoroughly sand blasted after cutting , drilling, welding. b. Provision of lifting lugs for core coil assembly	
8.3.2	Winding		
8.3.2.1	Material	Electrolytic Aluminum	
8.3.2.2	Maximum Current Density allowed	Maximum allowed 1.5 A per sqmm	
8.3.2.3	Winding Insulating material	Class F minimum, free from compounds liable to ooze out, shrink or collapse. Uniform insulation shall be applied to the windings and overall winding shall be epoxy cast resin	
8.3.2.4	Tapping	Off Circuit taps on HV winding , + / - 5 % in steps of 2.5 % , change of taps by link	
8.3.2.5	Essential provision for tap links	Shall be shrouded with cover made from insulating material. To prevent deposit of dust.	
8.3.2.6	Design features	a) Stacks of winding to receive adequate shrinkage treatment b) Connections braced to withstand shock during transport, switching, short circuit, or other transients. c) Minimum out of balance force in the transformer winding at all voltage ratios. d) Conductor width on edge exceeding six times its thickness	

Technical Specification of 11 KV Dry type Smart Packaged Substation

		<ul style="list-style-type: none">e) The termination bus-bar coming out from winding shall be tinned Copperf) Transposed at sufficient intervals.g) Threaded connection with locking facility.h) Winding leads rigidly supported, using guide tubes if practicablei) Provision of taps as indicated in the technical particulars
8.3.2.7	Essential provision of HV and LV winding leads	Phase marking required near termination on both HV and LV side. Phase colour coding required on insulating sleeves on both HV and LV side. Phase sequence 1U, 1V, 1W from left to right looking inside from the HV side door. Phase sequence 2n, 2u, 2v, 2w from right to left looking inside from LV side door Adequate HV termination clearance. Provision of check nut in all HV and LV winding lead connection.
8.3.3	Vibration Isolator	Vibration isolation pads shall be installed between core and coil assembly and enclosure base assembly to prevent the transmission of structure borne vibrations.
8.3.4	Bushings/Support Insulator/ terminations	
8.3.4.1	Type of HV and LV Bushings, support insulators	Epoxy Resin Cast
8.3.4.2	Minimum Creepage of bushings and support Insulators	31 mm / kV
8.3.4.3	Arcing horns	Not required
8.3.4.4	Termination on HV side	By cable within main enclosure by separable connector
8.3.4.5	HV side cable size	11 kV (E) grade , A2XCEWY 3C x 150 sqmm
8.3.4.6	Cable lugs	Long barrel medium duty Aluminium lug with knurling on inside surface. and suitable for cable size for 11 kV (E) grade , A2XCEWY 3C x 150 sqmm
8.3.4.7	HV side bushing	Indoor, Epoxy resin cast, 12kV voltage class and creepage 31mm/KV
8.3.4.7	Termination on LV side	Suitable bus bar as per PSS spec
8.3.5	Current Transformers	
8.3.5.1	Mounting	On LV side terminal busbars on all three phases and neutral with the help of fibre glass mounting plate
8.3.5.2	Maintenance requirements	Replacement should be possible without dismantling LV side support insulators
8.3.5.3	Accuracy Class	0.5s
8.3.5.4	Burden	5VA
8.3.5.5	Type	Resin Cast Ring type suitable for outdoor use
8.3.5.6	CT ratio	<ul style="list-style-type: none">a) 400/630kVA -1000/5 Ampsb) 1000kVA -1500/5 amp

Technical Specification of 11 KV Dry type Smart Packaged Substation

		c) 1500kVA- 2500/5 amp d) 2000kVA-3000/5 amp
8.3.6	Hardware	
8.3.6.1	External	Stainless Steel up 10mm size and Hot dip galvanized for 12mm and above size bolts.
8.3.6.2	Internal	Cadmium plated except special hardware for frame parts and core assembly as per manufacturer's design
8.4	Gasket	Neoprene rubber based gasket across all doors & covers
8.5	Control cable specification (to be used by the vendor)	PVC insulated, extruded PVC inner sheathed, FRLS , armoured, extruded PVC outer sheathed 1100 V grade control cable as per latest edition of IS 1554 part 1 minimum 2.5 sqmm for signals and 4 sqmm for CT with multistrand copper conductor
8.6	Terminal Blocks to be used by the vendor	Nylon 66 material, minimum 4 sq mm, screw type for control wiring and potential circuit.
8.6.1	Essential provision for CT terminals	Sliding link type disconnecting terminal block screwdriver operated stud type with facility for CT terminal shorting material of housing melamine/ Nylon66
8.7	Painting of WTI box	
8.7.1	Surface preparation	By 7 tank pre-treatment process CRCA sheet or Powder coating for GI sheet.
8.7.2	Finish on internal / external surfaces	Polyurethane based painting, min. Dry film thickness 80 microns
8.7.3	Insulating support material for base plate for mounting components	Bakelite shall not be used as a base plate for mounting any components, insulating material non hygroscopic insulating material like FRP shall be used.
8.8	Minimum Protective devices on Transformer	
8.8.1	Surge Arrestor	Required, Connected on Transformer Primary side on all three phases
8.8.1.1	Type	Metal oxide
8.8.1.2	Housing	Polymeric preferable
8.8.1.3	Rating	9 KV
8.8.1.4	Continuous operating voltage , kV rms	6.35
8.8.1.5	Maximum Continuous operating voltage, kV rms	7.65
8.8.1.6	Nominal Discharge Current, kA peak	5
8.8.1.7	Energy Absorption Capability, kJ/kV	Greater than 2.5
8.8.1.8	Creepage factor	31 mm /kV
8.8.1.9	Reference std	IS 3070 part 3 and IEC 99-4

Technical Specification of 11 KV Dry type Smart Packaged Substation

8.8.2	Winding Temperature scanner	Required
8.8.2.1	No of RTD inputs	Five (Three for windings, one for enclosure & one shall be spare) RTD for enclosure temperature monitoring shall be fixed at enclosure Top from inside to give max enclosure temp reading & shall be wired up to temp. scanner to indicate the reading
8.8.2.1.1	Location of winding RTD	At location of winding where maximum temperature is expected.
8.8.2.2	No of potential free trip contacts	Two
8.8.2.3	No of potential free Alarm contacts	Two
8.8.2.4	Auxiliary supply	240 V AC, 1 phase, 50 Hz. Tapped from LV side busbar through a MCB located inside box
8.8.2.5	Communication	RS 485 Port for communication on Modbus protocol for remote SCADA indication
8.8.2.6	Winding Temperature Scanner terminal Box	Required
8.8.2.6.1	Size	As per Manufacturer's Standard
8.8.2.6.2	Fixing of instrument within box	On base plate
8.8.2.6.3	Fixing of terminals within the box	On C channel available with the terminals
8.9	Fitting and accessories	
8.9.1	Rating & Diagram plate	Required
8.9.1.1	Material	Anodized aluminum 16SWG
8.9.1.2	Background	SATIN SILVER
8.9.1.3	Letters, diagram & border	Black
8.9.1.4	Process	Etching
8.9.1.5	Name plate details	Following details shall be provided on rating and diagram plate as a minimum a) Type of transformer i.e cast resin or VPI etc. With winding material b) IS / IEC standard to which it is manufactured c) Manufacturer's name; d) Transformer serial number; e) Month and year of manufacture f) Rated frequency in HZ g) Rated voltages in KV h) Number of phases i) Rated power in KVA j) Type of cooling k) Rated currents in a l) Vector group symbol m) 1.2/50 μ s wave impulse voltage withstand level in

Technical Specification of 11 KV Dry type Smart Packaged Substation

		<p>KV</p> <p>n) Power frequency withstand voltage in KV</p> <p>o) Impedance voltage at rated current and frequency in percentage at principal, minimum and maximum tap at highest temperature</p> <p>p) Load loss at rated current at highest temperature</p> <p>q) No-load loss at rated voltage and frequency</p> <p>r) Auxiliary loss</p> <p>s) Continuous ambient temperature at which ratings apply in c</p> <p>t) Winding connection diagram with taps and table of tapping voltage, current and power</p> <p>u) Transport weight of transformer</p> <p>v) Weight of core and windings</p> <p>w) Weight of enclosure and fittings</p> <p>x) Total weight</p> <p>y) Tapping details</p> <p>z) Phase ct details</p> <p>aa) Class of insulation</p> <p>bb) IP protection rating of the enclosure</p> <p>cc) Name of the purchaser</p> <p>dd) Po no and date</p> <p>ee) Guarantee period</p>
8.9.2	Detachable Bi-directional flat Roller Assembly	Required
8.9.2.1	Roller center to center distance	Minimum 900 mm on the side of HV and LV termination Maximum 800 mm on the other side (perpendicular to HV, LV termination). and LV termination Maximum 800 mm on the other side (perpendicular to HV, LV termination).
8.9.2.2	Essential provision	Roller dia. 150 mm min., roller to be fixed in such a way so that the lowermost part of the skid is above ground by at least 100 mm when the transformer is installed on roller.
8.9.3	Earthing pad on enclosure for transformer earthing complete with Stainless Steel nut, bolt, washers, spring washers etc.	Required with identification plate on outside of enclosure.
8.9.4	Core, Frame to tank Earthing	Required
8.9.5	Off Circuit tapping link	Required
8.9.6	Tap link position plate	Required inside HV side door
8.9.7	Danger plate made of Anodized aluminium with white letters on red background on HV and LV side	Required
8.9.8	Skid with Haulage lugs	Required

Technical Specification of 11 KV Dry type Smart Packaged Substation

8.9.9	Lifting lugs for complete transformer as well as enclosure	Required
8.9.9.1	Essential provision for lifting lugs	Lifting lugs for core coil assembly shall be provided in such a way that the weight shall not come on canopy while lifting. Lifting lugs for canopy/ enclosure shall be provided in such a way that the weight shall not come on canopy while lifting, it shall be borne by supporting members.
8.9.10	Caution Plate for tap links	Required
8.9.11	Ventilation louvers with stainless steel wire mesh and rain water guard	Required as per Manufacturer's design, but it is to be provided minimum required preventing ingress of excessive dust.
8.9.12	Surge Arrestor & its Grounding bushing	Required
8.9.12.1	Essential provision	Surge arrestor shall be erected vertically in such a way that the surge arrestor can be removed at site without removing HV cable lug. Surge arrestor shall not be used for any kind of support. Surge arrestor grounding strip to be routed to the surge arrestor grounding bushing near bottom of enclosure with proper support. Surge arrestor grounding bushing shall be identified by identification plate on outside of enclosure. Surge arrestor grounding bushing shall be supplied with all hardware to readily connect purchaser's ground lead.
8.9.13	LV additional neutral earthing bushing	Required
8.9.13.1	Essential provision	Busbar connecting the neutral to additional neutral bushing shall be properly supported and additional neutral bushing shall be identified by identification plate on outside of enclosure. Additional neutral bushing shall be supplied with all hardware to readily connect purchaser's ground lead.
8.9.14	Winding temperature scanner with inbuilt RS 485 port for SCADA communication	Required
8.9.15	RTD in Winding and near top of enclosure.	Required
8.9.16	Space heater inside enclosure	Thermostatically controlled space heater inside enclosure required, supply of space heater from feeder pillar through MCB fixed properly inside enclosure.
8.9.1	Mounting of space heater	By suitable spacers so that heater does not come in contact with panel wall directly.
8.9.17	Copper earthing link	Across all gasketed joints in the enclosure body.

Technical Specification of 11 KV Dry type Smart Packaged Substation**9.0 LV Switchgear Panel**

9.1	LV busbar system	
9.1.1	Type of connection on transformer	By flexible copper link rated size as per the transformer size.
9.1.2	Busbar material	High conductivity electrolytic grade aluminium
9.1.3	Main Bus bar	a. Suitable for carrying rated continuous current depending upon the incomer ACB rating. Current density should be less than 1A per sqmm. Busbars shall be continuous throughout the panel. b. Size of neutral busbar should be same as phase busbar.
9.1.4	Vertical/Dropper Busbar	a. Bus bars rating should be same as the rating of respective ACB/MCCB. Current density should be less than 1A per sqmm. b. Size of neutral busbar should be same as phase busbar. c. Bus bars shall be colour coded with heat resistant colour tapes.
9.1.5	Busbar Joints	a. Shall be silver plated. Adequate contact pressure shall be ensured b. Bimetallic connectors shall be provided, as necessary c. Length of overlap shall be more than the width of Busbar
9.1.6	Temperature Rise	20 degrees over ambient (maximum)
9.1.7	Insulation	a. Bus bar shall be provided with colour coded PVC insulating heat shrinkable sleeves rated for maximum operating voltage b. Insulating shroud should be provided on all joints
9.1.8	Bus insulator	Non-hygroscopic, Flame retardant, Track resistant type with high creepage surface (31mm/kV), epoxy resin insulators
9.1.9	Phase barrier	All cable termination shall be provided with phase barriers.
9.1.10	Neutral link	Bolted disconnecting links shall be provided for all incoming and outgoing feeders for isolation of neutral, if necessary
9.2.0	Air Circuit Breaker	
9.2.1	General Features	
9.2.1.1	Rated Current at 40 deg C	Rating of ACB as per the configuration table. De-rating @50 deg C shall be mentioned separately.
9.2.1.2	Number of Poles	4 Pole ACB
9.2.1.3	ACB mounting	Fixed type
9.2.1.4	Line-Load Reversibility	Required
9.2.1.5	Terminals	Suitable for connection with aluminium busbars with phase barriers & shrouds

Technical Specification of 11 KV Dry type Smart Packaged Substation

9.2.1.6	Operating mechanism	Electrical and manual spring charging, stored energy type
9.2.1.7	Operation counter	4 digit minimum, non reversible
9.2.1.8	Operating handle	Required
9.2.1.9	ACB indications	Separate ON / OFF / TRIP, L/R in remote & spring charge status
9.2.1.10	Closing coil	Closing coil shall operate correctly at all values of voltage between 85% & 110% of the rated voltage.
9.2.1.11	Tripping coil	Shunt trip shall operate correctly at all values of supply voltage between 70% & 110% of rated voltage.
9.2.1.12	ACB auxiliary contacts	6 NO + 6 NC minimum
9.2.1.13	ACB operating knob sealing	Possible in OFF condition
9.2.1.14	CT Requirement	All phase and neutral
9.2.1.15	Access to releases, coils & add on type replaceable parts to ACB	From front only
9.2.1.16	ACB indications	a. Separate ON / OFF / TRIP b. Spring charge status
9.2.1.17	ACB ingress protection (without enclosure)	IP2X minimum
9.2.1.18	Pollution degree as per IS	2 – non conductive pollution
9.2.1.19	ACB temperature rise limits	As per table 2 & 3 of IS 60947-1
9.2.2	Operation Features	
9.2.2.1	Number of phases	Three phase & neutral
9.2.2.2	Rated Operational Voltage(V)	415V
9.2.2.3	Rated Insulation Voltage (V)	1000V
9.2.2.4	Rated Impulse Voltage	8 kV for main circuit
9.2.2.5	Category of utilization	B
9.2.2.6	Rated Ultimate breaking capacity at rated voltage	a. Icu = 50kA minimum (up to 2000A rating ACB) b. Icu = 65kA minimum (above 2000A rating ACB)
9.2.2.7	Rated Service breaking capacity at rated voltage Ics	Ics =100% Icu
9.2.2.8	Rated short term withstand current for 1 sec at rated voltage - Icw	Icw = 100% Icu
9.2.2.9	Rated making current capacity -Icm	Icm = 220% Icu
9.2.2.10	Number of operating cycles at rated current (open + close) without changing arcing contact	5000
9.2.2.11	Number of mechanical operating cycles (open +	20000

Technical Specification of 11 KV Dry type Smart Packaged Substation

	close)	
9.2.2.12	Product Information marking on ACB	As per clause 5 of IS 60947 Part-I. In addition name of purchaser shall be marked on front of device
9.2.3	Measurement and Protection Requirement	
9.2.3.1	Microprocessor release	a. Microprocessor based release with true RMS based sensing. b. Self powered, tapped from incoming side of supply, setting panel with locking arrangement
9.2.3.2	Protections Required	Overload, short-circuit & earth fault
9.2.3.3	Tripping characteristic	Inverse definite minimum time characteristics for Short circuit and earth fault protection
9.2.3.4	Overload setting	40% -100% In, steps of 10%.
9.2.3.5	Overload setting time delay	2.5 s to 40 s minimum three settings
9.2.3.6	Short Circuit Setting	100% - 800% of In, steps of 10%.
9.2.3.7	Short Circuit Setting time delay	50 ms - 400 ms in steps of 50ms
9.2.3.8	Instantaneous setting	200% - 1500% of In & OFF
9.2.3.9	Earth fault setting	10- 100 % of In, steps of 10%
9.2.3.10	Earth fault setting time delay	50ms - 400 ms in steps of 50ms
9.2.3.11	Neutral unbalance	Earth fault function should not operate during neutral unbalance. Same will be verified during inspection.
9.2.3.12	Measurements required in release	a. Phase wise current b. Phase wise voltage c. Power factor d. Maximum current with date and time e. Instantaneous Power: Active, Reactive and apparent power f. Power Demand g. Energy
9.2.3.13	Metering measurement accuracy	a. 1% for current and voltage b. 2% for Power and energy
9.2.3.14	Other release requirements	a. Release should have backlit display. b. Release should be plug-in type and easily replaceable in field. c. Separate fault indication shall be provided for each protection stage i.e overload, short circuit and earthfault d. Release should store 10 fault records on FIFO basis with date and time stamp. e. Release should have 2 Digital Inputs. CB On and Off status shall be wired to DIs through auxiliary switch. f. Release should have RS485 port for SCADA communication on open Modbus protocol. It should be able to transmit all measured,

Technical Specification of 11 KV Dry type Smart Packaged Substation

		monitored and recorded data to SCADA including status of DIs. g. Remote time synchronization through SCADA should be possible
9.3.0	MCCB	
9.3.1	General Features	
9.3.1.1	Standard current rating at 40 deg C	As per the PSS configuration (De-rating @50 deg C shall be mentioned separately)
9.3.1.2	Construction	The MCCBs shall comprise of Four poles in a single construction. All the parts shall be enclosed in a moulded insulating material housing.
9.3.1.3	Type	The MCCBs shall be trip free type with quick make and break design.
9.3.1.4	Terminals	Suitable for connection with aluminium busbars with phase barriers & shrouds
9.3.1.5	CT Requirement	All phase and neutral
9.3.1.6	Access to releases, coils & add on type replaceable parts to MCCB	From front only
9.3.1.7	Indications	MCCBs shall be provided with mechanical position indicator with shrouded terminals. MCCB's shall have ON/OFF/trip positions.
9.3.1.8	MCCB ingress protection (without enclosure)	IP2X minimum
9.3.1.9	Pollution degree as per IS	2 – non conductive pollution
9.3.1.10	ACB temperature rise limits	As per table 2 & 3 of IS 60947-1
9.3.2.0	Operation Features	
9.3.2.1	Number of phases	Three phase & neutral
9.3.2.2	Rated Operational Voltage(V)	415V
9.3.2.3	Rated Insulation Voltage (V)	1000V
9.3.2.4	Rated Impulse Voltage	8 kV for main circuit
9.3.2.5	Category of utilization	A
9.3.2.6	Rated Ultimate breaking capacity at rated voltage	Icu = 50kA minimum
9.3.2.7	Rated Service breaking capacity at rated voltage Ics	Ics =100% Icu
9.3.2.8	Rated short term withstand current for 1 sec at rated voltage - Icw	Icw = 100% Icu
9.3.2.9	Rated making current capacity -Icm	Icm = 220% Icu
9.3.2.10	Number of operating cycles at rated current	5000

Technical Specification of 11 KV Dry type Smart Packaged Substation

	(open + close) without changing arcing contact	
9.3.2.11	Number of mechanical operating cycles (open + close)	20000
9.3.2.12	Product Information marking on MCCB	As per clause 5 of IS: 13947 Part-I. In addition name of purchaser shall be marked on front of device
9.3.3	Measurement and Protection Requirement	
9.3.3.1	Microprocessor release	a. Microprocessor based release with true RMS based sensing. b. Self powered, tapped from incoming side of supply, setting panel with locking arrangement
9.3.3.2	Protection	Overload, short-circuit & earth fault
9.3.3.3	Tripping characteristic	Inverse definite minimum time characteristics for Short circuit and earth fault protection
9.3.3.4	Overload setting	40% -100% I_n , steps of 10%.
9.3.3.5	Overload setting time delay	2.5 s to 40 s minimum three settings
9.3.3.6	Short Circuit Setting	100% - 800% of I_n , steps of 10%.
9.3.3.7	Short Circuit Setting time delay	50 ms - 400 ms in steps of 50ms
9.3.3.8	Instantaneous setting	200% - 1500% of I_n & OFF
9.3.3.9	Earth fault setting	10- 100 % of I_n , steps of 10%
9.3.3.10	Earth fault setting time delay	50ms - 400 ms in steps of 50ms
9.3.3.11	Neutral unbalance	Earth fault function should not operate during neutral unbalance. Same will be verified during inspection.
9.3.3.12	Measurements required in release	a. Phase wise current b. Phase wise voltage c. Power factor d. Maximum current with date and time e. Instantaneous Power: Active, Reactive and apparent power f. Power Demand g. Energy
9.3.3.13	Metering measurement accuracy	a. 1% for current and voltage b. 2% for Power and energy
9.3.3.14	Other release requirements	a. Release should have backlit display. b. Release should be plug-in type and easily replaceable in field. c. Separate fault indication shall be provided for each protection stage i.e overload, short circuit and earthfault d. Release should store 10 fault records on FIFO basis with date and time stamp. e. Release should have 2DIs for MCCB On and Off status shall be wired to DIs through auxiliary switch.

Technical Specification of 11 KV Dry type Smart Packaged Substation

		<ul style="list-style-type: none">f. Release should have RS485 port for SCADA communication on open Modbus protocol. It should be able to transmit all measured, monitored and recorded data to SCADA including status of DIs.g. Remote time synchronization through SCADA should be possible
9.3.10	Common RS 485 port	<ul style="list-style-type: none">a. Communication ports of all MCCBs and ACBs shall be looped and connected to a common RS485 port provided in the panel for interfacing with SCADA on open modbus protocol.b. If any additional communication device is required for looping/combining of ACB and MCCB data is to be provided.
9.3.11	Serial Port surge protection device	To be provided

10.0 Automatic Power Factor Correction system

The APFC equipment shall be located in LV compartment of package enclosure either as a separate panel or integrated along with LV Switchgear and shall have all the following features

10.1	APFC Output	As per the PSS configuration clause 4.0 APFC should be rated at 440V. Manufacturer need to specify the rated output at 440V.
10.2	APFC mounting	All components mounted in shelf type arrangement on package substation enclosure LV compartment wall or RMU compartment wall or Part of LT Panel
10.3	APFC relay & data logger	Mounted on base plate supported on compartment wall by three hinges
10.4	APFC system bus bar power connection to transformer LT side	<ul style="list-style-type: none">a) By 4CX300sqmm AYFY 1100V grade cable to or Bus Bars for 200kVAR/300kVAR APFC ratingb) By 2X4CX300sqmm AYFY 1100V grade cable to or Bus Bars for 600kVAR/800kVAR APFC rating
10.5	APFC system bus bar size	<ul style="list-style-type: none">a) 50x10mm tinned copper mounted on SMC insulators 1100V grade for 200kVAR/300kVAR APFC ratingb) 100x10mm tinned copper mounted on SMC insulators 1100V grade for 200kVAR/300kVAR APFC rating
10.6	APFC system CT input signal	From CT on transformer LV side by 7CX2.5sqmm YY 1100V grade cable
10.7	APFC capacitor modules	As per the requirement
10.8	Capacitor duty contactor for each capacitor module	Utilization category 6b as per IS

Technical Specification of 11 KV Dry type Smart Packaged Substation

10.9	MCCB for each capacitor module	100amp, Three Pole, Ics=Icu=35kA
10.10	Connection to each MCCB from APFC system bus	By 35sqmm copper wire double insulated with tinned copper lugs
10.11	APFC control supply	Through 415/240v transformer, 2amp / 6amp SP MCB
10.12	APFC relay	Microprocessor based relay for automatic control of minimum 12 capacitors in sequential or cyclic switching fashion with settable time delay 0 -180 sec.
10.13	APFC relay LCD display with self monitoring feature	To show no. of capacitors energized, actual PF & target PF, voltage & current
10.14	Target power factor setting range	0.8 lag to 0.9 lead in steps of 0.1
10.15	APFC relay sensing	3 phase CT input 5 amp to sense max load current
10.16	No volt protection in relay	To switch OFF all capacitors
10.17	Capacitor unit 25KVAR type	Double layer All Poly Propylene (APP) or Mixed Poly Propylene (MPP)
10.18	Capacitor unit construction	1.5mm thick sheet metal welded tank or Al cylindrical construction
10.19	Capacitor unit impregnant	Dry type filler or non PCB liquid
10.20	Capacitor unit conducting layer	Al foil or metalized film
10.21	Capacitor sealing	Hermetic sealing after vacuum process
10.22	Capacitor unit safety	Pressure sensitive dis-connector or internal fuse for each element
10.23	Discharge resistor	Between all three phases of capacitor unit, to reduce the voltage across the capacitor to 50V or less in one minute
10.24	Terminal bushings	For rated voltage class 1 KV Suitable wires / terminals brought out from capacitor unit is also acceptable.
10.25	Earth connection for individual capacitor container	To be done & connected to main earth bus bar of the panel
10.26	APFC Operational features	
10.26.1	Automatic power factor correction	To achieve target lagging power factor without hunting
10.26.2	Operation for rated output	At continuous rated voltage (440 V) & frequency (50 Hz)
10.26.3	Operation with over voltage	115% of rated voltage for 12 hours in a day
10.26.4	Operation with harmonic distortion	THD voltage – 5% & THD current 3%
10.26.5	Maximum permissible over current	1.3 times rated current, continuous
10.26.6	Dielectric loss	0.2 watt per KVAR maximum

Technical Specification of 11 KV Dry type Smart Packaged Substation

10.26.7	Temperature Category & Maximum temperature rise	- 5 / 60 deg C Not exceeding 10 deg C over 60 deg C.
10.26.8	Residual voltage after disconnection from mains	50 volts maximum after 60 seconds
10.26.9	Design life of capacitor unit	Minimum 10 years
10.27.0	Data Logger	
10.27.1	General	Accuracy class 0.5, microprocessor based with LCD display, with 3 CTs for measurement of cumulative KWH, power factor, voltage & current of transformer secondary, THD of voltage.
10.27.2	Data logging and Software	Data logging of KWH value at every 30 minutes to give cumulative reading of KWH for 45 days minimum, data downloadable in ASCII-II or MS Excel format. Software for downloading the data from data logger to be provided by data logger vendor.
10.27.3	Display communication and	Display of DATE, TIME, station ID -Display & log power parameters phase wise & total (load current, kVA, kW & PF). -Display & log kVAr phase wise & total. -Display TDH V or current. -The logger shall be with built in communication facility of RS485 to down load all parameters on demand. Integration of APFC relay with FRTU for SCADA monitoring and control.

11.0 Energy Meter Box

111.1	Energy meter	In the scope of purchaser
11.2	Location	To be provided mounted on enclosure wall in LV compartment.
11.3	Energy meter box Size	650 mm height x 450 mm width x 275 mm depth.
11.4	Box door design	With antitheft hinge, padlock facility, door fixed by stainless steel Allen screw M6 size.
11.5	Fixing of energy meter within box	On slotted horizontal channel 40 x 12 mm size, channel shall be movable on vertical slotted angle 40 x 40 mm size at two ends.
11.6	Meter reading window	Front door shall be with acrylic sheet for viewing the energy meter.
11.7	Sealing arrangement	02 no's sealing arrangement shall be provided on meter box's door.
11.8	Data downloading port	Slot shall be provided on door of meter box for fixing 9 pin DB connector.
11.9	Test Terminal Block	No Test terminal block shall be provided.

BSES	BSES-TS-122-SPSS-R0
Technical Specification of 11 KV Dry type Smart Packaged Substation	

11.10	Cables and wires	PVC insulated, extruded PVC inner sheathed, armored, extruded PVC outer sheathed 1100 V grade control cable as per latest edition of IS 1554 part 1 minimum 2.5 sq mm for PT and 4 sq mm for CT with multi strand copper conductor.
11.11	Cable Glands	Nickel plated brass double compression weatherproof cable gland.
11.12	Wiring diagram	To be fixed on the back of door along with CT spec. etched on Anodised Aluminium plate fixed by rivet.
11.13	CT Secondary/VT wires	All CT secondary wire and VT wires shall be routed through metallic conduit. All secondary wires shall be bunched and kept for termination without any terminal/ TTB in between.

12.0 Other Provisions: illumination, Hooter & Fire extinguisher

12.1.1	RMU, transformer & LV compartment illumination	By 36w CFL fixture controlled through SPMCB & door limit switch
12.1.2	RMU, transformer & LV compartment power socket	5/15amp 3 pin socket through 32 amp SPMCB
12.2	Smoke Detector in each compartment	Minimum 02 no's Smoke Detectors in each LV, HV and Transformer compartment , wiring to be provided for RMU tripping and SCADA indication.
12.3	Energy meter box	To be provided on transformer LT side along with wiring.
12.4	Portable Modular Fire Extinguisher for HV, LV and Transformer compartment	<ul style="list-style-type: none"> a) The Portable modular FE, ABC (Stored Pressure) shall conform IS 13849. b) The powder in the extinguisher must be MAP 90%. c) The Dry powder used in FE shall conform IS 4308. d) The internal and external surface of the body shall be epoxy powder coated of minimum 0.050mm thickness. e) The wall thickness shall be as per IS 13849 f) All Internal and external surface of the body shall be completely coated with lead-tin alloy (tin not less than 10%) by means of hot dipping or by electrolytic process to a thickness not less than 0.012 mm. The thickness of the coating shall be measured as given in IS 3203:1982. Epoxy powder coating can also be used for anti-corrosive treatment with 0.050 mm thickness. g) The extinguisher body and valve assembly shall be capable of withstanding the Internal

BSES	BSES-TS-122-SPSS-R0
Technical Specification of 11 KV Dry type Smart Packaged Substation	

		hydraulic pressure of 3 0 MN/m ² (30 kgf/cm ²) without rupture, leakage or visible distortion for a period of 2 minute". Make Cease fire/ Mini Max
12.5	Other requirements	Substation internal cabling, lighting & earthing system along with required hardware, gaskets, gland plates etc.

13.0 PSS Enclosure Earthing

13.1	Earth bus connection brought out of package substation enclosure to earth pad for connection to earth pit	a) Two earth pads for RMU, transformer & LV compartment each. b) Two earth pads for transformer neutral
13.2	Earth bus size	a) 50x6 GI flat up to 1000kVA rating of PSS b) 2X50x6 GI flat for 1600kVA and 2000kVA rating of PSS
13.3	Earth bus fault current capacity	a) 26.3kA for 1 sec up to 1000kVA rating b) 43KA for 1 sec up to 1600kVA rating and 2000kVA rating of PSS
13.4	Earth connection of all covers, doors & structural parts to GI bus	By metallic jumper connection
13.5	Earth connection of RMU, ACB & transformer body parts to GI bus	By two numbers of 50x6mm GI flat per equipment
13.6	Earth bus identification	Shown by letter 'E'

14.0 Labels & painting

14.1	Name plate on package enclosure	Fixing by rivet only
14.1.1	Material	Anodized aluminum 16SWG / Stainless Steel (SS)
14.1.2	Background	SATIN SILVER
14.1.3	Letters, diagram & border	Black
15.1.4	Process	Etching

BSES	BSES-TS-122-SPSS-R0
Technical Specification of 11 KV Dry type Smart Packaged Substation	

14.2	Name plate details	a) Month & year of manufacture b) transformer rating c) Purchaser name & order number d) Guarantee period e) Ref. IS / IES No. Shall be provided inside enclosure as well as outside enclosure.
14.3	Labels for meters & indications	Anodized aluminium with white character on black background OR 3 ply Lamicoid
14.4	Danger plate on doors of RMU compartment & LV compartment	Etched on 16 swg anodised aluminium / SS plate with white letters on red background
14.5	BSES Insignia	a) 02 no's b) HV and LV side of PSS enclosure. c) Shall be etched on anodized aluminium 16SWG / SS plate. d) Details shall be finalized during drawing approval.
14.6	Enclosure painting surface preparation	Shot blasting or 7 tank chemical process
14.7	Enclosure painting external finish Powder coated epoxy polyester base	Hot dip galvanizing – 80 micron thick grade A, shade - RAL 7032, uniform thickness 60 micron minimum .
14.8	Enclosure painting internal finish	Powder coated epoxy polyester base grade A, shade -white, uniform thickness 80 micron minimum

15.0 Approved makes

15.1	RMU	ABB/Schneider/Siemens/C&S
15.2	Transformer	ABB/Raychem/TMC/Voltamp
15.3	FRTU	ABB/Schneider/Siemens/Phoenix
15.4	FPI	EASI/ EMG/Siemens/C&S
15.5	Protection Relay	Ashida ADR241S -761/ C&S-CSPR-V2-500
15.6	Battery charger and BHMU	Allan/Gagate
15.7	Oil type transformer	ABB/ Schneider/Danish/kotson/Toshiba
15.8	Bushings make	Baroda bushing / CJI / Jaipur
15.9	Winding Temperature Indicator	Precimeasure/ Pecon
15.10	ACB	L&T / Schneider-MG /Siemens / ABB
15.11	MCCB	GE / ABB/Schneider/Siemens
15.12	APFC	ABB/Schneider/Epcos
15.13	Switch	ABB / Siemens / L&T (Salzer)
15.14	HRC Fuse Links	Alstom / Siemens / L&T / GE
15.15	Load manager	L&T / Enercon / AE / DUCATI / Phasetrac M-40 / TAS POWERTECH

Technical Specification of 11 KV Dry type Smart Packaged Substation

15.16	APFC relay	Beluk / ABB / Fraco / Ducati/ TAS / POWERTECH
15.17	AC Contactors	ABB / Schneider
15.18	Push buttons / Actuator	L&T / Teknic / Siemens
15.19	MCCB	ABB / L&T / Siemens/Schneider –MG
15.20	Capacitors	FRACO / DUCATI/ABB/shrim
15.21	Fans	EBM Nadi
15.22	Terminals	Connectwell / Elmex
15.23	Transformer Bushings (HV side)	Baroda/CJI/ any other make approved by BSES
15.24	Termination kits for RMU	3m/ Raychem/ Denson
15.25	Termination kits for Transformer	3M/ Raychem/ Denson / any other make approved by BSES
15.26	Cold applied cable boots	3M/ Raychem/KD joshi
15.27	Interposing relay	ABB / Tyco/OEN
15.28	Modem	Niseva/Lantronix/Pheonix
15.29	CT and Aux PT	Narayan Power Tech (NPT)/Gilbert Maxwell, Pragati, Nortex
15.30	CBCT (Both for Earth fault and Over current protection)	EMG/Schneider/SIEMENS/C&S
15.31	Battery	HBL/Exide
15.32	Protocol converter	ABB/Tyco/OEN
15.33	DC power connector	Wago/Havells/Connectwell
15.34	Surge protector	Phoenix
15.35	Vacuum Interrupter	CG/ABB/Schneider/BEL

Note – Any other make of component offered by the bidder maybe reviewed & approved by BSES

16.0 Quality assurance Inspection & testing

16.1	Vendor quality plan	To be submitted for purchaser approval for all components listed in clause 4.0 For transformer, RMU & APFC panel sub vendor quality plan to be submitted.
16.2	Inspection points in quality plan	To be mutually identified & agreed
16.3	Quality – Process Audits	BSES shall carryout vendor process audits.
16.4	Type test as per IS / IEC	a) Only type tested quality equipment(s) shall be offered. b) Type test certificates mentioned in this clause shall be submitted along with offer for scrutiny c) The test report should not be more than 5years old. d) If identical rating type test reports for transformers are not available vendor to carryout Short circuit withstand test, Lightning impulse test & temperature rise test without any additional cost.
16.4.1	Package substation assembly	As per IEC 62271-202

Technical Specification of 11 KV Dry type Smart Packaged Substation

16.4.2	11kv RMU, transformer, ACB, MCCB, APFC system and capacitor units	As per relevant IS/ IEC
16.5	Routing tests	
16.5.1	Routine tests of PSS	As per IEC 62271-202
16.5.2	Routine tests of transformer, RMU, LT panel & APFC	As per relevant IS/ IEC
16.6	Inspection and acceptance testing	<ul style="list-style-type: none">a) Purchaser reserves the right to inspect /witness all tests on the meters at manufacture's works at any time, prior to dispatch, to verify compliance with the specification/ standards.b) Manufacturer should have all the facilities/ equipments to conduct all the acceptance tests during inspection. All the testing equipment should be calibrated.c) Stage and / or final inspection call intimation shall be given at least 15 days in advance to the purchaser.
16.6.1	Stage inspection of transformer	Purchaser shall inspect transformers at the core and coil assembly stage at the manufacturer's premises.
16.6.2	Final inspection of transformers	<p>The sequence of testing shall be as follows</p> <ul style="list-style-type: none">a) Visual and dimension check for completely assembled transformer.b) Measurements of voltage ratio.c) Measurements of winding resistance at principal tap and two extreme taps.d) Vector Group and polarity test.e) *Measurements of insulation resistance and polarization index.f) Separate sources voltage withstand test.g) Measurement of iron losses and exciting current at rated frequency and 90%, 100% and 110% rated voltage.h) Induced voltage withstand test.i) Load losses measurement.j) Impedance measurement of principal tap (HV and LV) of the transformer.k) Measurement of Iron loss (to be repeated if type test are conducted).l) Measurement of capacitance and Tan Delta for HV and LV bushings and Tan Delta for transformer oil (for all transformers).m) Oil leakage test on assembled transformern) Magnetic balance test.o) Power frequency voltage withstand test on all auxiliary circuitsp) Measure of zero seq. impedance (Cl. 16.10 IS 2026 Part I).q) Measurement of acoustic noise level (Cl. 16.12 of

Technical Specification of 11 KV Dry type Smart Packaged Substation

		<p>IS 2026 Part I).</p> <p>r) Measurement of harmonic level on no load current.</p> <p>s) Partial discharge test</p> <p>*Insulation resistance measurement shall be carried out at 5kV for HV and 1kV for LV. Value of IR should not be less than 1000 Mohms. Polarization Index (PI = IR10min/IR1min) should not be less than 1.5 (If one minute IR value is above 5000 Mohms and it is not possible to obtain an accurate 10 minutes reading, in such cases polarization index can be disregarded as a measure of winding condition.)</p>
16.6.3	Final Inspection of package substation after complete assembly	<p>As per IEC 62271-202 and relevant IS/ IEC of equipment.</p> <p>a) Visual check</p> <p>b) Dimensional and sheet thickness check</p> <p>c) Verification of Wiring & BOM</p> <p>d) Paint thickness inside and outside of PSS enclosure.</p> <p>e) Functional test</p> <p>i. Operation of switchgear and control gear.</p> <p>ii. Mechanical operation and alignments of PSS doors.</p> <p>iii. Fixing of insulating barriers.</p> <p>iv. Voltage indication check</p> <p>v. Checking of temperature and liquid level of the transformer.</p> <p>vi. Fitting of earthing devices.</p> <p>vii. Cable testing</p> <p>viii. Replacement of LTCT</p> <p>ix. Operation of transformer tap changer</p> <p>x. Operation of illumination system</p> <p>xi. Trip function of HV switchgear.</p> <p>f) IR test</p> <p>g) HV test on power circuit</p> <p>h) HV test on auxiliary circuits</p> <p>i) Operational and interlocks check</p>
16.6.4	Acceptance Test of RMU	<p>a) Physical inspection , BOM & wiring checks</p> <p>b) Insulation Resistance test</p> <p>c) HV Test for one minute</p> <p>d) Operation & Interlock check</p> <p>e) Measurement of resistance of main circuit</p> <p>f) Voltage indication check of VPI</p> <p>g) Functional testing of FPI for alarm</p> <p>h) Primary current injection test for circuit breaker feeder on both ration's of all CT's with relay</p> <p>i) Breaker closing and opening time measurement</p>

BSES	BSES-TS-122-SPSS-R0
Technical Specification of 11 KV Dry type Smart Packaged Substation	

16.6.5	Acceptance Test of LT Panel / APFC Panel	a) Visual, dimension, wiring & BOM check. b) Operational check. c) IR Test. d) HV Test
16.7	Special acceptance tests	
16.7.1	Transformer	Temperature rise test shall be carried out on 01 no transformer of each rating randomly selected from the offered lot.
16.7.2	PSS	Temperature rise test of PSS along with transformer as per IEC 62271-202.
16.8	Right to waive off tests	Reserved by Purchaser

17.0 Shipping, Handling and Site support

17.1	Packing Protection	Against corrosion, dampness, heavy rains, breakage and vibration
17.2	Packing for accessories and spares	Robust wooden non returnable packing case with all the above protection & identification Label
17.3	Packing Identification Label (Anodized Aluminum Plate)	On each packing case, following details are required:
		a) Individual serial number
		b) Purchaser's name
		c) PO number (along with SAP item code, if any) & date
		d) Equipment Tag no. (if any)
		e) Destination
		f) Manufacturer / Supplier's name
		g) Address of Manufacturer / Supplier / it's agent
		h) Description of PSS.
		i) Country of origin
		j) Month & year of Manufacturing
		k) Case measurements
		l) Gross and net weights in kilograms
		m) All necessary slinging and stacking instructions
17.4	Shipping	The seller shall be responsible for all transit damage due to improper packing.
17.5	Handling and Storage	a) Manufacturer instruction shall be followed. b) Detail handling & storage instruction sheet / manual to be furnished before commencement of supply.

Technical Specification of 11 KV Dry type Smart Packaged Substation**18.0 Deviations**

18.1	Deviations from this Specification shall be stated in writing with the tender by reference to the Specification clause/GTP/Drawing and a description of the alternative offer. In absence of such a statement, it will be assumed that the bidder complies fully with this specification.
------	---

19.0 Drawings Submission

Drawing submission shall be as per the matrix given below.

- a) All documents/ drawing shall be provided in soft copy only in returnable Pen drives
- b) Language of the documents shall be English only.
- c) Incomplete submission shall be liable for rejection.
- d) Document check sheet compliance shall be the first sheet for each submission stage i.e. Technical bid, Drawing Approval, Pre Dispatch
- e) No submission is acceptable without check list compliance.
- f) Order of documents shall be strictly as per the check list.
- g) Any drawing not included in the below table but necessary for detailed engineering shall be deemed to be included in bidder's scope.

S No.	Description	Bid	For Approval	Pre Dispatch
19.1	Copy of specification along with company seal & signature on each page.	Required		
19.2	Duly filled GTP as per BSES specification	Required	Required	
19.3	GA drawing (Complete assembly, RMU, transformer, LT panel + other items)	Required	Required	
19.4	BOM of Packaged substation	Required	Required	
19.5	Valid type test reports	Required		Required
19.6	Transformer BIS license	Required	Required	Required
19.7	Reference list of clients/suppliers list for last 3 years	Required		
19.8	Performance certificates executed in last 5 years	Required		
19.9	Calculation for sizing of Transformer	Required	Required	
19.10	Sizing Calculation of busbar in support of its Guaranteed S.C. rating / Capability	Required	Required	
19.11	Deviation Sheet (if any)	Required	Required	
19.12	Catalogues & manuals for Package substation + RMU + Transformer + LT switchgear items + APFC			Required

Technical Specification of 11 KV Dry type Smart Packaged Substation

S No.	Description	Bid	For Approval	Pre Dispatch
19.13	User manual for Hermetically Sealed Transformers. The manual must be provided with, but not limited to, maintenance schedule, frequency & method of oil- sampling, procedures for oil-filling & oil-filtration, etc.			Required
19.14	Quality plan for Packaged substation	Required	Required	
19.15	Installation, commissioning manual for all items in Packaged substation. (for information)		Required	Required
19.16	Operation & maintenance manual for all items in Packaged substation. (for information)			Required
19.17	Transport / Shipping dimensions with weights, wheel base details, un tanking height		Required	
19.18	Recommended spare parts and consumable items for five years of operation and spare parts catalogue with price list	Required	Required	
19.19	Inspection and test reports carried out in manufacturers works			Required
19.20	Test certificates of all bought out items.			Required

Annexure A Service Conditions

The package substation shall be designed & tested to operate satisfactorily under following conditions -

BSES	BSES-TS-122-SPSS-R0
Technical Specification of 11 KV Dry type Smart Packaged Substation	

Sr No	Description	Data by purchaser
1.	Location	Delhi
2.	Reference design ambient temperature	40°C for Delhi
3.	Maximum ambient temperature	50°C for Delhi
4.	Relative humidity	85% for Delhi
5.	Seismic zone	Zone IV for Delhi

Annexure B Guaranteed Technical Particulars (Data by Supplier)

- i. Bidder shall furnish the GTP format with all details against each clause.
- ii. Bidder shall not change the format of GTP or clause description.

Technical Specification of 11 KV Dry type Smart Packaged Substation

iii. Bidder to submit duly filled GTP in hard copy format with company seal.

Sr. No.	Description	Data to be filled by Manufacturer
1	Manufacturer Name	
2	Manufacturer Address	
2.1	Telephone no	
3	Manufacturer contact person	
4	Manufacturer brand name (Give catalogue reference)	
4.1	Conformance to specification	Yes/No
4.2	If NO for above, Submission of clause wise deviation sheet	Yes/No
5	RMU	
5.1	Equipment make	
5.2	Equipment type / brand name	
5.3	Panel overall dimensions in mm	
5.3.1	Width (measured from front)	
5.3.2	Depth	
5.3.3	Height	
5.4	Panel weight in kg	
5.5	Panel enclosure protection offered	
5.6	Panel tested for internal arc	Yes / No
5.7	Insulation level for complete panel	
5.7.1	Impulse withstand	(KV peak)
5.7.2	Power frequency withstand	(KV rms)
5.8	Bus bar	
5.8.1	Material & grade	
5.8.2	Bus bar cross section area in sq mm	
5.8.3	Bus bar rated current in amp	
5.8.4	Max temperature rise above reference ambient	
5.8.5	Short time current withstand capacity for 3 seconds (in KA)	
5.8.6	Bus bar clearances in mm P-P / P-E	
5.8.7	Bus bar with insulation sleeve / barriers	
5.8.8	Bus bar support insulator type	
5.8.9	Bus bar support insulator voltage class	
5.8.10	Bus bar support insulator minimum creepage distance / mm	
5.9	Earth bus bar	
5.9.1	Earth bus bar material & grade	
5.9.2	Earth bus bar cross section area in sq mm	
5.9.3	Bus bar rated current in amp	

Technical Specification of 11 KV Dry type Smart Packaged Substation

	i) at designed 40 deg.C ambient ii) at 50 deg.C ambient	
5.9.4	Max temperature rise above reference ambient of 40 deg C	
5.9.5	Short time current withstand capacity for 3 seconds (in KA)	
5.9.6	Bus bar clearances in mm P-P / P-E	
5.9.7	Bus bar with insulation sleeve / barriers	
5.9.8	Bus bar support insulator type	
5.9.9	Bus bar support insulator voltage class	
5.9.10	Bus bar support insulator minimum creepage distance / mm	
5.9.11	Earth bus bar material	
5.9.12	Earth bus bar size	
5.9.13	Cable compartment	
5.9.13.1	C-C distance between bushings	
5.9.13.2	Phase to Phase Clearance (Min)	
5.9.13.3	Phase to Earth (Min) Clearance	
5.9.13.4	Impulse Withstand Voltage of design tested	
5.9.13.4	IAC level – Cable compartment / RMU Tank	
5.10	Circuit breaker type –VCB	
5.10.1	Rated voltage & frequency	
5.10.2	Rated current in amp	
5.10.3	Rated breaking current – KA rms symmetrical	
5.10.4	Short time withstand capacity in KA for 3 sec	
5.10.5	Rated making current - KA peak	
5.10.6	Breaker total opening time at rated breaking capacity (in milliseconds)	
5.10.7	Number of breaks per pole	
5.10.8	Total length of contact travel in mm	
5.10.9	No of circuit breaker operation cycles (close & open) guaranteed at rated current, Electrical endurance class	
5.10.9.1	25% rated current -	
5.10.9.2	50% rated current -	
5.10.9.3	75% rated current -	
5.10.9.4	100% rated current -	
5.10.10	No of breaker opening operations guaranteed at rated fault current, Electrical Endurance class	
5.10.11	No of breaker mechanical operation cycles (close & open) guaranteed at zero current,	

Technical Specification of 11 KV Dry type Smart Packaged Substation

	Mechanical endurance	
5.10.12	Contact material	
5.10.13	Operating mechanism – trip free	
5.10.14	Motorized/Manual Sprig charge type	
5.10.15	Spring charging motor rating - Watt	
5.10.16	Spring charging motor rated DC voltage	
5.10.17	Closing coil wattage & rated DC voltage	
5.10.18	Trip coil wattage & rated DC voltage	
5.11	Minimum permissible SF6 gas pressure (For SF6 type RMU only)	
5.12	Capacitor type cable voltage indication provided?	Yes / No
5.13	Operation counter provided – Yes/ No	
5.14.1	Disconnect switch continuous rating (Amp)	
5.14.2	Disconnect switch Short time withstand rating -20kA for 3 sec minimum	Yes / No
5.15	Earth Switch	
5.15.1	Minimum number of operations at no load- Mechanical Endurance class	
5.15.2	Making capacity endurance of earth switch – Electrical endurance class	
5.16	Self Powered Relay (Transformer VCB module)– Make / Model	
5.16.1	CT Input	
5.16.2	IDMT Setting Range 4 element – Over Current & Earth fault & steps	Overcurrent- Earth Fault- Instantaneous O/C Instantaneous E/F-
5.16.3	Operating Time	Over Current – Curves Instantaneous
5.16.4	Pick up Current	
5.16.5	Resetting Current	
5.16.6	Relay Burden	
5.16.7	Time Accuracy	
5.16.8	Tripping Coil O/P – type & duration	
5.16.9	Fault Current Display	
5.16.10	No of Fault Current Latching with time stamping	
5.16.11	Display Facility / Type	
5.16.12	Operational Indicators	
5.16.13	Potential Free Output Contacts	
5.16.14	Thermal Withstand Capacity of Relay	

Technical Specification of 11 KV Dry type Smart Packaged Substation

5.17	Fault Passage Indicator (for Cable feeder module 1 & 2)	
5.17.1	CBCT	
5.17.1.1	Type	
5.17.1.2	Mounting Arrangement	
5.17.1.3	CT to indicator connection	
5.17.1.4	ID of sensor	
5.17.2	Earth Fault Indicator	Make / Model
5.17.2.1	Sensing Current	
5.17.2.2	Sensing Time	
5.17.2.3	Indication	
5.17.2.3	Reset Time	
5.17.2.4	Resetting Facility	
5.17.2.5	Output Contact	
5.17.2.6	Contact Rating	
5.17.2.7	Aux Power Supply	
5.17.2.8	Degree of Protection	
5.17.2.9	Mounting Arrangement	
5.17.2.10	Ambient Temperature	
5.18	DC charger rating in amps – min 10 Amp Dual	Yes/No
5.18.1	MCB rating at 230V AC input of charger	Amp
5.18.2	MCB rating at 24V DC output of charger	Amp
5.18.3	Charger heat sink temperature rise (max 55 deg C above ambient 40 deg C)	
5.18.4	Voltage variation in 24v Dc output for FRTU	(Max +/-1 V)
5.18.5	Charger with natural cooling (no cooling fans)	Yes/No
5.18.6	Charger tested for input supply voltage regulation test (input variation 150v-250v, output DC voltage variation +/- 1 volt max)	Yes/No
5.18.7	Charger temperature rise test certificate submitted	Yes/No
5.19	DC battery rating in Ah – 26Ah (mini) OR as approved battery sizing during detail engineering ,whichever is higher.	
5.20	DC charger changeover – Diode rating 10A min	Yes/No
5.21	HT Cable termination - 3cX300sqmm AYYF cable– Height of power terminal from gland plate	mm
5.22	Mimic diagram, labels & finish as per specification	Yes / No
5.23.1	Cable termination –	Mm

Technical Specification of 11 KV Dry type Smart Packaged Substation

	Height of power terminal from gland plate	
5.23.2	Torque required for tightening terminal lug	
5.24	Submission of RMU / component catalogue	Yes/No
5.25	Unit price for Conversion kit offered separately for converting the RMU from single cable termination design to double cable termination design	Yes/No
5.26	FRTU Panel	
5.26.1	FRTU	
5.26.1.1	Make & Model No	
5.26.1.2	No of DI Modules	
5.26.1.3	No of DO Modules	
5.26.1.4	No of AI Modules	
5.26.1.5	Make of Protocol converter	
5.26.2	Modem	Ethernet Type
5.26.2.1	Make	
5.26.2.2	Serial port Isolator provided	Yes / No
5.26.2.3	Type – 4G Back compatible to 3G & 2G Refer FRTU Specifications	Yes / No
5.26.3	Interposing relay with freewheeling diode	
5.26.3.1	Make	
5.26.3.2	Capacity	
5.26.3.3	Model	
5.26.4	AC & DC MCB	
5.26.5	Terminal Blocks	
5.26.6	Disconnecting type fuses	
5.26.7	Enclosure	
5.26.7.1	Sheet steel thickness	
5.26.7.2	Painting process	
5.26.7.3	Construction of steel according to IEC 529 , index of protection	
5.26.7.4	Shade	
5.26.7.5	Louvers with filters	
5.26.8	Dimensions & Weight of FRTU	
5.28	Submission of RMU / component catalogue	Yes/No
6.0.0	11kv cable	from RMU to transformer
6.1.0	Cable size 3CX150 sqmm AYFY	Yes/No
6.2.0	Cable rated voltage - 11000v	Yes/No
6.3.0	Cable short circuit current capacity for 1 sec	kA
6.4.0	Type of insulation - XLPE	Yes/No
6.5.0	Outer insulation sheath – PVC with armor	Yes/No

Technical Specification of 11 KV Dry type Smart Packaged Substation

6.6.0	Cable termination type & make		
7.0.0	400/630/1000KVA Cast Resin Transformer		
7.1.0	Make		
7.2.0	Type- Cast Resin Dry Type	Yes / No	
7.3.0	Transformer continuous rating when placed in package substation enclosure	HV winding	LV winding
		KVA	KVA
7.4.0	Rated voltage (kV)	HV winding	LV winding
		11 KV	0.433 KV
7.5.0	Rated current	HV winding	LV winding
		Amps	Amps
7.6.0	Transformer vector group – Dyn11	Yes / No	
7.7.0	Impedance at principal tap rated current and frequency, ohm @130 °C	As per the specification	
7.7.1	Impedance at lowest tap	Ω	
7.7.2	Impedance at highest tap	Ω	
7.8.0	Resistance of the winding at 130°C in ohm	HV winding	LV winding
		Ω	Ω
7.9.0	Zero sequence impedance in ohm	HV winding	LV winding
		Ω	Ω
7.10.0	Guaranteed maximum losses at principal tap full load and 130°C without any positive tolerance, kW		
7.10.1	No load losses (max.)	KW	
7.10.2	Load losses (max.)	KW	
7.10.2	Total losses (max.),	KW	
7.10.4	No load loss at maximum permissible voltage and frequency (approx.),	KW	
7.11.0	Temperature rise over reference ambient		
7.11.1	Winding by resistance: Outside the PSS enclosure / inside the PSS enclosure °C	80°C/ 90°C	
7.11.2	Maximum hot spot temperature, Deg. C	°C	
7.12.0	Efficiency	at 130°C and unity power factor	
7.12.1	at 110% load	%	
7.12.2	at 100% load	%	
7.12.2	at 80% load	%	
7.12.3	at 60% load	%	
7.12.4	at 40% load	%	
7.12.5	at 20% load		
7.13.0	Maximum hot spot temperature, Deg. C	at 130°C and 0.8 power factor lag	
7.13.1	Efficiency	%	

Technical Specification of 11 KV Dry type Smart Packaged Substation

7.13.2	at 110% load	%
7.13.3	at 100% load	%
7.13.4	at 80% load	%
7.13.5	at 60% load	%
7.13.6	at 40% load	%
7.14.0	Maximum efficiency at 130°C	%
7.14.1	% Load and power factor at which it occurs	
7.15.0	Regulation at full load at 130°C	
7.15.1	at unity power factor	
7.15.2	at 0.8 power factor lagging	
7.16.0	Regulation at 110% load at 130° C	
7.16.1	at unity power factor	
7.16.2	at 0.8 power factor lagging	
7.17.0	Core	
7.17.1	Core material grade	Premium grade minimum M3 or better
7.17.2	Thickness of lamination mm	mm
7.17.3	Insulation of lamination	
7.17.4	Design Flux Density at rated condition at principal tap, Tesla- 1.7 Tesla (Max)	
7.17.5	Maximum flux density at 10 % over excitation /overfluxing, Tesla -1.9 Tesla (Max)	
7.17.6	Equivalent cross section area	
7.18.0	Guaranteed No Load current At 100% rated voltage , Amps	
7.18.1	HV	
7.18.2	LV	
7.19.0	Guaranteed No Load current At 110% rated voltage, Amps	
7.19.1	HV	
7.19.2	LV	
7.20.0	Type of Winding	
7.20.1	HV	
7.20.2	LV	
7.20.3	Conductor material	
7.20.4	Current density Amps/sqmm	
	HV winding	
	LV winding	
7.20.5	Gauge/area of cross section of conductor, sqmm	
	HV	
	LV	

Technical Specification of 11 KV Dry type Smart Packaged Substation

7.21.0	Tapping - Off Ckt	Yes / No	
7.21.1	Capacity	Full Capacity	
7.21.2	Range- steps X % variation		
7.21.3	Taps provided on HV winding	Yes / No	
7.21.4	Tap link Current rating , A		
7.22.0	Insulating material and thickness	Material	Thickness
7.22.1	HV Turn		mm
7.22.2	LV Turn		mm
7.22.3	LV to Core		mm
7.22.4	HV to LV		mm
7.23.0	Minimum design clearance, mm		
7.23.1	HV to earth in Air	mm	
7.23.2	LV to earth in Air	mm	
7.23.3	Between HV & LV in Air	mm	
7.23.4	Top winding and yoke	mm	
7.23.5	Bottom winding and yoke	mm	
7.24.0	Bushing / Support Insulator		
7.24.1	Make		
7.24.2	Type		
7.24.3	Reference Standard		
7.24.4	Voltage class, kV		
7.24.5	HV side Bushing / Support insulator		
7.24.6	LV side line and neutral bushing / Support insulator		
7.24.7	Creepage factor for all bushing	mm / KV	
7.24.8	Weight	KG	
7.24.9	HV bushing / Support insulator		
7.24.10	LV line and neutral bushing / Support insulator		
7.24.11	Free space required for bushing / Support insulator removal, mm		
7.24.12	HV bushing / Support insulator		
7.24.13	LV line and neutral bushing / Support insulator		
7.25.0	HV Termination arrangement	Suitable for 3CX150 mm ² AYFY 11KV	
7.25.1	Phase to phase clearance	mm	
7.25.2	Phase to earth clearance	mm	
7.25.3	HV side bus bar size		
7.25.4	HV Termination height	mm	
7.26.0	L.V termination arrangement	Suitable to 100x12 mm for phase & neutral	
7.26.1	Phase to phase clearance,	25 mm minimum	

Technical Specification of 11 KV Dry type Smart Packaged Substation

7.26.2	Phase to earth clearance ,	25 mm minimum
7.26.3	LV side bus bar size	
7.26.4	LV Termination Height	mm
7.27.0	Current Transformer on LV phases	
7.27.1	Type	
7.27.2	Make	
7.27.3	Reference Standard	
7.27.4	CT Ratio	
7.27.5	Burden, VA	
7.27.6	Class of Accuracy	
7.28.0	WT scanner terminal box size	
7.29.0	Alarm and Trip contact ratings of protective devices	
7.29.1	Rated / making/ breaking currents , Amp @ Voltage for	
7.29.2	Winding temperature scanner	
7.30.0	Fittings and Accessories as per Cl. 8.9 provided	(YES / NO)
7.31.0	Over all transformer dimensions	
7.31.1	Length	mm
7.31.2	Width	mm
7.31.3	Height	mm
7.32.0	Weight data	
7.32.1	Core	KG
7.32.2	Frame parts, kG	KG
7.32.3	Core and frame, kG	KG
7.32.4	Total Winding, kG	KG
7.32.5	Core , Frame, Winding, kG	KG
7.32.6	Enclosure, kG	KG
7.32.7	Total Transport weight of the transformer, kG	KG
7.32.8	Total weight of the transformer with all accessories	KG
7.33.0	Shipping Data	
7.33.0	Weight of heaviest package, kG	KG
7.33.0	Dimensions of the largest package (L x B x H)	mm
7.34.0	Surge Arrestor requirement	
7.34.1	Type	
7.34.2	System Voltage , kV rms	
7.34.3	Rated Voltage of Arrestor, kV rms	
7.34.4	Continuous operating voltage , kV rms	
7.34.5	Maximum Continuous operating voltage, kV	

Technical Specification of 11 KV Dry type Smart Packaged Substation

	rms	
7.34.6	Nominal Discharge Current, kA peak	
7.34.7	Energy Absorption Capability, kJ/kV	
7.34.8	Creepage factor	
7.34.9	Reference std	
7.35.0	WTI Scanner Details	
7.35.1	Make	
7.35.2	Model no.	
7.35.3	No of Channel / Input	
7.35.4	Manual submitted	
8.0.0	Low voltage bus bar system	To connect transformer LV side to ACB & to MCCB
8.1.0	Bus bar material tinned copper	Yes / No
8.2.0	Bus bar size	sqmm
8.3.0	Bus bar continuous current rating	Amp
8.4.0	Bus bar insulator voltage class	kV
8.5.0	Bus bar droppers size from ACB to MCCB (50X10 tinned copper)	
8.6.0	Maximum bus bar temperature rise	
9.0.0	ACB, MCCB	As per IS 13947
9.1.0	ACB make	
9.1.1	ACB rated voltage 415v +/- 10%	
9.1.2	ACB type 4 pole with isolable neutral link	Yes / No
9.1.3	ACB continuous current capacity at 415v 50Hz, at 50 deg C	amp
9.1.4	ACB short circuit breaking capacity $I_{cs} = I_{cu} = 50kA$ minimum	kA
9.1.5	ACB SC making current capacity 100kAp	kA peak
9.1.6	ACB short time current withstand capacity for 1 sec ($I_{cw} = 50kA$)	kA
9.1.7	ACB rated impulse withstand voltage for main & aux circuit in kv	
9.1.8	ACB closing time in ms	
9.1.9	ACB opening time in ms	
9.1.10	Guaranteed number of close & open operations at no load	
9.1.11	Guaranteed number of close & open operations at rated load	
9.1.12	ACB dimensions	
9.1.13	ACB operating mechanism -Trip free, anti pumping type, manual as well as motor	Yes / No
9.1.14	Spring charging motor supply	volt

Technical Specification of 11 KV Dry type Smart Packaged Substation

9.1.15	Close & trip coil supply	volt
9.1.16	ACB utilization category -B as per IS	
9.1.17	ACB indications - ON, OFF & TRIP	
9.1.18	ACB operation - manual - ON, OFF by push buttons	
9.1.19	ACB operation – electrical - ON, OFF by TNC switch	
9.1.20	L/R switch for remote operation	Yes / No
9.1.21	ACB overload, short circuit & earth fault protection - By static or micro processor based releases	
9.1.22	Inbuilt CT burden, ration & class	
9.1.23	Overload release setting range	
9.1.24	Short circuit release setting range	
9.1.25	Earth fault release setting range	
9.2.0	MCCB make	
9.2.1	MCCB type -4 pole, double break / pole	Yes / No
9.2.2	MCCB - On & OFF by Manual handle and electrical	Yes / No
9.2.3	L/R switch for remote operation	
9.2.4	MCCB Neutral connection - Fully isolable link sized for rated current	
9.2.5	MCCB rated voltage 415v +/- 10% at 50Hz	
9.2.6	MCCB rated continuous current (630/1250 As per the type of PSS enquiry)	
9.2.7	MCCB 3 ph short circuit breaking capacity Ics = Icu =35kA	
9.2.8	MCCB 3 ph short circuit withstand capacity, Icw =8kA for 1 sec	
9.2.9	MCCB SC making current capacity	
9.2.10	MCCB rated insulation level	
9.2.11	MCCB mechanical & electrical endurance as per IS 13947 / IEC	
9.2.12	MCCB category of duty - B as per IS / IEC 947	Yes / No
9.2.13	MCCB indications -ON, OFF ,TR & L/R switch	
9.2.14	MCCB protection - Microprocessor release + earth fault	
9.3.0	Connection to ACB main bus by Cu bar with double PVC insulation	Yes / No
9.3.1	630 amp MCCB	
9.4.0	Connection to outgoing cables by bus bar terminals suitable for 2x4CX300sqmm AYFY	

Technical Specification of 11 KV Dry type Smart Packaged Substation

	1100 volt grade cable	
9.4.1	No.of LT Outgoings as per the PSS type	
9.4.2	Only for Type 5 & 6- Provisions in LT panel to increase LT outgoing by 02 no's by adding MCCB's in future.	(YES/ NO)
10.0.0	APFC system	
10.1.0	Rating of APFC system	KVAR
10.2.0	Rated voltage & frequency	Volts at 50Hz
10.3.0	Rated line current of APFC system	Amp
10.4.0	Rated capacitance	micro Farad
10.5.0	Capacitor steps – Type I: 12x25KVAR? Type II: 8 X 25 KVAR?	Yes / No
10.6.0	Rated current of each 25KVAR unit	Yes / No
10.7.0	Rated capacitance – 25KVAR unit	micro Farad
10.8.0	Three phase connection – star / delta	
10.9.0	Capacitor dielectric type –	APP / MPP
10.10.0	No of series group / capacitor unit	
10.11.0	No. of parallel elements / series group	
10.12.0	Thickness of PP film in micron	
10.13.0	Thickness of Al foil in micron	
10.14.0	No. of PP film layers	
10.15.0	Maximum voltage stress per each PP film layer	
10.16.0	Discharge device material	
10.17.0	Capacitor tank steel thickness	mm
10.18.0	Capacitor unit dimension (L x D x H)	
10.19.0	APFC dimensions in mm (L x D x H)	
10.20.0	APFC system weight in kg	
10.21.0	Heat generated by APFC in Kw with all capacitor steps ON	
10.22.0	Operation with over voltage 115% of rated voltage for 12 hours in a day	
10.23.0	Operation with harmonic distortion THD 5% voltage & current	
10.24.0	Maximum permissible over current of	
10.25.0	1.3 times rated current continuous	
10.26.0	Dielectric loss less than 0.2w / KVAR	
10.27.0	Guaranteed minimum capacitor switching operations (ON/OFF) per year	
10.28.0	Maximum temperature rise above ambient of 45 Deg C	Deg C

Technical Specification of 11 KV Dry type Smart Packaged Substation

10.29.0	Residual voltage after de-energization & at 60 seconds	
10.30.0	Design life of capacitor unit	
10.31.0	APFC panel insulation level	
10.32.0	1 minute power frequency withstand	KV
10.33.0	Impulse withstand voltage	KVp
10.34.0	Main bus bar material / size (sqmm)	
10.35.0	Main bus bar rated current	
10.36.0	Main bus bar short time withstand	
10.37.0	CT make & accuracy class	
10.38.0	CT ratio & burden (VA)	
10.39.0	APFC relay make / type	
10.40.0	APFC relay catalogue enclosed?	Yes / No
10.41.0	Data logger make / type	
10.42.0	Data logger catalogue enclosed?	Yes / No
10.43.0	AC contactor make	
10.44.0	AC contactor rating	Amp
10.45.0	AC contactor utilization category as per IS	
10.46.0	100amp MCCB make	
10.47.0	100amp MCCB current breaking capacity Ics=Icu=35kA	
10.48.0	Copper wire size from MCCB to contactor & capacitor – 35sqmm Cu	
11.0.0	Energy meter box as per specification provided?	Yes / No
12.0	Enclosure for package substation	
12.1	Service conditions for outdoor use	Yes / No
12.2	Material for enclosure – Galvanised Sheet steel 2.5mm thick CRCA for all side doors, covers with painting	Yes / No
12.3	Enclosure construction -Frame supported construction with all doors, covers welded with steel channel ribs at every 1000mm minimum	Yes / No
12.4	Lifting lugs for site handling / lifting by crane - qty	
12.5	Doors for RMU compartment, Transformer compartment & LV compartment with anti theft hinge minimum 3 nos., with lockable handle & with padlocking facility	Yes / No
12.6	Top & other side walls of enclosure welded sheet metal	
12.7	Removable canopy above top cover -2.5mm thick sheet metal with 10° slope	Yes / No
12.8	Enclosure integral steel base frame 'I'	

Technical Specification of 11 KV Dry type Smart Packaged Substation

	section size	
12.9	Base frame bottom support pads for fixing by bolt to foundation - minimum six numbers to rest on foundation	Yes / No
12.10	Enclosure compartments -separate compartments for RMU, transformer & LV switchgear/APFC	Yes / No
12.11	Separation between RMU & transformer compartment by sheet steel 2.5mm thick	Yes / No
12.12	Separation between transformer compartment & LV compartment by sheet steel 2.5mm thick	Yes / No
12.13	Degree of ingress protection against solids & water as per IS12063	
12.13.1	IP53 for RMU compartment	
12.13.2	IP23 for transformer compartment	
12.13.3	IP33 for LV compartment	
12.14	Louvers on side covers of transformer compartment & side walls of LV compartment with steel wire mesh welded from inside so as to meet IP requirement as above	Yes / No
12.15	Louver area on cover / side wall -1500mm height x 1500mm minimum	
12.16	Exhaust fans mounted for APFC system to discharge air in transformer compartment - Controlled by SPMCB & thermostat to operate above 35 deg C, 2x150CFM, 1 ph 230v 50Hz	
12.17	Gland plate for RMU compartment - 2.5mm thick MS plate suitable for 3x3c300sqmm AYFY 11kv cable	
12.18	Gland plate for LV compartment -2.5mm thick MS plate suitable for 10x4c400sqmm cable + 10x7c2.5sqmm cable	
12.19	Class of enclosure as per IEC 62271-202 = 10K	Yes / No
12.20	Overall dimensions of package substation (LxWxH)	In mm
12.21	Overall weight of package substation	Kg
13.0	Enclosure earthing & illumination	
13.1	Two earth bus connection brought out of package substation enclosure to earth pad for connection to earth pit -Two earth pads for RMU, transformer & LV compartment each -One earth pads for transformer neutral	
13.2	Earth bus size 50X 6 mm GI flat	

Technical Specification of 11 KV Dry type Smart Packaged Substation

13.3	Earth bus fault current capacity 26.3kA for 1 sec	
13.4	Earth connection of all covers, doors & structural parts to GI bus by metallic jumper connection	Yes / No
13.5	Earth connection of RMU, ACB & transformer body parts to GI bus by two numbers of 50x6mm GI flat per equipment	
13.6	Earth bus identification shown by letter 'E'	Yes / No
13.7	RMU, transformer & LV Compartment illumination by 36w CFL fixture controlled through SPMCB & door limit switch	
13.8	RMU, transformer & LV compartment power socket - 5/15amp 3 pin socket controlled through 15 amp SPMCB	
13.9	Paint shade external for enclosure	
13.10	Paint shade internal for enclosure	
13.11	Paint material & thickness	
13.12	Name plate & labels as per specification provided?	Yes / No
13.13	Smoke Detector	Yes / No
13.13.1	Make	
13.13.2	No Of Aux Contacts	
13.14	Hooter	Yes / No
14.0	Type test report submitted with GTP for RMU, transformer, ACB, MCCB, APFC system?	Yes / No
14.1	GA drawing of package substation submitted with GTP?	Yes / No
14.2	Bill of material submitted with GTP?	Yes / No
14.3	Clause wise deviation to technical specification submitted?	Yes / No

Bidder / Vendor seal / signature -----

Name of the bidder	
Address of bidder	
Name of contact person	
Telephone no & email id	

Annexure D Recommended spares (Data by supplier)

List of recommended spares as following

Sr No	Description of spare part	Unit	Quantity
1	Battery Charger set for RMU – Dual RMU	Nos	limited to 10% of order

Technical Specification of 11 KV Dry type Smart Packaged Substation

			quantity of PSS
2	FPI	Nos	limited to 10% of order quantity of PSS
3	VPIS	Nos	limited to 10% of order quantity of PSS
4	Manometer with pressure indicator switch	Nos	limited to 10% of order quantity of PSS
5	Motor Kit for LBS	Nos	limited to 10% of order quantity of PSS
6	Self Powered Relay	Nos	limited to 10% of order quantity of PSS
7	Aux Relays	Nos	limited to 10% of order quantity of PSS
8	Aux Switches	Nos	limited to 10% of order quantity of PSS
9	Modem with antenna	Nos	limited to 10% of order quantity of PSS
10	CPU with Power Supply Card, I/O Adapter Board, rack, relay board etc	Nos	limited to 10% of order quantity of PSS
11	DO Card – 8 channel	Nos	limited to 10% of order quantity of PSS
12	DI Card -16 channel	Nos	limited to 10% of order quantity of PSS
13	AI Card- 6 channel	Nos	limited to 10% of order quantity of PSS
14	Voltage/current transducer	Nos	limited to 10% of order quantity of PSS
15	BHMu Module	Nos	limited to 10% of order quantity of PSS
16	Battery	Nos	limited to 10% of order quantity of PSS
17	Interlock card	Nos	limited to 10% of order quantity of PSS
18	ACB Release	Nos	limited to 10% of order quantity of PSS
19	MCCB Release	Nos	limited to 10% of order quantity of MCCB

Any additional spares, if required shall be separately listed by bidder. Unit price for each spare item to be provided.

Annexure E Specification of 4G Ethernet Modem for FRTU

1. **Module:** 4G with backward compatible 3G /GSM GPRS
 - a) FDD LTE: B1 (1920-1980/2110-2170) / B3 (1710-1785/1805-1880) / B8 (880-915/925-960) / B20 (800) MHz

Technical Specification of 11 KV Dry type Smart Packaged Substation

- b) TDD LTE: B38 (2570-2620) / B39 (1880-1920) / B40 (2300-2400) / B41 (2496-2690)
 - c) HSPA / UMTS: B1 (2100) / B8 (900) /800/850/1900 MHz
 - d) GSM: 900/1800/ MHz Class 10
2. WAN Protocol: PPP/IPCP over Asynchronous HDLC with PAP/CHAP Authentication.
 3. Modem shall be compatible with IPv4 & IPv6 scheme
 4. Console Interface: RS232 on RJ45 connector.
 5. LAN Interface: 10/100 Base-T complying to IEEE 802.3 / ANSI 8802-3 on RJ45 connector.
 6. Support for SCADA Protocols in transparent pass through mode.
 7. Network Protocols: PPP, IPCP, PAP, CHAP, ARP, IP, ICMP, TCP, UDP, IPSEC, SNTP, TFTP.
 8. Support for NAT and Port forwarding.
 9. Management: Serial, HTTP, Telnet & via SMS, Port Mapping, Event Log & Upload. Firmware Upgrade
 10. Modem shall have self healing capability to recover from dead lock situation.
 11. Status Monitoring: ICMP to 4 destinations for Keep Alive & Self Heal. Signal Strength & LEDs.
 12. SIM Interface: External with locking provision.
 13. AT Commands Interface: Supporting AT commands for dialing from FRTU through RS-232 serial port to modem.
 14. Communication Interface: Remote management features like telnet & remote download facility
 15. LED Indications: Power ON, Network–Signal strength, SIM availability, Ethernet link
 16. Connectors: RJ45 Ethernet Port, SIM Card Holder, DC power connector, SMA Antenna connector
 17. Power Supply: 24V DC (with reverse current protection) with 2 numbers Terminal Block without adapter.
 18. Enclosure: Metallic Extrusion
 19. Mounting: DIN Rail Mounting
 20. Temperature: Operating (-10 to 60 Degree Centigrade), 95% Humidity

Technical Specification of 11 KV Dry type Smart Packaged Substation

21. Antenna: High Gain Antenna with SMA connector.
22. Accessories:
 - a) 1 Meter cable for connecting to external DC power source (24 V)
 - b) 1 Meter Standard Ethernet (Straight) data cable
 - c) Standard Console cable for diagnostic port of Modem
 - d) 1 Meter serial cable for dialing modem from FRTU
23. Certification:
 - a) Conducted Immunity : IEC61000-4-6
Measure emission of the device (referenced to earth) on power mains and to compare them with specified limits to ascertain that the device will not disturb other equipments
Frequency : 0.15MHz to 80MHz
Modulation : 80% AM at 1 KHz
Test Voltage : 3V
 - b) Electrostatic Discharge (ESD):IEC61000-4-2
Check immunity against discharge of static electricity that may occur when a charged operator touches the device
Contact Discharge : 4KV
Air Discharge : 8KV
No of Discharge : 10 at pre-selected spots
Positive & Negative Polarity
 - c) EN55022 CLASS B
Immunity characteristics of the device when subjected to continuous conducted noise
Conducted Emission : Frequency - 150 KHz - 30 MHz
Radiation Emission : Frequency – 30 MHz - 1000 MHz
24. Warranty period: 5 years

Annexure F Specification for FRTU

1.0.0 Scope of Supply & Work

This document defines the scope of supply, including spares and scope of work of installation, testing & commissioning including interfacing/ integration with RMU, DT

Technical Specification of 11 KV Dry type Smart Packaged Substation

monitoring, ACB, LT panel, APFC, fire protection system and wireless sensors for acquisition of real time status and control functions associated with the same.

1.0.1 Scope of Supply

The specification covers design, engineering, manufacturing, factory testing, packaging and delivery of FRTU for complete PSS automation. The system should be completely wired up with all the required accessories to make the system capable of SCADA data acquisition and controlling of all components of PSS system. The scope of supply also covers the required spares that are to be supplied along with the system as per detail given under Spares, Accessories & Tools, clause 1.6.0.

1.0.2 Scope of Work

- a) The specification covers site survey, engineering, installation, testing and commissioning of FRTU system, to make the system capable of SCADA data acquisition and controlling of complete accessories of PSS system at site.
- b) The scope also covers the interfacing/ inter-connecting of FRTU with RMU, DT monitoring, ACB, LT panel, APFC and fire protection system used in PSS. The details are as per the clause 1.5.3 SAT is also included in the scope of work as defined in the document.
- c) Any firmware up-gradation meets the protocol requirement of MCC/ BCC communication protocol (IEC 60870-5-104) to be made available by the supplier engineer.
- d) End to end testing from MCC/ BCC to be carried out in presence of the supplier engineer. If any change is required for operation and monitoring of the RMU system to be made by the bidder without any price implication to owner.

1.1.0 Applicable Standards

FRTU shall comply with the requirements stated in the latest editions of the following recommendations, standard and specifications:

- a) International Electro technical Commission (IEC),
- b) Institute of Electrical and Electronics Engineering (IEEE),
- c) American National Standards Institute (ANSI),
- d) National Equipment Manufacturers Association (NEMA) standards

1.2.0 Technical Requirements**1.2.1 FRTU Functionalities:**

FRTU shall contain all the functions required for SCADA data acquisition and controlling of the complete accessories used in PSS.

- a) It should be capable of handling minimum 750 DP(data points) respectively.
- b) FRTU shall have serial port, configurable RS485/RS232 for MODBUS serial protocol and serial IEC 103.
- c) FRTU shall have TCP/IP port for Modbus TCP/IP and IEC 61850 communication.
- d) Ethernet and serial ports for interfacing with IEC 60870-5-104 protocol to communicate with MCC and BCC.

Technical Specification of 11 KV Dry type Smart Packaged Substation

- e) Ethernet port should be configured for IEC 60870-5-104 protocol as a slave.
- f) Built in optical couplers to isolate the field signals and field communication channels.
- g) Support for battery availability and battery health check feature.
- h) Suitable provision in FRTU to supervise and prevent accidental serious discharge of battery.
- i) FRTU shall support event storage capacity as measurand events (10,000), system events (1,000), alarms (1,000) and normal events (5,000). Events should be stored on the basis of FIFO.
- j) Local viewing of all events shall be possible.
- k) FRTU DI/ DO and AI communication channel capacity should be such that it can fulfill automation of complete PSS system.
- l) FRTU shall support web based monitoring from remote as well as local.
- m) All DI/ DO and AI communication channels should have individual LED indications.
- n) FRTU shall support feature of remote configuration as well as diagnosis.
- o) FRTU system shall support communication with 4 Nos. master stations simultaneously.
- p) FRTU shall support hot swap feature.
- q) As the SCADA/ DMS system will use public domain such as RF/ GPRS etc., therefore it is mandatory to guard the data/ equipment from intrusion/ damage/ breach of security & shall have SSL VPN based security.
- r) FRTU shall support SNMP (Simple Network Management Protocol).
- s) Capability of time synchronization with GPS receiver and SCADA MCC/ BCC.
- t) FRTU system should be modular and expandable.
- u) FRTU should be capable to store the configuration programme in detachable flash memory card.
- v) FRTU shall have console port with console cable.

1.2.2 CPU Module:

- a) 32 bit ARM core CPU, operating @ minimum 450 MHz.
- b) Internal memory minimum 128MB and RAM 64MB, suitable for handling the PSS data acquisition and controlling the RMU, DT monitoring, ACB, LT panel, APFC and used in PSS.
- c) RTC- Real Time Clock
- d) Display to show the error code and status of the processor.

1.2.3 Communication Ports:

- a) FRTU shall have the following port for communications

S. No	Communication With	Communication Protocol	Physical Layer		Connecting Cable	Required Qty
			Interface	Physical Port		
1	Master station(s)	IEC 60870-5-104	Ethernet	RJ45	CAT VI	1
2	LT panel/Transformer	IEC 61850	Ethernet	RJ45	CAT VI	1

BSES	BSES-TS-122-SPSS-R0
Technical Specification of 11 KV Dry type Smart Packaged Substation	

S. No	Communication With	Communication Protocol	Physical Layer		Connecting Cable	Required Qty
			Interface	Physical Port		
3	Local Configuration	—	RS232	USB/DB9	Console Cable	1
4	Protection relays	IEC 103	RS485	Terminal Block	Shielded RS485 Twisted Copper Cable	1
5	MFM	MODBUS	RS485	Terminal Block	Shielded RS485 Twisted Copper Cable	1
6	LT panel/Transformer	MODBUS	RS485	Terminal Block	Shielded RS485 Twisted Copper Cable	1
Total						6

- b) Each Serial port should be capable of handling minimum 10 Nos. devices on the network with same communication settings.
- c) The settings of Ethernet and serial ports should be programmable.
- d) System should have the capability to increase TCP/ IP Ethernet and serial ports for communication by addition of communication modules.

1.2.4 MCC/ BCC Communication Protocol:

- a) FRTU system shall be configured to communicate with MCC/ BCC simultaneously on IEC 60870-5-104 protocol.
- b) FRTU shall support periodic reporting of analog data that shall be configurable upto 1 hour polling delay.
- c) Digital status data shall have higher priorities as compared to the analog data.
- d) Dead band for reporting analog values shall be programmable for the full scale value.

1.2.5 Communication between FRTU, MFMs and Protection Relays:

- a) FRTU can acquire analog values from MFMs and protection relay through RS485 serial communication port using serial MODBUS and serial IEC 103 protocol respectively.
- b) Communication of ACB/MCCBs on Modbus TCP/IP / IEC 61850 protocol.
- c) MFM and protection relay will act as slaves to the FRTU. The FRTU shall transmit these analog values to master station by using IEC 60870-5-104 protocol.
- d) To protect the serial communication port(s), optical isolation is required which is mandatory to avoid damage to FRTU channels.

1.2.7 Digital Input Module:

Technical Specification of 11 KV Dry type Smart Packaged Substation

- a) FRTU shall be capable of accepting isolated potential free contact status inputs.
- b) FRTU shall provide necessary sensing voltage, current, optical isolation for each status input.
- c) FRTU shall be capable to configure re-bounce filtering for each input.
- d) The sensing voltage of input module should be 24VDC.
- e) The FRTU shall accept two types of status input: Single point and double point.
- f) Single point status input represented by 1 Bit in the protocol message whereas double point status input represented by 2 Bits in the protocol message.
- g) FRTU configuration software shall have the capability to invert the DI signal value required in the configuration.
- h) There shall be channel wise visual indication of all DIs modules installed in the FRTU panel for troubleshooting problems.
- i) Digital Input module should have hot swap compliance.

1.2.8 Digital Output Module:

- a) FRTU shall provide the capability for master station to select and change the state of Digital output points.
- b) These control outputs shall be used to control power system devices such as circuit breakers, isolators and other two state devices which shall be supported by FRTU.
- c) FRTU should also support single command output to reset FPI operation.
- d) The output contact shall be rated to operate RMU motor, ACB, LT MCCB, APFC and other signals used in PSS.
- e) In case control output module of FRTU does not provide potential free control output of required rating then separate control output relays shall be provided.
- f) There shall be channel wise visual indication of DOs available in FRTU panel and command issued for any digital channel for troubleshooting the problem.
- g) DO modules should have the capability to configure for a single as well as double command output.
- h) Digital Output module should have hot swap compliance.

1.2.9 Analog Module:

- a) FRTU analog module should be capable of connecting universal type of analog value ($\pm 20\text{mA}$, $\pm 10\text{V}$).
- b) FRTU should have the capability to configure the analog channel for any value of universal analog input through the FRTU configuration software.
- c) Analog module should be 16 Bit, bipolar.
- d) Analog module should have hot swap compliance.
- e) There shall be channel wise visual indication of AIs card available in FRTU panel.

1.2.10 Interfacing of FRTU system with all the components used in PSS

- a) RMU, DT monitoring, LT panel, APFC, wireless sensor signal connections should be terminated in bay wise and extension of the signals from the each equipment TB (Terminal Block) to FRTU TB through cable connectors, bay wise.
- b) Separate multi-core cable for Interconnection of FRTU with RMU, LT panel, DT monitoring, APFC, Sensors with suitable size and length.

Technical Specification of 11 KV Dry type Smart Packaged Substation

- c) Male and female connector with cable for interconnection should be provided in FRTU panel.
- d) Use 2.5/ 4 sqmm multi-strand copper wire/ cable of suitable length for connecting the battery bank and battery charger placed in the in FRTU cabinet.
- e) Supply and dressing of inter-connecting cables through suitable size PVC duct are in the supplier scope.
- f) Interconnections should have proper lugs, ferrules etc.

1.2.11 Communication Package:

- a) Communication media should support GSM/ GPRS.
- b) 1 no. of Ethernet, 4G/3G GPRS gateway with 1 ethernet 10/ 100 BaseT port.
- c) 3G GPRS Gateway, RF should support multi NAT configuration.
- d) Driver software
- e) Gateway shall be remotely manageable and configurable.
- f) Antenna with 5m coaxial pig tail (extension of antenna cable should be possible).
- g) Rated voltage: 9- 48 VDC.
- h) Cable to connect the communication module of FRTU.

1.2.12 Troubleshooting:

- a) FRTU should be configurable using web based configuration and maintenance tool.
- b) FRTU shall have proper diagnosis tool for troubleshooting the failures related to the following from remotely as well as locally. Supplier shall consider all required configuration and diagnosis cable and software with each supplied FRTU with license if any.
- c) Communication of FRTU with master
- d) Communication of MFM with FRTU
- e) Communication of DI/ DO/AI
- f) Communication with Protection Relay

1.2.13 Programmable Logic Control (PLC):

- a) FRTU shall be provided with the PLC license.
- b) FRTU should have the functionality of logic development and perform the task using its own CPU.
- c) FRTU should have the capability to run more than one PLC tasks at a time.

1.2.14 Cyber Security:

The FRTU shall support the advanced cyber security standard ISO 27002 2005 (previously known as ISO IEC 17799 2005), NERC CIP-009-1 and ISA-99.02.01[5]-[7].

FRTU should have following features:

- a) User level configuration
- b) User wise authentication like system admin, configuration admin, control, operator.
- c) Disabling the DNS

Technical Specification of 11 KV Dry type Smart Packaged Substation

- d) Disabling, enabling & configuration of TCP/ IP and UDP ports.
- e) Door lock alarm integration with FRTU.

1.3.0 General Construction of Enclosure:

- a) FRTU system housed in suitably sized panel, fabricate steel plate with mini 2mm thick frame and 2.0 mm thick CRCA sheet with seven tank process for indoor and for outdoor of protection mini IP 55 with safety lock of good quality. the cabinet shall have adequate space for installation of other hardware's like modem, battery charger and battery as well as shall have at least 30% spare space.
- b) It is suitable class of IP 55 protection as per indoor and outdoor applications.
- c) Enclosure fabricated with double door, swing frame type with proper pad lock arrangement to avert the theft of the equipment fitted inside.
- d) The component and accessories to be mounted on mounting plate of FRTU.
- e) Enclosure should have proper illumination, , universal type socket and laptop stand, Drawing pocket etc

1.4.0 FRTU Power Supply

- a) Power supply for FRTU shall be on 24V DC system which would be made wired from batteries housed in RMU to battery chargers in FRTU cabinet.
- b) The main DC circuits shall be protected by incoming circuit breakers. Each circuit shall be tapped through single pole MCBs so as to provide an individual DC feed to each of the I/O modules, modems and protocol converters. Contractor shall provide maximum power consumption data of each of the type of FRTU. To protect the batteries from the theft the battery in RMU compartment should have separate pad lock arrangement.
- c) Power supply system should have redundant battery charger to provide the supply to FRTU system as well as to charge the battery.
- d) Pluggable Surge Protection Device in accordance with IEC 61643 with KEMA & UL approval must be installed at the incoming power supply of FRTU.
- e) DIN Rail Mounted Suitable Surge Protection must be installed on all communication lines (Ethernet/RS 485)

1.5.0 FRTU Type and Routine Tests**1.5.1 Type Tests**

The FRTU's shall have passed type tests carried out by government accredited labs and in accordance with IEC 255-4, 255-5, 255-6, 801-2, and 801-3 to demonstrate that the FRTU's comply with the ratings stated in these standards. As a minimum, certificates for the following type tests shall be furnished:

- a) Dielectric test
- b) Impulse voltage withstand test
- c) High frequency disturbance test
- d) Thermal requirement test
- e) Mechanical requirement test

Technical Specification of 11 KV Dry type Smart Packaged Substation

- f) Limiting dynamic value test
- g) Contact performance test
- h) Electromagnetic radiation susceptibility test
- i) Electrostatic discharge susceptibility test

1.5.2 Routine Tests

The FRTU's shall pass the Manufacturer's standard routine tests in accordance with the referenced standards.

In addition to the tests described in the IEC standards, the routine tests and test report of the FRTU's shall include the following:

- a) Visual tests to confirm that construction and sizing requirements have been met.
- b) Rigorous testing of each input and output function of the FRTU's. This shall include the fault detection and the disturbance data storage functions as well as the operation and performance of the FRTU time and date facilities.
- c) Verification of the use of the FRTU test equipment for maintenance and testing.
- d) Verification of the ability to download parameters and configuration data from the SCADA/DMS master station.
- e) Verification that FRTU software and firmware support FRTU sizing and expansion requirements.
- f) Verification of successful communications (i.e. protocols) at all the required data rates.
- g) Testing for secure operation, including verification that: a) Communication errors are detected. b) SCBO procedures are properly performed for control outputs. c) No erroneous control operation occurs and no incorrect data is generated when power is turned on or off or when operating on low battery voltage.

1.5.3 SAT

This document exclusively covers the SAT for FRTU system.

After the successful commissioning and testing of the FRTU system and liquidation of all punch points, the system will be put on continuous running mode for a cycle of minimum thirty (30) days after clearance on punch-points. During this period, if the FRTUs performance due to configuration and/ or hardware does not meet the criteria as per Technical Requirements of this document, the cycle will be reset.

During the cycle, availability and operational efficacy in regard of the supplied FRTU system will be checked and after successful validation, SAT will be concluded.

SAT will include the validation of the following:

- a) Network
- b) FRTU availability and operational efficacy
- c) Validation of SOE
- d) Indication, Command and Measured data

BYPL reserves the right to financially penalize the supplier on failure of SAT as per the technical and tender document.

1.6.0 Spares, Accessories & Tools:

- a) Bidder should provide minimum 10% spare of each and every equipments and parts of the equipment that will be recommended by the bidder for 5 years for trouble free operations.
- b) The recommended spares of FRTU and accessories to be approved by the engineering in-charge of SCADA- DMS.
- c) The cost of spares is part of the tender and should not be considered separately.
- d) All software license shall be provided for programing, configuration, troubleshooting and diagnosis shall not be hardware/Machine specific. In case software's are machine or hardware specific mini two numbers of such software shall be supplied.
- e) The bidder shall provide all license software package (system/application/antivirus) required by the system for meeting the intent, functional, parametric and performance requirement of the specification. As a customer support, the bidder shall periodically inform and upgrade the provided software till completion of warranty period.

1.7.0 Software / Firmware

The term software is used in this Technical Specification to mean software or software implemented through firmware. All software shall be implemented according to the Contractor's latest established design and coding standards. Complete and comprehensive documentation shall be provided for all software. Contractor should provide windows based software as it is preferred for its user friendliness.

1.7.1 General

- a) A real-time non-proprietary operating system that is capable of managing the FRTU applications shall be provided.
- b) This software shall provide automatic restart of the FRTU upon power restoration, memory parity errors, hardware failures, and manual request. The software shall initialize the FRTU and begin execution of the FRTU functions without intervention by the SCADA/DMS master station. All restarts shall be reported to the SCADA/DMS.
- c) The software shall be prepared in a high level language and shall be documented in detail. No separate licensing charges or agreements shall attach to the FRTU software or its underlying operating system.
- d) In order to easily support the system under continuously changing site conditions all protocol, configuration, and application data must be contained in easily programmable non-volatile memory such as Flash EPROM.
- e) The FRTU design shall be independent of any communication protocol that would impose restrictions on the flexibility or functionality of the FRTU. Protocol changes shall be accomplished by software/firmware changes only.

1.7.2 Diagnostic Software

Technical Specification of 11 KV Dry type Smart Packaged Substation

Software shall be provided to continuously monitor operation of the FRTU and report FRTU hardware errors to the SCADA/DMS. The software shall check for memory, processor, and input/output errors and failures. It is desirable that internal diagnostics be sufficiently detailed to detect malfunctions to the level of the smallest replaceable component.

The FRTU shall facilitate isolation and correction of all failures and shall include features that promote rapid fault isolation and component replacement. All functional module nodes shall be designed with integrated on-line diagnostic functions. The results of these diagnostics shall be reported to the central processing module. The central module shall store this information and report it to the SCADA/DMS as permitted by the protocol. FRTU shall be able to access from remote (BCC/MCC) for down loading configuration.

1.8.0 Service Life and Warranty Support

Service Life:

BYPL prefers that the major equipments of FRTU system shall be capable of complying with this standard, including performing its intended purpose, for a minimum of 5 years from the date of supply.

The supplier shall provide a service support letter containing:

- a) The date at which the product was released for sale.
- b) The anticipated date at which the product will be withdrawn from sale, but support will continue to be supplied.
- c) The anticipated date of when the product support will be withdrawn i.e. spares will no longer be available and technical support will no longer be provided.

1.9.0 Trainings & Hands-on

The supplier personnel who are experienced instructors and who speak understandable English shall conduct training. The supplier shall arrange on its own cost all hardware training platform required for successful training and understanding at BYPLs works. The supplier shall provide all necessary training material. Each trainee shall receive individual copies of all technical manuals and all other documents used for training. These materials shall be sent to BYPL at least one (1) months before the scheduled commencement of the particular training course. Class materials, including the documents sent before the training courses as well as class handouts, shall become the property of BYPL. BYPL reserves the right to copy such materials, but for in-house training and use only. Hands-on training shall utilize equipment identical to that being supplied to BYPL. The schedule, location, and detailed contents of each course will be finalized during BYPL and supplier's discussions. If the supplier has utilized 3rd party equipment or outsourced work to a 3rd party then experienced instructors of the 3rd party are required to be part of the training sessions.

1.9.1 FRTU System Hardware Course

A computer system hardware course shall be offered, but at the system level. The training course shall be designed to give BYPL hardware personnel sufficient knowledge of the overall design and operation of the system, so that they can correct obvious problems, configure the hardware, perform preventive maintenance, run diagnostic programs, and communicate with contract maintenance personnel. The following shall be covered:

Technical Specification of 11 KV Dry type Smart Packaged Substation

- a) System hardware design architecture overview: Configuration of the system hardware.
- b) Equipment Maintenance: Basic theory of operation, maintenance techniques and diagnostic procedures for each element of the computer system, e.g., processors, auxiliary memories, Ethernet, routers and printers. Configuration of all the hardware equipment.
- c) System Expansion: Techniques and procedures to expand and add equipment such as loggers, monitors and communication channels.
- d) System Maintenance: Theory of operation, maintenance techniques and practices, diagnostic procedures and (where applicable) expansion techniques and procedures. Classes shall include hands-on training for the specific subsystems that are part of BYPLs equipment or part of similarly designed and configured subsystems. All interfaces to the computing equipment shall be taught in detail.
- e) Operational Training: Practical training on preventive and corrective maintenance of all equipment, including use of special tools and instruments. This training shall be provided on BYPLs equipment or on similarly configured systems.

1.9.2 FRTU System Software Course

The contractor shall provide a computer system software course that covers the following subjects:

- a) System Programming: Including all applicable programming languages and all stand-alone service and utility packages provided with the system. An introduction to software architecture, effect of tuning parameters (OS software, Network software, database software etc.) on the performance of the system.
- b) Operating System: Including the user aspects of the operating system, such as program loading and integrating procedures, scheduling, management, service and utility functions and system expansion techniques and procedures.
- c) System Initialization and Failover: Including design, theory of operation and practice
- d) Diagnostics: Including the execution of diagnostic procedure and the interpretation of diagnostic outputs.
- e) Software Documentation: Orientation in the organization and use of system software documentation.
- f) Hands-on Training: One week, with allocated computer time for trainee performance of unstructured exercises and with the course instructor available for assistance as necessary.

1.9.3 FRTU Application Software Course

The supplier shall provide comprehensive application software courses covering all applications including the database and display building course. The training shall include:

- a) Overview: Block diagrams of the application software and data flows. Programming standards and program Interface conventions.

Technical Specification of 11 KV Dry type Smart Packaged Substation

- b) Application Functions: Functional capabilities, design and major algorithm. Associated maintenance and expansion techniques.
- c) Software Development: Techniques and conventions to be used for the preparation and integration of new software functions.
- d) Software Generation: Generation of application software from source code and associated software configuration control procedures.
- e) Software Documentation: Orientation in the organization and use of functional and detailed design documentation and of programmer and user manuals.
- f) Hands-on Training: One week, with allocated computer time for trainee performance of unstructured exercises and with the course instructor available for assistance as necessary.

1.9.4 Requirement of Training

The supplier shall provide training for a batch (maximum of 10 people) for five (5) days in two slots (Time of which will be decided by BYPL and supplier) on the following courses.

Name of Course:

- a) System Hardware
- b) System Software
- c) Application Software

1.10.0 Drawings & Documents

The bidder shall submit all the standard and customised FRTU documents for review and approval which includes the following:

- a) FRTU function design document
- b) FRTU hardware description document & all the documents referred therein to meet all the clauses of the specification.
- c) FRTU Test equipment user documents
- d) FRTU user guide
- e) FRTU Operation & Maintenance document
- f) FRTU training documentation
- g) FRTU database document
- h) FRTU I/O list (as build) after the execution
- i) FRTU Test procedures
- j) Data Requirement Sheet (DRS) of all items
- k) Protocol documentation including implementation profile etc.

BSES	BSES-TS-122-SPSS-R0
Technical Specification of 11 KV Dry type Smart Packaged Substation	

- I) FRTU installation and layout, GA, BOQ, schematics and internal wiring drawings for each FRTU site

Following Technical documents shall be submitted in addition to Commercial Documentation based on Statutory Requirements and shall be submitted along with the bid:

S. No.	Description	For Approval	For Review	Final Submission
1	GTP	✓		✓
2	GA Drawing	✓		✓
3	Installation Instruction			✓
4	Manual/ Catalogues		✓	✓
5	Dimension drawing		✓	✓
6	QA & QC plan	✓	✓	✓
7	Test Certificates	✓	✓	✓

After the award of the contract, bidder shall submit 4 copies of Drawings describing the equipment in detail and forward for approval before final dispatch of the equipment. Soft copy of all the Drawings, GTP, Test certificates shall be submitted for final approval by BYPL. All the documents & drawings shall be in English language.

1.11.0 FRTU DI/DO/AI list

FRTU configuration DI/ DO/AI Channel requirement is indicated in the Table given below

1.11.1.1	FRTU configuration	DI-64 no's DO-16 no's AI-6 no's
1.11.2	Digital Inputs	
1.11.2.1	Cable feeder VCB module 1 & 2	CB ON
		CB OFF
		Disconnecter ON position
		Disconnecter OFF position
		Earth position ON position
		Earth position OFF position
		Fault Indicator ON Status
		Fault Indicator OFF Status
		L/R switch in remote
		Control circuit Healthy
1.11.2.2	Transformer VCB	CB ON
		CB OFF
		Disconnecter ON position

Technical Specification of 11 KV Dry type Smart Packaged Substation

		Disconnecter OFF position Earth position ON position Earth position OFF position Auto Trip L/R switch in remote Control circuit Healthy
1.11.2.3	Common Signals	SF6 Low Battery Charger 1 Fail Battery Charger 2 Fail Battery low(BHMu & Charger) Battery Unhealthy/fail Battery Test in progress Command Acknowledgement Door Open/Close
1.11.2.4	Transformer signals	Transformer Oil level low OTI Alarm from field WTI Alarm from field WTI trip Transformer pressure relay operated
1.11.2.5	APFC	APFC Incomer MCCB ON APFC Incomer MCCB OFF APFC Incomer MCCB Trip L/R switch in remote Control supply healthy
1.11.2.6	LT ACB (through microprocessor release)	LT ACB ON LT ACB OFF LTACB Trip L/R switch in remote Control supply healthy
1.11.2.7	Outgoing MCCB (through microprocessor release)	LT Outgoing MCCB ON LT Outgoing MCCB OFF L/R switch in remote Control supply healthy
1.11.2.8	Fire Extinguisher & smoke detector	Fire Extinguisher Operated In service Fire Alarm
1.11.3	Digital Outputs (Commands)	
1.11.3.1	Cable feeder VCB module 1 & 2	CB ON CB OFF FPI Reset
1.11.3.2	Transformer VCB module 3	CB ON CB OFF
1.11.3.3	LT ACB (through microprocessor release)	LT ACB ON LT ACB OFF
1.11.4	Measuring inputs	
1.11.4.1	Energy Meter (energy meter in purchaser)	IR IY

Technical Specification of 11 KV Dry type Smart Packaged Substation

	scope)	IB
		VAR
		W
		VA
		PF
		VRV
		VVB
		VBR
		VRN
		VYN
		VBN
		IN
1.11.4.2	ACB release	IR
		IY
		IB
		W
		VA
		VAR
		PF
		Harmonic
1.11.4.3	MCCB release	IR
		IY
		IB
		W
		VA
		VAR
		PF
		Harmonic
1.11.4.3	WTI Scanner	Oil temperature
		LV Winding temperature
		HV Winding temperature
1.11.4.4	APFC relay	Switching Step
		IR
		IY
		IB
		PF
		VA
		VAR
		W

1.12.0 Guaranteed Technical Documents

(Vendors shall furnish the General Technical Particulars along with their offer)

Sr. No.	Description	Requirement	Vendors Data
1	Vendors Name		
2	Guarantee period	5 yrs	
3	Make of FRTU base module		
4	No. of DI modules	40	

Technical Specification of 11 KV Dry type Smart Packaged Substation

5	No. of DO modules	16	
6	No. of AI modules	6	
7	Dimensions & Weight of FRTU	Vendor shall provide	
8	Dimensions of FRTU panel	Vendor shall Provide	
9	Make of protocol converter	Vendor shall provide	
10	Interposing relay with freewheeling diode		
10.1	Make	ABB / SCHNEIDER/SIEMENS	
10.2	Capacity	>8 A	
10.3	Model	CR-P with 2C/O contacts	
11	Surge protection		
11.1	Incoming to FRTU supply		
11.2	Serial communication		
11.3	Ethernet port		
12	AC & DC MCB	Merlin & Gerin / Protec / Indokopp	
13	Terminal Blocks	Elmex / Connectwell / Phoenix	
14	Disconnecting type fuses	Elmex / Connectwell / Phoenix	
15	Enclosure		
15.1	Sheet steel thickness	Mini 2 mm	
15.2	Painting process	7 tank	
15.3	Construction of steel according to IEC 529 , index of protection	IP55	
15.4	Shade	As PSS	
15.5	Louvers with filters	2 Nos	