



ಭಾರತ್ ಹೆವಿ ಎಲೆಕ್ಟ್ರಿಕಲ್ಸ್ ಲಿಮಿಟೆಡ್  
भारत हेवी इलेक्ट्रिकल्स लिमिटेड

**Bharat Heavy Electricals Ltd.,**  
**(A Government of India undertaking)**  
**Electronics Division**

PB 2606 , Mysore Road Bangalore , 560026 INDIA

SCPV: BOS: ITB - Rev 01

## **INSTRUCTIONS TO BIDDERS (ITB)**

Bidders are requested to read the instructions carefully and submit their quotations covering all the points:

### **A. GENERAL INSTRUCTIONS:**

1. Any Purchase Order resulting from this enquiry shall be governed by the Instructions to Bidders (document reference: SCPV: BOS: ITB – Rev 01), General Conditions of Contract (document reference: SCPV: BOS: GCC - Rev 01) and Special Conditions of Contract (document reference: SCPV: BOS: SCC: I - Rev 01/ SCPV: BOS: SCC: F - Rev 01), if any, of the enquiry.
2. Any deviations from or additions to the “General Conditions of Contract” or “Special Conditions of Contract” require BHEL’s express written consent. The general terms of business or sale of the bidder shall not apply to this tender.
3. Bidders (also includes the term suppliers / contractors wherever used in this document) are instructed to quote their most competitive price and best delivery, etc. in the offer. Prices should be indicated in both figures & words. **(Please also refer clause 11 under section B)**
4. Regret letter (either through post or by mail) indicating reasons for not quoting must be submitted without fail, in case of non-participation in this tender. If a bidder fails to respond against 3 consecutive tenders for the same item, he will be liable for removal as a registered vendor of BHEL.
5. Procurement directly from the manufacturers shall be preferred. However, if the OEM / Principal insist on engaging the services of an agent, such agent shall not be allowed to represent more than one manufacturer / supplier in the same tender. Moreover, either the agent could bid on behalf of the manufacturer / supplier or the manufacturer / supplier could bid directly but not both. In case bids are received from the manufacturer / supplier and his agent, bid received from the agent shall be ignored.
6. Consultant / firm (and any of its affiliates) shall not be eligible to participate in the tender/s for the related goods for the same project if they were engaged for consultancy services for the same project.
7. If an Indian representative / associate / liaison office quotes on behalf of a foreign based bidder, such representative shall furnish compulsorily the following documents:
  - a. Authorization letter to quote and negotiate on behalf of such foreign-based bidder.
  - b. Undertaking from such foreign based bidder that such contract will be honored and executed according to agreed scope of supply and commercial terms and conditions.
  - c. Undertaking shall be furnished by the Indian representative stating that the co-ordination and smooth execution of the contract and settlement of shortages / damages / replacement / repair of imported scope till system is commissioned and handed over to customer will be the sole responsibility of the Indian representative / associates / agent / liaison office.
8. In case of imported scope of supply, customs clearance & customs duty payment will be to BHEL account after the consignment is received at Indian Airport / Seaport. Bidders must provide all original documents required for completing the customs clearance along with the shipment. Warehousing charges due to incomplete or missing documentation will be recovered from the supplier’s bill. All offers for imported scope of supply must be made from any of the gateway ports (within the country) indicated. **(Refer Annexure I)**
9. The offers of the bidders who are on the banned list and also the offers of the bidders, who engage the services of the banned firms, shall be rejected. The list of the banned firms is available on BHEL website: **www.bhel.com**.

10. Business dealings with bidders will be suspended if they are found to have indulged in any malpractices / misconduct which are contrary to business ethics like bribery, corruption, fraud, pilferage, cartel formation, submission of fake/false/forged documents, poor quality, certificates, information to BHEL or if they tamper with tendering procedure affecting the ordering process or fail to execute a contract, or rejection of 3 consecutive supplies or if their firms / works are under strike / lockout for a long period.

## **B. GUIDELINES FOR PREPARATION OF OFFER:**

1. Quotation shall be submitted in Single Part Bid, Two Part Bid or Three Part Bid, as called for in the tender:
  - **SINGLE PART BID:** Technical and Commercial Bid with prices along with price summary & filled in BHEL Standard Commercial terms and conditions in a single sealed envelope.
  - **TWO PART BID:** Unpriced offer i.e. "Techno-commercial Bid" with filled in BHEL Standard Commercial terms and conditions in a sealed envelope **along with the copy of the "Price Bid" without the prices** should be enclosed in one cover and the cover must be super scribed "**Techno-commercial offer** and Priced offer i.e. "Price Bid" containing price summary in a separate sealed envelope and must be super scribed "**Price Bid**". Both these envelopes shall be enclosed in a single sealed envelope super scribed with enquiry number, due date of tender and any other details as called for in the tender document.
  - **THREE PART BID:** Pre-qualification Bid (Part-I), Techno Commercial Bid with filled in BHEL Standard Commercial terms and conditions (Part-II), and Price Bid (Part-III). All three envelopes shall be enclosed in a single sealed envelope super scribed with enquiry number due date of tender and any other details as called for in the tender document.

If any of the offers (Part I, Part II or Part III) are not submitted before the due date and time of submission at the venue/place specified or if any part of the offer is incomplete the entire offer of the bidder is liable for rejection.

2. Supplier shall ensure to super scribe each envelope with RFQ number, RFQ Date, RFQ Due date and time, Item Description and Project clearly & boldly. Also mention on the envelope whether it is "Techno Commercial Bid" or "Price Bid" or "Pre-Qualification Bid". Please ensure complete address, department name and purchase executive name is mentioned on the envelope (before dropping in the tender box or handing over) so that the tender is available in time for bid opening.
3. BHEL standard Commercial Terms and Conditions shall be duly filled, signed & stamped and must accompany Technical-Commercial offer without fail and should be submitted in original only. Photocopy will not be accepted. All documents submitted along with the offer shall be signed and stamped in each page by authorized representative of the bidder.
4. Any of the terms and conditions not acceptable to supplier, shall be explicitly mentioned in the Techno-Commercial Bid. If no deviations are brought out in the offer it will be treated as if all terms and conditions of this enquiry are accepted by the supplier without any deviation.
5. Deviation to this specification / item description, if any, shall be brought out clearly indicating "DEVIATION TO BHEL SPECIFICATION" without fail, as a part of Techno-Commercial Bid. If no deviations are brought out in the offer it will be treated as if the entire specification of this enquiry is accepted without deviation.
6. Suppliers shall submit one set of original catalogue, datasheets, bill of materials, dimensional drawings, mounting details and / or any other relevant documents called in purchase specification as part of Technical Bid.
7. "Price Bid" shall be complete in all respects containing price break-up of all components along with all applicable taxes and duties, packing & forwarding charges (if applicable), freight charges (if applicable) etc. Once submitted no modification / addition / deletion will be allowed in the "Price Bid." Bidders are advised to thoroughly check the unit price, total price to avoid any discrepancy.
8. In addition, bidder shall also quote for erection & commissioning charges (I&C charges), documentation charges, service charges, testing charges (type & routine), training charges, service tax, etc. wherever applicable. The price summary must indicate all the elements clearly.
9. Vendors should indicate "lump sum" charges (including To & Fro Fare, Boarding, Lodging, Local Conveyance etc.) for Supervision of Erection, Commissioning and handing over to customer. The quotation shall clearly indicate scope of work, likely duration of commissioning, pre-commissioning checklist and service tax (if any).
10. Wherever bidders require PAC (Project Authority Certificate) for import of raw materials, components required for Mega

Power Projects, Export Projects, MNRE Concession or other similar projects wherein supplies are eligible for customs duty /Excise duty benefits, lists and quantities of such items and their values (CIF) has to be mentioned in the offer. Prices must be quoted taking into account of such benefits.

11. All quotations shall be free from corrections /overwriting. Corrections if any should be authenticated with signature and seal. Any typographical error, totaling mistakes, currency mistake, multiplication mistake, summing mistakes etc. observed in the price bids will be evaluated as per **Annexure VI** "Guidelines for dealing with Discrepancy in Words & Figures – quoted in price bid". BHEL decision will be final.

#### **C. GUIDELINES FOR OFFER SUBMISSION:**

1. Offers / Quotations must be dropped in tender box before 13.00 Hrs. on or before due date mentioned in RFQ. The offers are to be dropped in the proper slot of the Tender Box kept in our reception area with caption "CE, SC&PV, DEFENCE." Tenders are opened on 3 days in a week (Monday/Wednesday/Friday). Tender must be deposited in the slot corresponding to the day (Monday - Box no.4/Wednesday - Box no. 6 /Friday - Box no.8) while depositing the offer. **(This clause will not be applicable for e-tenders).**
2. E-Mail / Internet / EDI offers received in time shall be considered only when such offers are complete in all respects. In case of offers received through E-mail, please send the offer to the email IDs within time of submission of tender.
3. In cases where tender documents are bulky, or due to some reasons tender documents are required to be submitted by hand or through posts/couriers, the offers are to be handed over to purchase officers.
4. Tenders will be opened on due date, time and venue as indicated in the RFQ in the presence of bidders at the venue indicated in the RFQ. In case of e-procurement, bidders can see tender results till seven days after due date and time.
5. Vendor will be solely responsible:
  - a. For submission of offers before due date and time. Offers submitted after due date and time will be treated as "Late offers" and will be rejected.
  - b. For submission of offers in the correct compartment of the tender box based on the day of due date (Monday/Wednesday/Friday). Please check before dropping your offer in the correct tender box.
  - c. For depositing offers in proper sealed condition in the tender box. If the bidder drops the tender in the wrong tender box or if the tender document is handed over to the wrong person BHEL will not be responsible for any such delays.
  - d. For offers received through email/courier etc., suppliers are fully responsible for lack of secrecy on information and ensuring timely receipt of such offers in the tender box before due date & time.
  - e. In case of e-tender, all required documents should be uploaded before due date and time. Availability of power, internet connections, etc. will be the sole responsibility of the vendor. Wherever assistance is needed for submission of e-tenders, help line numbers and executives of service provider of BHEL may be contacted.  
Service provider: M-junction  
Website address: <https://bheleps.buyjunction.in/>  
Helpline no.: 033-66106426/6217/6013/6046/6176 (9:30 am to 5:30 pm)  
9163348283/9163348284/9163348285/9163348286/8584008116 (5:30 pm to 8:30 pm)

**Purchase Executive / BHEL will not be responsible for any of the activities relating to submission of offer.**

#### **D. PROCESSING OFFERS RECEIVED:**

1. Any discount / revised offer submitted by the supplier on its own shall be accepted provided it is received on or before the due date and time of offer submission (i.e. Part-I bid). The discount shall be applied on pro-rata basis to all items unless specified otherwise by the bidder.
2. Changes in offers or Revised offers given after Part-I bid opening shall not be considered as a part of the original offer unless such changes / revisions are requested by BHEL.
3. In case there is no change in the technical scope and / or specifications and / or commercial terms & conditions by BHEL, the supplier will not be allowed to change any of their bids after Technical bids are opened (after the due date and time of tender opening of Part-1 Bid).

4. In case of changes in scope and/ or technical specifications and/ or commercial terms & conditions by BHEL and it accounts for price implications from vendors, all techno-commercially acceptable bidders shall be asked by BHEL (after freezing the scope, technical specifications and commercial terms & conditions) to submit the impact of such changes on their price bid. Impact price will be applicable only for changes in technical specification / commercial conditions by BHEL. The impact price must be submitted on or before the cut-off date specified by BHEL and the original price bid and the price impact bid will be opened together at the time of price bid opening. Impact price means only for those items which have been impacted by addition / deletion / changes in the technical specifications or commercial conditions. The impact may be +/- incremental value of the currency in which originally quoted. The impact price bid to be submitted on the cut-off date, time & venue as specified by BHEL. The impact price bid shall be opened along with original price bid.
5. Un-opened bids (including price bids) will be returned to the respective bidders after release of PO and receipt of order acknowledgement from the successful bidder.
6. After receipt of Purchase Order, supplier should submit required documents like drawings, bill of materials, datasheets, catalogues, quality plan, test procedure, type test report , O & M Manuals and / or any other relevant documents as per Specification / Purchase Order, as and when required by BHEL / Customer.
7. Any deviation to the terms and conditions not mentioned in the quotation by supplier in response to this enquiry will not be considered, if put forth subsequently or after issue of Purchase Order, unless clarification is sought for by BHEL EDN and agreed upon in the Purchase Order.
8. Evaluation shall be on the basis of delivered cost (i.e. "Total Cost to BHEL"). As per RFQ terms. "Total Cost to BHEL" shall include total basic cost, packing & forwarding charges, taxes and duties, inspection charges, freight charges, test charges, insurance, service tax for services, any other cost indicated by vendor for execution of the contract and loading factors (for non-compliance to BHEL Standard Commercial Terms & Conditions). Benefits arising out of Nil Import Duty on Mega Projects, Physical Imports or such 100% exemptions & MNRE Exemptions (statutory benefits), customer reimbursements of statutory duties (like Excise Duty, CST, VAT) will also be taken into account at the time of tender evaluation. (Wherever applicable and as indicated in SCC document of tender)
9. For evaluation of offers in foreign currency, the exchange rate (TT selling rate of SBI) shall be taken as under:
 

|                      |                            |
|----------------------|----------------------------|
| Single part bids:    | Date of tender opening     |
| Two/three part bids: | Date of Part-I bid opening |
| Reverse Auction:     | Date of Part-I bid opening |

In case of Performance Bank Guarantee (PBG) also, exchange rate will be considered as mentioned above for converting foreign currency to Indian currency and vice versa.

If the relevant day happens to be a bank holiday, then the exchange rate as on the previous working day of the bank (SBI) shall be taken.
10. Ranking (L-1, L-2 etc.) shall be done only for the techno-commercially acceptable offers and on the basis or evaluation of Total Cost to BHEL.

#### **E. INFORMATION ON PAYMENT TERMS:**

1. All payments will be through Electronic Fund transfer (EFT). Vendor has to furnish necessary details as per BHEL standard format (**Refer Annexure IV**) for receiving all payments through NEFT. (Applicable for Indian vendors only)
2. Statutory deductions, if any, will be made and the deduction certificate shall be issued. In case vendor does not provide PAN details, the TDS deduction shall be at the maximum percentage stipulated as per the provisions of Income Tax Act. (Applicable for Indian vendors only). Foreign vendors shall submit relevant details of their bankers like Swift Code, Banker's Name & Address etc.
3. Vendors must submit bills & invoices along with required supporting documents in time. Incomplete documentation / delayed submission of invoice / documents will result in corresponding delay in payment.

**F. STANDARD PAYMENT TERMS OF BHEL-EDN****Purchase Orders for indigenous procurement****(a) SUPPLY WITH I&C/SUPERVISION:****Supply:**

- 1) 80% of basic Supply value + 100% of taxes, duties and freight charges will be paid with 45 days credit from the receipt of material at site or 15 days credit from the date of submission of complete set of documentation whichever is later.
- 2) 10% of basic supply value will be paid on completion of I&C against submission of supplementary invoice along with proof of completion of I&C along with I&C charges (if any).
- 3) Balance 10% (retention money) against submission of supplementary invoice along with PBG valid for Warranty Period+3 months Claim Period from BHEL Consortium Bank.

**I&C/Supervision:** 100% on completion of I&C/Supervision and certification line item wise on pro-rata basis.

**O&M:** 100% O&M charges are payable as per RFQ terms against report certified by BHEL.

**(b) SUPPLY ONLY:**

- 1) 100% of Basic value with taxes, duties and freight will be paid with 45 days credit from the receipt of material at site or 15 days credit from the date of submission of complete set of documentation whichever is later)+ submission of PBG valid for Warranty Period+ 3 months Claim Period from BHEL Consortium Bank ,if applicable.

**Purchase orders for import procurement:****(c) SUPPLY WITH I&C/SUPERVISION:****Supply:**

- 1) 80% of the basic value (excluding I&C charges) will be paid with 45 days credit, against Sight draft, from the date of AWB/BOL on submission of complete set of documents as in PO.
- 2) 10% of basic supply value will be paid on completion of I&C against submission of supplementary invoice along with proof of completion of I&C along with I&C charges (if any).
- 3) Balance 10% (retention money) against submission of supplementary invoice along with PBG valid for Warranty Period+3 months Claim Period from BHEL Consortium Bank.

**I&C:** 100% on completion of I&C/Supervision and certification line item wise on pro-rata basis.

**(d) SUPPLY ONLY:**

- 1) 100% of PO value will be paid against Sight draft with 45 days Credit from the date of dispatch or 15 days credit from the date of submission of complete set of documents whichever is later )+ submission of PBG valid for Warranty Period+3 months Claim Period from BHEL Consortium Bank ,if applicable.

**Note for (a), (b), (c) and (d):** In exceptional cases, if vendor fails to submit PBG after supplies, vendors can also accept for the final 10% payment, payable after the warranty period + 3 months of claim period against supplementary invoice subject to the completion of commissioning (if applicable) as PBG is linked to Warranty period.

**G. LOADING FACTORS FOR PAYMENT TERMS & DELAYED DELIVERY:**

Loading factors as detailed below will be added to the quoted price (basic) to evaluate the lowest quote for non-compliance of BHEL standard commercial term.

| SI No | Deviation on                        | Nature of Deviation / Offered Terms                               | Loading % |
|-------|-------------------------------------|-------------------------------------------------------------------|-----------|
| 1.    | <b>Payment Terms</b>                | <b>For Purchase within India :-</b>                               |           |
|       |                                     | 1) Credit period less than 45 days                                | 15        |
|       |                                     | <b>* For Foreign Purchase :-</b>                                  |           |
|       |                                     | 1) Payment through At Sight Letter of Credit                      | 10        |
|       |                                     | 2) Payment through Letter of Credit with usance credit of 45 days | 5         |
|       |                                     | 3) Sight Draft with credit period less than 45 days               | 5         |
| 2.    | <b>Penalty for Delayed Delivery</b> | 1) Non – Acceptance                                               | 10        |
|       |                                     | 2) Partial Acceptance ( X% )                                      | (10 – X)  |

**\* All bank charges shall be to seller's account. If bank charges of BHEL banker are to BHEL's account then additional loading of 2% on the quoted basic value is applicable.**

Offer/s with payment terms other than the standard payment terms indicated at Clause No.F or Deviated Payment Terms with loading indicated at Clause No.G above are liable for rejection.

**NOTES:**

- ADVANCE PAYMENT/LC: Quotations with "Advance payment/Inland LC" shall be rejected.
- Basic value of Purchase Order mentioned above will include all components of the purchase order and will exclude only taxes, duties, freight and I&C charges (wherever applicable).
- Wherever the Purchase Order is split into import portion and indigenous portion of supply the retention money will be 10% (as applicable) of both purchase order values put together.
- Non-Compliance of Warranty terms. Offers not complying with Warranty terms as per RFQ Terms is liable for rejection.
- SALE IN TRANSIT/ LOCAL VAT: Sale in transit under section 6(2) of CST is allowed if movement of goods is interstate. In case intra state movement of goods, benefit of sale in transit is not available.
- In case of intrastate movement i.e. supply within same state and VAT is applicable, the vendor shall furnish the respective BHEL's nodal agency TIN no. and address in their invoice. (Refer **Annexure IX**)

**H. BANK GUARANTEE (BG) / PERFORMANCE BANK GUARANTEE (PBG):**

- Bank guarantee (BG) / Performance bank guarantee (PBG) will be applicable as called in the tender documents. Such PBG shall be valid for a period of Warranty Period + claim period of 3 months for a value equal to 10 % of the basic value of the purchase order. No deviation for the duration of PBG / BG will be permitted.
  - PBG shall be from any of the BHEL consortium of bankers (**refer Annexure V**).
  - PBGs from nationalized banks are also acceptable.

- c. PBG should be sent directly by the bank to the dealing executive mentioned in the purchase order located at the address mentioned in the purchase order. PBG should be in the format indicated. **(Refer Annexure III)**. No deviation to these formats will be allowed.
- d. Confirmation from any of the BHEL consortium of banks or any of the Indian Public Sector Banks is essential for the acceptance of PBGs issued by foreign banks (located outside India).
- e. Expired BGs / PBGs will be returned only after expiry of the claim period or on completion of the contractual obligation.
- f. In case vendor does not accept for submission of PBG, the vendor is liable for rejection on commercial grounds.

#### **I. DOCUMENTS (TRIPLICATE COPIES) REQUIRED AT THE TIME OF DISPATCH FOR PROCESSING OF BILL:**

##### **1. FOR INDIGENOUS SCOPE OF SUPPLY:**

**For Supply:** Invoice in Triplicate, Lorry receipt (LR) copy, Packing List, PSI Call Letter Copy, Proof of delivery such as MRC (Material Receipt Certificate)/ original acknowledged LR, Insurance intimation Letter and Warranty Certificate. Note that document pertaining to Proof of delivery shall clearly mention number of boxes/panels etc which shall be in line with the Packing list.

**For I&C:** Supplementary Invoice in Triplicate with copy of I&C Certificate (Proof of Completion of I&C).

**For PBG:** Supplementary Invoice in Triplicate with copy of PBG. However, PBG should reach concerned Purchase Officer directly from the Bank.

##### **2. FOR IMPORTED SCOPE OF SUPPLY:**

**For Supply:** Invoice in Triplicate, Air Way Bill/Bill of Lading, Packing List, PSI Call Letter Copy, and Warranty Certificate.

**For I&C:** Supplementary Invoice in Triplicate with copy of I&C Certificate (Proof of Completion of I&C).

**For PBG:** Supplementary Invoice in Triplicate with copy of PBG. Both PBG & supplementary invoice should reach concerned Purchase Officer directly from the Bank.

#### **J. PROVISIONS APPLICABLE FOR MSE VENDORS (MICRO AND SMALL ENTERPRISES)**

Vendors who qualify as MSE vendors are requested to submit applicable certificates (as specified by the Ministry of Micro, Small and Medium Enterprises) at the time of vendor registration. Vendors have to submit any of the following documents along with the tender documents in the Part I / Technical bid cover to avail the applicable benefits.

- a. Valid NSIC certificate or
- b. Entrepreneur's Memorandum part II (EM II) certificate (deemed valid for 2 years).
- c. EM II certificate with CA certificate **(in the prescribed format given in Annexure VIII)** applicable for the year certifying that the investment in plant and machinery of the vendor is within permissible limits as per the MSME Act 2006 for relevant status where the deemed validity is over.
- d. Documents submitted for establishing the credentials of MSE vendors must be valid as on the date of part I / technical bid opening for the vendors to be eligible for the benefits applicable for MSE vendors. Documents submitted after the Part I / Technical bid opening date will not be considered for this tender.

##### **PURCHASE PREFERENCE FOR MSE VENDORS:**

- e. ~~MSE vendors quoting within a price band of L1 + 15% shall be allowed to supply up to 20% of the requirement against this tender provided.~~
  - 1. ~~The MSE vendor matches the L1 price.~~
  - 2. ~~L1 price is from a non-MSE vendor.~~
  - 3. ~~L1 price will be offered to the nearest vendor nearest to L1 in terms of price ranking (L2 nearest to L1). In case of non-acceptance by the MSE vendor (L2) next ranking MSE vendor will be offered who is within the L1 + 15% band (if L3 is also within 15% band).~~
  - 4. ~~20% of the 20% (i.e. 4% of the total enquired quantity) will be earmarked for SC/ST owned MSE firms provided conditions as mentioned in (1) and (2) are fulfilled.~~
  - 5. ~~In case no vendor under SC / ST category firms are meeting the conditions mentioned in (1) and (2) or have not participated in the tender, in such cases the 4% quantity will be distributed among the other eligible MSE vendors who have participated in the tender.~~



- ~~6. Serial no. 1 to 5 will not be applicable wherever it is not possible to split the tendered quantity / items on account of customer contract requirement, or the items tendered are systems. Such information that tendered quantity will not be split will be indicated in the SCC.~~

#### **K. INTEGRITY COMMITMENT IN THE TENDER PROCESS, AND EXECUTION OF CONTRACTS:**

##### **1. Commitment by BHEL:**

BHEL commits to take all measures necessary to prevent corruption in connection with the Tender process and execution of the Contract. BHEL will, during the tender process, treat all bidder / suppliers in a transparent and fair manner, and with equity.

##### **2. Commitment by Bidder(s)/ Contractor(s):**

- a. The Bidder(s)/ Contractor(s) commit(s) to take all measures to prevent corruption and will not directly or indirectly try to influence any decision or benefit which he is not legally entitled to.
- b. The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any undisclosed agreement or understanding or any actions to restrict competition.
- c. The Bidder(s)/ Contractor(s) will not commit any offence under the relevant Acts. The Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain or pass on to others, any information or document provided by BHEL as part of business relationship.
- d. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract and shall adhere to the relevant guidelines issued from time to time by Government of India/ BHEL.

If the Bidder(s) / Contractor(s), before award or during execution of the Contract commit(s) a transgression of the above or in any other manner such as to put his reliability or credibility in question, BHEL is entitled to disqualify the Bidder(s) / Contractor (s) from the tender process or terminate the contract and/ or take suitable action as deemed fit.

#### **L. FRAUD PREVENTION POLICY:**

The bidder along with its associate/collaborators/sub-contractors/sub-vendors/consultants/service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website <http://www.bhel.com> and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice. Fraud Prevention policy and List of Nodal Officers shall be hosted on BHEL website, vendor portals of Units/regions intranet.

**PURCHASE EXECUTIVE**





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भारत हेवी इलेक्ट्रिकल्स लिमिटेड

Bharat Heavy Electricals Ltd.,  
(A Government of India undertaking)  
Electronics Division

PB 2606 , Mysore Road Bangalore , 560026 INDIA

SCPV: BOS: GCC - Rev 01

### **GENERAL COMMERCIAL CONDITIONS FOR CONTRACT (GCC)**

These 'General Commercial Conditions for Contract for Purchase' hereinafter referred to as GCC apply to all enquiries, tenders, requests for quotations, orders, contracts and agreements concerning the supply of goods and the rendering of related services (hereinafter referred to as "deliveries") to Bharat Heavy Electricals Limited and any of its units, regions or divisions (hereinafter referred to as "BHEL" or the Purchaser) or its projects / customers.

Any deviations from or additions to these GCC require BHEL's express written consent. The general terms of business or sale of the vendor shall not apply to BHEL. Acceptance, receipt of shipments or services or effecting payment shall not mean that the general terms of business or sale of the vendor have been accepted.

Orders, agreements and amendments thereto shall be binding if made or confirmed by BHEL in writing. Only the Purchasing department of BHEL is authorized to issue the Purchase Order or any amendment thereof.

**Definitions:** Throughout these conditions and in the specifications, the following terms shall have the meanings assigned to them, unless the subject matter or the context requires otherwise.

- a) 'The Purchaser' means Bharat Heavy Electricals Limited, Electronics division, Mysore road, Bangalore 560 026, a Unit of Bharat Heavy Electricals Limited (A Govt. of India Undertaking) incorporated under the Companies Act having its registered office at BHEL House, Siri Fort, New Delhi-110049, India and shall be deemed to include its successors and assigns. It may also be referred to as BHEL.
- b) 'The vendor' means the person, firm, company or organization on whom the Purchase Order is placed and shall be deemed to include the vendor's successors, representative heirs, executors and administrator as the case may be. It may also be referred to as Seller, Contractor or Supplier.
- c) 'Contract' shall mean and include the Purchase Order incorporating various agreements, viz. tender/ RFQ, offer, letter of intent / acceptance / award, the General Conditions of Contract and Special Conditions of Contract for Purchase, Specifications, Inspection / Quality Plan, Schedule of Prices and Quantities, Drawings, if any enclosed or to be provided by BHEL or his authorized nominee and the samples or patterns if any to be provided under the provisions of the contract.
- d) 'Parties to the Contract' shall mean the 'The Vendor' and the Purchaser as named in the main body of the Purchase Order.
- e) "Bidder" shall mean duly established reputed organisation, manufacturer etc. having requisite financial and technical capability and experience of participating in the bid invited by the purchaser for the tender.
- f) Bid- The term "bid" or "bidding" can also relate to the documented Offer submitted in response to a request for quotation (RFQ) /Tender.

### **Interpretation:**

In the contract, except where the context requires otherwise:

- a) words indicating one gender include all genders;
- b) words indicating the singular also include the plural and words indicating the plural also include the singular;
- c) provisions including the word "agree", "agreed" or "agreement" require the agreement to be recorded in writing, and
- d) "Written" or "in writing" means hand-written, type-written, printed or electronically made, and resulting in a permanent record.

**Applicable Conditions:**

1. **Price Basis:** All prices shall be firm until the purchase order is executed / completed in all respects. No price variations / escalation shall be permitted unless otherwise such variations / escalations are provided for and agreed by BHEL in writing in the purchase order.
2. **Validity:** The offer will be valid for a period of 90 days from the date of technical bid opening date. Validity beyond 90 days, if required, will be specified in the SCC (special conditions of contract).
3. **Taxes & Duties:** Taxes as mentioned in the Contract Price or Price Schedule shall be paid to the Contractor subject to the Contractor complying with all the statutory requirements and furnishing the relevant documents including error free invoices containing detailed break-up of the taxes. Any duties, levies or taxes not mentioned in Contract Price or Price Schedule but applicable as per any statute(s) shall be deemed to be included in the Contract price and shall be to the account of the Contractor.  
The Contractor shall bear and pay all the costs, liabilities, levies, interest, penalties in respect of non-compliances of any legal requirements as per various statutory provisions. The contractor shall keep the owner indemnified at all times from any tax liability, interest, penalties or assessments that may be imposed by the statutory authorities for non-compliances or non-observation of any statutory requirements by the Contractor.
4. **Ordering and confirmation of Order:** Vendor shall send the order acceptance on their company letter head within two weeks from the date of Purchase Order or such other period as specified / agreed by BHEL. BHEL reserves the right to revoke the order placed if the order confirmation differs from the original order placed. The acceptance of goods/services/supplies by BHEL as well as payments made in this regard shall not imply acceptance of any deviations.  
The purchase order will be deemed to have been accepted if no communication to the contrary is received within two weeks (or the time limit as specified / agreed by BHEL) from the date of the purchase order.
5. **Documentation:** After receipt of Purchase Order, vendor should submit required documents like drawings, bill of materials, datasheets, catalogues, quality plan, test procedure, type test report , O & M Manuals and/or any other relevant documents as per Specification/Purchase Order, as and when required by BHEL/Customer.  
At any stage within the contract period, the vendor shall notify of any error, fault or other defect found in BHEL's documents /specifications or any other items for reference. If and to the extent that (taking account of cost and time) any vendor exercising due care would have discovered the error, fault or other defect when examining the documents/specifications before submitting the tender, the time for completion shall not be extended. However if errors, omissions, ambiguities, inconsistencies, inadequacies or other defects are found in the vendor's documents, they shall be corrected at his cost, notwithstanding any consent or approval.
6. **TERMS OF DELIVERY:**  
**FOR IMPORTED PURCHASE:**  
Price offered shall be for goods packed and delivered CIF Seaport/ International Airport (FCA) including packing, forwarding, Handling, Ancillary charges like processing of Sight Draft, negotiation charges of bank, Export declaration, Certificate of origin etc.  
Packing shall be Air/Sea worthy, best suitable for trans-shipment and to take care of transit damages. If containerized, no. of containers & size of container shall be mentioned. Packing weight (gross & net) Packing dimensions shall be given prior to shipment to ascertain whether the consignment can be carried on standard cargo in contract or as ODC.  
Wooden packing material for all the foreign consignments should be treated as per ISPM-15 & Fumigation / Phytosanitary certificate to be submitted to the freight forwarders/ BHEL along with the invoice, B/L, packing list etc.  
Vendors shall indicate the name of International Airport/Seaport. The consignment shall be handed over to BHEL approved freight forwarder as mentioned in PO.

**FOR INDIGENOUS PURCHASE:**

Equipment shall be delivered on "FOR SITE" basis, inclusive of freight, packing, insurance & forwarding charges.

Packing shall be Road / Rail / Air / Sea worthy, best suitable for transshipment and to take care of transit damages. Smaller consignments can be dispatched through Courier services/ RPP with the prior approval of the purchasing Executive.

Deviation for the delivery term is liable for rejection.

**7. Penalty:**

**For delay in delivery:** In the event of delay in agreed contractual delivery as per Purchase Order, penalty @ 0.5 % (half percent ) per week or part thereof but limited to a max of 10% (ten percent) value of undelivered portion (basic material cost) will be applicable. Delivery will commence from the date of document approval by customer / BHEL or date of issue of manufacturing clearance, whichever is later. The date for which Inspection call is issued by vendor along with test certificates / test reports / Certificate of Conformance / calibration reports, as proof of completion of manufacturing will be treated as date of deemed delivery for penalty calculation. In the absence of furnishing such document indicated above as proof of completion of manufacturing along with inspection call, actual date of inspection will be considered as date of deemed delivery and BHEL will not be responsible for delay in actual date of inspection.

Penalty for delayed delivery, if applicable, shall be deducted at the time of first payment. If penalty is applicable for duration of less than a week, penalty @ 0.5% (half percent) of the basic material value will be deducted.

8. **Contract variations (Increase or decrease in the scope of supply):** BHEL may vary the contracted scope as per requirements at site. If vendor is of the opinion that the variation has an effect on the agreed price or delivery period, BHEL shall be informed of this immediately in writing along with technical details. Where unit rates are available in the Contract, the same shall be applied to such additional work. Vendor shall not perform additional work before BHEL has issued written instructions / amendment to the Purchase Order to that effect. The work which the vendor should have or could have anticipated in terms of delivering the service(s) and functionality (i.e.) as described in this agreement, or which is considered to be the result of an attributable error on the vendor's part, shall not be considered additional work.
9. **Reverse Auction:** BHEL reserves the right to go for Reverse Auction (RA) (Guidelines as available on [www.bhel.com](http://www.bhel.com)) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. Bidders to give their acceptance with the offer for participation in RA. Non-acceptance to participate in RA may result in non- consideration of their bids, in case BHEL decides to go for RA.

Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit 'Process compliance form' (to the designated service provider) as well as 'Online sealed bid' in the Reverse Auction. Non-submission of 'Process compliance form' or 'Online sealed bid' by the agreed bidder(s) will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on [www.bhel.com](http://www.bhel.com)).

The bidders have to necessarily submit online sealed bid less than or equal to their envelope sealed price bid already submitted to BHEL along with the offer. The envelope sealed price bid of successful L1 bidder in RA, if conducted, shall also be opened after RA and the order will be placed on lower of the two bids (RA closing price & envelope sealed price) thus obtained. The bidder having submitted this offer specifically agrees to this condition and undertakes to execute the contract on thus awarded rates.

If it is found that L1 bidder has quoted higher in online sealed bid in comparison to envelope sealed bid for any item(s), the bidder will be issued a warning letter to this effect. However, if the same bidder again defaults on this count in any subsequent tender in the unit, it will be considered as fraud and will invite

action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on [www.bhel.com](http://www.bhel.com)).

10. **Pre Shipment Inspection:** Prior written notice of at least one week shall be given along with internal test certificates / COC and applicable test certificates. Materials will be inspected by BHEL-EDN-QS/CQS or BHEL nominated Third Party Inspection Agency (TPIA) or BHEL authorized Inspection Agency or Customer / Consultant or jointly by BHEL & Customer / consultant. All tests have to be conducted as applicable in line with approved Quality plan or QA Checklist or Purchase specification and original reports shall be furnished to BHEL-EDN, Bangalore for verification / acceptance for issue of dispatch clearance.  
All costs related to inspections & re-inspections shall be borne by vendor. Whether the Contract provides for tests on the premises of the vendor or any of his Sub-contractor/s, vendor shall be responsible to provide such assistance, labour, materials, electricity, fuels, stores, apparatus, instruments as may be required and as may be reasonably demanded to carry out such tests efficiently. Cost of any type test or such other special tests shall be borne by BHEL only if specifically agreed to in the purchase order.
11. **Transit Insurance:** Transit insurance coverage between vendor's works and project site shall be to the account of BHEL, unless specifically agreed otherwise. However, vendor shall send intimation directly to insurance agency through fax/courier/e-mail, immediately on dispatch of goods for covering insurance. A copy of such intimation sent by vendor to insurance agency shall be given to BHEL along with dispatch documents. Dispatch documents will be treated as incomplete without such intimation copy. BHEL shall not be responsible for sending intimations to insurance agency on behalf of the vendor.
12. **Packaging and dispatch:** The Seller shall package the goods safely and carefully and pack them suitably in all respects considering the peculiarity of the material for normal safe transport by Sea / Air / Rail / Road to its destination suitably protected against loss, damage, corrosion in transit and the effect of tropical salt laden atmosphere. The packages shall be provided with fixtures / hooks and sling marks as may be required for easy and safe handling. If any consignment needs special handling instruction, the same shall be clearly marked with standard symbols / instructions. Hazardous material should be notified as such and their packing, transportation and other protection must conform to relevant regulations.  
The packing, shipping, storage and processing of the goods must comply with the prevailing legislation and regulations concerning safety, the environment and working conditions. Any Imported/Physical Exports items packed with raw / solid wood packing material should be treated as per ISPM – 15 (fumigation) and accompanied by Phytosanitary / Fumigation certificate. If safety information sheets (MSDS – Material Safety Data Sheet) exist for an item or the packaging, vendor must provide this information without fail along with the consignment.  
Each package must be marked with Consignee name, Purchase order number, Package number, Gross weight and net weight, dimensions (L x B x H) and Seller's name. Packing list of goods inside each package with PO item number and quantity must also be fixed securely outside the box to indicate the contents of each box. Total number of packages in the consignment must also be indicated.  
Separate packing & identification of items should be as follows.
  1. Main Scope - All items must be tagged with part no. & item description.
  2. Commissioning spares - All items must be tagged with part no. & item description.
  3. Mandatory spares - All items must be tagged with part no. & item description.
13. **Assignment of Rights & Obligations; Subcontracting:** Vendor is not permitted to subcontract the delivery or any part thereof to third party or to assign the rights and obligations resulting from this agreement in whole or in part to third parties without prior written permission from BHEL. Any permission or approval given by the BHEL shall, however, not absolve the vendor of the responsibility of his obligations under the Contract.
14. **Progress report:** Vendor shall render such report as to the progress of work and in such form as may be called for by the concerned purchase officer from time to time. The submission and acceptance of such reports shall not prejudice the rights of BHEL in any manner.
15. **Non-disclosure and Information Obligations: Vendor** shall provide with all necessary information pertaining to the goods as it could be of importance to BHEL. Vendor shall not reveal confidential information that may be divulged by BHEL to Vendor's employees not involved with the tender/ contract &

its execution and delivery or to third parties, unless BHEL has agreed to this in writing beforehand. Vendor shall not be entitled to use the BHEL name in advertisements and other commercial publications without prior written permission from BHEL.

16. **Cancellation / Termination of contract:** BHEL shall have the right to completely or partially terminate the agreement by means of written notice to that effect. Termination of the Contract, for whatever reason, shall be without prejudice to the rights of the parties accrued under the Contract up to the time of termination.  
BHEL shall have the right to cancel/foreclose the Order/ Contract, wholly or in part, in case it is constrained to do so, on account of any decline, diminution, curtailment or stoppage of the business.
17. **Risk Purchase Clause:** In case of failure of supplier, BHEL at its discretion may make purchase of the materials / services NOT supplied / rendered in time at the RISK & COST of the supplier. Under such situation, the supplier who fails to supply the goods in time shall be wholly liable to make good to BHEL any loss due to risk purchase.  
In case of items demanding services at site like erection and commissioning, vendor should send his servicemen /representatives within 7 days from the service call. In case a vendor fails to attend to the service call, BHEL at its discretion may also make arrangements to attend such service by other parties at the **RISK & COST** of the supplier. Under such situation the supplier who fails to attend the service shall be wholly liable to make good to BHEL any loss due to risk purchase / service including additional handling charges due to the change.
18. **Shortages:** In the event of shortage on receipt of goods and/or on opening of packages at site, all such shortages shall be made good within a reasonable time that BHEL may allow from such intimation and free of cost.  
**Transit Damages:** In the event of receipt of goods in damaged condition or having found them so upon opening of packages at site, Supplier shall make good of all such damages within a reasonable time from such intimation by BHEL.
19. **Remedial work:** Notwithstanding any previous test or certification, BHEL may instruct the vendor to remove and replace materials/goods or remove and re-execute works/services which are not in accordance with the purchase order. Similarly BHEL may ask the vendor to supply materials or to execute any services which are urgently required for any safety reasons, whether arising out of or because of an accident, unforeseeable event or otherwise. In such an event, Vendor shall provide such services within a reasonable time as specified by BHEL.
20. **Indemnity Clause:** Vendor shall comply with all applicable safety regulations and take care for the safety of all persons involved. Vendor is fully responsible for the safety of its personnel or that of his subcontractor's men / property, during execution of the Purchase Order and related services. All statutory payments including PF, ESI or other related charges have to be borne by the vendor. Vendor is fully responsible for ensuring that all legal compliances are followed in course of such employment.
21. **Product Information, Drawings and Documents:** Drawings, technical documents or other technical information received by Vendor from BHEL or vice versa shall not, without the consent of the other party, be used for any other purpose than that for which they were provided. They may not, without the consent of the Disclosing party, otherwise be used or copied, reproduced, transmitted or communicated to third parties. All information and data contained in general product documentation, whether in electronic or any other form, are binding only to the extent that they are by reference expressly included in the contract.  
Vendor, as per agreed date/s but not later than the date of delivery, provide free of charge information and drawings which are necessary to permit and enable BHEL to erect, commission, operate and maintain the product. Such information and drawings shall be supplied in as many numbers of copies as may be agreed upon.  
All intellectual properties, including designs, drawings and product information etc. exchanged during the formation and execution of the Contract shall continue to be the property of the disclosing party.
22. **Intellectual Property Rights, Licenses:** If any Patent, design, Trade mark or any other intellectual property rights apply to the delivery (goods / related service) or accompanying documentation shall be the exclusive

property of the Vendor and BHEL shall be entitled to the legal use thereof free of charge by means of a non-exclusive, worldwide, perpetual license. All intellectual property rights that arise during the execution of the Purchase Order/ contract for delivery by vendor and/or by its employees or third parties involved by the vendor for performance of the agreement shall belong to BHEL. Vendor shall perform everything necessary to obtain or establish the above mentioned rights. The Vendor guarantees that the delivery does not infringe on any of the intellectual property rights of third parties. The Vendor shall do everything necessary to obtain or establish the alternate acceptable arrangement pending resolution of any (alleged) claims by third parties. The Vendor shall indemnify BHEL against any (alleged) claims by third parties in this regard and shall reimburse BHEL for any damages suffered as a result thereof.

23. **Force Majeure:** Notwithstanding anything contained in the purchase order or any other document relevant thereto, neither party shall be liable for any failure or delay in performance to the extent said failures or delays are caused by the "Act of God" and occurring without its fault or negligence, provided that, force majeure will apply only if the failure to perform could not be avoided by the exercise of due care and vendor doing everything reasonably possible to resume its performance.

A party affected by an event of force majeure which may include fire, tempest, floods, earthquake, riot, war, damage by aircraft etc., shall give the other party written notice, with full details as soon as possible and in any event not later than seven (7) calendar days of the occurrence of the cause relied upon. If force majeure applies, dates by which performance obligations are scheduled to be met will be extended for a period of time equal to the time lost due to any delay so caused.

Notwithstanding above provisions, in an event of Force Majeure, BHEL reserves for itself the right to cancel the order/ contract, wholly or partly, in order to meet the overall project schedule and make alternative arrangements for completion of deliveries and other schedules.

24. **Guarantee / Warranty:** Wherever required, and so provided in the specifications / Purchaser Order, the Seller shall guarantee that the stores supplied shall comply with the specifications laid down, for materials, workmanship and performance. The guarantee / warranty period as described shall apply afresh to replaced, repaired or re-executed parts of a delivery. If the vendor fails to take proper corrective action to repair/replace defects satisfactorily within a reasonable period, Purchaser shall be free to take corrective action as may be deemed necessary at vendor's risk and cost after giving notice to the vendor, including arranging supply of goods from elsewhere at the sole risk and cost of the vendor. Unless otherwise specifically provided in the Purchase Order, Vendor's liability shall be co terminus with the expiration of the applicable guarantee / warranty period.

25. **Limitation of Liability:** Vendor's liability towards this contract is limited to a maximum of 100% of the contract value and consequential damages are excluded. However the limits of liability will have no effect in cases of criminal negligence or wilful misconduct.

The total liability of Vendor for all claims arising out of or relating to the performance or breach of the Contract or use of any Products or Services or any order shall not exceed the total Contract price.

26. **Liability during guarantee / warranty:** Vendor shall arrange replacement / repair of all the defective materials / services under its obligation under the guarantee / warranty period. The rejected goods shall be taken away by vendor and replaced / repaired. In the event of the vendor's failure to comply, BHEL may take appropriate action including disposal of rejections and replenishment by any other sources at the cost and risk of the vendor.

In case, defects attributable to vendor are detected during first time commissioning or use, vendor shall be responsible for replacement / repair of the goods as required by BHEL at vendor's cost. In all such cases expiry of guarantee / warranty will not be applicable.

27. **Liability after guarantee / warranty period:** At the end of the guarantee / warranty, the Vendor's liability ceases except for latent defects (latent defects are defects / performance issues noticed after the guarantee / warranty has expired). The Contractor's liability for latent defects warranty for the plant and equipment including spares shall be limited to a period of six months from the end of the guarantee / as specified in RFQ.

28. **Compliance with Laws:** Vendor shall, in performing the contract, comply with all applicable laws. The vendor shall make all remittances, give all notices, pay all taxes, duties and fees, and obtain all permits, licences and approvals, as required by the laws in relation to the execution and completion of the contract and for remedying of any defects; and the Contractor shall indemnify and hold BHEL harmless against and from the consequences of any failure to do so.
29. **Settlement of Disputes:** Except as otherwise specifically provided in the Purchase Order, decision of BHEL shall be binding on the vendor with respect to all questions relating to the interpretation or meaning of the terms and conditions and instructions herein before mentioned and as to the completion of supplies/work/services, other questions, claim, right, matter or things whatsoever in any way arising out of or relating to the contract, instructions, orders or these conditions or otherwise concerning the supply or the execution or failure to execute the order, whether arising during the schedule of supply/work or after the completion or abandonment thereof. Any disputes or differences among the parties shall to the extent possible be settled amicably between the parties thereto, failing which the disputed issues shall be settled through arbitration. Vendor shall continue to perform the contract, pending settlement of dispute(s).
30. **Arbitration Clause:** In case amicable settlement is not reached in the event of any dispute or difference arising out of the execution of the Contract or the respective rights and liabilities of the parties or in relation to interpretation of any provision in any manner touching upon the Contract, such dispute or difference shall (except as to any matters, the decision of which is specifically provided for therein) be referred by either party to the sole arbitration of an Arbitrator appointed by the Executive Director/ General Manager of the purchasing unit/ region/ division of BHEL. Vendor shall have no objection even if the Arbitrator so appointed is an employee of BHEL or has ever dealt/ had to deal with any matter relating to this Contract. Subject as aforesaid the provisions of the Arbitration and Conciliation Act, 1996 of India or any statutory modification or re-enactment thereof and the rules made there under and for the time being in force shall apply to the arbitration proceedings under this clause. It is a term of contract that the party initiating arbitration shall specify the dispute or disputes to be referred to arbitration under this clause together with the amount or amounts claimed in respect of each such dispute. The venue for the arbitration shall be Bangalore, India. The award of the arbitrator shall be a speaking award and shall be final, conclusive and binding on all parties to this contract.  
The cost of arbitration shall be borne equally by the parties. Notwithstanding the existence of any dispute or difference or any reference for the arbitration, the vendor shall proceed with and continue without hindrance the performance of the work under the contract with due diligence and expedition in a professional manner.
31. **Applicable Laws and Jurisdiction of Courts:** Prevailing Indian laws both substantive and procedural, including modifications thereto, shall govern the Contract. Subject to the conditions as aforesaid, the competent courts in BANGALORE alone shall have jurisdiction to consider over any matters touching upon this contract.
32. **General Terms:** That any non-exercise, forbearance or omission of any of the powers conferred on BHEL and /or any of its authorities will not in any manner constitute waiver of the conditions hereto contained in these presents.  
That the headings used in this agreement are for convenience of reference only.  
That all notices etc., to be given under the Purchase order shall be in writing, type script or printed and if sent by registered post or by courier service to the address given in this document shall be deemed to have been served on the date when in the ordinary course, they would have been delivered to the addressee.



**ANNEXURE - I**  
**LIST OF INTERNATIONAL GATEWAY AIRPORTS**

| SCHEDULE NO | COUNTRY      | CURRENCY CODE | AIRPORT                                                                               |
|-------------|--------------|---------------|---------------------------------------------------------------------------------------|
| D01         | UK           | GBP           | LONDON (HEATHROW)                                                                     |
| D02         | UK           | GBP           | NEW CASTLE                                                                            |
| D03         | UK           | GBP           | OXFORD. CHETLAM                                                                       |
| D04         | UK           | GBP           | BRISTOL. WELLINGBOROUGH                                                               |
| D05         | UK           | GBP           | BIRMINGHAM                                                                            |
| D06         | UK           | GBP           | EAST MIDLANDS                                                                         |
| D07         | UK           | GBP           | MANCHESTER                                                                            |
| D08         | UK           | GBP           | LEEDS                                                                                 |
| D09         | UK           | GBP           | GLASGOW                                                                               |
| D10         | FRANCE       | EURO          | PARIS (ROISSY) & LYON                                                                 |
| D11         | SWEDEN       | EURO          | STOCKHOLM                                                                             |
| D12         | SWEDEN       | EURO          | GOTHENBERG & MALMO                                                                    |
| D13         | ITALY        | EURO          | ROMA, MILAN                                                                           |
| D14         | ITALY        | EURO          | TURIN, BOLOGNA, FLORENCE                                                              |
| D15         | NETHERLANDS  | EURO          | AMSTERDAM, ROTTERDAM                                                                  |
| D16         | AUSTRIA      | EURO          | VIENNA, LINZ, GRAZ                                                                    |
| D17         | BELGIUM      | EURO          | ANTWERP, BRUSSELS                                                                     |
| D18         | DENMARK      | DKK           | COPENHAGEN                                                                            |
| D19         | JAPAN        | JPY           | TOKYO, OSAKA                                                                          |
| D20         | SINGAPORE    | SGD           | SINGAPORE                                                                             |
| D21         | CANADA       | CAD           | TORONTO                                                                               |
| D22         | CANADA       | CAD           | MONTREAL                                                                              |
| D23         | USA          | USD           | NEW YORK, BOSTON                                                                      |
| D24         | USA          | USD           | CHICAGO                                                                               |
| D25         | USA          | USD           | SAN FRANCISCO, LOS ANGELES                                                            |
| D26         | USA          | USD           | ALANTA, HOUSTON                                                                       |
| D27         | GERMANY      | EURO          | MUNICH, KOLN, DUSSELDORF, HANNOVER, HAMBURG, STUTTGART, DAMSTADT, MANIHIEM, NURUMBERG |
| D28         | GERMANY      | EURO          | FRANKFURT                                                                             |
| D29         | GERMANY      | EURO          | BERLIN                                                                                |
| D30         | SWITZERLAND  | SFR           | BASLE, ZURICH, GENEVA                                                                 |
| D31         | SPAIN        | EURO          | BARCELONA                                                                             |
| D32         | AUSTRALIA    | AUD           | SYDNEY                                                                                |
| D33         | AUSTRALIA    | AUD           | MELBOURNE                                                                             |
| D34         | AUSTRALIA    | AUD           | PERTH                                                                                 |
| D35         | CZECH        | EURO          | PRAGUE                                                                                |
| D36         | HONG KONG    | HKD           | HONG KONG                                                                             |
| D37         | NEW ZELAND   | NZD           | AUCKLAND                                                                              |
| D38         | RUSSIA       | USD           | MOSCOW                                                                                |
| D39         | SOUTH KOREA  | USD           | KIMPO INTERNATIONAL, INCHEON                                                          |
| D40         | FINLAND      | EURO          | HELSINKI                                                                              |
| D41         | ROMANIA      | EURO          | BUCHAREST                                                                             |
| D42         | NORWAY       | EURO          | OSLO                                                                                  |
| D43         | IRELAND      | EURO          | DUBLIN                                                                                |
| D44         | ISRAEL       | USD           | TEL AVIV                                                                              |
| D45         | UAE          | USD           | DUBAI                                                                                 |
| D46         | OMAN         | USD           | MUSCAT                                                                                |
| D47         | EGYPT        | USD           | CAIRO                                                                                 |
| D48         | TAIWAN       | USD           | TAIPEI                                                                                |
| D49         | UKRAINE      | USD           | KIEV                                                                                  |
| D50         | CHINA        | USD           | SHANGHAI, SHENZHEN                                                                    |
| D51         | PHILIPINES   | USD           | MANILA                                                                                |
| D52         | MALAYSIA     | USD           | KUALALUMPUR, PE NANG                                                                  |
| D53         | CYPRUS       | USD           | LARNACA                                                                               |
| D54         | SOUTH AFRICA | USD           | JOHANNESBERG, DURBAN                                                                  |
| D55         | SLOVAKIA     | EURO          | BARTISLOVA                                                                            |
| D56         | SAUDI ARABIA | SAR           | RIYADH                                                                                |
| D57         | TURKEY       | EURO          | ISTANBUL                                                                              |
| D58         | THAILAND     | USD           | BANGKOK                                                                               |
| D59         | BRAZIL       | USD           | SAO PAULO, RIO DE JANEIRO                                                             |

**ANNEXURE - II**  
**REQUEST FOR C FORM**

NAME OF VENDOR :

VENDOR CODE ALLOTTED BY BHEL :

E mail id for c form correspondence :

| BHEL<br>PO NO | INVOICE<br>NO | INVOICE<br>DATE | INVOICE<br>AMOUNT | SUPPLY<br>FROM -<br>STATE | SUPPLY<br>TO -<br>STATE | CST TIN<br>NUMBER<br>(SUPPLIER<br>) | INVOICE<br>AMOUNT<br>EXCLUDING<br>FREIGHT | C FORM<br>QTR | YEAR | SUPPLY<br>TO BHEL<br>EDN / SITE |
|---------------|---------------|-----------------|-------------------|---------------------------|-------------------------|-------------------------------------|-------------------------------------------|---------------|------|---------------------------------|
|---------------|---------------|-----------------|-------------------|---------------------------|-------------------------|-------------------------------------|-------------------------------------------|---------------|------|---------------------------------|

Please note that one 'C' form will be issued for a quarter.

Any modification and cancellation of c form is not possible from our end since it is generated online therefore include all invoices pertaining to quarter in your request  
Also check the data are correct in all respect

**General Instruction:**

1. C form request should be given only in this file.
2. Amount should be 100% of Invoice value but should Not include freight, Insurance etc.
3. PO No. should be numeric, starting with 4 and has 10 digits
4. For every quarter separate file to be provided
5. All Invoices pertaining to the relevant quarter to be included.
6. No corrections will be entertained once c-form is issued.

**ANNEXURE-III**

**BANK GUARANTEE FOR PERFORMANCE SECURITY**

Bank Guarantee No:

Date:

To

NAME

& ADDRESSES OF THE BENEFICIARY

Dear Sirs,

In consideration of the Bharat Heavy Electricals Limited <sup>1</sup> (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at \_\_\_\_\_ through its Unit at.....(name of the Unit) having awarded to (Name of the Vendor / Contractor / Supplier) having its registered office at \_\_\_\_\_ <sup>2</sup> hereinafter referred to as the 'Contractor/Supplier', which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns), a contract Ref No.....dated .....<sup>3</sup> valued at Rs.....<sup>4</sup> ( Rupees -----)/FC.....(in words.....) for .....<sup>5</sup> (hereinafter called the 'Contract') and the Contractor having agreed to provide a Contract Performance Guarantee, equivalent to .....% (.... Percent) of the said value of the Contract to the Employer for the faithful performance of the Contract,

we, ....., (hereinafter referred to as the Bank), having registered/Head office at ..... and inter alia a branch at ..... being the Guarantor under this Guarantee, hereby, irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer a maximum amount Rs ----- ( Rupees -----) without any demur, immediately on a demand from the Employer, .

Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. \_\_\_\_\_.

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Contractor/ Supplier in any suit or proceeding pending before any Court or Tribunal relating thereto our liability under this present being absolute and unequivocal.

The payment so made by us under this Guarantee shall be a valid discharge of our liability for payment thereunder and the contractors/supplier shall have no claim against us for making such payment.

We the .....bank further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract and that it shall continue to be enforceable till all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied or discharged.

We ..... BANK further agree with the Employer that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said Contractor/Supplier from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said Contractor/Supplier and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor/Supplier or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Contractor/Supplier or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee that the Employer may have in relation to the Contractor's liabilities.

This Guarantee shall remain in force upto and including.....<sup>6</sup> and shall be extended from time to time for such period as may be desired by Employer.

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Contractor/Supplier but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms thereof.

Unless a demand or claim under this guarantee is made on us in writing on or before the .....<sup>7</sup> we shall be discharged from all liabilities under this guarantee thereafter.

We, ..... BANK lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Notwithstanding anything to the contrary contained hereinabove:

- a) The liability of the Bank under this Guarantee shall not exceed.....<sup>8</sup>
- b) This Guarantee shall be valid up to .....<sup>9</sup>
- c) Unless the Bank is served a written claim or demand on or before .....<sup>10</sup> all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

We, \_\_\_\_\_ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

For and on behalf of  
(Name of the Bank)

Dated.....

Place of Issue.....

<sup>1</sup> NAME AND ADDRESS OF EMPLOYER I.e Bharat Heavy Electricals Limited

<sup>2</sup> NAME AND ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER.

<sup>3</sup> DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE

<sup>4</sup> PROJECT/SUPPLY DETAILS

<sup>5</sup> BG AMOUNT IN FIGURES AND WORDS

<sup>6</sup> VALIDITY DATE

<sup>7</sup> DATE OF EXPIRY OF CLAIM PERIOD

<sup>8</sup> BG AMOUNT IN FIGURES AND WORDS.

<sup>9</sup> VALIDITY DATE

<sup>10</sup> DATE OF EXPIRY OF CLAIM PERIOD

**Note:**

**1. In Case of Bank Guarantees submitted by Foreign Vendors-**

- a. **From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India)** can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.
- b. **From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)**
  - b.1 In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by **any of the Consortium Banks only** will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank (BHEL's Consortium Bank). It is advisable that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor. The tender stipulation should clearly specify these requirements.
  - b.2 **In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank** (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at **sl.no. b.1** will required to be followed.
  - b.3 The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time). In case, of Foreign Vendors, the BG Format provided to them should clearly specify the same.
  - b.4 The BG should clearly specify that the demand or other document can be presented in electronic form.

## **ANNEXURE - IV**

### **Electronic Funds Transfer (EFT) OR Paylink Direct Credit Form**

Please Fill up the form in **CAPITAL LETTERS** only.

TYPE OF REQUEST(Tick one): \_\_\_\_\_ CREATE \_\_\_\_\_ CHANGE

|                                |  |
|--------------------------------|--|
| BHEL Vendor / Supplier Code:   |  |
| Company Name :                 |  |
| Permanent Account Number(PAN): |  |
| Address                        |  |
|                                |  |
|                                |  |

|       |  |         |  |       |  |
|-------|--|---------|--|-------|--|
| City: |  | PINCODE |  | STATE |  |
|-------|--|---------|--|-------|--|

|                   |  |
|-------------------|--|
| Contact Person(s) |  |
| Telephone No:     |  |
| Fax No:           |  |
| e-mail id:        |  |

|                                                                                     |  |
|-------------------------------------------------------------------------------------|--|
| 1 Bank Name:                                                                        |  |
| 2 Bank Address:                                                                     |  |
|                                                                                     |  |
|                                                                                     |  |
| 3 Bank Telephone No:                                                                |  |
| 4 Bank Account No:                                                                  |  |
| 5 Account Type: Savings/Cash Credit                                                 |  |
| 6 9 Digit Code Number of Bank and branch<br>appearing on MICR cheque issued by Bank |  |
| 7 Bank swift Code(applicable for EFT only)                                          |  |
| 8 Bank IFSC code(applicable for RTGS)                                               |  |
| 9 Bank IFSC code(applicable for NEFT)                                               |  |

- A I hereby certify that the particulars given above are true, correct and complete and that I, as a representative for the above named Company, hereby authorise BHEL, EDN, Bangalore to electronically deposit payments to the designated bank account.
- B If the transaction is delayed or not effected at all for reasons of incomplete or incorrect information, I would not hold BHEL / transferring Bank responsible.
- C This authority remains in full force until BHEL, EDN,Bangalore receives written notification requesting a change or cancellation.
- D I have read the contents of the covering letter and agree to discharge the responsibility expected of me as a participant under ECS / EFT.

Date:

Authorised Signatory:

Designation:

Telephone NO. with STD Code

Company Seal

#### **Bank Certificate**

We certify that \_\_\_\_\_ has an Account No \_\_\_\_\_ with us and we confirm that the bank details given above are correct as per our records.

Date: \_\_\_\_\_ (.....)

Place: \_\_\_\_\_ Signature

Please return completed form along with a blank cancelled cheque or photocopy thereof to:

Bharath Heavy Electricals Ltd,

Attn:

Electronics Division, Mysore Road,

BANGALORE - 560 026

In case of any Query, please call : 080-26998xxx / 2674xxxx or fax no. 080-2674xxxx

**ANNEXURE-V**  
**BHEL MEMBER BANKS (LIST OF CONSORTIUM BANKS)**

**BANK GUARANTEE (BG) SHALL BE ISSUED FROM THE FOLLOWING BANKS ONLY:**

|    |                           |    |                                                           |
|----|---------------------------|----|-----------------------------------------------------------|
|    | <b>Nationalised Banks</b> |    | <b>Nationalised Banks</b>                                 |
| 1  | Allahabad Bank            | 19 | Vijaya Bank                                               |
| 2  | Andhra Bank               |    | <b>Public Sector Banks</b>                                |
| 3  | Bank of Baroda            | 20 | IDBI                                                      |
| 4  | Canara Bank               |    | <b>Foreign Banks</b>                                      |
| 5  | Corporation Bank          | 21 | CITI Bank N.A                                             |
| 6  | Central Bank              | 22 | Deutsche Bank AG                                          |
| 7  | Indian Bank               | 23 | The Hongkong and Shanghai Banking Corporation Ltd. (HSBC) |
| 8  | Indian Overseas Bank      | 24 | Standard Chartered Bank                                   |
| 9  | Oriental Bank of Commerce |    |                                                           |
| 10 | Punjab National Bank      | 26 | J P Morgan                                                |
| 11 | Punjab & Sindh Bank       |    | <b>Private Banks</b>                                      |
| 12 | State Bank of India       | 27 | Axis Bank                                                 |
| 13 | State Bank of Hyderabad   | 28 | The Federal Bank Limited                                  |
| 14 | Syndicate Bank            | 29 | HDFC Bank                                                 |
| 15 | State Bank of Travancore  | 30 | Kotak Mahindra Bank Ltd                                   |
| 16 | UCO Bank                  | 31 | ICICI Bank                                                |
| 17 | Union Bank of India       | 32 | IndusInd Bank                                             |
| 18 | United Bank of India      | 33 | Yes Bank                                                  |

**Note:**

- All BGs must be issued from BHEL consortium banks listed above.
- BHEL may accept BG from other Nationalised Banks also which are not listed above.
- BG will not be accepted from Scheduled Banks and Co-operative Banks.
- In case BG is issued from a bank located outside Indian territory and is issued in foreign currency, the BG must be routed through and confirmed by any one of the above mentioned consortium banks or any of the Indian Public Sector Banks.
- This list is subject to changes. Hence vendors are requested to check this list every time before issuing BGs.

## **ANNEXURE - VI**

### **DISCREPANCY IN WORDS & FIGURES – QUOTED IN PRICE BID**

Following guidelines will be followed in case of discrepancy in words & figures-quoted in price bid:

- (a) If, in the price structure quoted for the required goods/services/works, there is discrepancy between the unit price and the total price (which is obtained by multiplying the unit price by the quantity), the unit price shall prevail and the total price corrected accordingly, unless in the opinion of the purchaser there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price corrected accordingly.
- (b) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and
- (c) If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above.
- (d) If there is such discrepancy in an offer, the same shall be conveyed to the bidder with target date upto which the bidder has to send his acceptance on the above lines and if the bidder does not agree to the decision of the purchaser, the bid is liable to be ignored.



## **ANNEXURE - VII**

### **BENEFITS FOR MSE SUPPLIERS AS PER MSMED ACT 2006 AND PUBLIC PROCUREMENT POLICY 2012**

MSE suppliers can avail the intended benefits only if they submit along with the offer, attested copies of either EM II certificate having deemed validity (five years from the date of issue of Acknowledgement in EM II).

Or

Valid NSIC certificate or EM II certificate along with attested copy of CA certificate (Format enclosed: ANNEXURE VIII) where deemed validity of EM II certificate of five years has expired) applicable for the relevant financial year (latest audited).

Date to be reckoned for determining the deemed validity will be the date of bid opening (Part 1 in case of two part bid).

Non-submission of such documents will lead to consideration of their bid at par with other bidders.

No benefit shall be applicable for this enquiry if any deficiency in the above required documents are not submitted before price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal. Documents should be notarized or attested by a Gazette officer.

**ANNEXURE - VIII**  
**CERTIFICATE BY CHARTERED ACCOUNTANT ON LETTER HEAD**

This is to certify that M/s .....  
.....(Hereinafter referred to as 'Company') having  
its registered office at ..... is registered under MSMED Act 2006, (Entrepreneur  
Memorandum No ((Part-II) ..... dtd ..... Category: .....  
(Micro/Small). (Copy enclosed).

Further verified from the Books of Accounts that the investment of the company as per the  
latest audited financial year ..... **as per MSMED Act 2006 is as follows:**

**1. For Manufacturing Enterprises:** Investment in plant and machinery ( i.e., original cost excluding land  
and building and the items specified by the Ministry of Small Industries vide its notification No.S.O.1722  
(E) dated October 5, 2006:

Rs. ....Lacs.

**2. For Service Enterprises:** Investment in equipment (original cost excluding land and building  
and furniture, fittings and other items not directly related to the service rendered or as may be  
notified under the MSMED Act, 2006:

Rs. ....Lacs.

The above investment of Rs. .... Lacs in within permissible limit of Rs..... Lacs  
for.....Micro / Small (Strike off which is not applicable) Category under MSMED  
Act 2006.

(or)

The company has been graduated from its original category (Micro/Small) (Strike off which is not  
applicable) and the date of graduation of such enterprise from its original category is  
.....(dd/mm/yy) which is within the period of 3 years from the date of graduation of such enterprise  
from its original category as notified vide S.O.No.3322(E) dated 01.11.2013 published in the gazette  
notification dated 04.11.2013 by Ministry of MSME.

Date:

(Signature)

Name -

Membership Number -

Seal of Chartered Accountant

## ANNEXURE - IX

In case of intrastate movement i.e. supply within same state and VAT is applicable, the vendor shall furnish the respective BHEL™s nodal agency TIN no. and address in their invoice.

### List of Statewise Nodal Officers with Contact Details

| Region          | State             | Nodal Unit responsible for all other units except those in column 4 | Contact Details- Landline No.                                     | E-mail                                                                                                                                                                                                                                                                                                                                             | TIN No.                                                                                                                                                             | CST No.                           |
|-----------------|-------------------|---------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| 1               | 2                 | 3                                                                   |                                                                   | 7                                                                                                                                                                                                                                                                                                                                                  | 8                                                                                                                                                                   | 9                                 |
| Norther States  | Jammu & Kashmir   | PSNR                                                                | 0120-2510488/2416452                                              | <a href="mailto:rahulb@bhelspsnr.co.in">rahulb@bhelspsnr.co.in</a> / <a href="mailto:a.chadha@bhelspsnr.co.in">a.chadha@bhelspsnr.co.in</a>                                                                                                                                                                                                        | 01291101313                                                                                                                                                         |                                   |
|                 | Himachal Pradesh  | PSNR                                                                |                                                                   |                                                                                                                                                                                                                                                                                                                                                    | 02011000622                                                                                                                                                         |                                   |
|                 | Punjab            | PSNR                                                                |                                                                   |                                                                                                                                                                                                                                                                                                                                                    | 03451148722                                                                                                                                                         |                                   |
|                 | Haryana           | PSNR                                                                |                                                                   |                                                                                                                                                                                                                                                                                                                                                    | 06962606884                                                                                                                                                         |                                   |
|                 | Rajasthan         | PSNR                                                                |                                                                   |                                                                                                                                                                                                                                                                                                                                                    | 08232903345                                                                                                                                                         |                                   |
|                 | Uttar Pradesh     | PSNR                                                                | 0120-2416536                                                      | <a href="mailto:rahulb@bhelspsnr.co.in">rahulb@bhelspsnr.co.in</a> / <a href="mailto:smittal@bhelspsnr.co.in">smittal@bhelspsnr.co.in</a>                                                                                                                                                                                                          | 09365800914                                                                                                                                                         |                                   |
|                 | Uttarakhand       | Hardwar                                                             | 01334-285449                                                      | <a href="mailto:alok@bhelhwr.co.in">alok@bhelhwr.co.in</a>                                                                                                                                                                                                                                                                                         | 05001757277 Dated 30th Sep 2005                                                                                                                                     | 5000030 Dated 13/03/1965          |
|                 | Delhi             | TBG                                                                 | 0120-6748429                                                      | <a href="mailto:skjindal@bhel.in">skjindal@bhel.in</a>                                                                                                                                                                                                                                                                                             | 07472001760                                                                                                                                                         | 07472001760                       |
| Western States  | Madhya Pradesh    | Bhopal                                                              | 0755-2503231                                                      | <a href="mailto:meeta@bhelbpl.co.in">meeta@bhelbpl.co.in</a>                                                                                                                                                                                                                                                                                       | 23573600001 (HEL/05/01/0001/S dated 15/11/1979 under MPCT)                                                                                                          | HEL/05/01/0004/C dated 15/11/1979 |
|                 | Chattisgarh       | PSWR                                                                | 0712-3048609                                                      | <a href="mailto:mgupta@bhelspswr.co.in">mgupta@bhelspswr.co.in</a>                                                                                                                                                                                                                                                                                 | 22173202974                                                                                                                                                         |                                   |
|                 | Gujarat           | PSWR                                                                | 0265-2370321                                                      | <a href="mailto:bhavin@bhelspswr.co.in">bhavin@bhelspswr.co.in</a>                                                                                                                                                                                                                                                                                 | 24190101571                                                                                                                                                         |                                   |
|                 | Maharashtra       | ROD Mumbai                                                          | 022-22126061/22187850                                             | <a href="mailto:mahajani@bhel.in">mahajani@bhel.in</a>                                                                                                                                                                                                                                                                                             | 27060300130V                                                                                                                                                        | 27060300130C                      |
|                 | Daman & Diu       | EDN                                                                 | 080-26998724 / 26998830                                           | <a href="mailto:theerthagiri@bheledn.co.in">theerthagiri@bheledn.co.in</a>                                                                                                                                                                                                                                                                         | 25000009902                                                                                                                                                         |                                   |
| Southern States | Orissa            | PSSR                                                                | 044-28286773                                                      | <a href="mailto:sparida@bhelspsr.co.in">sparida@bhelspsr.co.in</a> / <a href="mailto:lakshmi@bhelspsr.co.in">lakshmi@bhelspsr.co.in</a>                                                                                                                                                                                                            | 21031301916                                                                                                                                                         |                                   |
|                 | Tamil Nadu        | Trichy                                                              | 0431-2577757/ 2577229                                             | <a href="mailto:msrao@bheltry.co.in">msrao@bheltry.co.in</a> / <a href="mailto:bharaths@bheltry.co.in">bharaths@bheltry.co.in</a>                                                                                                                                                                                                                  | 33243560005                                                                                                                                                         | 239383 dt.11.6.91                 |
|                 | Kerala            | PSSR                                                                | 044-28286773                                                      | <a href="mailto:lakshmi@bhelspsr.co.in">lakshmi@bhelspsr.co.in</a>                                                                                                                                                                                                                                                                                 | 32072043622                                                                                                                                                         |                                   |
|                 | Karnataka         | EDN                                                                 | 080-26998724 / 26998830                                           | <a href="mailto:theerthagiri@bheledn.co.in">theerthagiri@bheledn.co.in</a>                                                                                                                                                                                                                                                                         | 29180069268                                                                                                                                                         | 00850081                          |
|                 | Telangana         | HPEP RC, Puram                                                      | 040-23185406/ 040-23182238                                        | <a href="mailto:chand@bhelhyd.co.in">chand@bhelhyd.co.in</a> / <a href="mailto:sbsv@bhelhyd.co.in">sbsv@bhelhyd.co.in</a>                                                                                                                                                                                                                          | 36360151179                                                                                                                                                         |                                   |
|                 | Andhra Pradesh    | HPVP, Vizag                                                         | 0891-6681298                                                      | <a href="mailto:sarmaass@bhpvl.com">sarmaass@bhpvl.com</a>                                                                                                                                                                                                                                                                                         | 37418632431                                                                                                                                                         |                                   |
|                 | Puducherry        | PSSR                                                                |                                                                   |                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                     |                                   |
| Eastern States  | West Bengal       | PSER                                                                | 033-23216130-3238                                                 | <a href="mailto:amitavac@bhelsper.co.in">amitavac@bhelsper.co.in</a>                                                                                                                                                                                                                                                                               | 19200936019                                                                                                                                                         | 19200936213                       |
|                 | Bihar             | PSER                                                                | 0612-2231275                                                      | <a href="mailto:rakesh@bhelsper.co.in">rakesh@bhelsper.co.in</a>                                                                                                                                                                                                                                                                                   | 10010994046                                                                                                                                                         | 10010994046                       |
|                 | Jharkhand         | PSER                                                                | 06549-266351(Sh. Parmanand Swaroop)/06534-292179 (Sh. K.K. Ajeet) | <a href="mailto:pswaroop@bhelsper.co.in">pswaroop@bhelsper.co.in</a> (Bokaro) <a href="mailto:kk.ajit@bhelsper.co.in">kk.ajit@bhelsper.co.in</a> (Koderma/Abhijeet/North Karanpura) <a href="mailto:manishk.jain@bhelsper.co.in">manishk.jain@bhelsper.co.in</a> (Chandrapura)/ <a href="mailto:kpsubbu@bhelsper.co.in">kpsubbu@bhelsper.co.in</a> | 20352205642 (Bokaro) 20082005255 (Maithon) 20512405410 (Koderma) 20122200394 (Chandrapura) 20620905730(Adhunik) 20650507026(Abhijeet) 20452110016 (North Karanpura) | TG-729(C)                         |
|                 | Mizoram           | PSER                                                                | 033-23216130-3249                                                 | <a href="mailto:anindya@bhelsper.co.in">anindya@bhelsper.co.in</a>                                                                                                                                                                                                                                                                                 | 15501465017                                                                                                                                                         |                                   |
|                 | Arunachal Pradesh | PSER                                                                | 033-23216130-3249                                                 | <a href="mailto:anindya@bhelsper.co.in">anindya@bhelsper.co.in</a>                                                                                                                                                                                                                                                                                 | 12020122182                                                                                                                                                         | Not Applied                       |
|                 | Assam             | PSER                                                                | 033-23216130-3249                                                 | <a href="mailto:anindya@bhelsper.co.in">anindya@bhelsper.co.in</a>                                                                                                                                                                                                                                                                                 | 18790101415                                                                                                                                                         | 18179903204                       |
|                 | Tripura           | PSER                                                                | 03821-265209                                                      | <a href="mailto:mkmahato@bhelsper.co.in">mkmahato@bhelsper.co.in</a>                                                                                                                                                                                                                                                                               | 16060947071                                                                                                                                                         | 16060947273                       |
|                 | Sikkim            | PSER                                                                |                                                                   |                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                     |                                   |
|                 | Meghalaya         | PSER                                                                |                                                                   |                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                     |                                   |
|                 | Manipur           | PSER                                                                |                                                                   |                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                     |                                   |
|                 | Nagaland          | PSER                                                                |                                                                   |                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                     |                                   |

|                                                                                   |                                                                                                                                                                                             |                |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
|  | <b>PURCHASE SPECIFICATION- GROUP: PHOTOVOLTAICS</b><br><b>SUPPLY OF BOS ITEMS, I&amp;C, O&amp;M FOR 10 MW (AC) SPV</b><br><b>POWER PLANT</b><br><b>AT WBSEDCL CHHARAH SITE, WEST BENGAL</b> | PS-439-1083    |
|                                                                                   |                                                                                                                                                                                             | Rev No: 01     |
|                                                                                   |                                                                                                                                                                                             | PAGE : 1 OF 45 |

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**Technical Specification for**

**Supply, installation and commissioning of Balance of System items of**  
**10 MW(ac) Solar PV grid connected power plant at WBSEDCL Chharah site, West Bengal**

**Revision R 01:**

- (i) Operations and maintenance activities of 5-years including security is removed from the scope. Vendor's scope of work is only up to commissioning and completion of other supply and I & C activities of the plant.
- (ii) The foundations for various equipment as CT, PT, GOS, LA, etc., in IR-1, IR-2 and Control room switchyards are deleted from vendor's scope.
- (iii) Supply of MS angles and steel work for fabricated support structures for switchyard is deleted from vendor scope. Only vendor has to supply 14 nos of ISMC 185 x 75, 7m length channels.
- (iv) Foundations of 4 nos of 2800 ONAF transformer foundations, 1 no of Auxiliary transformer and 80 nos of SMB foundations are excluded from vendor's scope.
- (v) Vendor to provide of dedicated leased line for provide 10 Mbps internet at the site.
- (vi) I & C works of Solar array earthing (of MMS structures) including construction of earth pit chambers continues to be in vendor's scope are in vendor's scope.
- (vii) Introduction of supply, I & C works for earthing provision of SMB communication SPD, namely installation conventional GI earth electrodes at 80 locations close to the SMBs and including construction of earth pit chambers with cover is in vendor's scope.
- (viii) Supply of Straight-line connectors (MC4) (Qty: 3000 sets) and associated tools.
- (ix) Porta cabin shall be equipped with one-tonne split air-conditioner and DG set.

|                                                                                                                        |                                                                                                         |               |
|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|---------------|
| Prepared:                                                                                                              | Approved:                                                                                               | Date:         |
| <br>Sheetal Prasad / Phalguni Sahoo | <br>V Radhakrishnan | 20-March 2017 |

|                                                                                   |                                                                                                                                                                                             |                |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
|  | <b>PURCHASE SPECIFICATION- GROUP: PHOTOVOLTAICS</b><br><b>SUPPLY OF BOS ITEMS, I&amp;C, O&amp;M FOR 10 MW (AC) SPV</b><br><b>POWER PLANT</b><br><b>AT WBSEDCL CHHARAH SITE, WEST BENGAL</b> | PS-439-1083    |
|                                                                                   |                                                                                                                                                                                             | Rev No: 01     |
|                                                                                   |                                                                                                                                                                                             | PAGE : 2 OF 45 |

## 1.0 Introduction

Bharat Heavy Electricals Limited (BHEL), Electronics Division, Bangalore is setting up a 10 MW(AC) Grid connected Solar Photovoltaic power Plant at Chharrah site, West Bengal. Overall area of the plant is 40 acres. The site location is 300 Kms from Kolkata and the site is located **Chharrah, Puralia District, West Bengal**.

This tender is for the supply and installation & commissioning of Balance of system of the solar power plant.

### 1.1 PLANT DESCRIPTION:

The plant will have fixed angle solar array field structures of solar modules. The solar modules rating for the entire 5 MW array will be of 300 to 315 Wp with interval of 5 watts and all solar modules shall be of same dimensions.

The entire solar array is therefore split into sub-arrays as below:

| Sub-array                    | SMB        | No of SMBs | Remarks                                  |
|------------------------------|------------|------------|------------------------------------------|
| Sub array 1 to 8:<br>1260 KW | 10 nos x 8 | 80 nos     | Each SMB is a 24-input and 1-output type |

The Inverter room houses the four nos of 1250 KW PCUs, DB panel, UPS and SCADA RTU panel. The 2800 KVA transformers is located outside the Inverter room. The output of the solar array (5000 KW) located close to the inverter room shall be inverted by four inverters (or PCUS). The AC output of the four PCUs in a single Inverter room shall be combined and stepped up to 33 KV voltage level through 2 nos of **2800 KVA, two LV-winding transformers and combined by VCBs** to obtain 5 MW AC output at 33 KV level. The various cabling are as table below:

| From                                   | To                                  | Cable                                                                                             | Approximate length                                                                                                                                                            |
|----------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SMBs                                   | PCUs in Inverter rooms              | 1cx300 mm <sup>2</sup> Al cable, two runs for Positive and Negative                               | Laid underground in trenches – 2500m                                                                                                                                          |
| 1250 KW PCU of Inverter room           | 2800 KVA ONAF transformer           | 4-runs of 1cx630 mm <sup>2</sup> <b>per phase</b> Aluminium XLPE insulated and PVC sheathed cable | Laid on steel cable trays to be fabricated by the vendor approximately 4 m in length                                                                                          |
| 33 KV, 2800 KVA transformer            | 33 KV VCB panel                     | ACSR DOG conductor                                                                                | Laid overhead                                                                                                                                                                 |
| 33 KV VCB panel in Inverter room yards | 33 KV HT panel in Main control room | 33 KV, 3cx300 mm <sup>2</sup> , aluminum cable, XLPE insulated and armoured HT cable              | Laid in brick-walled cable trenches on steel angle at 1 m intervals for approximately total running length of 800m along with OFC, Battery cable and auxiliary cables – 800 m |

**Likewise from Inverter room-2 switchyard, 5 MW AC output is produced from another set of solar array, four nos of 1250 KW PCUs and 5 MW AC output at 33kV level.**

### 33 kV EVACUATION SWITCHYARD (at Control room):

The switchyard houses the outdoor 33 KV HT Panel which combines the 5 MW (AC) outputs at 33 kV level from the two Inverter rooms to form totally 10 MW of AC output at 33 KV level. HT breaker panels includes 2 incomer Outdoor PC-VCB panels, 1 outgoer PC-VCB panel and 33 kV Isolator for Station transformer and 1 Bus PT.

|                                                                                   |                                                                                                                                                                            |                |
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| From                             | To                       | Cable                                       | Remarks                                                                     |
|----------------------------------|--------------------------|---------------------------------------------|-----------------------------------------------------------------------------|
| Inverter room-1: <b>5MW (AC)</b> | 33 kV Common bus         | <b>1 run of 3-cx300 sq mm 33kV HT cable</b> | Combined on a six-pole structure through a common bus of ACSR DOG conductor |
| Inverter room-2: <b>5MW (AC)</b> | 33 kV Common bus         | <b>1 run of 3-cx300 sq mm 33kV HT cable</b> |                                                                             |
| Outgoer VCB panel                | CT & PT                  | ACSR DOG conductor                          |                                                                             |
| CT & PT                          | Final 33 kV GOS isolator | ACSR DOG conductor                          |                                                                             |
| CT & PT                          | Metering                 | 4 mm <sup>2</sup> copper                    |                                                                             |

The Control room also houses the SCADA system with the Weather monitoring instruments of Pyranometer, Anemometer and Thermometers (for solar module and ambient temperatures).

**Scope of work of construction of Inverter rooms and control room is in BHELs scope.**

No of Inverter rooms: Quantity 2 nos

No of Control rooms: Quantity 1 no

**Construction of all rooms is in BHELs scope. Only the supply and I & C works of the following are in vendor's scope:**

- (i) Fire detection system in Main control room and the four Inverter rooms.
- (ii) Firefighting equipment as fire cylinders in both Inverter rooms and control room
- (iii) Switchyards (Inverter room-1 and -2) and also Control room)
- (iv) Supply and installation of Security cabin, Quantity 1 no

The plant also includes other infrastructural works as:

- (i) Solar modules water cleaning system with tanks, CPVC piping infrastructure, valves, pressure gun. This includes supply and installation of 3 nos of Submersible pumpsets with piping to the Inverter rooms and Control room tanks.
- (ii) Lighting system for the solar array field and for the switchyards

**2.0 Documents enclosed with this specification**

| Sl No | Description                                                            | Drawing reference                      |
|-------|------------------------------------------------------------------------|----------------------------------------|
| 1     | Solar array layout, SMB and DC cable layout                            | BH-WBSEDCL-CHHARRAH-DG-006R2           |
| 2     | Trench layouts                                                         | BH-WBSEDCL-CHHARRAH-DG-007R2           |
| 2     | Chain-link fencing all switchyards                                     | 3-679-05-00869 R1                      |
| 3     | Solar array earthing scheme                                            | BH-WBSEDCL-CHHARRAH-DG-004R1, Sh 1 & 2 |
| 4     | Earth pit chamber                                                      | 4-679-05-00064                         |
| 5     | Electrical schematic of Main ACDB panel and Inverter room Switchboards | 3-679-05-05-00868                      |
| 6     | Equipment layout in switchyard of Inverter room                        | BH-WBSEDCL-CHHARRAH-DG-003R1           |
| 7     | Equipment layout in switchyard of Control room                         | BH-WBSEDCL-CHHARRAH-DG-002R2           |
| 8     | Peripheral Lighting layout in Solar array area                         | BH-WBSEDCL-CHHARRAH-DG-009 sh 1        |
| 9     | Lighting pole arrangement for peripheral and array lights              | BH-WBSEDCL-CHHARRAH-DG-009 sh 2        |

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### 3.0 Scope of work

#### 3.1 Vendor scope of work (as briefly outlined activities)

The table below indicates the scope of work for the vendor, related items of supply and I & C are grouped to enable a brief understanding of the scope of work. However to be prices quoted should be as per tender enquiry.

#### SUPPLY-related:

| #  | Scope of work (as briefly outlined)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Qty            |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| 1  | Supply of porta cabin and furnishings for Porta cabin (cl no 5.1), Security cabin (cl no 5.1a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1 set          |
| 2  | Supply of cable ties(cl 5.8), HDPE conduits(cl 5.9), Submersible pumps sets (cl 5.4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1 set          |
| 3  | <b>Supply of LT / HT power cables and 33 kV termination kits:</b><br>(i) 3.5-cx 95 mm <sup>2</sup> Cu conductor, XLPE arm cable (cl 5.31(d)),<br>(ii) 3.5-cx 25 mm <sup>2</sup> Cu conductor, XLPE arm cable (cl 5.31(c))<br>(iii) 3.5-cx 2.5 mm <sup>2</sup> Cu PVC ins and arm cable (Cl 5.51),<br>(iv) 1cx25 mm <sup>2</sup> Cu PVC unarm cable, cl no 5.51<br>(v) 2-c x 1.5 mm <sup>2</sup> PVC ins and sheathed unarm cable (Cl 5.51),<br>(v) 1-c x 1.5 mm <sup>2</sup> PVC unarm cable (Cl 5.51),<br>(vi) 2-pair 4 mm <sup>2</sup> Cu cable, cl no 5.39(a)<br>(vii) 12-core x 1.5 mm <sup>2</sup> Cu instrumentation unarm cable, cl no 5.39(a)<br>(viii) 33kV termination kits (cl 5.23), cl no 5.23 | 1 set          |
| 4  | (i) Supply of Battery bank 110 volts, 125 AH capacity of PLANTE cells, Lead-acid type<br>(ii) Battery charger 135 volts / 25 Amps capacity, (cl 5.40)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1 set<br>1 set |
| 5  | Supply of Main ACDB (1 no), Distribution Switchboards (2 nos) and DCDBs (cl 5.31)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1 set          |
| 6  | Supply of items for Inverter room-1 switchyard, cl no 5.24 to 5.28 (i) RSJ joist 185 x 75 x 6, Length 7 m – Qty 4 nos (ii) 33 kV GOS / Isolator -10 sets) without ES (iii) Lightning arrestors/surge suppressors, Total Qty: 12 nos (Cl 5.26), (iv) ACSR DOG conductor (Qty: 1000 m), (v) 33 kV Disc insulators, Qty: 12 Nos (vi) Galvanised hardware, Qty & type: As required (vii) Cable lugs (viii) Stay wire and sets including buckle, Qty: As required                                                                                                                                                                                                                                                | 1 set          |
| 7  | Supply of items for Inverter room-1 switchyard, cl no 5.24 to 5.28 (i) RSJ joist 185 x 75 x 6, Length 7 m – Qty 4 nos (ii) 33 kV GOS with & without ES – (Qty: 2 +10 sets) (iii) Lightning arrestors/surge suppressors, Total Qty: 12 nos (Cl 5.26), (iv) ACSR DOG conductor (Qty: Included in above), (v) 33 kV Disc insulators, Qty: 12 Nos (vi) Galvanised hardware, Qty & type: As required (vii) Cable lugs (viii) Stay wire and sets including buckle, Qty: As required                                                                                                                                                                                                                               | 1 set          |
| 8  | Supply of items for Control room switchyard, 5.24 to 5.29, 5.32 (i) RSJ joist 185 x 75 x 6, Length 6.6m Qty: 6 nos, (ii) 33 kV GOS without & with ES included in above (iii) Lightning arrestors/surge suppressors (Cl 5.26), (iv) ACSR DOG conductor (1 Km), (v) 33 kV Disc insulators, Qty: As required (vi) ABT meter, Qty: 2 nos, cl no 5.30 (vii) Metering cubicle, Qty: 1 no (viii) Paint of red oxide and silver paint, Qty: As required (ix) Galvanised hardware, Qty & type: As required (x) Cable lugs (xvi) Stay wire and sets including buckle – Qty as required (xi) Metering CT, Qty: 3 nos, cl no 5.30(xii) Metering PT, Qty: 3 nos, cl no 5.30                                              | 1 set          |
| 9  | Supply of items of fencing, cl no 5.28 (i) Angles 75 x 5mm (Qty: As required (ii) GI Chain-linked fencing 75x75x4 mm diameter of height (1.6m), Total running length 220 m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1 set          |
| 10 | Supply of miscellaneous items , cl no 5.68 (i) HDPE pipes, Qty: 8500 m (ii) PVC pipes, 1-inch, 6000m (iii) M-10 x45mm galvanised bolt with flat and spring washers (hardware sets) for SMB earthing, Qty: 100 sets (iv) PVC sleeves and Silicone sleeves, 1 set (v) PVC pipe 300 mm diameter, 40 Kgf, Qty: 20 metres (vi) RCC hume pipes, 300 mm diameter, length: 3 m, Qty: 60 nos (vii) Hardware, various types: 50 Kgs, (viii) GI wire SWG 12, Qty: 500 m, (ix) Sintex tanks 6000 Litres capacity, Qty: 3 nos                                                                                                                                                                                            | 1 set          |



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|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 11 | Supply of MS cable support structures for Inverter rooms-1, -2 (cl no 5.18) and cable trays cl no 5.14)                                                                                                                                                                                                                                                                  | 1 set |
| 12 | Supply of items of module cleaning system such as pumps, CPVC pipes with fittings, ball valves, nipples (CI 5.53)                                                                                                                                                                                                                                                        | 1 set |
| 13 | Supply of items for yard lighting system such as pole pipes, 25-watts LED lamps with fittings, junction boxes, cable lugs, related accessories, flexible PVC hose, hardware as per clauses 5.49 to 5.51.                                                                                                                                                                 | 1 set |
| 14 | Supply of miscellaneous items such as cable tags (CI 5.54) , danger boards, cable markers (CI 5.55), hoarding board (CI 5.56), sign boards and display boards (cl 5.57), electrical insulation mat (CI 5.58), Air conditioners (CI 5.59), Tool kits and Measuring instruments (CI no 5.62), Office furniture (CI 5.63), Grass cutting machine, cl no 5.62, Straight-line | 1 set |
| 15 | Supply of safety related items including fire alarm system for Main control room and four Inverter rooms, fire extinguishers for Inverter rooms and Main control room, Safety gadgets, EPABX communication system, as per clauses 5.64, 5.66,                                                                                                                            | 1 set |

#### CONSTRUCTION-related

|    |                                                                                   |        |
|----|-----------------------------------------------------------------------------------|--------|
| 16 | Construction of earth pits chambers with cover as per drawing no. 4-679-05-006401 | 160 AU |
|----|-----------------------------------------------------------------------------------|--------|

#### I & C-related:

|    |                                                                                                                                                                                                                                                                                                                                                                                                                              |       |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 17 | I&C: bore wells including tank connection, as per clauses 5.1, 5.2, 5.3                                                                                                                                                                                                                                                                                                                                                      | 1 AU  |
| 18 | I&C: Interconnection of SPV modules, installation of string monitoring boxes <b>including separate grounding/ earthing connection for Power SPD and Communication SPD</b> and cable terminations and inspection thereof per MW as per clauses 5.6 to 5.11                                                                                                                                                                    | 1 AU  |
| 19 | I&C: Formation of cable trenches and laying of 1cx300 mm <sup>2</sup> Al armoured cables, per MW basis, as per clause 5.13 (1 AU = 1 MW) as per clause 5.13                                                                                                                                                                                                                                                                  | 10 AU |
| 20 | I&C: Erection of control room electrical panels including grouting, erection of cable trays and cable supports in both Inverter rooms, routing and terminations of DC and AC cables up to LV side of transformers in switchyard as per clauses 5.14 to 5.16                                                                                                                                                                  | 2 AU  |
| 21 | I&C: Laying of 33 kV earth mat at 1 m depth in each of (i) Inverter room-1 switchyard (ii) Inverter room-2 switchyard and (iii) Control room switchyard                                                                                                                                                                                                                                                                      | 3 AU  |
| 22 | I&C of Inverter rooms -1 & -2 Switchyard: (i) Erection & installation of 2800 KVA transformers on its pedestal and oil filtration activity (ii) Erection of 3 nos of PC-VCBs on structure with spring charge motor mechanism(iii) Erection of CTs, PTs, Isolators (iv)Termination of ACSR DOG conductor at Transformer end, at CT end, at PT end (v) Installation and wiring of C&R panels as per clauses 5.17, 5.18, 5.19   | 2 AU  |
| 23 | I&C: (i) Spreading of stone jelly (ii) Fencing for switchyard (iii) Provision of gate for Inverter rooms -1 & -2                                                                                                                                                                                                                                                                                                             | 2 AU  |
| 24 | I&C: Cable trench formation and laying of 33kV, 3-c x 300 sq mm HT cable from corresponding 33 kV PC-VCBs in Inverter room to the HT Outdoor PC-VCB Panel in the control room including termination of cables as per clause 5.20                                                                                                                                                                                             | 2 AU  |
| 25 | I&C of switchyard at Control room: (i) Erection of PC-VCBs (ii) Erection of CTs, PTs, Isolators (iii)Termination of ACSR DOG conductor at Transformer end, at CT end, at PT end (iv) Erection of CTs, PTs, Isolators (v) Erection of LAs, 33 kV GOS (Isolators) (vi)Termination of ACSR DOG conductor at Transformer end, at CT end, at PT end (vii) Erection of Metering CT, PT and Metering cubicle in Control room (viii) |       |



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|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 26 | I&C: Switchyard leveling, jelly spreading, fencing including gates for 33 KV switchyard associated with Control room, as per clauses 5.35, 5.36, 5.37                                                                                                                                                                                                                                                                                                                                                                                                                              | 1 AU |
| 27 | I&C: Cable trenches, cable laying, cable terminations for control and optic fibre cables related to remote C&R panel and SCADA as per clauses 5.36 to 5.38, 5.39, 5.40, 5.41, 5.42 and 5.42a.                                                                                                                                                                                                                                                                                                                                                                                      | 1 AU |
| 28 | <b>I&amp;C of earthing system:</b> (i) Earthing for solar array field (ii) Earthing of Inverter room / Main control room panels including laying of copper strips (iii) Installation of Earth mat for Inverter rooms -1 & -2 yards and control room switchyard (iii) Two independent earthing for 4 nos of 2800 KVA transformers – Body earth and Neutral earth, equipment including installation of Chemical electrodes, construction & electrical interconnection of earth chambers as per clauses 5.44, 5.45, 5.46 (iv) Two independent earthing of CTs, PTs, LAs, Metering box | 1 AU |
| 29 | I & C of cells to form Battery bank, I & C of Battery charger, initial charging of battery bank                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1 AU |
| 30 | I&C of yard lights for solar array field, switchyard and including cable trenches, cable laying and cable terminations at the yard lighting poles as well as Main ACDB panel in Main control room etc., as per clauses 5.49 to 5.53                                                                                                                                                                                                                                                                                                                                                | 1 AU |
| 31 | Supply, installation and communication system between Main control room and the two Inverter rooms and also provision of dedicated leased line for provide 10 Mbps internet at the site as per clause 5.60                                                                                                                                                                                                                                                                                                                                                                         | 1 AU |
| 32 | I&C of module cleaning system including trenches for pipelines, laying of pipelines from bore wells to solar array field through overhead tanks, erection of pumps, ball valves, non-returnable valves etc., as per clauses 5.55                                                                                                                                                                                                                                                                                                                                                   | 1 AU |
| 33 | I & C of LA (ESE) lightning protection system for solar array field                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1 AU |
| 34 | I&C of miscellaneous and safety items such as cable tags, danger boards, cable markers for 33 kV HT cables, hoarding board, sign boards, display boards, electrical insulation mat, air conditioners, office furniture, fire extinguishers, fire alarm system, etc., as per clauses 5.51 to 5.62 and 5.66 to 5.68.                                                                                                                                                                                                                                                                 | 1 AU |
| 35 | I&C: Pre-commissioning inspections / checks / tests, MRT tests and coordination with state departments CEA/CEIG etc., for necessary approvals / clearances for commissioning, synchronization with grid and post-commissioning operation of the plant as per clause 5.69, 5.70                                                                                                                                                                                                                                                                                                     | 1 AU |

### 3.2 BHEL scope of work

#### (i) BHEL's scope of supply:

|                                                                                   |                                                                                                                                                                           |                |
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|    |                                                                                                                                                                                |                     |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1  | Solar PV Modules, 300 watts                                                                                                                                                    | 36,000 nos approx   |
| 2  | Solar modules mounting structures (20-modules per structure) including mounting of solar modules, remaining solar modules wiring in vendor's scope                             | 1800 nos approx.    |
| 3  | Cable, 1Cx 6 mm <sup>2</sup> unarm (connection of PV modules to string monitoring boxes)                                                                                       | Approx: 55 + 55 Kms |
| 4  | Cable, 1C x 300 mm <sup>2</sup> Al arm (for connection from SMBs up to PCUs in control room)                                                                                   | Approx: 7 + 7 Kms   |
| 5  | Cable, 1c x 630 mm <sup>2</sup> Al unarm (connection from PCUs to Inverter transformer)                                                                                        | -                   |
| 6  | Cable 3c x 300 mm <sup>2</sup> Al 33kV HT arm cable (from Inverter rooms -1 and -2 to Control room switchyards)                                                                | -                   |
| 5  | String monitoring boxes with mounting fixtures                                                                                                                                 | 80 sets             |
| 6  | Power conditioning units (PCUs) of 1250 KW                                                                                                                                     | 8 sets              |
| 7  | Transformers ONAF-type, 2800 kVA, 33kV/380V-380V (1 HV winding, 2 LV windings)                                                                                                 | 4 Nos.              |
| 8  | 33 kV PC-VCBs OUTDOOR type                                                                                                                                                     | 9 nos               |
| 9  | 33 kV C&R indoor panel                                                                                                                                                         | 9 nos               |
| 10 | Supply of Weather monitoring equipment for solar irradiation, wind velocity, ambient temperature, module temperature including supply                                          | 1 set               |
| 11 | SCADA data station with PC, Data loggers, accessories and software                                                                                                             | 1 set               |
| 12 | Data cable terminations at SMBs, SCADA data station panel and control desk (supply and laying of data cables except for weather monitoring equipment shall be in vendor scope) | -                   |
| 13 | Supply of chemical earth electrodes (70 nos), 25 x 3 GI strip, 50 x 6 GI strip, 50 x 8 GI strip, 50 x 6 Cu strip, Φ32 GI rods for earth mat                                    | 1 set or 1 lot      |
| 14 | LA (ESE) terminals with all erection materials                                                                                                                                 | 9 sets              |
| 15 | OFC cable and RS 485 cable in BHEL scope                                                                                                                                       |                     |

**(ii) BHEL's scope of work:**

|   |                                                                                                                             |
|---|-----------------------------------------------------------------------------------------------------------------------------|
| 1 | Unloading of BHEL-supplied materials at Stores area                                                                         |
| 2 | Entire plant security, however vendor shall arrange for safety and security of his own materials                            |
| 3 | Erection of MMS structures up to assembly of solar modules                                                                  |
| 4 | Foundations for SMBs                                                                                                        |
| 5 | All switchyard foundations in BHEL's scope including steelwork for equipment mounting                                       |
| 6 | Pathways, approach roads, drains within the solar array plant area                                                          |
| 7 | All operation and maintenance work post-commissioning                                                                       |
| 8 | Digging of trench for earth strip laying (peripheral earth strip) for solar array earthing, remaining works in vendor scope |
| 9 | Inverter rooms and Control room construction                                                                                |

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#### 4.0 Instructions to vendors on bid submission

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.1 | Offer shall be submitted in two-parts (Two part-bid).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 4.2 | First-part shall be techno-commercial bid. Following details shall be furnished:<br>(i) Covering letter with Company details / brochure<br>(ii) Filled-up enclosures as per BHEL formats (meant for first-part) provided in tender.<br>(iii) Clause-wise compliance shall be filled-up in the column provided in this specification, with signature and seal on every page<br>(iii) <b>PROPOSED PROJECT IMPLEMENTATION</b> – MONTHLY SCHEDULE IN EXCEL BAR CHART including confirmation to requirements of cl nos. 5.3, 5.32 and 5.33<br>(iv) Month-wise manpower deployment at site |
| 4.3 | Second-part shall be price bid with filled up enclosures as per BHEL formats provided in tender.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 4.4 | In addition to the above instructions, tender document provides detailed instructions for bid submission. Vendor shall submit the bid based on instructions in tender document.                                                                                                                                                                                                                                                                                                                                                                                                      |

#### 5.0 Technical specification for supply, installation and commissioning

Vendor shall indicate clause-wise compliance (Yes/No) in the column provided as below. In case of non-compliance or deviation, vendors shall record their comment.

| #      | BHEL specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | To indicate YES / NO, If "NO" to record comments |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| 5.1    | (i) Vendor shall supply and install site porta-cabin office for a period of six months. The porta cabin should be at site within 15 days of issue of Purchase order. Vendor shall provide furnishings with essential amenities such as two work tables, six chairs, two lights and one fan and 1-tonne split air conditioner.<br>(ii) Vendor shall supply and maintain 5 kW DG set for power for powering the mentioned loads for 12-hours every day.                                                                                                                              | Vendor to confirm YES / No                       |
| 5.1(a) | <b>Supply of Security cabin:</b><br>Dimensions of Security cabin to be minimum 3m x 3m, of Pre-engineered type. Cabin shall have provision of light, fan and electrical power, one table and two chairs. Drawing to be submitted for BHEL approval.                                                                                                                                                                                                                                                                                                                                | Vendor to confirm YES / No                       |
| 5.2    | <b>Construction power &amp; water:</b> Vendor shall arrange Electrical power and water for his construction works.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Vendor to confirm YES / No                       |
| 5.3    | <b>Stores maintenance or accounting and movement of BHEL and vendor supplied items (Unloading works by BHEL only):</b><br>(i) Site storage space being arranged by BHEL.<br>(ii) Unloading of site materials of BHEL-supplied materials at site will be arranged by BHEL. Vendor shall arrange for unloading of his own-supplied items.<br>(iii) <b>Vendor to allocate designated and dedicated person</b> (who will do no other works but handle stores work) for the following works:<br>- Maintaining records of supply as Invoices, LR's, raising MRC, etc. on full time basis | Vendor to confirm YES / No                       |

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|     | <ul style="list-style-type: none"> <li>- Maintaining register with list of items, box files for receipt details, LR copies, raise MRC, other paper works. Vendor shall maintain proper documentation / compilation of all the records related to shipping (invoices, delivery challans) and shall take verification and approval from BHEL site engineer for every consignment. The documents shall be suitably preserved for further handing over to BHEL.</li> <li>- Maintaining a register for maintaining stock of all BHEL materials and also vendor-supplied materials, deduct issuances of materials to site.</li> <li>- Updating stock details to be mailed to BHEL Bangalore office on a fortnightly basis.</li> </ul> <p><b>With regard to storage of solar modules – they shall be stored in wattage ranges of 300-305 watts, 305-310 watts, 310-315 watts, &gt;315 watts.</b></p> <ol style="list-style-type: none"> <li>(1) Vendor shall arrange for necessary insurance for his supplied items up to the time of commissioning.</li> <li>(2) BHEL will arrange insurance for all the BHEL supplied items.</li> <li>(3) <b>Vendor shall make his own arrangements for movements of the items from storage yard to the point of construction.</b></li> </ol>                                                              |                               |
| 5.4 | <p>(i) <b>Supply of 3 HP Submersible pump-sets with cable, Quantity: 3 sets</b></p> <p>(ii) <b>Construction of bore wells including hydro survey, water analysis, electrical cabling and plumbing works.</b></p> <ol style="list-style-type: none"> <li>(1) Vendor shall identify locations for three bore wells in consultation with BHEL.</li> <li>(2) Bore wells shall be of necessary depth based on water table at the identified locations.</li> <li>(3) Water analysis shall be carried out and report shall be submitted to BHEL.</li> <li>(4) Supply of Submersible AC centrifugal pump of 3HP (3 phase) with all necessary electrical cabling up to control room ACDB panel shall be provided.</li> <li>(5) Casing as required shall be provided for the pump.</li> <li>(6) Pump and the electrical cables shall be in vendor scope of supply. 5cx4 mm<sup>2</sup> cable (copper, armoured, PVC) shall be laid underground at a depth of ~600 mm, with sand layers below and above the cable (100 mm each). A brick layer, class-2, 75mm thick shall be laid over the sand layer. Trench shall, then, be closed with refill soil and neatly compacted.</li> <li>(7) Length of cable required ~ 600m</li> <li>(8) Pump make: CGL, Suguna, Kirloskar or any other reputed equivalent as shall be approved by BHEL.</li> </ol> | Vendor to confirm<br>YES / No |
| 5.5 | <p><b>Interconnection of SPV modules to form strings:</b><br/>Supply of SPV modules is in BHEL scope, range 300 to 315 watts, approximate total quantity = 36,000 nos.</p> <p><b>Erection of mounting structures and fixing / mounting of the SPV modules on the structures is in BHEL scope.</b><br/>Vendor shall interconnect the modules as follows:</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Vendor to confirm<br>YES / No |

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|     | <p>(a) Each module is fitted integrally with a junction box having positive and negative polarity cables (4 mm<sup>2</sup>).</p> <p>(b) Positive cable of one module shall be connected to the negative cable of adjacent module. The cables have MC4 type of connectors. One polarity cable has male type connector, while the other has female type connector.</p> <p>(c) This way, 20 modules shall be connected in series. Each set of connections is called as a series string. Thus, 1800 strings shall be formed respectively.</p> <p>(d) After placing the purchase order on vendor, BHEL will provide layout drawings that will describe the exact way in which the series strings are formed. Vendor shall implement the interconnection as per these drawings.</p> <p>(e) Interconnected cables shall be neatly routed and dressed using UV resistant nylon cable ties of appropriate dimension.</p> <p>(f) These cable ties shall be in vendor scope of supply. Approved make: 3M, Phoenix contact, Weidmuller, Hellermannntyton, Panduit.</p> <p>(g) Vendor shall submit report for open circuit voltage.</p> <p>Specs: Nylon cable ties, polyamide 6.6 UV stabilized black, UL94 flammability rating V2, meant for outdoor use. Operating temperature up to 85°C. Width of cable tie shall be minimum 4.5 mm. BHEL approval to be obtained for the selected brand / size of cable tie. Cables shall not be loosely hanging.</p> |                               |
| 5.6 | <p><b>Installation of string monitoring boxes</b></p> <p><b>BHEL will construct of the foundations for the SMBs. Vendor needs to erect the Mounting fixtures and SMBs and performing the remaining works as below:</b></p> <p>(h) Vendor shall mechanically erect the SMBs in the solar array field at the foundations spots (foundations in BHEL scope).</p> <p>(ii) Drawings and details of SMBs and the fixtures will be provided to the vendor after placement of purchase order.</p> <p>(iii) SMBs shall be fixed on the stands using the hardware that are supplied by BHEL as part of SMB assembly kit.</p> <p>(iv) All tools necessary for mounting shall be in vendor scope.</p> <p><b>(v) POWER-side SPD provided in the SMB shall be earthed to the SMB leg using 1cx25mm<sup>2</sup> cable. Two separate earthing connections through 25 x 3 GI strip to be made to the nearest main grid of 50x8mm / MMS structure for each SMB.</b></p> <p><b>(vi) COMMUNICATION-side SPD shall be earthed to a single separate earth pit using conventional earthing of GI pipe / rod to 3 m depth.</b></p> <p><b>(vii) Supply of running length GI strips is in BHEL scope. However vendor shall arrange to cut the same in required lengths and drill holes (holes provision in GI strip shall not be done by welding, only by drilling).</b></p>                                                                                            | Vendor to confirm<br>YES / No |
| 5.7 | <p><b>Interconnection of series-connected module strings to SMB using 6 mm<sup>2</sup> cable:</b></p> <p><b>(1) Each SPV module string is to be connected to SMB by extending the series string last solar modules cables with 1cx 6 mm<sup>2</sup> cable</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                               |

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|             | <p>(copper, TUV cable) and MC4 straight connector, <b>both items to be supplied by vendor, ref cl no. 5.68(viii).</b></p> <p>(2) SPV module is provided with positive and negative cables (4 mm<sup>2</sup>) having male and female parts of MC4 type connectors.</p> <p>(3) <b>Cable numbering by ferrule numbers to be provided at both ends (SMB termination end and 6 mm<sup>2</sup> cable end).</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| <b>5.8</b>  | <p><b>Routing of 1Cx 6 mm<sup>2</sup> cable:</b></p> <p>(1) 6 mm<sup>2</sup> cables connecting the SPV module strings to SMBs shall be neatly routed within purlin member of the structures. Cable ties shall be used for tying the cables together at maximum distances of 300 mm.</p> <p>(2) Cable ties, nylon polyamide 6.6 UV-stabilized black, UL94 flammability rating V2, operating temperature up to 85°C, shall be used to arrest any possibility of movement or sagging. Cable ties shall be of make: 3M, Phoenix contact, Weidmuller, Hellermannntyton, Panduit.</p> <p>(3) <b>Width of the cable ties shall be a minimum of 4.5 mm.</b></p> <p>(4) <b>Cable ties length 300mm-Qty: 10,000 nos</b></p> <p>(5) <b>Cable ties length 100mm- Qty: 40,000 nos</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| <b>5.9</b>  | <p><b>Underground laying of 6 mm<sup>2</sup> cables between SOLAR ARRAY rows:</b></p> <p>(1) HDPE double walled corrugated (DWC) pipe shall be used to guide the 6 mm<sup>2</sup> cables underground from one row to the other. <b>Quantity: 8500 metres (IN VENDOR'S SCOPE) to be supplied in lengths 7m.</b></p> <p>(2) Where 6 mm<sup>2</sup> cables run between two rows of structure, HDPE DWC pipe shall be within scope of vendor supply.</p> <p>(3) Specification of HDPE DWC pipe: As per IS 14930 (Part II), TEC GR No. GR/DWC-34/01 SEP 2007, RDSO specification no. RDSO/SPN/201/2011; ID shall be selected to accommodate the number of 6 mm<sup>2</sup> cables to be guided. However, ID shall be minimum 63mm.</p> <p>(4) Make: Jyoti Electricals or reputed make as shall be approved by BHEL.</p> <p>(5) Make, part number, sizes / dimensions shall be submitted to BHEL for approval.</p> <p>(6) This trench is in vendor's scope. Details of cable trench:</p> <ol style="list-style-type: none"> <li>Trench depth = 450 mm minimum</li> <li>Trench width = 300 mm minimum</li> <li>Bottom layer shall be sand of IS: 383 with 100mm thick.</li> <li>HDPE conduit shall be laid over the sand layer.</li> <li>Another layer of sand of 100 mm thick.</li> <li>Trench shall, then, be filled with refill soil and compacted.</li> </ol> |  |
| <b>5.10</b> | <p><b>Connecting the 6 mm<sup>2</sup> cables on input side of SMBs:</b></p> <p>(1) 6 mm<sup>2</sup> cables of positive and negative polarities from individual SPV module strings shall be terminated at the input side of SMBs.</p> <p>(2) Vendor scope includes removal of sleeve at the cable end, crimping with suitable cable lug of appropriate type/size and connecting the lugged end to the terminal block (connector) within the SMB. Cables shall enter the SMB through the cable glands that are part of the SMBs supplied by BHEL.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |





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|             | <p>(3) Cable lug shall be supplied by BHEL.</p> <p>(4) <b>PVC sleeve shall be used for covering the crimping connection and shall be in vendor's scope.</b> All necessary tools such as pliers, strippers, crimping tool shall be in vendor's scope.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| <b>5.11</b> | <p><b>Connecting the 1-corex300 mm<sup>2</sup> Al cables on output side of SMBs:</b></p> <p>(1) BHEL-supplied cables of 1cx300 mm<sup>2</sup> (aluminium conductor, XLPE insulation, PVC sheathed and armoured) cables of positive and negative polarities shall be terminated at the output side of SMBs. Positive and negative cables are identified by colour.</p> <p>(2) Overall diameter of cable ~ 32mm.</p> <p>(3) Vendor scope includes removal of sleeve at the cable end, crimping with suitable cable lug of appropriate type/size and connecting the lugged end to the bus bar within the SMB. Cables shall enter the SMB through the metallic cable glands. Cable glands and cable lugs shall be part of SMB supply arranged by BHEL.</p> <p>(4) <b>Silicone heat shrinkable sleeve</b> to be used to cover the crimped lug connection and shrunk using hot-air gun. Hardware such as bolts, nuts, plain washers and spring washers shall be in vendor scope of supply. The size and type of these shall be in accordance with termination arrangement on the bus bar.</p> <p>(5) All necessary tools such as pliers, strippers, crimping tool shall be within vendor scope.</p>                                       |  |
| <b>5.12</b> | <p><b>Construction and laying of underground Cable trenches for laying power cables from SMBs to Inverter rooms 1 &amp; 2:</b></p> <p>(1) <b>Excavation of trenches with JCB for laying of power cables from SMBs to Inverter room-1 and Inverter room-2 is in BHEL scope of work.</b></p> <p>(2) Vendor is required to lay 1cx300 sq mm Al cables from the respective SMBs to Inverter room-1 and Inverter room-2, RS-485 cable, OFC cable,</p> <p>(3) Cable : 1cx300 mm<sup>2</sup> (aluminium, armoured, XLPE insulation, PVC sheath) of positive (red) and negative (black)</p> <p>(4) Cable trench drawing and layout as per drawing no. BH-WBSEDCL-CHHARRAH-DG-007 REV0</p> <p>(5) No of SMBs: 80 nos</p> <p>(6) No of Cables: 160 nos; Two cables (+, -) from each of the 80 SMBs.</p> <p>(7) <b>Minimum width of trench shall be 300 mm.</b></p> <p>(8) Near each SMB, the RS 485 cables shall be routed in flexible 1-inch PVC pipes. After routing the mouth of the conduit shall closed with silicone sealant to avoid entry of rodents.</p> <p>(9) <b>APPROXIMATE CUMULATIVE TOTAL LENGTH OF DC Cable TRENCHES: 2500 METRES.</b></p> <p>(10) Quantity of 1-inch PVC pipes: 2000 metres shall be supplied by vendor.</p> |  |
| <b>5.13</b> | <p><b>Road crossing with hume pipes:</b></p> <p>(1) In the case of road crossing, hume pipes shall be provided for the routing of the cables. Civil works for the same shall be in vendor's scope.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |

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|             | <p>(2) Hume pipes shall be of minimum 300 mm diameter and 3 metres length and in the scope of the vendor.<br/>Quantity to be supplied: 25 nos.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| <b>5.14</b> | <p><b>Cable trays supply &amp; installation in Inverter rooms-1 and -2:</b><br/>The Inverter rooms -1 and -2 will be of brick-wall superstructure type with suitable foundations, with RCC slab roofing. There is an internal cable trench of <b>width 1.2m, depth 1m</b>. Three ISMC angles ISMC 100 are embedded into the brick-walls of cable trench, the angles shall be at pitch of 1.5m all along the length of the cable trench. The angles are for three-tier cable trays.</p> <p>(1) <b>Vendor shall supply and install cable trays</b> within Inverter room trenches and the Main control room trench for laying DC and AC cables over the trays.<br/>Vendor shall supply cable trays as follows:</p> <ul style="list-style-type: none"> <li>(a) Perforated GI, Hot dip galvanized</li> <li>(b) Thickness = 3 mm, Depth = 40 mm, Width = 750 mm</li> <li><b>(c) Normal type trays: 300 m maximum (total length)</b></li> <li><b>(d) corner-bend trays, Qty: 24 nos</b></li> </ul> <p>(2) Vendor shall fix the cable trays on the projecting steel sections in cable trench of control room.</p> <p>(3) Suitable cut outs shall be made in the cable trays to provide path for the cable to reach the lower level trays.</p> <p>(4) Adjacent cable trays shall be interconnected using suitable hardware items that shall be in vendor scope of supply.</p> <p>(5) Cables shall be laid over the cable trays and neatly dressed using appropriate cable ties etc.</p> <p>(6) Similarly, cable ladders shall be provided for 1Cx 300 mm<sup>2</sup> cables to avoid sagging strain, near the single exit points, through which the cables approach transformer placed just outside. Cable ladders shall be made of MS, painted using red oxide and black paint. Drawing of ladder arrangement shall be submitted to BHEL for approval.</p> <p><b>(7)</b> 1cx630mm<sup>2</sup> cables are routed from Inverter room to transformers in switchyard through foundations of the control room in which</p> |  |



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| 5.15 | <p><b>(i) POSITIONING OF EQUIPMENTS IN INVERTER ROOMS -1 &amp; -2: PCUs, ACDB panel, UPS panel, Cable trays in trenches, data stations (Loggers) of SCADA.</b></p> <p>Vendor shall organize necessary resources such as labour, cranes, hydra, forklifts, transportation trucks / trolleys and other accessories for movements and positioning of the items as below within the Inverter rooms 1&amp;2:</p> <p>(a) 1250 kW PCU panels: 1 set (each ~2500 Kg)<br/> (b) ACDB panel: 1 set (~800 Kg)<br/> (c) Data loggers and station for SCADA: 1 set (~500 Kg)<br/> (d) C&amp;R panel : 1 set</p> <p>Panels shall be placed over the cable trenches in control room, in the exact sequence and locations as shown in BHEL drawings that will be provided to vendor at an appropriate time during the period of execution.</p> <p>(ii) Panels shall be suitably grouted using welding / bolting methods as appropriate. BHEL approval shall be obtained for the grouting arrangement. All necessary hardware for the same shall be within vendor scope of supply.</p> <p><b>(iii) POSITIONING OF EQUIPMENTS IN CONTROL ROOM: Battery banks, UPS, FCBC battery charger panels, ACDB panel, data stations of SCADA, Cable trays in trench.</b></p> <p>(iv) Fixing of PCUs ducting to the wall / ceiling in the Inverter rooms, all fixtures and rods will be provided by BHEL, Quantity: 8 sets.</p> |  |
| 5.16 | <p><b>Power cable terminations on DC side of PCUs in control room:</b></p> <p>(1) On DC side, for each PCU, vendor shall carry out the cable terminations for 11 positive and 11 negative inputs connections – unsleeving, crimping and connecting.</p> <p>(2) BHEL shall supply the cables (1Cx300 mm<sup>2</sup> aluminium, armoured, XLPE insulation, PVC sheath), cable glands, cable lugs, bolts, nuts and washers.</p> <p>(3) All tools and accessories required to carry out the termination shall be within scope of vendor.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| 5.17 | <p><b>630 mm<sup>2</sup> Power cable terminations on AC (LT) side for PCUs and 2800 kVA transformers</b></p> <p>(1) On AC side, 3-phase 3-wire power cable interconnections shall be made between PCUs and 2800 kVA transformers using 4-runs per phase of 1cx630mm<sup>2</sup> aluminium, XLPE insulated, PVC sheathed, unarmoured, PVC cable.</p> <p>(2) For cable terminations at 2800 kVA transformer end.</p> <p>(3) For this 630 mm<sup>2</sup> cable terminations at PCU panels, BHEL shall supply the cables, cable glands, cable lugs, bolts, nuts, plain washers and spring washers.</p> <p>(4) Vendor shall make the measurements between the equipment, cut the cables to the required lengths, fix them with glands, remove sleeve at the ends, crimp them with the lugs and terminate them at the respective bus bar provisions within the panels.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |



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|             | <p>(5) There are 8 PCUs of 1250 kW with built-in Air Circuit Breakers, and 4 Transformers of 2800 kVA capacity.</p> <p>(6) All tools and accessories required to carry out the termination shall be within scope of vendor.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>5.18</b> | <p><b>Cable supporting structure:</b><br/>Cable supporting structure shall be installed between Inverter room wall and LV side of transformer using ISA angles of minimum 50x50x6 mm arranged in vertical and horizontal orientations and joined using welding. The level of structure shall be at a minimum height of 1000 mm above the ground level. Adequate number of horizontal angles shall be provided to minimize gap between two angles so that cable sagging is avoided. Vertical angles shall be grouted using concrete foundation with depth of minimum 400mm. PCC layer 1:3:6 of 100mm thick shall be used. Cross section of foundation shall be minimum 200x200mm. All items required for the structure shall be in vendor scope of supply. Structure shall be painted using red oxide and BHEL approved black paint. Suitable arrangement, such as fixing perforated cable trays in inverted position, shall be provided to cover the laid cables. <b>Length of cable tray shall be maximum 4 metres.</b> Vertical legs support shall be provided at maximum intervals of 1 metre.<br/><b>Quantity of cable support structure with cover = 4 sets.</b></p>                                                                                            |  |
| <b>5.19</b> | <p><b>Outdoor installation of BHEL-supplied 2800kVA, 33kV/350V-350V ONAF transformers:</b><br/><b>(1) BHEL WILL ARRANGE for construction of two nos of transformer foundations in Inverter room no. 1 and 2 as per drawing no. 3-679-05-00866.</b><br/>(2) Transformer and its accessory parts such as radiators, cable boxes, hardware as supplied by BHEL shall be moved from storage yard and positioned on foundation pedestal. All parts and hardware shall be assembled as per guidance at site provided by BHEL / transformer vendor.<br/>(3) Hardware for fixing position of transformers on foundation is in vendor's scope, Quantity: 4 sets.<br/>(4) <b>Vendor has to arrange for BDV measurements and for OIL FILTRATION MACHINE.</b> Vendor shall perform following works for each transformer:<br/>(a) Oil filling and oil filtration in all transformers.<br/>(b) Measurement of parameters: insulation resistance etc.<br/>(c) Connections to marshalling box<br/>(d) Measurement of BDV voltage of oil in Transformer tank and also in oil drums.<br/>(e) Vendor shall carry out oil filtration of oil in drums and also of oil in transformer tank.<br/>(f) <b>Vendor shall check BDV voltage</b> after filtration, it shall be minimum 60 kV.</p> |  |
| <b>5.20</b> | <p><b>Solid copper grounding of four nos of 2800 kVA ONAF transformers:</b><br/>Vendor is required to provide solid grounding by copper strip by joining the bus-bar already provided in each of the four transformers.<br/><b>Copper bus-bar will be provided by BHEL.</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |

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| <b>5.21</b> | <p><b>Cable trench and laying of control cables and LT cables in switchyards of the two Inverter rooms-1 and -2:</b></p> <p>Vendor shall construct underground RCC cable trench (rectangular cross section) with RCC slab cover <b>shall be laid in concrete of dimensions 450mm depth x 450 mm width</b>, for laying of the following cables:</p> <p>(i) Transformer data cables of OTI/WTI/others from the transformer marshalling box to the local SCADA panel</p> <p>(ii) Cables from the OUTDOOR PC-VCBs TO THE C &amp; R panels in the Inverter rooms-1 &amp; -2.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| <b>5.22</b> | <p><b>Separate cable trenches between (i) Inverter room-1 and Control room &amp; (ii) Inverter room-2 and Control room:</b></p> <p><b>Total approximate running length: 800 metres</b><br/> <b>Brick-walled cable trench and RCC cover (75mm thick) as per BHEL drawing no: BH-WBSEDCL-CHHARRAH-DG-007 REV0.</b></p> <p>Cable trench shall be formed running between each of the Inverter room-1 and -2 and the Control room for following cables:</p> <p>(i) 3cx300 mm<sup>2</sup> 33 kV cables from Outdoor PC-VCB panel in Inverter room to Evacuation switchyard in Control room</p> <p>(ii) OFC cable from Inverter room SCADA panel to Main SCADA desk in Main control room</p> <p>(iii) 3.5-c x 25 mm<sup>2</sup> copper armoured LT cable for distribution of Auxiliary power from Main control room to Inverter rooms</p> <p>(iv) 6mm<sup>2</sup> DC cable from FCBC in Control room to Inverter rooms through PVC conduit pipe of 1-inch diameter.</p> <p>(v) Telephone cable</p> <p>(vi) 3c x 2.5 mm<sup>2</sup> cable for lighting</p>                                                                                                                                                                                             |  |
| <b>5.23</b> | <p><b>Supply and termination of 33 kV termination kits for Power cable terminations on AC HT side:</b><br/> <b>33 kV termination kits termination shall be arranged by vendor, to be done only by authorised representative of the manufacturer or personnel licensed by him.</b></p> <p>Vendor shall carry out the following terminations:</p> <p>(1) <b>INVERTER ROOM PANELS:</b></p> <p>(a) 3cx300 sq mm 33 kV HT cable on HV side (33kV) in cable box of 2800 kVA transformers (4 sets) with 33 kV termination kits</p> <p>(b) ACSR DOG conductor terminations in CTs, PTs and GOS</p> <p>(d) Final outgoing from Inverter room switchyard to Evacuation yard in Control room shall through 33 kV, 3cx 300 mm<sup>2</sup> HT cable with 33 kV termination kit for which all cable lugs, 33 kV HT termination kits and all necessary hardware, <b>all of which shall be within vendor scope of supply.</b></p> <p>No of terminations with HT kits in Inverter room-1 swyd: 2 Nos<br/> No of terminations with HT kits in Inverter room-2 swyd: 2 Nos</p> <p>(2) <b>CONTROL ROOM PANELS:</b></p> <p>(a) For termination of the 3cx 300 mm<sup>2</sup> HT cable coming from the two nos of Inverter room to the incomers of PC-VCB panels</p> |  |

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|             | <p>(b) For termination of the ACSR DOG conductor PC-VCBs to the common bus of the Four-pole structure</p> <p>(c) For termination of ACSR DOG conductor from Four-pole structure to the Outgoing PC-VCB, CT, PT and Final GOS (Isolator)</p> <p>(c) For termination of the ACSR DOG conductor going to the 200 kVA station transformer</p> <p>(d) HT termination kits shall be of 36 kV, 3-core, Outdoor type. <b>Make: Raychem, 3M</b> or reputed equivalent to be approved by BHEL.</p> <p>(e) <b>Quantity of termination kits required (by vendor):</b></p> <p>(i) <b>Outdoor type 300 mm<sup>2</sup>, 3-core, Inv room-1 &amp; -2, Qty: 3 + 3 sets + 2 sets spares</b></p> <p>(ii) <b>Indoor termination kits, Inv room-1, Inv room-2, Qty: 2 + 2 sets + 2 spares</b></p> <p>(iii) <b>Outdoor type 300 mm<sup>2</sup>, 3-core, for Control room: 3 sets</b></p> <p>(iv) <b>Indoor termination kits for Control room, Qty: 2 sets</b></p> <p>Cable lugs and hardware shall be of Dowells / 3M or reputed equivalent as shall be approved by BHEL.</p> <p>(f) All tools and accessories required to carry out the termination shall be within the scope of vendor.</p> <p>(g) Since no cable glands are provided for these cases, vendor shall apply suitable grade of bitumen, RTV or any other sealant as shall be approved by BHEL, for sealing the gap around the cable at the cable entry of transformers and HT panels.</p> |  |
| <b>5.24</b> | <p><b>Supply of RSJ poles 175x85xmin 7m, Qty: 14 nos</b></p> <p>(1) Vendor shall supply rolled steel joist beams (RSJ I-beams) <b>of 175x 85mm and minimum length 7m</b> as per IS: 2062-1992 (hot rolled steel) with dimensions as per IS: 808-1989 and tolerances as per IS: 1852-1985. Beams shall be hot-dip galvanized or suitably painted with red oxide and Aluminum paint.</p> <p>(2) The cross section dimensions of RSJ poles shall be as per WBSEDCL requirements meant for four pole / double pole structures.</p> <p>(3) Vendor shall submit the dimension details of RSJ poles. BHEL approval shall be obtained for the brand and supplier of the poles.</p> <p>(4) Test reports shall be submitted to BHEL.</p> <p>(5) <b>Quantity of RSJ poles for Inverter room-1 yard: 4 nos</b></p> <p>(6) <b>Quantity of RSJ poles for Inverter room-2 yard: 4 nos</b></p> <p>(7) <b>Quantity of RSJ poles for Control room switchyard: 6 nos</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>5.25</b> | <p><b>Supply of 33 kV Gang operated switch (Air break switch), triple pole, double break, HORIZONTAL, DOUBLE-BREAK and centrally rotating type:</b></p> <p>(1) Rated voltage: 36 kV</p> <p>(2) Operating voltage: 33 kV</p> <p>(3) Impulse withstand voltage: 75 kV peak</p> <p>(4) Power frequency withstand voltage (1 min): 35 kV rms</p> <p>(5) Continuous current rating: 400 Amps<br/>Short-time current rating: 40 kA</p> <p>(7) Construction: Triple pole, Three insulators per pole, double break, centrally rotating type</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |

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|             | <p>(8) Insulators: Porcelain type conforming to IS 2544 / IEC 273, made of homogeneous material with uniform glazing, free from cavities and other flaws, with high quality smooth finish. Fixed electrical contacts are supported by the insulators.</p> <p>(9) Mounting base: The three poles shall be mounted on a rigid base of MS channel of minimum size of 75x 40 x6 mm (hot dip galvanized), provided with suitable holes, clamps and bolts to enable firm mounting.</p> <p>(10) Electrical contacts: All current carrying parts shall be made of electrolytic copper (silver plated). The fixed contacts shall be of spring-loaded pressure type so as to ensure firm contact and proper alignment. (The springs shall not carry any current). Arcing contacts shall be provided with spring assisted operation.</p> <p>(11) Earthing terminals: Two terminals with adequate size to carry full short circuit current; shall be provided on the frame of each pole.</p> <p>(12) Coupling rod: 25mm nominal bore GI pipe medium gauge</p> <p>(13) Operating rod: 32 mm nominal bore GI pipe medium gauge single length 6m.</p> <p>(14) Standard: IS: 9921 part 1 to 4 / IEC 265 part 1</p> <p>(15) Drawing / Catalogue shall be submitted by the vendor for BHEL approval.</p> <p>(16) Approved make: (i) Transpower Switchgear Industries, Mumbai<br/>(ii) Hightension Electrical Equipments Limited, Kolkata</p> <p><b>QUANTITY OF GOS SWITCHES REQUIRED:</b></p> <p>(a) <b>1 sets with Earth switch (manually operated) – 36 kV, 400 Amps at Evacuation point</b></p> <p>(b) <b>9 sets without Earth switch: One set each for Outgoing at each Inverter room</b></p> <p>(c) <b>Spares 1 set each with and without Earth switch</b></p> |  |
| <b>5.26</b> | <p><b>Supply of LIGHTNING ARRESTORS for switchyard (Surge suppressors):</b></p> <p>(1) Arrestor rating: 42kV, 10kA, Class-3 with IB</p> <p>(2) Type: Metal oxide Gapless lightning arrestor</p> <p>(3) Make: LAMCO (Hyderabad), ELECTROLITES (Jaipur) or any other reputed equivalent to be approved by BHEL.</p> <p>(4) Standard: IS 3070 (part-3) 1993 &amp; IEC 60099-4 of 2004</p> <p>(5) Test report to be furnished</p> <p>(6) These lightning arrestors / surge suppressors (9 Nos) shall be mounted on the four pole structures as shown in SLD diagram. Three each shall be mounted on the two outgoing lines from HT panel. And, the balance three shall be mounted on the second set of four pole structure.</p> <p>(7) <b>Total quantity required = 12 nos</b><br/><b>DISTRIBUTION: 3 nos each at 33 KV Inv-1 and -2 room switchyard + 3 nos at Evacuation point + 3 extra for spares</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>5.27</b> | <p><b>Inverter room-1 and -2 transformer yard installation works:</b><br/><b>Ref drawing: BH-WBSEDCL-CHHARRAH-DG-0003</b><br/>BHEL will arrange for the construction of all foundations of VCB, CT, PT, GOS isolator switch. The installation requirements are as follows:</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |

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|         | <p>(1) <b>Installation of 33 kV Earth mat grid as per drawing</b></p> <p>(2) <b>Erection of GOS switches</b> (Air break switch), 3 pole, double break, horizontal, centrally operated, 33 kV, 400A as per IS:9921 part 1-4, without earth switch: 2 sets</p> <p>(3) <b>Erection of Lightning arrestors</b> (surge suppressors) of 42 kV, 10kA, class-3:</p> <ul style="list-style-type: none"> <li>- 3 Nos for the line1 from outgoing-1 HT VCB panel</li> <li>- 3 Nos for the line2 from outgoing-2 HT VCB panel</li> </ul> <p>(4) <b>Erection of Insulators</b> as per IS: 2544 / IEC 273 shall be used wherever required to maintain HV isolation from RSJ poles.</p> <p>(5) Angular channels shall be used to guide the XLPE HT cables (33kV, 3-Cx300 mm<sup>2</sup> cable) reaching the four pole structure from the two 33 kV PC VCB panels. These pipes shall be positioned vertically at the central location between adjacent RSJ poles. The pipes shall be fixed using a suitable arrangement of GI clamps, IS angles, hardware etc. The pipe as well as the clamping arrangement shall be approved by BHEL prior to procurement / fabrication.</p> <p>(6) All hardware fittings and accessories, which are essential to fulfill the functional requirements of the four pole structure in terms of mechanical stability, electrical insulation / connections, shall be provided by the vendor. This shall include items such as cross-arms, stay sets, disk insulators, insulation hardware (suspension string, tension string), forging fittings, yoke plates, clamps, connectors, corona control rings, arcing horns, earthing accessories, ACSR DOG conductor and its accessories, vibration dampers, spacers, as applicable to meet the WBSEDCL requirement shall be provided by the vendor.</p> <p>(7) Electrical interconnection between the switchyard equipment, including termination using 33 kV termination kits / ACSR conductor is to be done by the vendor.</p> <p>(8) <b>Switchyard fencing as per BHEL drawing no. 3-679-0-500869.</b></p> <p>(9) <b>Final levelling of the switchyard area and compaction of the soil</b></p> <p>(10) <b>Stone jelly spreading for minimum 100mm above FGL.</b></p> |  |
| 5.27(a) | <b>Supply of ACSR DOG conductor, Qty: 1000 m</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| 5.28    | <p><b>Supply of fencing materials and erection of switchyard fencing with gate (for both Control room switchyard and Inverter room-1 and -2 transformer yards):</b></p> <p>Vendor shall provide all around chain-link fencing for all three yards with gate at one location as shall be decided by BHEL site engineer.</p> <p>(a) <b>Fencing shall be as per BHEL drawing 3-679-0-500869.</b></p> <p>(b) GI Fence length ~ 80 m for Inverter room-1 yard</p> <p>(c) GI Fence length ~ 80 m for Inverter room-2 yard</p> <p>(d) GI Fence length ~ 60 m for Control room yard</p> <ul style="list-style-type: none"> <li>- Two gates, each 2.5m width x 3m height, Frame of 50x50mm MS pipes with 4mm thick for <b>each Inverter room-1 and -2 transformer yards (100 Kgs max each)</b></li> <li>- One gate with 3.5m width x 3m height, Frame of 50x50mm MS pipes with 4mm thick for <b>Control room switchyard (150 Kgs)</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |



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|             | <ul style="list-style-type: none"> <li>- <b>Totally five gates</b></li> <li><b>Details of gate:</b> <ul style="list-style-type: none"> <li>- Vertical grills of 16mm square bar at 120mm c/c</li> <li>- Other necessary details such as hinges, padlocks, wheels shall be considered.</li> <li>- Gate shall be finished with red oxide (two coats) and two coats paint of silver colour.</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| <b>5.29</b> | <p><b>Control room Switchyard installation works:</b><br/> BHEL will arrange for the construction of all foundations of control room switchyard. The Control room switchyard layout is as per for various 33 kV switchgear as VCB, CT, PT, GOS isolator switch is shown in drawing no. <b>BH-WBSEDCL-CHHARRAH-DG-002</b>. The installation requirements are as follows:</p> <ol style="list-style-type: none"> <li>(1) <b>Installation of 33 kV Earth mat grid as per drawing.</b></li> <li>(2) Erection of switchyard electrical equipment on the structures provided by BHEL as GOS, PV-VCBs, LAs, Insulators, etc.</li> <li>(3) Angular channels shall be used to guide the XLPE HT cables (33kV, 3-Cx300 mm<sup>2</sup> cable) reaching the four pole structure from the two 33 kV PC VCB panels. These pipes shall be positioned vertically at the central location between adjacent RSJ poles. The pipes shall be fixed using a suitable arrangement of GI clamps, IS angles, hardware etc. The pipe as well as the clamping arrangement shall be approved by BHEL prior to procurement / fabrication.</li> <li>(4) Vendor has to supply RSJ poles for 6-pole structure – <b>remaining MS structures in BHEL scope.</b></li> <li>(5) All hardware fittings and accessories, which are essential to fulfill the functional requirements of the four pole structure in terms of mechanical stability, electrical insulation / connections, shall be provided by the vendor. This shall include items such as cross-arms, stay sets, disk insulators, insulation hardware (suspension string, tension string), forging fittings, yoke plates, clamps, connectors, corona control rings, arcing horns, earthing accessories, ACSR DOG conductor and its accessories, vibration dampers, spacers, as applicable to meet the WBSEDCL requirement shall be provided by the vendor. <b>Note: All MS parts of RSJ poles shall be suitably painted using red oxide and silver colour paint.</b></li> <li>(6) <b>Stone jelly spreading for minimum 100mm above FGL.</b></li> </ol> |  |

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| 5.30 | <p><b>METERING CUBICLES:</b></p> <p>(1) <b>Single or two independent cubicle panels housing</b> two nos of ERP 300P Trivector meters (class 0.2s) with RS485 port, MODBUS RTU protocol, with downloading license shall be supplied and installed close in the Control room. Choice of single or two separate panels shall be made at time of submission of drawings by vendor.</p> <p>(2) The panel shall be wall-mounted type. Common Meter Reading Instrument as per IEC-62056, Sands make (CMRI-1006) or BHEL approved equivalent along with optical probes to be provided (2 sets).</p> <p><b>Details of Scrolling of various parameters shall be provided in the Trivector Meter to BHEL for approval.</b></p> <p>(3) <b>Supply of separate CT and PT , Quantity: 2 sets</b> – one for each ABT-meter</p> <p><b>CT details:</b> CT ratio – 250 / 1-1 Amps, CL:0.2s, 5 VA</p> <p><b>PT details:</b> PT ratio- 33kV/V3:110V/V3: 110V/V3 , CL:0.2, 30 VA</p> <p>Outdoor oil-immersed combined CT/PT set for metering purpose. The CTs and PTs shall each have two cores on their secondary side both meant for metering.</p> <p>CT and PT shall be manufactured in accordance with IS: 2705 / IEC 185 and IS: 3156 / IEC 186 respectively.</p> <p>Approved makes: LAMCO, ASCOT</p> <p>(3) <b>Vendor shall arrange for downloading of software on assigned computer PC to enable downloading of data from the CMRI. PC shall be allocated at time of commissioning by BHEL or its customer.</b></p> <p><b>Vendor shall arrange for calibration and testing of the TVM meters, Metering CT and PT at WBSEDCL laboratory or at their nominated agency / laboratory. The costs associated with the same shall be in vendor scope.</b></p> |  |
| 5.31 | <p><b>Auxiliary power or Station power:</b></p> <p>(1) The third GOS switch shall be for connected to the Station transformer that is mounted on a double pole structure.</p> <p>(2) From this it is connected to 100 kVA Station transformer to be stepped down to 415 volts to the Main ACDB panel through the change-over switch.</p> <p>(3) From the Main ACDB, the power is distributed to within the Main control unit and also to the four Inverter rooms. For this power distribution, 4 runs of 3.5cx25 mm<sup>2</sup> copper armoured PVC cable is to be used.</p> <p>(4) <b>For this the following items are in the scope of the vendor:</b></p> <p>(a) <b>Main ACDB</b> - Quantity: 1 no</p> <p>(b) <b>Switchboards</b> - Quantity: 2 nos</p> <p>(c) <b>DCDBs</b> - Quantity: 2 nos</p> <p>(c) <b>3.5cx25 mm<sup>2</sup> copper armoured PVC cable</b> – Quantity: 1500m</p> <p>(d) <b>3.5cx95 mm<sup>2</sup> copper armoured XLPE cable</b> – Quantity: 100m</p> <p><b>MAIN ACDB specifications:</b></p> <p>(i) Mechanical details:</p> <p>Floor resting type ISMC 100 base frame</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |



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|      | <p>Panel sheets of 2mm / 14 gauge CRCA sheet<br/>Hinged door: 2mm / 14 gauge CRCA sheet<br/>Removable door: 1.6mm / 16 gauge CRCA sheet<br/>Gland plate: 3mm / 10 gauge<br/>Lifting hooks (4 nos) of adequate capacity<br/>Locking provision with key, no door on rear side<br/>Paint colour: RAL 7032 of IS:5<br/>Incomer cables: 3.5cx95 mm<sup>2</sup> cables<br/>Cable glands for 3.5cx95 mm<sup>2</sup> (Qty: 1 no)<br/>Cable glands for 3.5-c x 25 mm<sup>2</sup>(Qty: 4 nos)<br/><b>(a) Electrical details for MAIN ACDB PANEL, reference BHEL drawing no. 3-679-05-00868, sheet 1</b><br/>Metering: Voltmeter, Ammeter, KWH meter (Model EM 6400 with MODBUS 485 output, Make: CONZERV<br/>Main ACDB shall have common bus with coupler for TGBPP supply and for take of outputs to Sub ACDBs.</p> <p><b>The ACDB panel has have provision for correction and maintaining power factor to minimum 0.9 for a maximum inductive load of 25 KVA.</b></p> <p><b>(b) Electrical details for Switchboard distribution boards, reference BHEL drawing no. 3-679-05-00868, sheet 2</b><br/><b>(c) DCDB will have following MCBs fitted:</b><br/>- 16 Amps (1 no) input<br/>- 6 Amps (4 nos) output<br/>DCDBS will have be a box walled mountable enclosure with cable gland, earthing provision.<br/><b>Detailed drawings to be submitted for approval prior to clearance for manufacturing.</b><br/><b>(d) Supply of 5 kVA UPS with battery bank, Quantity: 3 Nos</b><br/><b>The battery bank shall be suitable for a back-up of 4 hours of 5kVA, by means of external battery if necessary.</b></p> |  |
| 5.32 | <p><b>Supply and Installation of Auxiliary transformer, RSJ structures, 33 kV GOS (Isolator) and drop out fuses on the HT side:</b><br/>Vendor shall supply and install a concrete structure that carries the following items:</p> <p><b>Supply of 100 kVA Auxiliary transformer:</b><br/>(1) Outdoor, Oil immersion type, ONAN, 3-phase, Dyn11, 100 kVA, 33kV/415V (+/-10%), 50Hz +/- 3% transformer, Class A insulation, percent impedance 4.5%, <b>cable box with bottom side cable entry on both LV and HV side</b>, as per IS: 2026 for auxiliary power consumption to internal utilities of the power plant.<br/>Cable glands, cable lugs, bolts, nuts, plain washers and spring washers for LV side should be supplied along with transformer suitable for 3.5cx95 mm<sup>2</sup>, copper conductor, armoured, 1100V, XLPE insulation, PVC sheath cable as per IS: 1554 (part-1).</p> <p>Other parameters:</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |

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|  | <ul style="list-style-type: none"> <li>- Winding material: Electrolytic grade copper for both primary and secondary windings</li> <li>- Off-circuit tap changer on HV side: +/- 5% in steps of 2.5% (-5%, -2.5%, 0, +2.5%, 5%)</li> <li>- <b>Maximum Load loss @ 75°C : 1.235 KW</b></li> <li>- <b>Maximum No load loss @ 75°C: 180 watts</b></li> <li>- Silica gel breather</li> <li>- HV side delta, LV side star with 4-wire, neutral terminal brought out separately and earthed through solid earthing.</li> <li>- Highest voltage for equipment: 36 kV rms for HV side, 1.1kV rms for LV side</li> <li>- Rated short duration power frequency withstand voltage: 28kV rms for HV side, 3kV rms for LV side</li> <li>- Rated lightning impulse withstand voltage: 75kV peak for HV side</li> <li>- Temperature rise: For max ambient of 40°C, the maximum allowable temperature rises in oil and winding by thermometer method shall be 45°C and 50°C respectively.</li> <li>- BHEL shall witness the temperature rise test and routine tests, for which vendor shall provide inspection call to BHEL in advance.</li> </ul> <p>(2) Transformer shall be mounted on concrete pedestal at a height 1.5 metres from the ground level.</p> <p>(3) The drawing for the concrete pedestal will be furnished by BHEL.</p> <p>Drop out fuse wires with 33kV fuse holders shall be mounted on a suitable mounting arrangement such as base channel of 75x40x6, etc. Rated voltage 36kV, copper fuse wire of AWG 30 (~10A melting). Reputed equivalent as shall be approved by BHEL.</p> <p>(1) Electrical interconnections up to the transformer bushings on HV side shall be made using ACSR conductors.</p> <p>(2) On LV side, suitable supporting arrangement shall be provided to route the cable, 3.5Cx 95 mm<sup>2</sup>, copper conductor, armoured, XLPE insulation, PVC sheathed cable as per IS:1554. The arrangement shall provide for suitable clips, clamps to ensure neat dressing of the cable. Suitable nickel-plated cable glands to be used.</p> <p>(3) All hardware fittings and accessories, which are essential to fulfill the functional requirements of the double pole structure in terms of mechanical stability, electrical insulation / connections shall be provided by the vendor. This shall include items such as insulation hardware (suspension string, tension string), forging fittings, yoke plates, clamps, connectors, corona control rings, arcing horns, earthing accessories, ACSR conductor accessories, vibration dampers, spacers, stay sets, cross-arms as applicable to the context shall be provided by the vendor.</p> <p>(4) Vendor shall submit general arrangement and detailed drawings with bill of materials / quantities of the double pole structure with individual item description, quantity, make, specs / ratings for BHEL approval.</p> <p><b>Note: All MS parts of FP structure shall be suitably painted using red oxide and BHEL approved silver colour paint.</b></p> |  |
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|  | <b>PURCHASE SPECIFICATION- GROUP: PHOTOVOLTAICS<br/>SUPPLY OF BOS ITEMS, I&amp;C, O&amp;M FOR 10 MW (AC) SPV<br/>POWER PLANT<br/>AT WBSEDCL CHHARAH SITE, WEST BENGAL</b> | PS-439-1083     |
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| 5.33 | <p><b>Power cable terminations at 100 kVA transformer, Main ACDB and Distribution boards:</b></p> <ol style="list-style-type: none"> <li>(1) Vendor shall carry out termination on LT side of 100kVA auxiliary transformer (33kV/415V) using 3.5cx95 mm<sup>2</sup>, copper conductor, armoured, 1100V, XLPE insulation, PVC sheath cable as per IS: 1554 (part-1), cable glands, cable lugs, bolts, nuts, plain washers and spring washers. All these items including cable shall be within vendor scope of supply.</li> <li>(2) Similar terminations shall be carried out on the other end of cable that gets terminated at Main ACDB panel in Main control room. Vendor shall supply the necessary cable glands, cable lugs and hardware for ACDB end as well.</li> <li>(3) All tools and accessories required to carry out the termination shall be within the scope of vendor.</li> </ol> <p>From the Main ACDB, 3.5cx25mm<sup>2</sup> copper, PVC insulated and arm cables are run independently to the Distribution boards of the four Inverter rooms. This cable is run in the same trench as the 33KV HT cables.</p> <p><b>QTY: Approx. length of 3.5-Cx95mm<sup>2</sup> copper, class 5, XLPE arm cable: 100 metres</b></p> <p><b>QTY: Approx. length of 3.5-Cx25mm<sup>2</sup> copper, class 5, PVC arm cable: 2000 metres.</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| 5.34 | <p><b>The construction of Inverter room-1, Inverter room-2 and Control room is in BHEL scope.</b></p> <p>The Inverter rooms -1 and -2 will be of brick-wall superstructure type with suitable foundations, with RCC slab roofing. There is an internal cable trench <b>of width 1.2m, depth 1m</b>. Three ISMC angles ISMC 100 are embedded into the brick-walls of cable trench, the angles shall be at pitch of 1.5m all along the length of the cable trench. The angles are for three-tier cable trays.</p> <p><b>Vendor shall supply and install cable trays</b> within Inverter room trenches and the Main control room trench for laying DC and AC cables over the trays.</p> <p>Vendor shall supply cable trays as follows:</p> <ol style="list-style-type: none"> <li>a. Perforated GI, Hot dip galvanized</li> <li>b. Thickness = 3 mm, Depth = 40 mm, Width = 750 mm</li> <li>c. <b>Normal type trays: 300 m maximum (total length)</b><br/><b>Corner-bend trays, Qty: 24 nos</b></li> </ol> <p>Vendor shall fix the cable trays on the projecting steel sections in cable trench of control room.</p> <ol style="list-style-type: none"> <li>d. Suitable cut outs shall be made in the cable trays to provide path for the cable to reach the lower level trays.</li> <li>e. Adjacent cable trays shall be interconnected using suitable hardware items that shall be in vendor scope of supply.</li> <li>f. Cables shall be laid over the cable trays and neatly dressed using appropriate cable ties etc.</li> <li>g. Similarly, cable ladders shall be provided for 1Cx 300 mm<sup>2</sup> cables to avoid sagging strain, near the single exit points, through which the cables approach transformer placed just outside. Cable ladders shall</li> </ol> |  |

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|      | <p>be made of MS, painted using red oxide and black paint. Drawing of ladder arrangement shall be submitted to BHEL for approval.</p> <p>1Cx630mm<sup>2</sup> cables are routed from Inverter room to transformers in switchyard through an opening in the wall of control room. <b><u>These openings shall be closed using a suitable sheet made of steel / aluminium / fiber etc., to arrest entry of rodents.</u></b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| 5.35 | <p><b>Miscellaneous works of Control room works:</b></p> <p><b>The construction of Control room is in BHEL scope. However miscellaneous works are in vendor's scope:</b></p> <p>The Main control room shall be of brick-wall superstructure type and RCC slab roof.</p> <p>(i) Provision of Water tank of 6000 litres capacity</p> <p>(ii) <b>Provision of cable tray for single trench for communication cables of length 20 m maximum.</b></p> <p>Chequered plate cover for trench of 6 mm thickness (Final Black colour painted) to cover cable trench after equipment installation.</p> <p>(iii) <b>Supply of furniture for conference room and office</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| 5.36 | <p><b>Support and assistance for SCADA integration for the power plant</b></p> <p><b>Introduction to the SCADA of the Plant:</b></p> <p>SCADA for the power plant comprises of the following:</p> <p>(i) Data loggers located at the two Inverter rooms -1 and -2 for capturing the data from the various equipment and converting the digital / analog signals to optical signals for transmission by the optical fibre cable.</p> <p>(ii) Data station panel and PC based control desk with software located at the Control room to collect, store, process and report the following data parameters of power plant.</p> <p>a. String monitoring boxes in solar array field: string current, voltage, box temperature, module temperature, status of SPD and load break switch in SMBs</p> <p>b. Weather monitoring equipment: solar irradiation, ambient temperature, wind velocity and module temperature.</p> <p>c. <b>At Inverter rooms:</b> PCU data signals: DC input /AC output parameters of inverters, grid data, fault status and events logged, ACB status.</p> <p>d. <b>At Inverter rooms:</b> 33 KV VCB: Status, status of protection relays of transformers, oil / winding temperatures, LOLA, Fire alarm status</p> <p>e. <b>At Control room:</b> HT breaker panels: VCB breakers status, status of protection relays of transformers, oil / winding temperatures, AC parameters at 5MW levels, energy generation values.</p> <p>(1) Vendor shall provide support and assistance to BHEL in following activities:</p> <p>(a) <b>Formation of underground cable trenches</b></p> <p>- Cable laying for data communication cables from 2800 KVA transformer to Data logger in Inverter room using 10-core, 0.5 mm<sup>2</sup>, copper, screened cable in HDPE conduit, Qty: Approx. 25 m</p> |  |

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|                | <ul style="list-style-type: none"> <li>- Cable laying of Data cable from looped PCU, 33 KV VCB and ACDB panel to Data logger using 1-pair, twisted 0.5mm<sup>2</sup>, copper screened cable in HDPE conduit</li> <li>- Metering cubicles to SCADA panel in Main control room using 10-core, 0.5 mm<sup>2</sup>, copper, screened cable, Qty: 20m</li> </ul> <p>(b) Daisy looping of the two PCUs and connection to Data loggers in the respective Inverter room with 1-pair, twisted 0.5mm<sup>2</sup>, copper screened cable</p> <p>(c) Data cable laying from PCUs, ACDB panels to Data loggers with 1-pair, twisted 0.5 mm<sup>2</sup>, copper, screened cable</p> <p>(d) Data cable terminations at PCUs, ACDB panels, transformers and 33KV VCB panels and cable laying to the Data logger.</p> <p>Following materials shall in the vendor's scope:</p> <p>(i ) Cable glands, 1-inch, polyamide, Quantity: 30 nos</p> <p>(ii) Lugs for termination and ferruling numbering.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| <b>5.36(a)</b> | <p><b>Daisy-chain looping and Laying of RS 485 cable (Data communication cables) in trenches from SMBs to Inverter rooms -1 and -2.</b></p> <p><b>Reference drawing: BH-WBSEDCL-CHHARRAH-DG-007R2</b></p> <p><b>The supply of unarmoured cables RS 485 (2 pair, 0.5 sq mm) is in BHEL scope. The RS 485 cable shall be laid in PVC conduit pipe including bends, couplers, nipples and PVC conduit 1-inch in vendor scope.</b></p> <p><b>The vendor is required to perform looping by laying in trenches (combined with the DC cable) of following:</b></p> <p>SMB1 to SMB10 (approx. length of trench 500m) &amp; SMB11 to SMB20 (approx. length of trench 500m)</p> <p>SMB21 to SMB30 (approx. length 500m) &amp; SMB31 to SMB40 (approx. length 500m)</p> <p>SMB41 to SMB50 (approx. length 500m) &amp; SMB51 to SMB60 (approx. length 500m)</p> <p>SMB61 to SMB70 (approx. length 500m) &amp; SMB71 to SMB80 (approx. length 500m)</p> <p>For the above looping the RS 485 cable shall be laid in the trenches.</p> <p>(1) This cable is meant for RS485 interfacing. The RS485 output of SMBs shall be daisy-chain looped using this cable. 10 SMBs shall be daisy-chained to form one cable connection running up to SCADA room. In such a case, the last SMB, OFC cable will run to the Inverter room. These data cables shall be laid underground in same cable trench along with power cables. A minimum distance of 500mm shall be maintained between the data cable trench and power cable trench to avoid EMI interference.</p> <p>(2) Underground laying shall be ensured even within the daisy-chain looping between adjacent SMBs.</p> <p>(3) Cable trench shall be as per details below:</p> <p>(a) Trench depth = 850mm minimum</p> <p>(b) Trench width shall be 200mm minimum</p> |  |

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|             | <p>(c) Bottom layer shall be sand as per IS: 383 with 100mm layer thickness.</p> <p>(d) Data cable shall be laid over the sand.</p> <p>(e) Another layer of sand, 100 mm thick, shall be laid.</p> <p>(f) A single layer of brick, class-2, 75mm thick, shall be laid over the sand.</p> <p>(g) Trench, then, shall be filled up with refill soil.</p> <p><b>(4) Total length of trench ~ 4000m</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| <b>5.37</b> | <p><b>(a)OFC cable laying in 33 kV HT cable trench, to be read in conjunction with cl no. 5.22:</b><br/><b>OFC cable is in BHEL scope.</b><br/>OFC cable is to be laid underground for the following:<br/>(i) Communication output last SMB in the daisy-chain loop; namely from each of the SMB10, SMB20, SMB30, SMB40, SMB50, SMB60, SMB70 and SMB80 to be laid in trenches to the RTU unit in the corresponding Inverter room.<br/>(ii) Connecting the Data loggers in the Inverter room-1 and Inverter room-2 to the Data station panel in Main control room.</p> <p><b>Drawing to be referred: BH-WBSEDCL-CHHARRAH-DG-007 and is for the OFC cable, 33 kV 3-cx300 sq mm HT cable, 6 sq mm battery cable and Auxiliary power cable (3cx25 sq mm cable).</b></p> <p><b>(b) OFC cable termination for SMBs, SCADA panels are in vendor's scope.</b></p>                                                                                                                                                                                                                                                                                                                                                           |  |
| <b>5.38</b> | <p><b>Cable trench construction for laying of data communication cables from switchyard equipment to RTU in Inverter rooms -1 and -2 / Control room.</b></p> <p><b>These data cables (details under following section), which are within the vendor scope of supply, shall be laid in concrete trenches, of dimensions 450mm depth x 450 mm width.</b></p> <p><b>Cables required:</b> 12-core, 1.5 mm<sup>2</sup> copper conductor, PVC insulated, shielded and armoured cable. In case 12-core is not readily vendor shall supply cable with greater number of cores.<br/>1-pair x 4 sq mm cable</p> <p><b>(i) Data cables in Transformer yard in Inverter room:</b><br/>(a) From 2800 kVA transformers to 33kV C&amp;R panel (of VCB panel) in each of Inverter room-1 and -2 using 12-core, 1.5 mm<sup>2</sup> instrumentation cable,<br/>(b) Inter-wiring between CT / PT in switchyard to C&amp;R panel using 2-pair 4 sq mm copper cable.</p> <p><b>(ii) Data cables in switchyard in Control room:</b><br/>(a) 100 kVA transformer to C&amp;R panel using 12-core 1.5 sq mm cable<br/>(b) Metering cubicles to SCADA panel, 2-c, 0.5 mm<sup>2</sup> copper, PVC insulated, shielded and armoured cables.</p> |  |



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| 5.39    | <p><b>Data cable terminations in Inverter rooms / Control room &amp; switchyards:</b></p> <ul style="list-style-type: none"> <li>- Cables (12-c x 1.5mm<sup>2</sup> copper cable) required for the above terminations are in vendor scope.</li> <li>-Cable lugs and all hardware required for making the above terminations shall be in vendor scope of supply.</li> </ul> <p><b>(i) Inverter rooms and its switchyard:</b><br/>Vendor shall carry out data cable terminations at 2800 kVA transformers, Outdoor CB breaker panels, Metering panels, ACDB panels and PCUs.</p> <ul style="list-style-type: none"> <li>(a) Terminations at Marshalling box of the 2800 kVA transformer</li> <li>(b) 33kV Outdoor CB panel (Buchholz relay, pressure release valve, low oil level, WTI, OTI).</li> <li>(c) Terminations at 33kV VCB panel (Buchholz relay, pressure release valve, low oil level, WTI, OC/EF relay, EM6400 meters for SCADA connections.</li> <li>(d) Terminations at the 1250 kW PCU for capturing ON/OFF status of ACBs for SCADA purpose and also Modbus</li> <li>(e) Termination at the 1250 kW PCU for capturing the power, current RS485 MODBUS communication cable connections</li> </ul> <p><b>(ii) Data cable terminations in Control room and its switchyard</b></p> <ul style="list-style-type: none"> <li>(a) Termination at the Metering panels</li> <li>(b) Termination at the Marshalling box of the Aux transformer</li> <li>(c) Termination at the EM6400 in the 2 incomers and 1 outgoer for capturing the power, current</li> <li>(e) Terminations between 3 sets of HT panels: OC/EF relay, OV/UV relay etc.</li> <li>(f) Terminations at the PCU for capturing ON/OFF status of ACBs for SCADA purpose.</li> <li>(g) Terminations at two metering panels</li> </ul> <ul style="list-style-type: none"> <li>(a) Terminations at 1 ACDB panel.</li> <li>(b) All the cables required for the above terminations are in BHEL scope.</li> <li>(c) Cable lugs and all hardware required for making the above terminations shall be in vendor scope of supply.</li> </ul> <p><b>Note:</b> Along with the above activities, DC / AC power supply cable laying and terminations shall be also be carried out for transformers and HT panels panel using 2Cx 2.5 sq-mm copper, armoured, PVC cables. Cable shall be laid from battery bank (for DC) and ACDB panel (for AC).</p> |  |
| 5.39(a) | <b>Supply of 2-pair 4 mm<sup>2</sup> copper PVC cable, Qty: 3000 m</b><br><b>Supply of Data cable 12-core x 1.5 mm<sup>2</sup> copper PVC cable, Qty: 750m</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| 5.40    | <b>Supply of Battery bank and chargers in Control room:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |

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|             | <p>(i) Vendor shall supply 110 volts / 125 AH battery bank with Float-cum-boost charger 135V / boost current 25 Amps, <b>Qty: 1 set</b></p> <p>(ii) The cells shall be of PLANTE-type, YCP 11, lead-acid type, make: EXIDE</p> <p>(i) The supply shall include <b>teak wood racks with acid-resistant paint</b>, intercell connectors etc., required for installation of the battery banks.</p> <p>(ii) Operation in both boost and float modes, with maximum float current of 10 Amps.</p> <p>(iii) <b>Charger shall have DCDB terminal provision.</b></p> <p>(iv) Supply should include spares as Control card, fuses.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| <b>5.41</b> | <p><b>I &amp; C of Battery and charger:</b> Erection of the battery bank, filling with electrolyte and initial charging shall be done by authorised representative of the manufacturer as initial charging is important for long life of the battery. If any problems arise with the charger, vendor shall arrange for Charger manufacturer to visit site for repair of charger.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |
| <b>5.42</b> | <p><b>Earthing of solar array field:</b><br/><b>The supply of running length of GI strips 25x3mm, 50x5mm and Chemical earthing electrodes shall be completely in BHEL's scope of supply. I &amp; C works are in the scope of the vendor.</b></p> <p><b>(a) PERIPHERAL GI GRID FORMATION</b></p> <p><b>(1) GI BURIED GRID FORMATION</b> (as per drawing no. BHE-WBSEDCL-CHHARRAH-DG-004) of 50x5mm GI strip at 400mm depth shall be formed in the solar array field and surrounding. For forming this peripheral grid, overlap joining of 50x5 mm strips shall be by arc welding with overlap of 150mm.</p> <p><b>(2) MMS interconnection:</b> Vendor shall arrange to cut <b>BHEL-SUPPLIED</b> 25X3mm strip into shorter pieces of strips approximately 250mm with oblong holes for interconnecting the legs or columns of adjacent MMS structures is in BHEL scope, with M-10 hardware for this is in BHEL scope.</p> <p>(3) From this grid vendor shall interconnect solar array structures using bolting with 25x3 mm GI strips. The 25x3 mm GI strip to be connected to the outer 50x5mm GI strip by welding.</p> <p>(4) Chemical electrodes shall be used for earthing connection. Connection to the electrode to be made by bolting using M-10 x 45 mm hardware. The connection to the electrode to be made by a smaller a suitable bent GI strip bolted to the 25x3 mm GI strip.</p> <p><b>(5) BHEL shall supply chemical electrodes (70 sets) for earthing of this grids. I &amp; C of chemical electrodes is in vendor's scope.</b></p> <p>(6) Earth pit shall be drilled and the chemical earth electrode shall be placed in the pit, filled with back filling chemical compound all around the electrode as per vendor data-sheet instructions.</p> <p>(7) Procedure for installation of chemical electrodes as per the manufacturer's instructions should be followed.</p> <p>a) After finishing the pit work, pour a few buckets of water around the pit.</p> |  |



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|             | <p>(8) Earth chambers of brick masonry shall be constructed as per BHEL drawing 4-679-05-00064. All items of earth chambers, including lid, shall be in vendor scope of supply.</p> <p>(9) Earth chambers shall be interconnected for every 1MW of the solar array field, using 50x5 mm GI strip that shall be laid underground.</p> <p>(10) Terminations at the electrode end shall be made using bolting method. Welding shall not be applied at electrode end. For this purpose, a separate link with multiple mounting holes shall be used at the electrode end. This way, GI strips (25x6 mm) running from structure leg and the GI strips (50x5 mm) from adjacent electrodes shall be terminated at this link, which shall, in turn, be connected to the electrode. Joining of 50x5 mm GI strips at intermediate positions, wherever applicable, shall be made using either welding or bolting method. Either way, the overlapping of the two strips shall be for a minimum length of 150mm. Welding shall be for the entire overlapping length. In case of bolting, minimum three bolt joints shall be used per overlap length.</p> <p>(11) All hardware (nuts, bolts, washers) for jointing of earth strips shall be in vendor scope of supply.</p> <p>(12) BHEL will provide layout drawings showing earth chamber locations.</p> <p><b>NOTE: The resistance as measured at the individual electrodes measured in isolation from the remaining shall be less than 3 ohms.</b></p> <p><b>(b) Earthing of SMBs (of communication SPDs):</b></p> <p>(1) Each of the 80 nos of SMBs shall have a separate earthing for the communication SPDs.</p> <p>(2) This shall be earthed by “Conventional earthing” using 50mm GI class B pipe of length 3 m using charcoal and salt.</p> <p>(3) Earth chambers of brick masonry shall be constructed as per BHEL drawing 4-679-05-00064. All items of earth chambers, including lid, shall be in vendor scope of supply.</p> <p><b>(c) JOINING OF ADJACENT STRUCTURE COLUMNS (or LEGS):</b><br/>There are totally 1800 sets of MMS structures. One column (or leg) of each MMS is to be bolted to its adjacent using 25 x 3 mm GI flat. BHEL shall supply running length of GI strip. Vendor needs to this running strip and punch two oblong slots in each cut strip – of length approx. 250 mm. M10 hardware for joining two adjacent structures will be in BHEL scope.</p> |  |
| <b>5.43</b> | <p><b>EARTHING FOR EQUIPMENTS IN INVERTER ROOMS and CONTROL ROOM(PCUs, ACDB panels, SCADA panels):</b><br/>50mm x 5 mm GI strip lines shall be laid in the cable trenches of Inverter room-1 and -2.<br/>GI strips shall be anchored to the cable trench wall using insulation bush supports. Quantity of supports required ~ 30 Nos.</p> <p>(1) Expansion bolts of appropriate size (Minimum M8) shall be used to fix the insulation bush supports.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |

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|             | <p>(2) BHEL will provide the earthing line layout drawing.</p> <p>(3) Copper strips shall be interconnected to the earthing terminals of all the control room panels using 6 mm<sup>2</sup> copper, unarmoured, PVC cables that shall be supplied by BHEL. Cable lugs and hardware (bolts, nuts, washers) required for connecting the 6 mm<sup>2</sup> cable to the earth terminals of panels and also to the copper strip end shall be in vendor scope of supply.</p> <p>(4) Earth chambers of brick masonry shall be constructed as per BHEL drawing 4-679-05-00053. These chambers shall be located around the control room. Exact locations will be intimated by BHEL site engineer.</p> <p>(5) Connection between earth chamber and copper earthing strip in the control room shall be made using cable, 1cx25 mm<sup>2</sup>, copper, unarmoured, 1100V, PVC cables as per IS:1554 (part-1) that shall be in vendor scope of supply. Quantity of cable required ~ 150m maximum.</p> <p>(6) Routing of 1Cx25 mm<sup>2</sup> cables to earth chambers shall be in 1-inch CPVC pipes, joints, bends and elbows that shall be in vendor scope of supply. Routing shall be underground outside the control room, at a depth of ~450mm below the ground level. Length of CPVC pipe required = 100m. Number of CPVC joints and elbows shall be as applicable.</p> <p>(7) Expansion bolts, cable lugs and all hardware required for this activity shall be within vendor scope of supply.</p> <p>(8) Chemical earth electrodes are required to be provided for the following:</p> <ul style="list-style-type: none"> <li>- Transformer body, 2 nos</li> <li>- Transformer neutral, 2 nos</li> <li>- Fencing, 1 no</li> </ul> <p>The resistance as measured at the individual electrodes measured in isolation from the remaining shall be less than 0.5 ohm.</p> |  |
| <b>5.44</b> | <p><b>Earthing of switchyard equipment in switchyard of Inverter room-1 and Inverter room-2, ref drawing no. BH-WBSEDCL-CHHARRAH-DG-010 rev 00:</b></p> <p>(i) Vendor install Earth mat for the entire switchyard area at 1 m below the ground level and all body earth shall be connected to the earth mat. BHEL will supply Ø32 mm GI rods for the same.</p> <p>(ii) GI rods interconnection by welding overlap of 150 mm and by red oxide painted at welded portions.</p> <p>(iii) Vendor shall install chemical electrode, typically Zn coated, Hot dip galvanized, with brick masonry earth chamber for each case.</p> <p><b>BHEL shall supply GI strip of dimensions 50 x 6 for the earthing.</b></p> <p><b>BHEL shall supply chemical earth electrodes.</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>5.45</b> | <p><b>Earthing of switchyard equipment in switchyard of Main control room, drawing no. BH-WBSEDCL-CHHARRAH-DG-011 rev 00:</b></p> <p>(i) Vendor install Earth mat for the entire switchyard area at 1 m below the ground level and all body earth shall be connected to the earth mat. BHEL will supply Ø32 mm GI rods for the same. BHEL will supply Ø32 mm GI rods for the same.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |

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|             | <p>(ii) GI rods interconnection by welding overlap of 150 mm and by red oxide painted at welded portions.</p> <p>(iii) Vendor shall install chemical electrode, typically Zn coated, Hot dip galvanized, with brick masonry earth chamber for each case as per BHEL.</p> <p>BHEL shall supply GI strip of dimensions 50 x 6 for the earthing.</p> <p>Vendor shall carry out all the necessary GI laying and interconnections.</p> <p><b>BHEL shall supply GI strip of dimensions 50 x 6 for the earthing.</b></p> <p><b>BHEL shall supply chemical earth electrodes.</b></p> <p><b>Vendor shall pour water in the earth pits DAILY for the first 15 DAYS after installation of chemical electrodes.</b></p> <p>Vendor shall carry out measurement of earth resistance in all the cases that shall be witnessed, verified and certified by BHEL site engineer.</p>                                                                                                                                                                                                                                                                                          |  |
| <b>5.46</b> | <p><b>Installation of Lightning protection for site using Lightning arrestors (ESE) type:</b></p> <p>BHEL shall supply all the 9 nos of <b>Lightning arrestors (ESE) type along with auxiliary items as pole, HT cable, guy wires, chemical electrodes.</b></p> <p>The vendor shall install the LA (ESE) including civil foundations in solar array field.</p> <p>(1) Quantity = 9 nos</p> <p>(2) Lightning arrestors shall be mounted on top of a mast of height 7m minimum above ground level using MS pipe of 100 mm minimum average diameter with painted finish; Each mast shall be secured by three steel stay wires that are suitably grouted. Masts shall have appropriate steel base plate for mounting on an RCC concrete foundation pedestal of 450x450 mm size, 1m depth below ground level, 300mm minimum above ground level, PCC 1:4:8 as the bottom layer (~100 mm thick), steel rods of diameter 8mm minimum, concrete M25 with four J bolts (M16) of 750mm long, with nuts and washers.</p> <p>(3) Three earth pit chambers per lightning arrestor set using chemical earthing electrodes shall be constructed as per 4-679-05-00064.</p> |  |
| <b>5.47</b> | <p><b>Lightning arrestor for control room</b></p> <p>Vendor shall supply and install 3 sets of lightning rod at the terrace of the Control room connected to earthing chemical electrode. BHEL approval shall be obtained for type of lightning rod.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| <b>5.48</b> | <p><b>Supply &amp; erection of Yard lights for each Inverter room switchyard and Control room switchyard</b></p> <p>(1) 25 W LED light, Quantity: 6 nos, for each Inverter room switchyard</p> <p>25 W LED light, Quantity: 7 nos for Control room switchyard</p> <p>(2) 80 W Beam LED light, Quantity: 2 nos, on wall of Inverter room within the switchyard</p> <p>(3) 25NB bend pipes (1m running length) shall be supplied and fixed on angles/ poles of switchyard fencing. Balance 14 shall be fixed</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |

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|             | <p>on the switchyard fencing poles. Suitable fixing arrangements shall be provided.</p> <ol style="list-style-type: none"> <li>(4) Light fitting, Crompton Greaves-make, model no. LSTO-30-CDL (30 W) shall be supplied and fitted on the GI bend pipes using necessary hardware.</li> <li>(5) CPVC pipe of 1.5", carrying 3.5cx2.5 sq-mm copper, armoured, PVC cable, from ground level up to Junction box.</li> <li>(6) 2 cores used for phase, neutral of yard light.</li> <li>(7) 1 core used for body earth purpose.</li> <li>(8) Junction box shall be at a height of 1m above ground level.</li> <li>(9) Junction box (IP65, polycarbonate), with 12 elmex-type, DIN rail of suitable length, MCB (1A, single pole) of Schneider or reputed make, 2 glands (Polyamide single compression) for 3.5cx2.5mm<sup>2</sup> cable, 1 gland (polyamide) for 2cx1.5mm<sup>2</sup> copper, unarmoured, PVC cable.</li> <li>(10) The junction box, cable lugs, steel bracket for mounting the box on the lighting pole and all hardware items shall be in vendor scope.</li> <li>(11) Glands shall be located at the bottom side of Junction box.</li> <li>(12) CPVC pipe of 1" shall be provided between junction box and bend pipe to guide the 2Cx1.5 sq-mm cable.</li> <li>(13) It shall be ensured that lamp is well above the fencing height, which is 3m above the ground level.</li> <li>(14) Vendor shall submit general arrangement and detailed drawings with bill of materials / quantities of the overall yard lighting arrangement to BHEL for approval.</li> </ol>              |  |
| <b>5.49</b> | <p><b>Supply &amp; erection of Array lights for solar array field and periphery: (ref: BH-WBSEDCL-CHHARRAH-DG-009)</b></p> <ul style="list-style-type: none"> <li>- <b>Along periphery 204 Nos of</b> Light fitting, Crompton Greaves-make, model no. LSTO-30-CDL (30 W)</li> <li>- <b>Within Solar array 77 Nos of</b> Light fitting, Crompton Greaves-make, model no. LSTO-30-CDL (30 W)</li> </ul> <ol style="list-style-type: none"> <li>(1) Lighting poles shall be located at distributed locations in the solar array field as per layout that will be provided by BHEL at an appropriate time during period of execution.</li> <li>(2) 80NB pipes (length 2.8m) to be grouted with concrete foundation of depth 600 mm, with PCC 1:3:6 of 100mm layer (450x450mm), M25 concrete, foundation height 300mm above ground level.</li> <li>(3) 2 cores used for phase and neutral for yard light.</li> <li>(4) 3 cores used for 3-phase power supply that will be used for running the high pressure pump for module cleaning.</li> <li>(5) Additionally, 1Cx1.5 mm<sup>2</sup> copper, armoured, PVC cable shall be used for earthing the pole.</li> <li>(6) Junction box (IP65, polycarbonate), with 12 elmex-type, DIN rail of suitable length, MCB (1A, single pole) of Schneider or reputed make, 2 glands (nickel plated brass single compression) for 5Cx2.5 mm<sup>2</sup> cable, 1 gland (polyamide) for 2Cx1.5 mm<sup>2</sup> copper, unarmoured, PVC cable. Additionally, for yard lights of solar array field, the box shall have 3-phase 20A socket with cover.</li> </ol> |  |

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|             | <p>(7) Glands, socket shall be located at the bottom side of Junction box.</p> <p>(8) The junction box, cable lugs, steel mounting bracket and all hardware items are in vendor scope.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
| <b>5.50</b> | <p><b>Cable trench formation and laying of cables for yard lights</b></p> <p>As far as possible cable trench already constructed in cl no 5.22 to be used for laying of the 3.5-c x 2.5 mm<sup>2</sup>. Otherwise in certain areas vendor shall construct the underground trench from control room to various parts of the solar array field, switchyard and compound wall for laying the cables for yard lights</p> <p>(1) Trench depth = 850 mm minimum</p> <p>(2) Trench width minimum = 450 mm minimum, depending on cables quantity</p> <p>(3) Sand as per IS: 383 of 100 mm layer thickness shall be laid at the bottom most level of trench.</p> <p>(4) Over the sand layer, cables shall be laid one adjacent to the other. Cables shall not be laid one over the other. In other words, only one layer of cables shall be allowed.</p> <p>(5) Over the layer of cables, one more layer of sand of 100mm shall be laid.</p> <p>(6) Then, a single layer of class-2 brick of 75 mm thickness shall be laid.</p> <p>(7) Trench shall then be filled up with refill soil.</p> <p>(8) Total length of trench required for yard lights, all the three categories (solar array, switchyard and compound wall / chain link fencing) put together ~ 4000m.</p> |  |
| <b>5.51</b> | <p><b>Cable supply and terminations for yard lights / peripheral lights / solar lights</b></p> <p>(1) Cable termination:</p> <p>(a) Termination of cables, including unsleeving, crimping, connecting to the junction box and lamp shall be within scope of vendor.</p> <p>(b) Similarly, cables shall be terminated at the ACDB panel within the control room.</p> <p>(c) BHEL will provide the wiring scheme of ACDB panel.</p> <p>(2) <b>Vendor shall supply following lengths of cable:</b></p> <p>(a) 3.5-c x 2.5 mm<sup>2</sup>, Cu, armoured, PVC cable ~7500m</p> <p>(b) 2-c x 1.5 mm<sup>2</sup>, Cu, unarmoured, PVC cable ~ 2000m</p> <p>(c) 1Cx 1.5 mm<sup>2</sup>, Cu, armoured, PVC cable ~ 1200m</p> <p>(d) 1c x 25 mm<sup>2</sup>, Cu, unarmoured PVC cable ~ 1000m</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
| <b>5.52</b> | <p><b>Laying of pipelines between bore wells and overhead tank</b></p> <p>(1) CPVC pipes (2-inch) shall be laid underground (at depth of ~500 mm) from the three bore wells to overhead tank of Main control room.</p> <p>(2) All necessary CPVC fittings such as T-joints, bends, nipples, reducers, couplers shall be used as applicable.</p> <p>(3) Lines from the three bore wells shall have independent 2-inch non-returnable valves (forged steel) and 2-inch ball valve (forged</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |

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|             | <p>steel). Further, the lines shall be interconnected to become a single line that shall be laid underground up to overhead tank.</p> <p>(4) Approximate length of CPVC line ~ 300m</p> <p>(5) Vendor shall submit a detailed water pipeline layout scheme with BoM from bore wells to OH tank for BHEL approval.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| <b>5.53</b> | <p><b>SPV module cleaning system</b></p> <p>(1) Vendor shall lay 2-inch CPVC pipelines from overhead tanks to the solar array field with all necessary CPVC nipples, T-joints, reducers, bends, couplers etc. This forms the main header pipeline. Suitable valves such as brass valves of 2-inch etc shall be provided for this main header line. For the branching out lines that spread into various rows of the solar array to provide water delivery points for module cleaning, 1-inch CPVC pipelines shall be used.</p> <p>(2) A suitable centrifugal 3-phase pump of 2HP capacity shall be supplied and installed at a suitable location to draw the water from OH tank to solar array field for solar PV module cleaning. One spare pump shall also be supplied.</p> <p>(3) Starter and DP switch (1 set) shall be supplied and installed near ACDB panel for operating the 2HP pump.</p> <p>(4) Supply of electrical cables (with lugs, hardware) and wiring the pump up to the ACDB panel / starter in the control room shall be in vendor scope. Cable 3.5Cx 4 sq-mm, Cu, armoured, PVC cable shall be used. Length required ~50m.</p> <p>(5) CPVC pipelines shall be laid underground (at a depth of ~500 mm below ground level).</p> <p>(6) There shall be 50 Nos of minimum delivery points for module cleaning. At these delivery points, 1-inch riser lines shall be provided to tap the water from underground line to the delivery point ~300 mm above ground level. Ball valve forged steel type, 1-inch, with suitable nipple for connecting the hose pipe, shall be provided at each delivery point.</p> <p>(7) After installation and testing of water lines, excavated trenches shall be closed with refill soil. Further, the soil, all along the water lines, shall be suitably leveled and compacted.</p> <p>(8) Hosepipes (ribbed, flexible) of 50m long – 3 sets shall be provided for connecting the hose to a portable high pressure 3-phase pump (3-5 HP) that in turn will be connected to the nearest ball valve / nipple delivery point. Pump shall be of Bosch or any other reputed equivalent as shall be approved by BHEL.</p> <p>(9) Purpose of high pressure pump is to pressurize the water at the delivery end so that quantum of water consumption shall be minimized. 2 sets of this complete portable arrangement including pump shall be supplied by vendor. Portable arrangement shall have heavy duty wheels to ensure durability. Additionally, 3 sets of 8mm high pressure pipe of 50m length shall be supplied.</p> <p>(10) High pressure pipe shall be provided with nozzles or appropriate guns to direct the pressurized water on the surface of the module under cleaning.</p> |  |



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|             | (11) Approximate length for 2-inch header line ~ 1500m<br>(12) Approximate length for 1-inch header line ~ 3600m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| <b>5.54</b> | <b>Identification markings using paint and cable tags, as applicable to the individual cases and as approved by BHEL, shall be provided. All painting to black in yellow back-ground.</b><br>(1) String monitoring junction boxes: Identification marking by way of painting on nearby module structure.<br>(2) Individual structures to be labelled for identification by painting.<br>(3) All switchyard equipment such as transformers, Outdoor VCB panels, and metering panels shall be provided with suitable identification markings using painting, with inscriptions as approved by BHEL.<br>(4) Cable sizes with arrow marks in switchyard (for HT cables) using painting.<br>(5) Identification markings for all the earth chambers (using painting) with inscriptions as approved by BHEL.<br>(6) Cable tags using aluminum plate of 1-2 mm thickness with suitable inscriptions as approved by BHEL for all the power cables of the electrical panels such as PCUs, LT panels, Batteries, FCBC chargers, Annunciation panels, ACDB panel.                                                                                                                                                                                                            |  |
| <b>5.55</b> | <b>Cable markers</b><br>(1) Steel cable markers with suitable labels (DC cable, LT cable, HT cable, Data cable, CPVC water pipeline, etc.) and arrow marks (pointing to the cable destination) shall be supplied and installed along the cable trenches for following cases:<br>a) For 1-c x 300 sq-mm cable from string monitoring boxes to control room: Quantity of markers = 125 Nos<br>b) For data communication cables from string monitoring boxes to control room: Quantity of markers = 125 Nos<br>c) For cables of yard lights of solar array field, compound wall/chain-link fencing and switchyard fencing: Qty of markers = 100 Nos<br>d) For electrical cables of bore well connections:<br>Qty of markers = 10 Nos<br>e) For HT (33kV) cables within switchyard:<br>Quantity of markers = 10 Nos<br>f) For aux transformer to ACDB panel<br>Quantity of markers = 2 Nos<br>g) For CPVC water pipelines, Quantity = 50 Nos<br>(2) Cable markers shall be suitably grouted with concrete foundation depth of minimum 300 mm below the ground level. Cross section of foundation shall be minimum 200mm diameter.<br>(3) Cable markers shall have a minimum height of 300 mm above the ground level.<br>(4) Cable markers shall be suitably painted. |  |
| <b>5.56</b> | <b>Hoarding for the solar power plant.</b><br>(1) Hoarding for the plant shall be made of 1500x1800x 2mm thick MS plate. Approximate dimension of board 1500x1800 mm.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |



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|             | <p>(2) Similar plate mentioning salient details of transformers, switchyard details, DP / FP details, date of energisation, make / sl no, etc., to be displayed.</p> <p>(3) Board shall be given a red oxide coat and painted with black colour for background. Letters shall be written with white colour.</p> <p>(4) Board shall be fixed on a frame constructed using ISA 50x50x8 angles. Diagonal supports shall also be provided. The frame shall be supported by two vertical legs of ISA 75x75x8 that is grouted with concrete foundation.</p> <p>(5) Depth of foundation shall be 600 mm below ground level, with 100mm thick PCC layer 1:4:8 of 400x400mm, M25 concrete of 300x300mm, foundation pedestal of 200mm height above ground level.</p> <p>(6) Bottom level of board shall be at a height of 1.5m above the ground level.</p> <p>(7) Vendor shall submit the drawing of hoarding arrangement to BHEL for approval.</p>                                                                                                                                                                                                                   |                      |                                                                                  |      |   |                                                                                                                                                                  |       |   |                                                                                                                                                                               |                      |   |                                                                                                                                                                                                                          |        |  |
| <b>5.57</b> | <p><b>Display boards and sign boards</b></p> <table border="1"> <tr> <td>1</td><td>Board showing list of O&amp;M staff with name, qualification and work responsibility</td><td>1 No</td></tr> <tr> <td>2</td><td>Board showing list of contact details of BHEL, O&amp;M team, O&amp;M security, police station, fire service, hospital, medical store with names, address, mobile numbers</td><td>2 Nos</td></tr> <tr> <td>3</td><td>Danger boards with details such as value of voltage for string monitoring boxes, PCUs, LT panels, Transformers, HT panels, Four pole / two pole structures in switchyard etc.</td><td>Quantity as required</td></tr> <tr> <td>4</td><td>Identification boards, of suitable sizes, within and outside control room such as Main control room, Inverter room, executive lounge, store room, security room, gents / ladies toilets etc. BHEL will provide the list.</td><td>20 Nos</td></tr> </table> <p>(a) 5mm thick sun board with LG make vinyl sticker (computerized cutting and pasting) shall be used for Sl. Nos 4, 5, 8 and 9.</p> <p>(b) For others, flex banner with design &amp; printing shall be used.</p> | 1                    | Board showing list of O&M staff with name, qualification and work responsibility | 1 No | 2 | Board showing list of contact details of BHEL, O&M team, O&M security, police station, fire service, hospital, medical store with names, address, mobile numbers | 2 Nos | 3 | Danger boards with details such as value of voltage for string monitoring boxes, PCUs, LT panels, Transformers, HT panels, Four pole / two pole structures in switchyard etc. | Quantity as required | 4 | Identification boards, of suitable sizes, within and outside control room such as Main control room, Inverter room, executive lounge, store room, security room, gents / ladies toilets etc. BHEL will provide the list. | 20 Nos |  |
| 1           | Board showing list of O&M staff with name, qualification and work responsibility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1 No                 |                                                                                  |      |   |                                                                                                                                                                  |       |   |                                                                                                                                                                               |                      |   |                                                                                                                                                                                                                          |        |  |
| 2           | Board showing list of contact details of BHEL, O&M team, O&M security, police station, fire service, hospital, medical store with names, address, mobile numbers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2 Nos                |                                                                                  |      |   |                                                                                                                                                                  |       |   |                                                                                                                                                                               |                      |   |                                                                                                                                                                                                                          |        |  |
| 3           | Danger boards with details such as value of voltage for string monitoring boxes, PCUs, LT panels, Transformers, HT panels, Four pole / two pole structures in switchyard etc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Quantity as required |                                                                                  |      |   |                                                                                                                                                                  |       |   |                                                                                                                                                                               |                      |   |                                                                                                                                                                                                                          |        |  |
| 4           | Identification boards, of suitable sizes, within and outside control room such as Main control room, Inverter room, executive lounge, store room, security room, gents / ladies toilets etc. BHEL will provide the list.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 20 Nos               |                                                                                  |      |   |                                                                                                                                                                  |       |   |                                                                                                                                                                               |                      |   |                                                                                                                                                                                                                          |        |  |
| <b>5.58</b> | <p><b>Electrical insulation mat</b><br/><b>Total Quantity: 30 m of width 1m</b></p> <p>(1) Vendor shall supply electrical insulating mat as follows:</p> <p>(a) Make: M/s. Vardhman House Private Ltd or reputed equivalent as shall be approved by BHEL.</p> <p>(b) As per IS: 15652:2006</p> <p><b>(c) Class B</b></p> <p>(d) Thickness 2.5 mm minimum</p> <p>(e) Colour: to be confirmed by BHEL</p> <p>(f) Max use voltage = 33kV</p> <p>(g) Marking of IS standard on the mat</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |                                                                                  |      |   |                                                                                                                                                                  |       |   |                                                                                                                                                                               |                      |   |                                                                                                                                                                                                                          |        |  |





**PURCHASE SPECIFICATION- GROUP: PHOTOVOLTAICS  
SUPPLY OF BOS ITEMS, I&C, O&M FOR 10 MW (AC) SPV  
POWER PLANT  
AT WBSEDCL CHHARAH SITE, WEST BENGAL**

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|      | (2) Test certificate shall be provided by vendor<br>(3) Vendor shall lay the mats in front of electrical panels (PCUs,) and ACDB panel in the Inverter and Main control rooms.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                     |                                 |                       |          |       |   |                    |              |         |       |   |                   |        |         |       |   |                         |       |         |       |   |                                    |              |  |       |   |                      |                                     |         |       |   |                                                                     |            |   |                 |       |   |                                                                                                 |       |   |                                             |       |   |                                                               |       |   |                    |       |   |                      |       |   |               |       |   |                                |      |    |        |       |  |
| 5.59 | <b>Supply and Installation of Air conditioners, Minimum 3-star rating, Quantity: 2 sets</b><br>Split air conditioner of 1.5T capacity with stabilizer (2 sets) shall be supplied and installed in SCADA room and Office room of the Main control room. Make: LG, Videocon, Blue Star or reputed equivalent that shall be approved by BHEL.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                     |                                 |                       |          |       |   |                    |              |         |       |   |                   |        |         |       |   |                         |       |         |       |   |                                    |              |  |       |   |                      |                                     |         |       |   |                                                                     |            |   |                 |       |   |                                                                                                 |       |   |                                             |       |   |                                                               |       |   |                    |       |   |                      |       |   |               |       |   |                                |      |    |        |       |  |
| 5.60 | <b>EPABX COMMUNICATION SYSTEM &amp; INTERNET:</b><br>(i)EPABX communication system shall be provided between the Control control room and the four Inverter rooms. The scope shall include supply and installation of communication system including cabling between the Main control room and the Inverter rooms.<br><b>(ii)Provision of Leased line for internet provision of 100 Mbps is included in vendor's scope.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                     |                                 |                       |          |       |   |                    |              |         |       |   |                   |        |         |       |   |                         |       |         |       |   |                                    |              |  |       |   |                      |                                     |         |       |   |                                                                     |            |   |                 |       |   |                                                                                                 |       |   |                                             |       |   |                                                               |       |   |                    |       |   |                      |       |   |               |       |   |                                |      |    |        |       |  |
| 5.61 | <b>I &amp; C of communication system including laying of telephone cables in trenches.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                     |                                 |                       |          |       |   |                    |              |         |       |   |                   |        |         |       |   |                         |       |         |       |   |                                    |              |  |       |   |                      |                                     |         |       |   |                                                                     |            |   |                 |       |   |                                                                                                 |       |   |                                             |       |   |                                                               |       |   |                    |       |   |                      |       |   |               |       |   |                                |      |    |        |       |  |
| 5.62 | <b>Tool kits and instruments</b><br>Vendor shall supply the following tool kits and instruments:<br><b>A. Measuring instruments</b> <table border="1"><tr><td>1</td><td>Digital Earth Resistance Tester</td><td>Cambridge Instruments</td><td>DET-2000</td><td>2 Nos</td></tr><tr><td>2</td><td>Digital multimeter</td><td>Reputed make</td><td>MOTWANE</td><td>2 Nos</td></tr><tr><td>3</td><td>AC-DC Clamp Meter</td><td>Lutron</td><td>MOTWANE</td><td>2 Nos</td></tr><tr><td>4</td><td>Thermometer, Laser Beam</td><td>Fluke</td><td>62 Mini</td><td>2 Nos</td></tr><tr><td>5</td><td>Digital thermometer (wall hanging)</td><td>Reputed Make</td><td></td><td>2 Nos</td></tr><tr><td>6</td><td>Digital Megger – 5KV</td><td>Shanti Electric Instruments, Nippen</td><td>MOTWANE</td><td>2 Nos</td></tr></table> <p>Note: Make / model number shall be approved by BHEL prior to procurement.</p> <b>B. Tool kits</b> <table border="1"><tr><td>1</td><td>Double ended spanner Set of sizes 10-11, 12-13, 14-15, 16-17, 17-18</td><td>2 Nos each</td></tr><tr><td>2</td><td>Screwdriver Set</td><td>1 Set</td></tr><tr><td>3</td><td>Crimping tool with Dye range 50-630 mm<sup>2</sup> cable, mechanical gear power, hand operated</td><td>1 Set</td></tr><tr><td>4</td><td>Crimping tool up to 6 mm<sup>2</sup> cable</td><td>1 set</td></tr><tr><td>5</td><td>Drilling machine AC, hand operated, with bit size up to 20 mm</td><td>1 set</td></tr><tr><td>6</td><td>Measuring Tape, 5m</td><td>2 Nos</td></tr><tr><td>7</td><td>Measuring Tape, 50 m</td><td>2 Nos</td></tr><tr><td>8</td><td>Allen Key set</td><td>1 Set</td></tr><tr><td>9</td><td>Adjustable spanner 2-inch size</td><td>1 No</td></tr><tr><td>10</td><td>Hammer</td><td>2 Nos</td></tr></table> | 1                                   | Digital Earth Resistance Tester | Cambridge Instruments | DET-2000 | 2 Nos | 2 | Digital multimeter | Reputed make | MOTWANE | 2 Nos | 3 | AC-DC Clamp Meter | Lutron | MOTWANE | 2 Nos | 4 | Thermometer, Laser Beam | Fluke | 62 Mini | 2 Nos | 5 | Digital thermometer (wall hanging) | Reputed Make |  | 2 Nos | 6 | Digital Megger – 5KV | Shanti Electric Instruments, Nippen | MOTWANE | 2 Nos | 1 | Double ended spanner Set of sizes 10-11, 12-13, 14-15, 16-17, 17-18 | 2 Nos each | 2 | Screwdriver Set | 1 Set | 3 | Crimping tool with Dye range 50-630 mm <sup>2</sup> cable, mechanical gear power, hand operated | 1 Set | 4 | Crimping tool up to 6 mm <sup>2</sup> cable | 1 set | 5 | Drilling machine AC, hand operated, with bit size up to 20 mm | 1 set | 6 | Measuring Tape, 5m | 2 Nos | 7 | Measuring Tape, 50 m | 2 Nos | 8 | Allen Key set | 1 Set | 9 | Adjustable spanner 2-inch size | 1 No | 10 | Hammer | 2 Nos |  |
| 1    | Digital Earth Resistance Tester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Cambridge Instruments               | DET-2000                        | 2 Nos                 |          |       |   |                    |              |         |       |   |                   |        |         |       |   |                         |       |         |       |   |                                    |              |  |       |   |                      |                                     |         |       |   |                                                                     |            |   |                 |       |   |                                                                                                 |       |   |                                             |       |   |                                                               |       |   |                    |       |   |                      |       |   |               |       |   |                                |      |    |        |       |  |
| 2    | Digital multimeter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Reputed make                        | MOTWANE                         | 2 Nos                 |          |       |   |                    |              |         |       |   |                   |        |         |       |   |                         |       |         |       |   |                                    |              |  |       |   |                      |                                     |         |       |   |                                                                     |            |   |                 |       |   |                                                                                                 |       |   |                                             |       |   |                                                               |       |   |                    |       |   |                      |       |   |               |       |   |                                |      |    |        |       |  |
| 3    | AC-DC Clamp Meter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Lutron                              | MOTWANE                         | 2 Nos                 |          |       |   |                    |              |         |       |   |                   |        |         |       |   |                         |       |         |       |   |                                    |              |  |       |   |                      |                                     |         |       |   |                                                                     |            |   |                 |       |   |                                                                                                 |       |   |                                             |       |   |                                                               |       |   |                    |       |   |                      |       |   |               |       |   |                                |      |    |        |       |  |
| 4    | Thermometer, Laser Beam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Fluke                               | 62 Mini                         | 2 Nos                 |          |       |   |                    |              |         |       |   |                   |        |         |       |   |                         |       |         |       |   |                                    |              |  |       |   |                      |                                     |         |       |   |                                                                     |            |   |                 |       |   |                                                                                                 |       |   |                                             |       |   |                                                               |       |   |                    |       |   |                      |       |   |               |       |   |                                |      |    |        |       |  |
| 5    | Digital thermometer (wall hanging)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Reputed Make                        |                                 | 2 Nos                 |          |       |   |                    |              |         |       |   |                   |        |         |       |   |                         |       |         |       |   |                                    |              |  |       |   |                      |                                     |         |       |   |                                                                     |            |   |                 |       |   |                                                                                                 |       |   |                                             |       |   |                                                               |       |   |                    |       |   |                      |       |   |               |       |   |                                |      |    |        |       |  |
| 6    | Digital Megger – 5KV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Shanti Electric Instruments, Nippen | MOTWANE                         | 2 Nos                 |          |       |   |                    |              |         |       |   |                   |        |         |       |   |                         |       |         |       |   |                                    |              |  |       |   |                      |                                     |         |       |   |                                                                     |            |   |                 |       |   |                                                                                                 |       |   |                                             |       |   |                                                               |       |   |                    |       |   |                      |       |   |               |       |   |                                |      |    |        |       |  |
| 1    | Double ended spanner Set of sizes 10-11, 12-13, 14-15, 16-17, 17-18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2 Nos each                          |                                 |                       |          |       |   |                    |              |         |       |   |                   |        |         |       |   |                         |       |         |       |   |                                    |              |  |       |   |                      |                                     |         |       |   |                                                                     |            |   |                 |       |   |                                                                                                 |       |   |                                             |       |   |                                                               |       |   |                    |       |   |                      |       |   |               |       |   |                                |      |    |        |       |  |
| 2    | Screwdriver Set                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1 Set                               |                                 |                       |          |       |   |                    |              |         |       |   |                   |        |         |       |   |                         |       |         |       |   |                                    |              |  |       |   |                      |                                     |         |       |   |                                                                     |            |   |                 |       |   |                                                                                                 |       |   |                                             |       |   |                                                               |       |   |                    |       |   |                      |       |   |               |       |   |                                |      |    |        |       |  |
| 3    | Crimping tool with Dye range 50-630 mm <sup>2</sup> cable, mechanical gear power, hand operated                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1 Set                               |                                 |                       |          |       |   |                    |              |         |       |   |                   |        |         |       |   |                         |       |         |       |   |                                    |              |  |       |   |                      |                                     |         |       |   |                                                                     |            |   |                 |       |   |                                                                                                 |       |   |                                             |       |   |                                                               |       |   |                    |       |   |                      |       |   |               |       |   |                                |      |    |        |       |  |
| 4    | Crimping tool up to 6 mm <sup>2</sup> cable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1 set                               |                                 |                       |          |       |   |                    |              |         |       |   |                   |        |         |       |   |                         |       |         |       |   |                                    |              |  |       |   |                      |                                     |         |       |   |                                                                     |            |   |                 |       |   |                                                                                                 |       |   |                                             |       |   |                                                               |       |   |                    |       |   |                      |       |   |               |       |   |                                |      |    |        |       |  |
| 5    | Drilling machine AC, hand operated, with bit size up to 20 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1 set                               |                                 |                       |          |       |   |                    |              |         |       |   |                   |        |         |       |   |                         |       |         |       |   |                                    |              |  |       |   |                      |                                     |         |       |   |                                                                     |            |   |                 |       |   |                                                                                                 |       |   |                                             |       |   |                                                               |       |   |                    |       |   |                      |       |   |               |       |   |                                |      |    |        |       |  |
| 6    | Measuring Tape, 5m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2 Nos                               |                                 |                       |          |       |   |                    |              |         |       |   |                   |        |         |       |   |                         |       |         |       |   |                                    |              |  |       |   |                      |                                     |         |       |   |                                                                     |            |   |                 |       |   |                                                                                                 |       |   |                                             |       |   |                                                               |       |   |                    |       |   |                      |       |   |               |       |   |                                |      |    |        |       |  |
| 7    | Measuring Tape, 50 m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2 Nos                               |                                 |                       |          |       |   |                    |              |         |       |   |                   |        |         |       |   |                         |       |         |       |   |                                    |              |  |       |   |                      |                                     |         |       |   |                                                                     |            |   |                 |       |   |                                                                                                 |       |   |                                             |       |   |                                                               |       |   |                    |       |   |                      |       |   |               |       |   |                                |      |    |        |       |  |
| 8    | Allen Key set                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1 Set                               |                                 |                       |          |       |   |                    |              |         |       |   |                   |        |         |       |   |                         |       |         |       |   |                                    |              |  |       |   |                      |                                     |         |       |   |                                                                     |            |   |                 |       |   |                                                                                                 |       |   |                                             |       |   |                                                               |       |   |                    |       |   |                      |       |   |               |       |   |                                |      |    |        |       |  |
| 9    | Adjustable spanner 2-inch size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1 No                                |                                 |                       |          |       |   |                    |              |         |       |   |                   |        |         |       |   |                         |       |         |       |   |                                    |              |  |       |   |                      |                                     |         |       |   |                                                                     |            |   |                 |       |   |                                                                                                 |       |   |                                             |       |   |                                                               |       |   |                    |       |   |                      |       |   |               |       |   |                                |      |    |        |       |  |
| 10   | Hammer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2 Nos                               |                                 |                       |          |       |   |                    |              |         |       |   |                   |        |         |       |   |                         |       |         |       |   |                                    |              |  |       |   |                      |                                     |         |       |   |                                                                     |            |   |                 |       |   |                                                                                                 |       |   |                                             |       |   |                                                               |       |   |                    |       |   |                      |       |   |               |       |   |                                |      |    |        |       |  |



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POWER PLANT  
AT WBSEDCL CHHARAH SITE, WEST BENGAL**

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|             | <table> <tr> <td>11</td><td>Rough file kit</td><td>1 Set</td></tr> <tr> <td>12</td><td>Platform balance, 50Kg range, 100g accuracy</td><td>1 No</td></tr> <tr> <td>13</td><td>Cutting Pliers</td><td>2 Nos</td></tr> <tr> <td>14</td><td>Nose Pliers</td><td>2 Nos</td></tr> <tr> <td>15</td><td>Vacuum cleaner, of industrial type, for control room sweeping / cleaning.</td><td>1 No</td></tr> <tr> <td>16</td><td>Blowers for cleaning the panels</td><td>2 Nos</td></tr> <tr> <td>17</td><td>Grass cutting machine with spare blades (2 nos each) – Heavy duty BOSCH-make</td><td>2 Nos</td></tr> </table> <p>Note: Prior to procurement, vendor shall obtain approval from BHEL for the make and specification of the items.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 11     | Rough file kit                                                   | 1 Set  | 12 | Platform balance, 50Kg range, 100g accuracy | 1 No   | 13 | Cutting Pliers           | 2 Nos  | 14 | Nose Pliers          | 2 Nos | 15 | Vacuum cleaner, of industrial type, for control room sweeping / cleaning. | 1 No  | 16 | Blowers for cleaning the panels | 2 Nos | 17 | Grass cutting machine with spare blades (2 nos each) – Heavy duty BOSCH-make | 2 Nos |  |
| 11          | Rough file kit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1 Set  |                                                                  |        |    |                                             |        |    |                          |        |    |                      |       |    |                                                                           |       |    |                                 |       |    |                                                                              |       |  |
| 12          | Platform balance, 50Kg range, 100g accuracy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1 No   |                                                                  |        |    |                                             |        |    |                          |        |    |                      |       |    |                                                                           |       |    |                                 |       |    |                                                                              |       |  |
| 13          | Cutting Pliers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2 Nos  |                                                                  |        |    |                                             |        |    |                          |        |    |                      |       |    |                                                                           |       |    |                                 |       |    |                                                                              |       |  |
| 14          | Nose Pliers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2 Nos  |                                                                  |        |    |                                             |        |    |                          |        |    |                      |       |    |                                                                           |       |    |                                 |       |    |                                                                              |       |  |
| 15          | Vacuum cleaner, of industrial type, for control room sweeping / cleaning.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1 No   |                                                                  |        |    |                                             |        |    |                          |        |    |                      |       |    |                                                                           |       |    |                                 |       |    |                                                                              |       |  |
| 16          | Blowers for cleaning the panels                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2 Nos  |                                                                  |        |    |                                             |        |    |                          |        |    |                      |       |    |                                                                           |       |    |                                 |       |    |                                                                              |       |  |
| 17          | Grass cutting machine with spare blades (2 nos each) – Heavy duty BOSCH-make                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2 Nos  |                                                                  |        |    |                                             |        |    |                          |        |    |                      |       |    |                                                                           |       |    |                                 |       |    |                                                                              |       |  |
| <b>5.63</b> | <p><b>Office furniture</b></p> <table> <tr> <td>1</td><td>Executive table, wooden type, complete with draws and side racks</td><td>2 sets</td></tr> <tr> <td>2</td><td>Chairs, swivel type, with arm rest</td><td>10 Nos</td></tr> <tr> <td>3</td><td>Sofa set with one teapoy</td><td>2 sets</td></tr> <tr> <td>4</td><td>PC table with chairs</td><td>1 set</td></tr> <tr> <td>5</td><td>Storage almirahs</td><td>2 Nos</td></tr> <tr> <td>6</td><td>Filing cabinets</td><td>2 Nos</td></tr> </table> <p>Make: Godrej or reputed equivalent as shall be approved by BHEL. BHEL approval shall be obtained, prior to procurement, for the type of office furniture, for which catalog with model numbers, sizes / dimensions shall be submitted to BHEL.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1      | Executive table, wooden type, complete with draws and side racks | 2 sets | 2  | Chairs, swivel type, with arm rest          | 10 Nos | 3  | Sofa set with one teapoy | 2 sets | 4  | PC table with chairs | 1 set | 5  | Storage almirahs                                                          | 2 Nos | 6  | Filing cabinets                 | 2 Nos |    |                                                                              |       |  |
| 1           | Executive table, wooden type, complete with draws and side racks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2 sets |                                                                  |        |    |                                             |        |    |                          |        |    |                      |       |    |                                                                           |       |    |                                 |       |    |                                                                              |       |  |
| 2           | Chairs, swivel type, with arm rest                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 10 Nos |                                                                  |        |    |                                             |        |    |                          |        |    |                      |       |    |                                                                           |       |    |                                 |       |    |                                                                              |       |  |
| 3           | Sofa set with one teapoy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2 sets |                                                                  |        |    |                                             |        |    |                          |        |    |                      |       |    |                                                                           |       |    |                                 |       |    |                                                                              |       |  |
| 4           | PC table with chairs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1 set  |                                                                  |        |    |                                             |        |    |                          |        |    |                      |       |    |                                                                           |       |    |                                 |       |    |                                                                              |       |  |
| 5           | Storage almirahs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2 Nos  |                                                                  |        |    |                                             |        |    |                          |        |    |                      |       |    |                                                                           |       |    |                                 |       |    |                                                                              |       |  |
| 6           | Filing cabinets                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2 Nos  |                                                                  |        |    |                                             |        |    |                          |        |    |                      |       |    |                                                                           |       |    |                                 |       |    |                                                                              |       |  |
| <b>5.64</b> | <p><b>Fire alarm system for Main control room and Inverter rooms:</b></p> <p>(i) Fire alarm system with smoke detectors, hooters, manual call points, an electronic control panel and interconnection wiring shall be supplied and installed in the Main control room and the Four Inverter rooms. Make: Zicom or any other reputed equivalent as shall be approved by BHEL.</p> <p>(ii) Control panel (3 sets), in sheet steel enclosure, power coated finish, shall be a microprocessor based system with central processing unit, input / output modules, power supply with battery and battery charger, control electronics and display mechanisms. The panel shall be a 4-zone system with audio-visual provisions (LED indications and beeps) for zone-wise annunciation. Individual detector-wise traceability / addressability is not required. It shall have provisions for acknowledgement of alarm and manual resetting. Batteries used shall be lead acid maintenance free type provided with connecting leads.</p> <p>(iii) Smoke detectors shall be of conventional / optical / photoelectric type. It shall not be of ionization type that employs radioactive materials.</p> <p>(iv) Electrical hooters shall sound the alarm upon detection of smoke by the detectors.</p> |        |                                                                  |        |    |                                             |        |    |                          |        |    |                      |       |    |                                                                           |       |    |                                 |       |    |                                                                              |       |  |



**PURCHASE SPECIFICATION- GROUP: PHOTOVOLTAICS  
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POWER PLANT  
AT WBSEDCL CHHARAH SITE, WEST BENGAL**

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|      | <p>(v) Manual call point shall be with high-gloss finish, alarm LED provision, breakable glass unit, hammer and chain.</p> <p>(vi) All the system components shall be installed and commissioned using suitable wiring using copper cable, 2C x 1.5 mm<sup>2</sup>, armoured, fire retardant low smoke PVC with casing / tubing of type and size, of required length, as approved by BHEL.</p> <p>Control panel: Control room – 1 no<br/>Inverter room -1 - 1 no<br/>Inverter room-2 - 1 no</p> <p>Smoke detectors: Control room – 15 nos<br/>Inverter room-1 - 4 nos<br/>Inverter room-2 - 4 nos</p> <p>Battery: Control room - 1 no<br/>Inverter room -1 &amp; -2 - 1 no each</p> <p>Manual call point: Control room - 1 no<br/>Inverter room-1 &amp; -2 - 1 no each</p> <p>Hooter: Control room - 2 nos<br/>Inverter room -1 &amp; -2 - 1 no each</p> <p>(vii) Locations of sensors shall include cable trenches of control room as well. Vendor shall submit fire alarm layout / scheme to BHEL for approval.</p>             |                                                                                                                                                  |          |       |   |                                                                                           |        |   |                                     |        |   |                                        |        |   |               |       |   |               |        |   |                                                     |                                                                                                                                                  |       |  |
| 5.65 | <p><b>Installation of Weather monitoring system:</b><br/>BHEL will all the individual equipment, however the installation including grouting is in vendor’s scope:</p> <p>(i) Pyranometers, 2 Nos<br/>(ii) Anemometer, 1 No<br/>(ii) Ambient temperature sensor, 1 No<br/>(iii) Solar module temperature sensors<br/>(iv) Data logger, 1 No</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                  |          |       |   |                                                                                           |        |   |                                     |        |   |                                        |        |   |               |       |   |               |        |   |                                                     |                                                                                                                                                  |       |  |
| 5.66 | <p><b>Other safety related items</b></p> <p>(1) Safety gadgets</p> <table><tr><td>1</td><td>Gas Mask</td><td>2 Nos</td></tr><tr><td>2</td><td>First Aid Box with essential medicines and bandage cotton, antibiotic cream, Dettol, etc.</td><td>6 sets</td></tr><tr><td>3</td><td>Hand Gloves 33 KV for GOS operation</td><td>2 sets</td></tr><tr><td>4</td><td>Hand Gloves 1KV for Maintenance of SMB</td><td>2 sets</td></tr><tr><td>5</td><td>Discharge rod</td><td>3 Nos</td></tr><tr><td>6</td><td>Safety Helmet</td><td>10 Nos</td></tr></table> <p>(2) Fire extinguishers and sand buckets, as follows, shall be supplied and commissioned at the power plant. BHEL approval shall be obtained for locations at which they shall be kept.</p> <table><tr><td>1</td><td>Dry powder fire extinguisher (stored pressure type)</td><td>Capacity: 10 Kg<br/>IS: 13849,<br/>CM/L-7759096<br/>Suitability for Class A, B &amp; C fire, related to solid combustibles, flammable liquid and gases.</td><td>12Nos</td></tr></table> | 1                                                                                                                                                | Gas Mask | 2 Nos | 2 | First Aid Box with essential medicines and bandage cotton, antibiotic cream, Dettol, etc. | 6 sets | 3 | Hand Gloves 33 KV for GOS operation | 2 sets | 4 | Hand Gloves 1KV for Maintenance of SMB | 2 sets | 5 | Discharge rod | 3 Nos | 6 | Safety Helmet | 10 Nos | 1 | Dry powder fire extinguisher (stored pressure type) | Capacity: 10 Kg<br>IS: 13849,<br>CM/L-7759096<br>Suitability for Class A, B & C fire, related to solid combustibles, flammable liquid and gases. | 12Nos |  |
| 1    | Gas Mask                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2 Nos                                                                                                                                            |          |       |   |                                                                                           |        |   |                                     |        |   |                                        |        |   |               |       |   |               |        |   |                                                     |                                                                                                                                                  |       |  |
| 2    | First Aid Box with essential medicines and bandage cotton, antibiotic cream, Dettol, etc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 6 sets                                                                                                                                           |          |       |   |                                                                                           |        |   |                                     |        |   |                                        |        |   |               |       |   |               |        |   |                                                     |                                                                                                                                                  |       |  |
| 3    | Hand Gloves 33 KV for GOS operation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2 sets                                                                                                                                           |          |       |   |                                                                                           |        |   |                                     |        |   |                                        |        |   |               |       |   |               |        |   |                                                     |                                                                                                                                                  |       |  |
| 4    | Hand Gloves 1KV for Maintenance of SMB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2 sets                                                                                                                                           |          |       |   |                                                                                           |        |   |                                     |        |   |                                        |        |   |               |       |   |               |        |   |                                                     |                                                                                                                                                  |       |  |
| 5    | Discharge rod                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3 Nos                                                                                                                                            |          |       |   |                                                                                           |        |   |                                     |        |   |                                        |        |   |               |       |   |               |        |   |                                                     |                                                                                                                                                  |       |  |
| 6    | Safety Helmet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 10 Nos                                                                                                                                           |          |       |   |                                                                                           |        |   |                                     |        |   |                                        |        |   |               |       |   |               |        |   |                                                     |                                                                                                                                                  |       |  |
| 1    | Dry powder fire extinguisher (stored pressure type)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Capacity: 10 Kg<br>IS: 13849,<br>CM/L-7759096<br>Suitability for Class A, B & C fire, related to solid combustibles, flammable liquid and gases. | 12Nos    |       |   |                                                                                           |        |   |                                     |        |   |                                        |        |   |               |       |   |               |        |   |                                                     |                                                                                                                                                  |       |  |



**PURCHASE SPECIFICATION- GROUP: PHOTOVOLTAICS  
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POWER PLANT  
AT WBSEDCL CHHARAH SITE, WEST BENGAL**

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|             | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Carbon dioxide (CO2) type fire extinguisher with trolley | Capacity: 9 Kg<br>IS: 2878<br>Suitability for Class B&C fires involving flammable liquids & gases, electronic equipment.                                                                                                                                                                                                                                  | 12Nos  |  |
|             | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Sand buckets                                             | GI fire buckets (as per IS: 2546) with suitable steel stand and cover arrangement. All items shall be painted with red oxide and BHEL approved red paint. BHEL approval shall be obtained for the overall arrangement. Each set of stand shall carry four sand buckets. A suitable cover shall be designed and provided to protect the buckets from rain. | 3 sets |  |
| <b>5.67</b> | <b>PEST CONTROL:</b><br>Vendor to supply and install materials as recommended by proposal of Pest Control of India proposal for pest control against snakes, rats in the Inverter room-1, -2 and Control room.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                          |                                                                                                                                                                                                                                                                                                                                                           |        |  |
| <b>5.68</b> | <b>Miscellaneous items: Supply of the following items:</b><br>(i) 1-inch PVC pipes, quantity: 6000m<br>(ii) M-10 x 45 mm GI bolts with washers plain/spring and M-10 nut, quantity: 100 sets<br>(iii) Hardwares for structure to structure GI 25x3 strip shorting, quantity: 1800 sets<br>(iv) Heavy duty 300mm dia PVC pipe, quantity: 60m<br>(v) Hardware various types: 50 Kgs<br>(vi) GI wire SWG 12, quantity 500m<br><b>(vii) Sintex tanks 6000 litres, quantity: 3 nos</b><br>(viii) Following items for solar modules interconnection:<br>(a) <b>Straight inline connectors (MC4) for solar modules interconnectors with 1cx6 sq mm cable, must be TUV-approved, Qty: 2000 sets – 1 set is one no male connector and 1 no female connector</b><br>(b) <b>Crimping tool, 3 nos</b><br>(c) <b>Spanner and Unlocking tool, Qty: 30 nos each</b><br><b>Makes: SUNLONT, SL-4</b><br><b>BIZILINK, S418 (SUNBOLTS), STAUBLI-make</b> |                                                          |                                                                                                                                                                                                                                                                                                                                                           |        |  |
| <b>5.69</b> | <b>(i) Pre-commissioning inspections / checks / tests on equipment,</b><br><b>(ii) Synchronization with grid and</b><br><b>(iii) Minimum pre-commissioning checks to be carried out:</b><br>(a) Verification of firmness of terminations in all electrical equipment:<br>- All 80 nos of SMBs,<br>- 8 nos of PCUs in Inverter rooms- 1 and -2,<br>- 33kV VCBs in Inverter rooms-1, -2 and Control room<br>- Transformers, FP/DP/SP structure items (GOS, LAs), SCADA stations, weather monitoring equipment.                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                          |                                                                                                                                                                                                                                                                                                                                                           |        |  |

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|  | <p>(b) Verification of earthing for all these electrical equipment.</p> <p>(c) Measurement and verification of parameters at string monitoring boxes at solar array field: string current, voltage, combined SMB output current, module temperature, SMB temperature.</p> <p>(d) Measurement and verification of parameters on DC input side of PCUs: DC current and voltage; Vendor shall support the PCU engineer on these tests.</p> <p>(e) Insulation resistance measurements (megger tests) for all the electrical equipment of control room and switchyard.</p> <p>(f) Functional checks for PCUs: Vendor shall support the PCU engineer during the pre-commissioning tests.</p> <p>(g) Functional checks for transformer marshalling box:<br/>Availability of AC/DC power supply, (b) Responses of the relays at HT panels and corresponding indications at annunciation panel by simulating the alarm / trip of Buchholz, PRV, WTI, OTI, LOLA at marshalling box.</p> <p><b>(h) The vendor shall arrange for an Electrical Contractor to perform the following:</b></p> <p><b>(1) Functional checks for HT panels / transformers:</b></p> <ul style="list-style-type: none"> <li>- Transformer oil filtration at time of commissioning of 2800 kVA transformers including Oil BDV test for all five transformers</li> <li>- Over-current tripping of all incomers / outgoers by primary current injection</li> <li>- UV / OV tripping of Bus PT by simulating bus voltage</li> <li>- Differential relays testing</li> <li>- Earth fault trip of all incomers / outgoers</li> <li>- Functioning of electromagnetic and numerical relays</li> <li>- VCBs ON / OFF</li> <li>- Availability of AC/DC power supplies, spring charging, LED indications, Verification of interlock operations related to incomer and outgoer VCBs.</li> </ul> <p><b>(2) Earth measurements:</b></p> <ul style="list-style-type: none"> <li>- Measurements of earth resistance in the Solar array field</li> <li>- Measurements of earth resistance in the Inverter rooms switchyard</li> <li>- Measurements of earth resistance in the Main control room switchyard</li> </ul> <p><b>(3) Pre-commissioning tests on transformers, CTs, PTs, Lightning arrestors, GOS switches, vacuum circuit breaker, relays, etc:</b><br/>Usually performed tests are indicated as below. However, exact type of tests required to be conducted at site prior to commissioning shall be in line with WBSEDCL / CEA requirements.</p> |  |
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|      | <p>(a) <b>Transformers:</b> IR tests, ratio tests, <b>excitation current measurement</b>, magnetic balance test on HV, short circuit test, excitation test LV side, vector group test.</p> <p>(b) <b>33kV vacuum circuit breaker panels:</b> IR tests and continuity tests for panels, IR values for CTs/PTs, excitation test on CTs, primary injection tests for CTs, ratio test for PTs</p> <p>(c) <b>Auxiliary transformers:</b> IR tests, ratio tests.</p> <p>(d) Relays in HT panels: open/close, tripping, primary injection tests.</p> <p>(e) Outdoor CTs/PTs: IR tests, Polarity tests, Ratio tests, Burden tests, Winding resistance tests, Primary injection tests, excitation tests.</p> <p>(f) Lightning arrestors: IR tests</p> <p>(g) GOS switches: IR and contact resistance tests.</p> <p><b>This being a CRITICAL ACTIVITY for satisfactory commissioning, the credentials of vendor to be given to BHEL for approval – BHEL approval (for testing agency for the tests) to be taken.</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |
| 5.70 | <p><b>Coordination with state departments for necessary approvals and clearances for commissioning</b></p> <p>(1) Vendor shall coordinate / liaison with concerned WBSEDCL/MRT departments to fix up test schedules and witness by their representatives.</p> <p>(1) Vendor shall prepare and submit the reports to MRT departments and obtain their approval through necessary liaison activities.</p> <p>(2) Vendor shall coordinate and liaison with CEA/ WBSEDCL/ CEIG, prepare and submit the applications with necessary enclosures on behalf of BHEL and obtain their approval:</p> <ul style="list-style-type: none"> <li>(a) Approval for BHEL drawings</li> <li>(b) Approval for synchronization of plant with grid.</li> <li>(c) CEIG inspection of power plant</li> <li>(d) Provisional CEIG clearance to proceed with commissioning</li> </ul> <p>1. Vendor shall implement corrective steps on the observations of CEIG, follow-up with them and obtain final clearance for licensed operation of the plant on a continuous basis.</p> <p><b>Note:</b> Scope of coordinating with state departments such as CEA, WBSEDCL, CEIG to get the clearances / approvals for licensed / statutory operation of the power plant on a continuous basis includes all transactions required for successful liaison and clearances. Application fees and renewal fees (say, in the form of DD) to be enclosed with application / renewal documents shall be in the scope of BHEL.</p> <p><b>All other expenses in the above process shall be in the scope of vendor including for liasioning with CEIG / CEA for clearance.</b></p> |  |

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|  | <b>PURCHASE SPECIFICATION- GROUP: PHOTOVOLTAICS<br/>SUPPLY OF BOS ITEMS, I&amp;C, O&amp;M FOR 10 MW (AC) SPV<br/>POWER PLANT<br/>AT WBSEDCL CHHARAH SITE, WEST BENGAL</b> | PS-439-1083     |
|                                                                                   |                                                                                                                                                                           | Rev No: 01      |
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## 6.0 Tests at manufacturer / sub-vendor works and witnessing by BHEL

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 6.1 | <p>BHEL shall witness routine / acceptance tests performed at manufacturer works for following items. Vendor shall accordingly provide inspection call to BHEL, with submission of quality assurance plan to BHEL in advance.</p> <ol style="list-style-type: none"> <li>HDPE DWC pipe</li> <li>RSJ poles</li> <li>Gang operated switch 400A, 33kV without earth switch</li> <li>Gang operated switch 400A, 33kV with earth switch</li> <li>Lightning arrestors 42kV, 10kA</li> <li>Outdoor CTs / PTs</li> <li>Tri vector meter ER300P</li> <li>Auxiliary transformer 100kVA, 33kV/415V, ONAN</li> <li>Drop out fuse units</li> <li>Disc insulators and other overhead line accessories</li> <li>ACSR DOG conductor</li> <li><b>All cables</b></li> </ol> |  |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

## 7.0 General conditions applicable during installation and commissioning phase

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 7.1 | Water required for construction works shall be organized by vendor. Bore wells, which are deliverables of vendor as part of this contract, shall be dug in the beginning stages so that bore well water itself can be used for the construction purposes. In case bore well is not successful, vendor shall make their own alternate arrangements (tankers).                                                                                                                                                                                    |  |
| 7.2 | All machinery such as cranes, hydra, JCBs, transport trucks, trolleys necessary for movement of materials shall be organized by the vendor.                                                                                                                                                                                                                                                                                                                                                                                                     |  |
| 7.3 | All necessary tools and tackles such as crimping tool (including heavy duty tools for crimping copper cables up to 300 mm <sup>2</sup> ), screw driver set, power screwdrivers, cutting pliers, nose pliers, spanner sets, adjustable spanners, hole saw cutter set, bending tools, torque wrenches, hack saw blades, pipe wrenches, flat / round files, HV termination tools, drilling machines, welding machines, concrete mixers, steel bar bending tools / templates for RCC works, spade, shovel, hammer shall be organized by the vendor. |  |
| 7.4 | All necessary measuring instruments such as digital multimeters, electrical testers, meggers (1kV, 2.5kV, 5kV), lamp load testers for solar array string measurements, earth resistance meters, weighing machines, water level indicators shall be organized by the vendor.                                                                                                                                                                                                                                                                     |  |
| 7.5 | Vendor shall make their own arrangements for necessary food, drinking water and accommodation for their labour and employees posted at the site. Similarly, food and drinking water required at the site, during the construction operations, shall also be in scope of vendor.                                                                                                                                                                                                                                                                 |  |
| 7.6 | Vendor shall organize all necessary steps to meet statutory requirements such as labour license, PF, ESI and also ensure compliance with relevant acts such as minimum wages act, income tax act, employee insurance act for their labour deployed at site.                                                                                                                                                                                                                                                                                     |  |
| 7.7 | Vendor shall maintain updated labour register, with name, age, qualification, salary, attendance details at the site.                                                                                                                                                                                                                                                                                                                                                                                                                           |  |



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|  | <b>PURCHASE SPECIFICATION- GROUP: PHOTOVOLTAICS<br/>SUPPLY OF BOS ITEMS, I&amp;C, O&amp;M FOR 10 MW (AC) SPV<br/>POWER PLANT<br/>AT WBSEDCL CHHARAH SITE, WEST BENGAL</b> | PS-439-1083     |
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| 7.8  | Vendor shall use danger boards, wherever required, to ensure safety of the persons during the work at site.                                                                                                                                                                                                                                                                                              |  |
| 7.9  | Vendor shall adhere to all necessary safety norms such as use of helmet, goggles, hand gloves, gumboots, aprons etc. It is the ultimate responsibility of the vendor in all respect to prevent accidents at the site and safeguard their labour from accidents.                                                                                                                                          |  |
| 7.10 | Vendor shall, at the completion of every work, clear off the debris, which resulted out of the work. In case of excavation work such as cable trench, vendor shall finish the land neatly with necessary leveling, rolling.                                                                                                                                                                              |  |
| 7.11 | Vendor shall carry out the work without causing inconvenience to other contract groups at the site. In case of conflicts with other groups, vendor shall ensure that the matter is resolved at once amicably so that the progress of work is not affected.                                                                                                                                               |  |
| 7.12 | Any damages on the building, structures attributable to the acts of labour / employees of vendor shall be rectified and made good by the vendor at their own cost.                                                                                                                                                                                                                                       |  |
| 7.13 | No child labour shall be employed for execution of the present contract.                                                                                                                                                                                                                                                                                                                                 |  |
| 7.14 | Any miscellaneous materials, which are found essential for technical completion of the contract but not mentioned explicitly in this specification, shall be deemed to be included in the specification. Accordingly, such materials shall be included by the vendor as part of the offer.                                                                                                               |  |
| 7.15 | Special instruction for earthing:<br>In compliance with Rule 33 and 61 of Indian Electricity Rules, 1956 (as amended up to date), all non-current carrying metal parts shall be earthed with two separate and distinct earth continuity conductors to an efficient earth electrode. Accordingly, all cases such as cable support structures, cable ladders, cable trays (control room) shall be earthed. |  |
| 7.16 | Any deviations shall be discussed with BHEL site engineers and implementation shall be taken up only after approval from BHEL.                                                                                                                                                                                                                                                                           |  |
| 7.17 | Vendor shall submit periodic status report, on daily as well as weekly consolidated basis, to BHEL on the progress of the contract.                                                                                                                                                                                                                                                                      |  |



| SPECIAL COMMERCIAL CONDITIONS OF CONTRACT (for foreign vendors) |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                |                             |                   |
|-----------------------------------------------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------|
| RFQ No. UPK0000987                                              |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                |                             |                   |
| Sl. No.                                                         | Terms                               | Particulars                                                                                                                                                                                                                                                                                                                                                                                                                    | Confirmation                | Deviation/Remarks |
| 1                                                               | Pre Qualification Requirement (PQR) | 1. Vendor should have executed at least one contract of indoor / outdoor electrical installation of 33kV minimum in power plants or sub-stations in India with scope including both supply and erection for total value, not less than Rs. 2 Crores. As evidence for this, the vendor should submit<br>(a) Certification from clients for completion of supply and erection<br>(b) Copies of Purchase orders from the clients. | Complied                    |                   |
|                                                                 |                                     | 2. Vendor should furnish the solvency certificate issued by Nationalised / Scheduled works for minimum worth Rs. 1 Crore with date of issue not before three months from the tender opening date.                                                                                                                                                                                                                              | Complied                    |                   |
|                                                                 |                                     | 3. Vendor should be registered company for a period not less than one year from the date of tender opening. As evidence to this, vendor should submit certificate of registration.                                                                                                                                                                                                                                             | Complied                    |                   |
| 2                                                               | Bidding                             | (a) Bid has to be submitted as Two Part – Techno Commercial Bid (Part-1) & Price Bid (Part-II). Bids shall be submitted through e-Procurement portal <a href="https://bheleps.buyjunction.in">https://bheleps.buyjunction.in</a> of M/s. Mjunction Services Limited.                                                                                                                                                           | Complied                    |                   |
|                                                                 |                                     | (b) Annexures B & B1 to be submitted along with technical bid (Part-I) & Annexure B2 to be submitted along with Price bid (Part-II).                                                                                                                                                                                                                                                                                           | Complied                    |                   |
|                                                                 |                                     | (c) Clause-wise compliance to BHEL Purchase specification along with all documents as called in Technical specification to be submitted along with technical bid (Part-1).                                                                                                                                                                                                                                                     | Complied                    |                   |
| 3                                                               | Price basis:                        | Firm i.e., from the date of PO to completion of supply if I&C is not applicable. If I&C is in supplier's scope, then the prices shall remain Firm till commissioning & handing-over of the complete system.<br>(PVC clause not acceptable).                                                                                                                                                                                    | Complied                    |                   |
| 4                                                               | Evaluation of L1 vendor             | Over all L1 of Supply + I&C on "FOR" basis to site will only be considered.                                                                                                                                                                                                                                                                                                                                                    | Complied                    |                   |
| 5                                                               | Octroi / Entry Tax                  | Any Entry Tax / Octroi if applicable for supplies to these project location, the same has to borne by the vendor.                                                                                                                                                                                                                                                                                                              | Complied                    |                   |
| 6                                                               | Terms of Delivery:                  | CIF Seaport/CIF Airport/FCA Airport <b>(Indicate name of Seaport/Airport)</b>                                                                                                                                                                                                                                                                                                                                                  | Acceptable / Not acceptable |                   |
| 7                                                               | Delivery Period                     | (a) Supply: 4 Weeks from document approval Date<br>(b) Drawing Submission: 1 Week from PO Date<br>(c) I&C: 4 Weeks from supply                                                                                                                                                                                                                                                                                                 | Acceptable / Not acceptable |                   |

|    |                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |  |
|----|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|--|
| 8  | Payment Term                  | <p><b>1)</b> 80% of basic Supply value + 100% of taxes, duties and freight charges will be paid with 45 days credit from the receipt of material at site or 15 days credit from the date of submission of complete set of documentation whichever is later.</p> <p><b>2)</b> 10% of basic supply value will be paid on completion of I&amp;C against submission of supplementary invoice along with proof of completion of I&amp;C along with I&amp;C charges (if any).</p> <p><b>3)</b> Balance 10% (retention money) against submission of supplementary invoice along with PBG valid for Warranty Period+3months Claim Period from BHEL Consortium Bank.</p> <p><b>I&amp;C/Supervision:</b> 100% on completion of I&amp;C/Supervision and certification line item wise on pro-rata basis.</p> <p><b>Note:</b> In exceptional cases, if vendor fails to submit PBG after supplies, vendors can also accept for the final 10% payment, payable after the warranty period + 3 months of claim period against supplementary invoice subject to the completion of commissioning (if applicable) as PBG is linked to Warranty period.</p> | Acceptable / Not acceptable |  |
|    |                               | <b>(b)</b> For any deviation in payment term, the offer will be liable for loading as per Clause G of ITB (Doc Ref : SCPV: BOS: ITB - Rev 01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Acceptable / Not acceptable |  |
| 9  | Warranty                      | <p><b>(a) Warranty for Supply:</b> 18 Months from Supply or 12 Months from I&amp;C, whichever is earlier.</p> <p><b>(b) Warranty for Workmanship &amp; I&amp;C:</b> 12 months from I&amp;C</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Acceptable / Not acceptable |  |
| 10 | Pre Shipment Inspection       | (a) Pre Shipment Inspection will be carried out by BHEL/Customer for which test report shall be sent one week in advance.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Acceptable / Not acceptable |  |
|    |                               | <p>(b) Inspection charges &amp; co-ordination for third party inspection shall be to your account. Please confirm that your quotation for individual item includes inspection charges by any of BHEL approved inspection agencies.</p> <p>In case nothing is mentioned regarding inspection charges, it will be presumed that these are included in quoted prices. Please confirm.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Acceptable / Not acceptable |  |
| 11 | Penalty                       | <b>(a) Supply:</b> Penalty of 0.5% per week at the basic price of the good for undelivered quantity of supply portion, subject to a maximum of 10%. For Supply, Pre Shipment Inspection Call Letter Date (Receipt of test report) will be treated as delivery for purpose of penalty.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Acceptable / Not acceptable |  |
|    |                               | <b>(b)</b> For any deviation in penalty term, the offer will be liable for loading as per Clause No. G, Point No.(b) of ITB (Doc Ref : SCPV: BOS: ITB - Rev 01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Acceptable / Not acceptable |  |
| 12 | PBG                           | <p><b>(a)</b> PBG shall be furnished in the BHEL prescribed format.</p> <p><b>(b)</b> Deviation if any Please specify.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Acceptable / Not acceptable |  |
| 13 | Validity:                     | Quotation should remain valid for a period of 90 days from the due date.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Acceptable / Not acceptable |  |
| 14 | Bank charges (If applicable): | (a) All Bank charges to seller's account                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Acceptable / Not acceptable |  |
|    |                               | (b) Deviation will be liable for loading as per Cl.G of ITB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Acceptable / Not acceptable |  |

|    |                                     |                                                                                                                                                                                                                                                                                                            |                               |  |
|----|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|--|
| 15 | <b>Reverse Auction:</b>             | BHEL reserves the right to conduct Reverse auction.Procedure for the same will be informed by BHEL .                                                                                                                                                                                                       | Acceptable / Not acceptable   |  |
| 16 | <b>DUN No.</b>                      | Please mention Dun & Bradstreet No.(DUN No.)                                                                                                                                                                                                                                                               | To be furnished if applicable |  |
| 17 | <b>Consignment Details</b>          | Weight and Dimension of consignment with packing                                                                                                                                                                                                                                                           | Furnished / To be furnished   |  |
| 18 | <b>Despatch Documents</b>           | Despatch documents include AWB, Invoice, Packing list, Warranty certificate, O&M manuals                                                                                                                                                                                                                   | Acceptable / Not acceptable   |  |
|    |                                     | One copy of Invoice, Packing list and Air Way Bill shall be faxed immediately after despatch. Also one copy of packing list to be kept inside each box for easy identification of material at site.                                                                                                        |                               |  |
| 19 | <b>Other terms &amp; conditions</b> | For any other Terms and Conditions, kindly refer to the following:<br>A: ITB<br>B: GCC                                                                                                                                                                                                                     | Acceptable / Not acceptable   |  |
| 20 | <b>BOS %</b>                        | The percentage of Supply and I&C and O&M values shall be in the range indicated below (approximately, with overall tallying to 100%) :<br>(a) Supply : 46 to 50 %<br>(b) I&C : 50 to 54 %<br>Successful bidder shall submit detailed billing break up for BHEL approval after placement of Purchase order. | Acceptable / Not acceptable   |  |
| 21 | <b>Documents Submission</b>         | All the documents pertaining to I&C and O&M as per <b>Annexure-C</b> to be submitted as applicable.                                                                                                                                                                                                        | Acceptable / Not acceptable   |  |

**AUTHORISED SIGNATORY WITH SEAL**

| TECHNICAL BID ENCLOSURE FOR COMPLIANCE OF QUOTE : UNPRICED BID (Foreign Vendors) |          |               |                                          |      |      |          |          |
|----------------------------------------------------------------------------------|----------|---------------|------------------------------------------|------|------|----------|----------|
| RFQ No. UPK0000987                                                               |          |               |                                          |      |      |          |          |
| Sl No.                                                                           | Ref. No. | Material Code | DESCRIPTION                              | QTY  | UNIT | Quoted   | Currency |
| 1                                                                                | S-220    | PS0679065415  | Security cabin                           | 1    | NO   | YES / NO |          |
| 2                                                                                | S-230    | PS0679065423  | Submersible pump 3-phase                 | 3    | NO   | YES / NO |          |
| 3                                                                                | S-240    | PS0679065440  | HDPE DWC pipe                            | 8500 | M    | YES / NO |          |
| 4                                                                                | S-250    | PS0679065458  | Cable trays in control room: Normal typ  | 300  | M    | YES / NO |          |
| 5                                                                                | S-260    | PS0679065466  | Cable trays in control room: Corner ben  | 24   | NO   | YES / NO |          |
| 6                                                                                | S-270    | PS0679065474  | Cable support structure                  | 12   | NO   | YES / NO |          |
| 7                                                                                | S-280    | PS0679065482  | Cable support structure (normal)         | 4    | NO   | YES / NO |          |
| 8                                                                                | S-290    | PS0679065490  | Hardware for grouting control room panel | 1    | ST   | YES / NO |          |
| 9                                                                                | S-300    | PS0679065504  | Hardware requirements                    | 4    | ST   | YES / NO |          |
| 10                                                                               | S-310    | PS0679065512  | Cable 3.5-cx95mm2, copper conductor      | 100  | M    | YES / NO |          |
| 11                                                                               | S-320    | PS0679065520  | Cable 3.5-cx25mm2, copper conductor      | 2000 | M    | YES / NO |          |
| 12                                                                               | S-330    | PS0679065539  | Termination kits, INDOOR TYPE            | 8    | NO   | YES / NO |          |
| 13                                                                               | S-340    | PS0679065547  | Termination kits, OUTDOOR TYPE,          | 11   | NO   | YES / NO |          |
| 14                                                                               | S-350    | PS0679065555  | RSJ Poles 185x75x6mm, 7m length          | 14   | NO   | YES / NO |          |
| 15                                                                               | S-360    | PS0679065563  | GOS switches                             | 10   | NO   | YES / NO |          |
| 16                                                                               | S-1260   | PS0679065571  | GOS with earth switch                    | 2    | NO   | YES / NO |          |
| 17                                                                               | S-380    | PS0679065580  | Lightning arrestors                      | 12   | NO   | YES / NO |          |
| 18                                                                               | S-390    | PS0679065598  | Supporting BOQ items of four pole        | 2    | ST   | YES / NO |          |
| 19                                                                               | S-400    | PS0679065601  | Supporting BOQ items of Six pole         | 1    | ST   | YES / NO |          |
| 20                                                                               | S-410    | PS0679065628  | 33 kV Outdoor CT                         | 1    | ST   | YES / NO |          |
| 21                                                                               | S-420    | PS0679065636  | 33 kV Outdoor PT                         | 1    | ST   | YES / NO |          |
| 22                                                                               | S-430    | PS0679065644  | Metering panel                           | 1    | ST   | YES / NO |          |
| 23                                                                               | S-440    | PS0679065652  | License with MRI instrument              | 2    | ST   | YES / NO |          |
| 24                                                                               | S-1290   | PS0679065660  | Cable 2 pair x 4 sq-mm, copper           | 3000 | M    | YES / NO |          |
| 25                                                                               | S-460    | PS0679065679  | Auxiliary transformer 100kVA             | 1    | NO   | YES / NO |          |
| 26                                                                               | S-470    | PS0679065687  | Drop out fuse                            | 1    | ST   | YES / NO |          |
| 27                                                                               | S-480    | PS0679065695  | ACDB panel                               | 1    | NO   | YES / NO |          |
| 28                                                                               | S-490    | PS0679065709  | DB Switchboards                          | 2    | NO   | YES / NO |          |
| 29                                                                               | S-500    | PS0679065717  | ACSR conductor DOG type, 7/4.09          | 1000 | M    | YES / NO |          |
| 30                                                                               | S-510    | PS0679065725  | Cable glands, cable lugs and hardware    | 1    | ST   | YES / NO |          |
| 31                                                                               | S-1270   | PS0679065733  | Cross-linked GI 50x50x4mm                | 375  | ST   | YES / NO |          |
| 32                                                                               | S-540    | PS0679065750  | MS gate 3.5m wide x 3m tall              | 5    | NO   | YES / NO |          |
| 33                                                                               | S-550    | PS0679065768  | Stone jelly 20mm for Inv rooms           | 60   | ST   | YES / NO |          |
| 34                                                                               | S-560    | PS0679065776  | Stone jelly 20mm for Control room        | 40   | ST   | YES / NO |          |
| 35                                                                               | S-1300   | PS0679065784  | Data cable 12 core x 1.5 mm2             | 700  | M    | YES / NO |          |
| 36                                                                               | S-970    | PS0679065792  | Miscellaneous item for bos supply        | 1    | ST   | YES / NO |          |
| 37                                                                               | S-580    | PS0679065806  | Battery bank                             | 1    | ST   | YES / NO |          |
| 38                                                                               | S-590    | PS0679065814  | Battery charger, 135 volts, 25 Amps      | 1    | NO   | YES / NO |          |
| 39                                                                               | S-600    | PS0679065822  | UPS 5 kVA with battery bank              | 3    | NO   | YES / NO |          |
| 40                                                                               | S-960    | PS0679065830  | hardware for 6 mm2 cable earthing        | 1    | ST   | YES / NO |          |
| 41                                                                               | S-850    | PS0679065849  | Cable 1Cx 25 mm2 copper conductor        | 1000 | M    | YES / NO |          |
| 42                                                                               | S-1280   | PS0679065857  | pest control                             | 1    | ST   | YES / NO |          |
| 43                                                                               | S-630    | PS0679065865  | Expansion bolts                          | 100  | NO   | YES / NO |          |
| 44                                                                               | S-640    | PS0679065873  | Lightning rod with earthing set          | 3    | NO   | YES / NO |          |
| 45                                                                               | S-650    | PS0679065881  | LED lights LSTO-25 W                     | 300  | NO   | YES / NO |          |
| 46                                                                               | S-660    | PS0679065890  | Lighting hardwares for solar array       | 250  | NO   | YES / NO |          |
| 47                                                                               | S-860    | PS0679065903  | Lighting hardwares for Yard lights       | 50   | NO   | YES / NO |          |
| 48                                                                               | S-680    | PS0679065911  | Cable 3.5cx 2.5 mm2                      | 7500 | M    | YES / NO |          |
| 49                                                                               | S-690    | PS0679065920  | Cable 2Cx 1.5 mm2 copper                 | 2000 | M    | YES / NO |          |
| 50                                                                               | S-700    | PS0679065938  | Cable 1Cx 1.5 mm2                        | 1200 | M    | YES / NO |          |
| 51                                                                               | S-710    | PS0679065946  | CPVC pipe, 2-inch, for module cleaning   | 1500 | M    | YES / NO |          |
| 52                                                                               | S-720    | PS0679065954  | CPVC pipe, 1 inch, for module cleaning   | 3600 | M    | YES / NO |          |
| 53                                                                               | S-730    | PS0679065962  | Booster Pump                             | 3    | NO   | YES / NO |          |
| 54                                                                               | S-740    | PS0679065970  | Sintex                                   | 3    | NO   | YES / NO |          |
| 55                                                                               | S-750    | PS0679065989  | Ball valves 2-inch                       | 5    | NO   | YES / NO |          |
| 56                                                                               | S-760    | PS0679065997  | Ball valves 1-inch                       | 100  | NO   | YES / NO |          |
| 57                                                                               | S-770    | PS0679066004  | Hose pipes ribbed, flexible (50 m)       | 3    | ST   | YES / NO |          |
| 58                                                                               | S-780    | PS0679066012  | High pressure gun                        | 3    | ST   | YES / NO |          |
| 59                                                                               | S-790    | PS0679066020  | Cable tags                               | 1    | ST   | YES / NO |          |
| 60                                                                               | S-800    | PS0679066039  | Danger boards                            | 1    | ST   | YES / NO |          |

|    |         |              |                                          |     |    |          |  |
|----|---------|--------------|------------------------------------------|-----|----|----------|--|
| 61 | S-810   | PS0679066047 | Cable markers                            | 460 | NO | YES / NO |  |
| 62 | S-820   | PS0679066055 | Hoarding plate                           | 1   | ST | YES / NO |  |
| 63 | S-870   | PS0679066063 | Display boards and Sign boards           | 1   | ST | YES / NO |  |
| 64 | S-880   | PS0679066071 | insulation mat                           | 60  | NO | YES / NO |  |
| 65 | S-890   | PS0679066080 | Air conditioner                          | 2   | NO | YES / NO |  |
| 66 | S-900   | PS0679066101 | Tool kits and instruments                | 1   | ST | YES / NO |  |
| 67 | S-910   | PS0679066110 | Office furniture                         | 1   | ST | YES / NO |  |
| 68 | S-920   | PS0679066128 | Fire alarm system with spares            | 1   | ST | YES / NO |  |
| 69 | S-930   | PS0679066136 | Safety gadgets                           | 1   | ST | YES / NO |  |
| 70 | S-940   | PS0679066144 | Fire extinguishers                       | 1   | ST | YES / NO |  |
| 71 | S-950   | PS0679066152 | Grass cutting machine                    | 2   | NO | YES / NO |  |
| 72 | S-1250  | PS0679070133 | GI earth electrodes for SMB              | 80  | NO | YES / NO |  |
| 73 | I&C-10  | PS0679066160 | I&C1- upkeeping of Stores & porta cabin  | 1   | AU | YES / NO |  |
| 74 | I&C-20  | PS0679066179 | I&C2-Borewell & tank connection          | 3   | AU | YES / NO |  |
| 75 | I&C-30  | PS0679066187 | I&C3-DC cabling,SMB instlln & terminatio | 8   | AU | YES / NO |  |
| 76 | I&C-40  | PS0679066195 | I&C4-laying,closing of array cable trenc | 2   | AU | YES / NO |  |
| 77 | I&C-50  | PS0679066209 | I&C5-Eqpt erection & termination-IRs,CR  | 2   | AU | YES / NO |  |
| 78 | I&C-60  | PS0679066217 | I&C6-Earth mat in IR & CR                | 3   | AU | YES / NO |  |
| 79 | I&C-70  | PS0679066225 | I&C7-switchyard erection activities-IRs  | 2   | AU | YES / NO |  |
| 80 | I&C-80  | PS0679066233 | I&C8-Stone jelly, fencing for IR yards   | 2   | AU | YES / NO |  |
| 81 | I&C-90  | PS0679066241 | I&C9-HT cable trench & terminations      | 2   | AU | YES / NO |  |
| 82 | I&C-100 | PS0679066250 | I&C10--swyd erection activities for CRs  | 1   | AU | YES / NO |  |
| 83 | I&C-110 | PS0679066268 | I&C11-Stone jelly, fencing for CR yard   | 1   | AU | YES / NO |  |
| 84 | I&C-120 | PS0679066276 | I&C12-Comm cbl lay,termination-SCADA,CRP | 1   | AU | YES / NO |  |
| 85 | I&C-130 | PS0679066284 | I&C13-Earthing in IRs,CR, Swyd & array   | 1   | AU | YES / NO |  |
| 86 | I&C-140 | PS0679066292 | I&C14-I&C of Battery & charger           | 1   | AU | YES / NO |  |
| 87 | I&C-150 | PS0679066306 | I&C15-I&C of lighting system             | 1   | AU | YES / NO |  |
| 88 | I&C-160 | PS0679066314 | I&C16-Comm system & WMS installation     | 1   | AU | YES / NO |  |
| 89 | I&C-170 | PS0679066322 | I&C17-I&C of cleaning system             | 1   | AU | YES / NO |  |
| 90 | I&C-180 | PS0679066330 | I&C18-I&C of LA ESE                      | 10  | AU | YES / NO |  |
| 91 | I&C-190 | PS0679066357 | I&C19-I&C of balance misc items          | 1   | AU | YES / NO |  |
| 92 | I&C-200 | PS0679066365 | I&C20-Commissioning,tests,CEA approval   | 1   | AU | YES / NO |  |

**Note:**

\* The above format is to be used for Unpriced bid. Reproducing on letter head is acceptable.

BHEL is trying to avail Customs Duty & Excise duty exemption. Successful bidder shall support with all relevant documents.

**AUTHORISED SIGNATORY WITH SEAL**

| TECHNICAL BID ENCLOSURE FOR COMPLIANCE OF QUOTE : UNPRICED BID (Indigenous Vendors) |                     |               |                                          |                |      |           |                                       |          |
|-------------------------------------------------------------------------------------|---------------------|---------------|------------------------------------------|----------------|------|-----------|---------------------------------------|----------|
| RFQ No. UPK0000987                                                                  |                     |               |                                          |                |      |           |                                       |          |
| Sl No.                                                                              | Ref No.             | Material Code | DESCRIPTION                              | Total Quantity | Unit | UNIT RATE | Total value<br>(Unit Rate x Quantity) | Currency |
| 1                                                                                   | S-220               | PS0679065415  | Security cabin                           | 1              | NO   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 2                                                                                   | S-230               | PS0679065423  | Submersible pump 3-phase                 | 3              | NO   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 3                                                                                   | S-240               | PS0679065440  | HDPE DWC pipe                            | 8500           | M    |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 4                                                                                   | S-250               | PS0679065458  | Cable trays in control room: Normal typ  | 300            | M    |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 5                                                                                   | S-260               | PS0679065466  | Cable trays in control room: Corner ben  | 24             | NO   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 6                                                                                   | S-270               | PS0679065474  | Cable support structure                  | 12             | NO   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 7                                                                                   | S-280               | PS0679065482  | Cable support structure (normal)         | 4              | NO   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 8                                                                                   | S-290               | PS0679065490  | Hardware for grouting control room panel | 1              | ST   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 9                                                                                   | S-300               | PS0679065504  | Hardware requirements                    | 4              | ST   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 10                                                                                  | S-310               | PS0679065512  | Cable 3.5-cx95mm2, copper conductor      | 100            | M    |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 11                                                                                  | S-320               | PS0679065520  | Cable 3.5-cx25mm2, copper conductor      | 2000           | M    |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 12                                                                                  | S-330               | PS0679065539  | Termination kits, INDOOR TYPE            | 8              | NO   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 13                                                                                  | S-340               | PS0679065547  | Termination kits, OUTOOR TYPE,           | 11             | NO   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 14                                                                                  | S-350               | PS0679065555  | RSJ Poles 185x75x6mm, 7m length          | 14             | NO   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 15                                                                                  | S-360               | PS0679065563  | GOS switches                             | 10             | NO   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 16                                                                                  | S-1260              | PS0679065571  | GOS with earth switch                    | 2              | NO   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 17                                                                                  | S-380               | PS0679065580  | Lightning arrestors                      | 12             | NO   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 18                                                                                  | S-390               | PS0679065598  | Supporting BOQ items of four pole        | 2              | ST   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 19                                                                                  | S-400               | PS0679065601  | Supporting BOQ items of Six pole         | 1              | ST   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 20                                                                                  | S-410               | PS0679065628  | 33 kV Outdoor CT                         | 1              | ST   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 21                                                                                  | S-420               | PS0679065636  | 33 kV Outdoor PT                         | 1              | ST   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 22                                                                                  | S-430               | PS0679065644  | Metering panel                           | 1              | ST   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 23                                                                                  | S-440               | PS0679065652  | License with MRI instrument              | 2              | ST   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 24                                                                                  | S-1290              | PS0679065660  | Cable 2 pair x 4 sq-mm, copper           | 3000           | M    |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 25                                                                                  | S-460               | PS0679065679  | Auxiliary transformer 100kVA             | 1              | NO   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 26                                                                                  | S-470               | PS0679065687  | Drop out fuse                            | 1              | ST   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 27                                                                                  | S-480               | PS0679065695  | ACDB panel                               | 1              | NO   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 28                                                                                  | S-490               | PS0679065709  | DB Switchboards                          | 2              | NO   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 29                                                                                  | S-500               | PS0679065717  | ACSR conductor DOG type, 7/4.09          | 1000           | M    |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 30                                                                                  | S-510               | PS0679065725  | Cable glands, cable lugs and hardware    | 1              | ST   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 31                                                                                  | S-1270              | PS0679065733  | Cross-linked GI 50x50x4mm                | 375            | ST   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 32                                                                                  | S-540               | PS0679065750  | MS gate 3.5m wide x 3m tall              | 5              | NO   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 33                                                                                  | S-550               | PS0679065768  | Stone jelly 20mm for Inv rooms           | 60             | ST   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |
| 34                                                                                  | S-560               | PS0679065776  | Stone jelly 20mm for Control room        | 40             | ST   |           |                                       |          |
|                                                                                     | Unit Rate in Words: |               |                                          |                |      |           |                                       |          |

|    |                     |              |                                        |      |    |  |  |  |
|----|---------------------|--------------|----------------------------------------|------|----|--|--|--|
| 35 | S-1300              | PS0679065784 | Data cable 12 core x 1.5 mm2           | 700  | M  |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 36 | S-970               | PS0679065792 | Miscellaneous item for bos supply      | 1    | ST |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 37 | S-580               | PS0679065806 | Battery bank                           | 1    | ST |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 38 | S-590               | PS0679065814 | Battery charger, 135 volts, 25 Amps    | 1    | NO |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 39 | S-600               | PS0679065822 | UPS 5 kVA with battery bank            | 3    | NO |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 40 | S-960               | PS0679065830 | hardware for 6 mm2 cable earthing      | 1    | ST |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 41 | S-850               | PS0679065849 | Cable 1Cx 25 mm2 copper conductor      | 1000 | M  |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 42 | S-1280              | PS0679065857 | pest control                           | 1    | ST |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 43 | S-630               | PS0679065865 | Expansion bolts                        | 100  | NO |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 44 | S-640               | PS0679065873 | Lightning rod with earthing set        | 3    | NO |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 45 | S-650               | PS0679065881 | LED lights LSTO-25 W                   | 300  | NO |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 46 | S-660               | PS0679065890 | Lighting hardwares for solar array     | 250  | NO |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 47 | S-860               | PS0679065903 | Lighting hardwares for Yard lights     | 50   | NO |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 48 | S-680               | PS0679065911 | Cable 3.5cx 2.5 mm2                    | 7500 | M  |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 49 | S-690               | PS0679065920 | Cable 2Cx 1.5 mm2 copper               | 2000 | M  |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 50 | S-700               | PS0679065938 | Cable 1Cx 1.5 mm2                      | 1200 | M  |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 51 | S-710               | PS0679065946 | CPVC pipe, 2-inch, for module cleaning | 1500 | M  |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 52 | S-720               | PS0679065954 | CPVC pipe, 1 inch, for module cleaning | 3600 | M  |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 53 | S-730               | PS0679065962 | Booster Pump                           | 3    | NO |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 54 | S-740               | PS0679065970 | Sintex                                 | 3    | NO |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 55 | S-750               | PS0679065989 | Ball valves 2-inch                     | 5    | NO |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 56 | S-760               | PS0679065997 | Ball valves 1-inch                     | 100  | NO |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 57 | S-770               | PS0679066004 | Hose pipes ribbed, flexible (50 m)     | 3    | ST |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 58 | S-780               | PS0679066012 | High pressure gun                      | 3    | ST |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 59 | S-790               | PS0679066020 | Cable tags                             | 1    | ST |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 60 | S-800               | PS0679066039 | Danger boards                          | 1    | ST |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 61 | S-810               | PS0679066047 | Cable markers                          | 460  | NO |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 62 | S-820               | PS0679066055 | Hoarding plate                         | 1    | ST |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 63 | S-870               | PS0679066063 | Display boards and Sign boards         | 1    | ST |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 64 | S-880               | PS0679066071 | insulation mat                         | 60   | NO |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 65 | S-890               | PS0679066080 | Air conditioner                        | 2    | NO |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 66 | S-900               | PS0679066101 | Tool kits and instruments              | 1    | ST |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 67 | S-910               | PS0679066110 | Office furniture                       | 1    | ST |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 68 | S-920               | PS0679066128 | Fire alarm system with spares          | 1    | ST |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 69 | S-930               | PS0679066136 | Safety gadgets                         | 1    | ST |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 70 | S-940               | PS0679066144 | Fire extinguishers                     | 1    | ST |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 71 | S-950               | PS0679066152 | Grass cutting machine                  | 2    | NO |  |  |  |
|    | Unit Rate in Words: |              |                                        |      |    |  |  |  |
| 72 | S-1250              | PS0679070133 | GI earth electrodes for SMB            | 80   | NO |  |  |  |



|    |                     |              |                                          |    |    |  |  |
|----|---------------------|--------------|------------------------------------------|----|----|--|--|
| 72 | Unit Rate in Words: |              |                                          |    |    |  |  |
| 73 | I&C-10              | PS0679066160 | I&C1- upkeeping of Stores & porta cabin  | 1  | AU |  |  |
|    | Unit Rate in Words: |              |                                          |    |    |  |  |
| 74 | I&C-20              | PS0679066179 | I&C2-Borewell & tank connection          | 3  | AU |  |  |
|    | Unit Rate in Words: |              |                                          |    |    |  |  |
| 75 | I&C-30              | PS0679066187 | I&C3-DC cabling,SMB instlln & terminatio | 8  | AU |  |  |
|    | Unit Rate in Words: |              |                                          |    |    |  |  |
| 76 | I&C-40              | PS0679066195 | I&C4-laying,closing of array cable trenc | 2  | AU |  |  |
|    | Unit Rate in Words: |              |                                          |    |    |  |  |
| 77 | I&C-50              | PS0679066209 | I&C5-Eqpt erection & termination-IRs,CR  | 2  | AU |  |  |
|    | Unit Rate in Words: |              |                                          |    |    |  |  |
| 78 | I&C-60              | PS0679066217 | I&C6-Earth mat in IR & CR                | 3  | AU |  |  |
|    | Unit Rate in Words: |              |                                          |    |    |  |  |
| 79 | I&C-70              | PS0679066225 | I&C7-switchyard erection activities-IRs  | 2  | AU |  |  |
|    | Unit Rate in Words: |              |                                          |    |    |  |  |
| 80 | I&C-80              | PS0679066233 | I&C8-Stone jelly, fencing for IR yards   | 2  | AU |  |  |
|    | Unit Rate in Words: |              |                                          |    |    |  |  |
| 81 | I&C-90              | PS0679066241 | I&C9-HT cable trench & terminations      | 2  | AU |  |  |
|    | Unit Rate in Words: |              |                                          |    |    |  |  |
| 82 | I&C-100             | PS0679066250 | I&C10--swyd erection activities for CRs  | 1  | AU |  |  |
|    | Unit Rate in Words: |              |                                          |    |    |  |  |
| 83 | I&C-110             | PS0679066268 | I&C11-Stone jelly, fencing for CR yard   | 1  | AU |  |  |
|    | Unit Rate in Words: |              |                                          |    |    |  |  |
| 84 | I&C-120             | PS0679066276 | I&C12-Comm cbl lay,termination-SCADA,CRP | 1  | AU |  |  |
|    | Unit Rate in Words: |              |                                          |    |    |  |  |
| 85 | I&C-130             | PS0679066284 | I&C13-Earthing in IRs,CR, Swyd & array   | 1  | AU |  |  |
|    | Unit Rate in Words: |              |                                          |    |    |  |  |
| 86 | I&C-140             | PS0679066292 | I&C14-I&C of Battery & charger           | 1  | AU |  |  |
|    | Unit Rate in Words: |              |                                          |    |    |  |  |
| 87 | I&C-150             | PS0679066306 | I&C15-I&C of lighting system             | 1  | AU |  |  |
|    | Unit Rate in Words: |              |                                          |    |    |  |  |
| 88 | I&C-160             | PS0679066314 | I&C16-Comm system & WMS installation     | 1  | AU |  |  |
|    | Unit Rate in Words: |              |                                          |    |    |  |  |
| 89 | I&C-170             | PS0679066322 | I&C17-I&C of cleaning system             | 1  | AU |  |  |
|    | Unit Rate in Words: |              |                                          |    |    |  |  |
| 90 | I&C-180             | PS0679066330 | I&C18-I&C of LA ESE                      | 10 | AU |  |  |
|    | Unit Rate in Words: |              |                                          |    |    |  |  |
| 91 | I&C-190             | PS0679066357 | I&C19-I&C of balance misc items          | 1  | AU |  |  |
|    | Unit Rate in Words: |              |                                          |    |    |  |  |
| 92 | I&C-200             | PS0679066365 | I&C20-Commissioning,tests,CEA appproval  | 1  | AU |  |  |
|    | Unit Rate in Words: |              |                                          |    |    |  |  |

**Note:**

\* The above format is to be used for Unpriced bid. Reproducing on letter head is acceptable.

BHEL is trying to avail Customs Duty & Excise duty exemption. Successful bidder shall support with all relevant documents.

**AUTHORISED SIGNATORY WITH SEAL**

| SPECIAL COMMERCIAL CONDITIONS OF CONTRACT (SCC) - for indigenous vendors |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                |                             |                     |
|--------------------------------------------------------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|---------------------|
| RFQ No. UPK0000987                                                       |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                |                             |                     |
| Sl No.                                                                   | Terms                               | BHEL Term                                                                                                                                                                                                                                                                                                                                                                                                                      | Confirmation                | Deviation / Remarks |
| 1                                                                        | Pre Qualification Requirement (PQR) | 1. Vendor should have executed at least one contract of indoor / outdoor electrical installation of 33kV minimum in power plants or sub-stations in India with scope including both supply and erection for total value, not less than Rs. 2 Crores. As evidence for this, the vendor should submit<br>(a) Certification from clients for completion of supply and erection<br>(b) Copies of Purchase orders from the clients. | Complied                    |                     |
|                                                                          |                                     | 2. Vendor should furnish the solvency certificate issued by Nationalised / Scheduled works for minimum worth Rs. 1 Crore with date of issue not before three months from the tender opening date.                                                                                                                                                                                                                              | Complied                    |                     |
|                                                                          |                                     | 3. Vendor should be registered company for a period not less than one year from the date of tender opening. As evidence to this, vendor should submit certificate of registration.                                                                                                                                                                                                                                             | Complied                    |                     |
| 2                                                                        | Bidding                             | (a) Bid has to be submitted as Two Part – Techno Commercial Bid (Part-1) & Price Bid (Part-II). <b>Bids shall be submitted through e-Procurement portal <a href="https://bheleps.buyjunction.in">https://bheleps.buyjunction.in</a> of M/s. Mjunction Services Limited.</b>                                                                                                                                                    | Complied                    |                     |
|                                                                          |                                     | (b) <b>Annexure B (SCC) &amp; Annexure B1</b> to be submitted along with technical bid (Part-I) & <b>Annexure B2</b> to be submitted along with Price bid (Part-II).                                                                                                                                                                                                                                                           | Complied                    |                     |
|                                                                          |                                     | (c) Clause-wise compliance to BHEL Purchase specification along with all documents as called in Technical specification to be submitted along with technical bid (Part-1).                                                                                                                                                                                                                                                     | Complied                    |                     |
| 3                                                                        | Price Basis                         | Firm i.e., from the date of PO to completion of supply if I&C is not applicable. If I&C is in supplier's scope, then the prices shall remain Firm till commissioning & handing-over of the complete system. (PVC clause not acceptable).                                                                                                                                                                                       | Complied                    |                     |
| 4                                                                        | Terms of Delivery                   | Free On Road Basis to Project site. Present Projects are : <b>WBSEDCL, CHHARRAH, WEST BENGAL</b>                                                                                                                                                                                                                                                                                                                               | Complied                    |                     |
| 5                                                                        | Delivery Period                     | (a) <b>Supply:</b> 4 Weeks from document approval Date<br>(b) <b>Drawing Submission:</b> 1 Week from PO Date<br>(c) <b>I&amp;C:</b> 4 Weeks from supply                                                                                                                                                                                                                                                                        | Acceptable / Not acceptable |                     |

|    |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |                                                                  |
|----|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------------------------------------------------------------|
| 6  | Payment Term            | <p><b>1)</b> 80% of basic Supply value + 100% of taxes, duties and freight charges will be paid with 45 days credit from the receipt of material at site or 15 days credit from the date of submission of complete set of documentation whichever is later.</p> <p><b>2)</b> 10% of basic supply value will be paid on completion of I&amp;C against submission of supplementary invoice along with proof of completion of I&amp;C along with I&amp;C charges (if any).</p> <p><b>3)</b> Balance 10% (retention money) against submission of supplementary invoice along with PBG valid for Warranty Period+3months Claim Period from BHEL Consortium Bank.</p> <p><b>I&amp;C/Supervision:</b> 100% on completion of I&amp;C/Supervision and certification line item wise on pro-rata basis.</p> <p><b>Note:</b> In exceptional cases, if vendor fails to submit PBG after supplies, vendors can also accept for the final 10% payment, payable after the warranty period + 3 months of claim period against supplementary invoice subject to the completion of commissioning (if applicable) as PBG is linked to Warranty period.</p> | Acceptable / Not acceptable |                                                                  |
|    |                         | <b>(b)</b> For any deviation in payment term, the offer will be liable for loading as per Clause G of ITB.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Acceptable / Not acceptable |                                                                  |
| 7  | Excise Duty             | <b>(a)</b> To confirm whether applicable. If applicable, indicate prevailing rate of Excise duty.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Applicable / Not applicable | Prevailing rate of Excise duty: ..... %                          |
| 8  | Sales Tax               | <b>(a)</b> To confirm whether applicable. If applicable, indicate prevailing rate of <b>Sales Tax without Form C</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Applicable / Not applicable | Prevailing rate of <b>Sales Tax without Form C</b> : ..... %     |
| 9  | Value Added Tax         | Both are in the same State, VAT is applicable please indicate VAT applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Applicable / Not applicable | Prevailing rate of VAT: ..... %                                  |
| 10 | Service Tax             | To confirm whether applicable, if applicable indicate current rate of Service Tax.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Applicable / Not applicable | Prevailing rate of Service Tax: _____%                           |
|    |                         | Furnish Service Tax Regn. No.<br>Confirmation that Service Tax register is maintained.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                             | Service Tax Regn. No. ....<br>S.Tax Register maintained : Yes/No |
| 11 | Evaluation of L1 vendor | Over all L1 of Supply + I&C on "FOR" basis to site will only be considered.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Complied                    |                                                                  |
| 12 | Warranty                | <p><b>(a) Warranty for Supply:</b> 18 Months from Supply or 12 Months from I&amp;C, whichever is earlier.</p> <p><b>(b) Warranty for Workmanship &amp; I&amp;C:</b> 12 months from I&amp;C</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Acceptable / Not acceptable |                                                                  |

|    |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                             |  |
|----|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|--|
| 13 | Pre Shipment Inspection  | (a) Pre Shipment Inspection will be carried out by BHEL/Customer for which test report shall be sent atleast one week in advance. All documents as per Purchase specification shall be submitted along with PSI Call letter                                                                                                                                                                                                                                                              | Acceptable / Not acceptable |  |
|    |                          | (b) Pre Shipment Inspection charges , if any, shall be considered while evaluating your offer to arrive at "Total Cost to BHEL". The charges for the same shall be informed to you before Price Bid Opening/Reverse Auction.                                                                                                                                                                                                                                                             |                             |  |
| 14 | Penalty                  | (a) <b>Supply:</b> Penalty of 0.5% per week at the basic price of the good for undelivered quantity of supply portion, subject to a maximum of 10%. For Supply, Pre Shipment Inspection Call Letter Date (Receipt of test report) will be treated as delivery for purpose of penalty.                                                                                                                                                                                                    | Acceptable / Not acceptable |  |
|    |                          | (b) For any deviation in penalty term, the offer will be liable for loading as per Clause No. G, Point No.(b) of ITB.                                                                                                                                                                                                                                                                                                                                                                    | Acceptable / Not acceptable |  |
| 15 | Road Permit              | Road permit if applicable will be given by BHEL before Dispatch of ordered Items.However, vendor shall give request for road permit 24 hours in advance.                                                                                                                                                                                                                                                                                                                                 | Complied                    |  |
| 16 | PBG                      | (a) PBG shall be furnished in the BHEL prescribed format.<br>(b) Deviation if any Please specify.                                                                                                                                                                                                                                                                                                                                                                                        | Acceptable / Not acceptable |  |
| 17 | Despatch Documents       | Complete set of despatch documents in 3 sets shall be forwarded to BHEL directly. Despatch documents include Commercial Invoice, Excise Invoice (if ED is applicable), Lorry receipt (L/R), Packing list, PSI letter Copy, Proof of delivery such as MRC (Material Receipt Certificate)/ original acknowledged LR, Insurance intimation letter and Warranty certificate.<br>One set of Invoice, Packing list and L/R shall be emailed immediately after despatch to BHEL-EDN, Bangalore. | Complied                    |  |
| 18 | Reverse Auction          | BHEL reserves the right to conduct Reverse auction. Procedure for the same will be informed by BHEL .                                                                                                                                                                                                                                                                                                                                                                                    | Acceptable / Not acceptable |  |
| 19 | Other terms & conditions | For any other Terms and Conditions, kindly refer to the following:<br>A: ITB (document ref :SCPV: BOS: ITB - Rev 01)<br>B: GCC (document ref: SCPV: BOS: GCC - Rev 01)                                                                                                                                                                                                                                                                                                                   | Acceptable / Not acceptable |  |
| 20 | Validity                 | Quotation should remain valid for a period of 90 days from the due date.                                                                                                                                                                                                                                                                                                                                                                                                                 | Acceptable / Not acceptable |  |
| 21 | Shipment                 | Kindly indicate the state from where the shipment will take place.                                                                                                                                                                                                                                                                                                                                                                                                                       | State/Place to be mentioned |  |
| 22 | Documents Submission     | All the documents pertaining to I&C and O&M as per <b>Annexure-C</b> to be submitted as applicable.                                                                                                                                                                                                                                                                                                                                                                                      | Acceptable/ Not acceptable  |  |

|    |                             |                                                                                                                                                                                                                                                                                                            |                               |  |
|----|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|--|
| 23 | <b>BOS %</b>                | The percentage of Supply and I&C and O&M values shall be in the range indicated below (approximately, with overall tallying to 100%) :<br>(a) Supply : 46 to 50 %<br>(b) I&C : 50 to 54 %<br>Successful bidder shall submit detailed billing break up for BHEL approval after placement of Purchase order. | Acceptable/<br>Not acceptable |  |
| 24 | <b>Documents Submission</b> | All the documents pertaining to I&C and O&M as per Annexure-C to be submitted as applicable.                                                                                                                                                                                                               | Acceptable/<br>Not acceptable |  |
| 25 | <b>Octroi / Entry Tax</b>   | Octroi/ Entry tax if applicable for supply of material at this project location shall be in scope of vendor.                                                                                                                                                                                               | Acceptable/<br>Not acceptable |  |

**AUTHORISED SIGNATORY WITH SEAL**

| TECHNICAL BID ENCLOSURE FOR COMPLIANCE OF QUOTE : UNPRICED BID (Indigenous Vendors) |          |               |                                          |      |      |        |       |       |       |         |                |
|-------------------------------------------------------------------------------------|----------|---------------|------------------------------------------|------|------|--------|-------|-------|-------|---------|----------------|
| RFQ No. UPK0000987                                                                  |          |               |                                          |      |      |        |       |       |       |         |                |
| Sl. No.                                                                             | Ref. No. | Material Code | DESCRIPTION                              | QTY  | UNIT | QUOTED | TAXES |       |       |         | Remarks        |
|                                                                                     |          |               |                                          |      |      |        | ED %  | CST % | VAT % | S. TAX% |                |
| 1                                                                                   | S-220    | PS0679065415  | Security cabin                           | 1    | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 2                                                                                   | S-230    | PS0679065423  | Submersible pump 3-phase                 | 3    | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 3                                                                                   | S-240    | PS0679065440  | HDPE DWC pipe                            | 8500 | M    | YES/NO | NA    |       |       | NA      | Taxes Included |
| 4                                                                                   | S-250    | PS0679065458  | Cable trays in control room: Normal typ  | 300  | M    | YES/NO | NA    |       |       | NA      | Taxes Included |
| 5                                                                                   | S-260    | PS0679065466  | Cable trays in control room: Corner ben  | 24   | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 6                                                                                   | S-270    | PS0679065474  | Cable support structure                  | 12   | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 7                                                                                   | S-280    | PS0679065482  | Cable support structure (normal)         | 4    | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 8                                                                                   | S-290    | PS0679065490  | Hardware for grouting control room panel | 1    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 9                                                                                   | S-300    | PS0679065504  | Hardware requirements                    | 4    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 10                                                                                  | S-310    | PS0679065512  | Cable 3.5-cx95mm2, copper conductor      | 100  | M    | YES/NO | NA    |       |       | NA      | Taxes Included |
| 11                                                                                  | S-320    | PS0679065520  | Cable 3.5-cx25mm2, copper conductor      | 2000 | M    | YES/NO | NA    |       |       | NA      | Taxes Included |
| 12                                                                                  | S-330    | PS0679065539  | Termination kits, INDOOR TYPE            | 8    | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 13                                                                                  | S-340    | PS0679065547  | Termination kits, OUTOOR TYPE,           | 11   | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 14                                                                                  | S-350    | PS0679065555  | RSJ Poles 185x75x6mm, 7m length          | 14   | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 15                                                                                  | S-360    | PS0679065563  | GOS switches                             | 10   | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 16                                                                                  | S-1260   | PS0679065571  | GOS with earth switch                    | 2    | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 17                                                                                  | S-380    | PS0679065580  | Lightning arrestors                      | 12   | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 18                                                                                  | S-390    | PS0679065598  | Supporting BOQ items of four pole        | 2    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 19                                                                                  | S-400    | PS0679065601  | Supporting BOQ items of Six pole         | 1    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 20                                                                                  | S-410    | PS0679065628  | 33 kV Outdoor CT                         | 1    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 21                                                                                  | S-420    | PS0679065636  | 33 kV Outdoor PT                         | 1    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 22                                                                                  | S-430    | PS0679065644  | Metering panel                           | 1    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 23                                                                                  | S-440    | PS0679065652  | License with MRI instrument              | 2    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 24                                                                                  | S-1290   | PS0679065660  | Cable 2 pair x 4 sq-mm, copper           | 3000 | M    | YES/NO | NA    |       |       | NA      | Taxes Included |
| 25                                                                                  | S-460    | PS0679065679  | Auxiliary transformer 100kVA             | 1    | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 26                                                                                  | S-470    | PS0679065687  | Drop out fuse                            | 1    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 27                                                                                  | S-480    | PS0679065695  | ACDB panel                               | 1    | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 28                                                                                  | S-490    | PS0679065709  | DB Switchboards                          | 2    | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 29                                                                                  | S-500    | PS0679065717  | ACSR conductor DOG type, 7/4.09          | 1000 | M    | YES/NO | NA    |       |       | NA      | Taxes Included |
| 30                                                                                  | S-510    | PS0679065725  | Cable glands, cable lugs and hardware    | 1    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 31                                                                                  | S-1270   | PS0679065733  | Cross-linked GI 50x50x4mm                | 375  | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 32                                                                                  | S-540    | PS0679065750  | MS gate 3.5m wide x 3m tall              | 5    | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 33                                                                                  | S-550    | PS0679065768  | Stone jelly 20mm for Inv rooms           | 60   | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 34                                                                                  | S-560    | PS0679065776  | Stone jelly 20mm for Control room        | 40   | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 35                                                                                  | S-1300   | PS0679065784  | Data cable 12 core x 1.5 mm2             | 700  | M    | YES/NO | NA    |       |       | NA      | Taxes Included |
| 36                                                                                  | S-970    | PS0679065792  | Miscellaneous item for bos supply        | 1    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 37                                                                                  | S-580    | PS0679065806  | Battery bank                             | 1    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 38                                                                                  | S-590    | PS0679065814  | Battery charger, 135 volts, 25 Amps      | 1    | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 39                                                                                  | S-600    | PS0679065822  | UPS 5 kVA with battery bank              | 3    | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 40                                                                                  | S-960    | PS0679065830  | hardware for 6 mm2 cable earthing        | 1    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 41                                                                                  | S-850    | PS0679065849  | Cable 1Cx 25 mm2 copper conductor        | 1000 | M    | YES/NO | NA    |       |       | NA      | Taxes Included |
| 42                                                                                  | S-1280   | PS0679065857  | pest control                             | 1    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 43                                                                                  | S-630    | PS0679065865  | Expansion bolts                          | 100  | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 44                                                                                  | S-640    | PS0679065873  | Lightning rod with earthing set          | 3    | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 45                                                                                  | S-650    | PS0679065881  | LED lights LST0-25 W                     | 300  | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 46                                                                                  | S-660    | PS0679065890  | Lighting hardwares for solar array       | 250  | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 47                                                                                  | S-860    | PS0679065903  | Lighting hardwares for Yard lights       | 50   | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 48                                                                                  | S-680    | PS0679065911  | Cable 3.5cx 2.5 mm2                      | 7500 | M    | YES/NO | NA    |       |       | NA      | Taxes Included |
| 49                                                                                  | S-690    | PS0679065920  | Cable 2Cx 1.5 mm2 copper                 | 2000 | M    | YES/NO | NA    |       |       | NA      | Taxes Included |
| 50                                                                                  | S-700    | PS0679065938  | Cable 1Cx 1.5 mm2                        | 1200 | M    | YES/NO | NA    |       |       | NA      | Taxes Included |
| 51                                                                                  | S-710    | PS0679065946  | CPVC pipe, 2-inch, for module cleaning   | 1500 | M    | YES/NO | NA    |       |       | NA      | Taxes Included |
| 52                                                                                  | S-720    | PS0679065954  | CPVC pipe, 1 inch, for module cleaning   | 3600 | M    | YES/NO | NA    |       |       | NA      | Taxes Included |
| 53                                                                                  | S-730    | PS0679065962  | Booster Pump                             | 3    | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 54                                                                                  | S-740    | PS0679065970  | Sintex                                   | 3    | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 55                                                                                  | S-750    | PS0679065989  | Ball valves 2-inch                       | 5    | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 56                                                                                  | S-760    | PS0679065997  | Ball valves 1-inch                       | 100  | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 57                                                                                  | S-770    | PS0679066004  | Hose pipes ribbed, flexible (50 m)       | 3    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 58                                                                                  | S-780    | PS0679066012  | High pressure gun                        | 3    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 59                                                                                  | S-790    | PS0679066020  | Cable tags                               | 1    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 60                                                                                  | S-800    | PS0679066039  | Danger boards                            | 1    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 61                                                                                  | S-810    | PS0679066047  | Cable markers                            | 460  | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 62                                                                                  | S-820    | PS0679066055  | Hoarding plate                           | 1    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 63                                                                                  | S-870    | PS0679066063  | Display boards and Sign boards           | 1    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 64                                                                                  | S-880    | PS0679066071  | insulation mat                           | 60   | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 65                                                                                  | S-890    | PS0679066080  | Air conditioner                          | 2    | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 66                                                                                  | S-900    | PS0679066101  | Tool kits and instruments                | 1    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 67                                                                                  | S-910    | PS0679066110  | Office furniture                         | 1    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 68                                                                                  | S-920    | PS0679066128  | Fire alarm system with spares            | 1    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 69                                                                                  | S-930    | PS0679066136  | Safety gadgets                           | 1    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 70                                                                                  | S-940    | PS0679066144  | Fire extinguishers                       | 1    | ST   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 71                                                                                  | S-950    | PS0679066152  | Grass cutting machine                    | 2    | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 72                                                                                  | S-1250   | PS0679070133  | GI earth electrodes for SMB              | 80   | NO   | YES/NO | NA    |       |       | NA      | Taxes Included |
| 73                                                                                  | I&C-10   | PS0679066160  | I&C1- upkeeping of Stores & porta cabin  | 1    | AU   | YES/NO | NA    | NA    | NA    |         | Taxes Included |
| 74                                                                                  | I&C-20   | PS0679066179  | I&C2-Borewell & tank connection          | 3    | AU   | YES/NO | NA    | NA    | NA    |         | Taxes Included |
| 75                                                                                  | I&C-30   | PS0679066187  | I&C3-DC cabling,SMB instlln & terminatio | 8    | AU   | YES/NO | NA    | NA    | NA    |         | Taxes Included |
| 76                                                                                  | I&C-40   | PS0679066195  | I&C4-laying,closing of array cable trenc | 2    | AU   | YES/NO | NA    | NA    | NA    |         | Taxes Included |
| 77                                                                                  | I&C-50   | PS0679066209  | I&C5-Eqpt erection & termination-IRs,CR  | 2    | AU   | YES/NO | NA    | NA    | NA    |         | Taxes Included |
| 78                                                                                  | I&C-60   | PS0679066217  | I&C6-Earth mat in IR & CR                | 3    | AU   | YES/NO | NA    | NA    | NA    |         | Taxes Included |
| 79                                                                                  | I&C-70   | PS0679066225  | I&C7-switchyard erection activities-IRs  | 2    | AU   | YES/NO | NA    | NA    | NA    |         | Taxes Included |
| 80                                                                                  | I&C-80   | PS0679066233  | I&C8-Stone jelly, fencing for IR yards   | 2    | AU   | YES/NO | NA    | NA    | NA    |         | Taxes Included |
| 81                                                                                  | I&C-90   | PS0679066241  | I&C9-HT cable trench & terminations      | 2    | AU   | YES/NO | NA    | NA    | NA    |         | Taxes Included |

|    |         |                                                                                  |                                          |    |    |        |    |    |    |  |                |
|----|---------|----------------------------------------------------------------------------------|------------------------------------------|----|----|--------|----|----|----|--|----------------|
| 82 | I&C-100 | PS0679066250                                                                     | I&C10--swyd erection activities for CRs  | 1  | AU | YES/NO | NA | NA | NA |  | Taxes Included |
| 83 | I&C-110 | PS0679066268                                                                     | I&C11-Stone jelly, fencing for CR yard   | 1  | AU | YES/NO | NA | NA | NA |  | Taxes Included |
| 84 | I&C-120 | PS0679066276                                                                     | I&C12-Comm cbl lay,termination-SCADA,CRP | 1  | AU | YES/NO | NA | NA | NA |  | Taxes Included |
| 85 | I&C-130 | PS0679066284                                                                     | I&C13-Earthing in IRs,CR, Swyd & array   | 1  | AU | YES/NO | NA | NA | NA |  | Taxes Included |
| 86 | I&C-140 | PS0679066292                                                                     | I&C14-I&C of Battery & charger           | 1  | AU | YES/NO | NA | NA | NA |  | Taxes Included |
| 87 | I&C-150 | PS0679066306                                                                     | I&C15-I&C of lighting system             | 1  | AU | YES/NO | NA | NA | NA |  | Taxes Included |
| 88 | I&C-160 | PS0679066314                                                                     | I&C16-Comm system & WMS installation     | 1  | AU | YES/NO | NA | NA | NA |  | Taxes Included |
| 89 | I&C-170 | PS0679066322                                                                     | I&C17-I&C of cleaning system             | 1  | AU | YES/NO | NA | NA | NA |  | Taxes Included |
| 90 | I&C-180 | PS0679066330                                                                     | I&C18-I&C of LA ESE                      | 10 | AU | YES/NO | NA | NA | NA |  | Taxes Included |
| 91 | I&C-190 | PS0679066357                                                                     | I&C19-I&C of balance misc items          | 1  | AU | YES/NO | NA | NA | NA |  | Taxes Included |
| 92 | I&C-200 | PS0679066365                                                                     | I&C20-Commissioning,tests,CEA approval   | 1  | AU | YES/NO | NA | NA | NA |  | Taxes Included |
| 93 |         | <b>Freight Charge including Service Tax on Freight: Included in Quoted rates</b> |                                          |    |    |        |    |    |    |  |                |

**Note:**

1. The quoted prices shall be on "FOR" basis to project site: **WBSEDCL, CHHARRAH, WEST BENGAL**
2. The quoted prices shall be inclusive of all Taxes & Duties, Packing & Forwarding charges and Freight.
3. However, the percentage of taxes considered against each item shall be indicated in the column for Taxes for the purpose of availing Tax Credit.
4. \*\*ED shall not be considered as the project is under MNRE approval. Hence all inclusive rate for Supply is to be quoted without ED for Supply. However, the prevailing rate of ED shall be indicated in SCC (Annexure B). In case any item is rejected by MNRE, ED shall be reimbursed for that item at actuals.
5. The above format only shall be used for compliance. (reproducing on your letter head is acceptable).
6. Insurance will be in BHEL scope.

**AUTHORISED SIGNATORY WITH SEAL**

| TECHNICAL BID ENCLOSURE FOR COMPLIANCE OF QUOTE : UNPRICED BID (Indigenous Vendors) |                     |               |                                          |      |      |                 |                                        |       |       |       |         |                |
|-------------------------------------------------------------------------------------|---------------------|---------------|------------------------------------------|------|------|-----------------|----------------------------------------|-------|-------|-------|---------|----------------|
| RFQ No. UPK0000987                                                                  |                     |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| Sl. No.                                                                             | Ref. No.            | Material Code | DESCRIPTION                              | QTY  | UNIT | Unit Rate (Rs.) | Total Value (Rs.)<br>(Unit Rate x Qty) | TAXES |       |       |         | Remarks        |
|                                                                                     |                     |               |                                          |      |      |                 |                                        | ED %  | CST % | VAT % | S. TAX% |                |
| 1                                                                                   | S-220               | PS0679065415  | Security cabin                           | 1    | NO   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 2                                                                                   | S-230               | PS0679065423  | Submersible pump 3-phase                 | 3    | NO   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 3                                                                                   | S-240               | PS0679065440  | HDPE DWC pipe                            | 8500 | M    |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 4                                                                                   | S-250               | PS0679065458  | Cable trays in control room: Normal typ  | 300  | M    |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 5                                                                                   | S-260               | PS0679065466  | Cable trays in control room: Corner ben  | 24   | NO   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 6                                                                                   | S-270               | PS0679065474  | Cable support structure                  | 12   | NO   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 7                                                                                   | S-280               | PS0679065482  | Cable support structure (normal)         | 4    | NO   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 8                                                                                   | S-290               | PS0679065490  | Hardware for grouting control room panel | 1    | ST   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 9                                                                                   | S-300               | PS0679065504  | Hardware requirements                    | 4    | ST   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 10                                                                                  | S-310               | PS0679065512  | Cable 3.5-cx95mm2, copper conductor      | 100  | M    |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 11                                                                                  | S-320               | PS0679065520  | Cable 3.5-cx25mm2, copper conductor      | 2000 | M    |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 12                                                                                  | S-330               | PS0679065539  | Termination kits, INDOOR TYPE            | 8    | NO   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 13                                                                                  | S-340               | PS0679065547  | Termination kits, OUTOOR TYPE,           | 11   | NO   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 14                                                                                  | S-350               | PS0679065555  | RSJ Poles 185x75x6mm, 7m length          | 14   | NO   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 15                                                                                  | S-360               | PS0679065563  | GOS switches                             | 10   | NO   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 16                                                                                  | S-1260              | PS0679065571  | GOS with earth switch                    | 2    | NO   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 17                                                                                  | S-380               | PS0679065580  | Lightning arrestors                      | 12   | NO   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 18                                                                                  | S-390               | PS0679065598  | Supporting BOQ items of four pole        | 2    | ST   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 19                                                                                  | S-400               | PS0679065601  | Supporting BOQ items of Six pole         | 1    | ST   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 20                                                                                  | S-410               | PS0679065628  | 33 kV Outdoor CT                         | 1    | ST   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 21                                                                                  | S-420               | PS0679065636  | 33 kV Outdoor PT                         | 1    | ST   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 22                                                                                  | S-430               | PS0679065644  | Metering panel                           | 1    | ST   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 23                                                                                  | S-440               | PS0679065652  | License with MRI instrument              | 2    | ST   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 24                                                                                  | S-1290              | PS0679065660  | Cable 2 pair x 4 sq-mm, copper           | 3000 | M    |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 25                                                                                  | S-460               | PS0679065679  | Auxiliary transformer 100kVA             | 1    | NO   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 26                                                                                  | S-470               | PS0679065687  | Drop out fuse                            | 1    | ST   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 27                                                                                  | S-480               | PS0679065695  | ACDB panel                               | 1    | NO   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 28                                                                                  | S-490               | PS0679065709  | DB Switchboards                          | 2    | NO   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 29                                                                                  | S-500               | PS0679065717  | ACSR conductor DOG type, 7/4.09          | 1000 | M    |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 30                                                                                  | S-510               | PS0679065725  | Cable glands, cable lugs and hardware    | 1    | ST   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 31                                                                                  | S-1270              | PS0679065733  | Cross-linked GI 50x50x4mm                | 375  | ST   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 32                                                                                  | S-540               | PS0679065750  | MS gate 3.5m wide x 3m tall              | 5    | NO   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 33                                                                                  | S-550               | PS0679065768  | Stone jelly 20mm for Inv rooms           | 60   | ST   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 34                                                                                  | S-560               | PS0679065776  | Stone jelly 20mm for Control room        | 40   | ST   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 35                                                                                  | S-1300              | PS0679065784  | Data cable 12 core x 1.5 mm2             | 700  | M    |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 36                                                                                  | S-970               | PS0679065792  | Miscellaneous item for bos supply        | 1    | ST   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 37                                                                                  | S-580               | PS0679065806  | Battery bank                             | 1    | ST   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 38                                                                                  | S-590               | PS0679065814  | Battery charger, 135 volts, 25 Amps      | 1    | NO   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 39                                                                                  | S-600               | PS0679065822  | UPS 5 kVA with battery bank              | 3    | NO   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 40                                                                                  | S-960               | PS0679065830  | hardware for 6 mm2 cable earthing        | 1    | ST   |                 |                                        | NA    |       |       | NA      | Taxes Included |
|                                                                                     | Unit Rate in Words: |               |                                          |      |      |                 |                                        |       |       |       |         |                |
| 41                                                                                  | S-850               | PS0679065849  | Cable 1Cx 25 mm2 copper conductor        | 1000 | M    |                 |                                        | NA    |       |       | NA      | Taxes Included |



| #  |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|----|---------|--------------|------------------------------------------|---------------------|----|--|--|----|----|----|----|----------------|
| 42 | S-1280  | PS0679065857 | pest control                             | 1                   | ST |  |  | NA |    |    | NA | Taxes Included |
| 43 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-630   | PS0679065865 | Expansion bolts                          | 100                 | NO |  |  | NA |    |    | NA | Taxes Included |
| 44 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-640   | PS0679065873 | Lightning rod with earthing set          | 3                   | NO |  |  | NA |    |    | NA | Taxes Included |
| 45 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-650   | PS0679065881 | LED lights LSTO-25 W                     | 300                 | NO |  |  | NA |    |    | NA | Taxes Included |
| 46 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-660   | PS0679065890 | Lighting hardwares for solar array       | 250                 | NO |  |  | NA |    |    | NA | Taxes Included |
| 47 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-860   | PS0679065903 | Lighting hardwares for Yard lights       | 50                  | NO |  |  | NA |    |    | NA | Taxes Included |
| 48 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-680   | PS0679065911 | Cable 3.5cx 2.5 mm2                      | 7500                | M  |  |  | NA |    |    | NA | Taxes Included |
| 49 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-690   | PS0679065920 | Cable 2Cx 1.5 mm2 copper                 | 2000                | M  |  |  | NA |    |    | NA | Taxes Included |
| 50 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-700   | PS0679065938 | Cable 1Cx 1.5 mm2                        | 1200                | M  |  |  | NA |    |    | NA | Taxes Included |
| 51 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-710   | PS0679065946 | CPVC pipe, 2-inch, for module cleaning   | 1500                | M  |  |  | NA |    |    | NA | Taxes Included |
| 52 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-720   | PS0679065954 | CPVC pipe, 1 inch, for module cleaning   | 3600                | M  |  |  | NA |    |    | NA | Taxes Included |
| 53 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-730   | PS0679065962 | Booster Pump                             | 3                   | NO |  |  | NA |    |    | NA | Taxes Included |
| 54 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-740   | PS0679065970 | Sintex                                   | 3                   | NO |  |  | NA |    |    | NA | Taxes Included |
| 55 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-750   | PS0679065989 | Ball valves 2-inch                       | 5                   | NO |  |  | NA |    |    | NA | Taxes Included |
| 56 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-760   | PS0679065997 | Ball valves 1-inch                       | 100                 | NO |  |  | NA |    |    | NA | Taxes Included |
| 57 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-770   | PS0679066004 | Hose pipes ribbed, flexible (50 m)       | 3                   | ST |  |  | NA |    |    | NA | Taxes Included |
| 58 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-780   | PS0679066012 | High pressure gun                        | 3                   | ST |  |  | NA |    |    | NA | Taxes Included |
| 59 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-790   | PS0679066020 | Cable tags                               | 1                   | ST |  |  | NA |    |    | NA | Taxes Included |
| 60 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-800   | PS0679066039 | Danger boards                            | 1                   | ST |  |  | NA |    |    | NA | Taxes Included |
| 61 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-810   | PS0679066047 | Cable markers                            | 460                 | NO |  |  | NA |    |    | NA | Taxes Included |
| 62 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-820   | PS0679066055 | Hoarding plate                           | 1                   | ST |  |  | NA |    |    | NA | Taxes Included |
| 63 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-870   | PS0679066063 | Display boards and Sign boards           | 1                   | ST |  |  | NA |    |    | NA | Taxes Included |
| 64 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-880   | PS0679066071 | insulation mat                           | 60                  | NO |  |  | NA |    |    | NA | Taxes Included |
| 65 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-890   | PS0679066080 | Air conditioner                          | 2                   | NO |  |  | NA |    |    | NA | Taxes Included |
| 66 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-900   | PS0679066101 | Tool kits and instruments                | 1                   | ST |  |  | NA |    |    | NA | Taxes Included |
| 67 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-910   | PS0679066110 | Office furniture                         | 1                   | ST |  |  | NA |    |    | NA | Taxes Included |
| 68 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-920   | PS0679066128 | Fire alarm system with spares            | 1                   | ST |  |  | NA |    |    | NA | Taxes Included |
| 69 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-930   | PS0679066136 | Safety gadgets                           | 1                   | ST |  |  | NA |    |    | NA | Taxes Included |
| 70 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-940   | PS0679066144 | Fire extinguishers                       | 1                   | ST |  |  | NA |    |    | NA | Taxes Included |
| 71 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-950   | PS0679066152 | Grass cutting machine                    | 2                   | NO |  |  | NA |    |    | NA | Taxes Included |
| 72 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | S-1250  | PS0679070133 | GI earth electrodes for SMB              | 80                  | NO |  |  | NA |    |    | NA | Taxes Included |
| 73 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | I&C-10  | PS0679066160 | I&C1- upkeeping of Stores & porta cabin  | 1                   | AU |  |  | NA | NA | NA |    | Taxes Included |
| 74 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | I&C-20  | PS0679066179 | I&C2-Borewell & tank connection          | 3                   | AU |  |  | NA | NA | NA |    | Taxes Included |
| 75 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | I&C-30  | PS0679066187 | I&C3-DC cabling,SMB instlln & terminatio | 8                   | AU |  |  | NA | NA | NA |    | Taxes Included |
| 76 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | I&C-40  | PS0679066195 | I&C4-laying,closing of array cable trenc | 2                   | AU |  |  | NA | NA | NA |    | Taxes Included |
| 77 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | I&C-50  | PS0679066209 | I&C5-Eqpt erection & termination-IRs,CR  | 2                   | AU |  |  | NA | NA | NA |    | Taxes Included |
| 78 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | I&C-60  | PS0679066217 | I&C6-Earth mat in IR & CR                | 3                   | AU |  |  | NA | NA | NA |    | Taxes Included |
| 79 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | I&C-70  | PS0679066225 | I&C7-switchyard erection activities-IRs  | 2                   | AU |  |  | NA | NA | NA |    | Taxes Included |
| 80 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | I&C-80  | PS0679066233 | I&C8-Stone jelly, fencing for IR yards   | 2                   | AU |  |  | NA | NA | NA |    | Taxes Included |
| 81 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | I&C-90  | PS0679066241 | I&C9-HT cable trench & terminations      | 2                   | AU |  |  | NA | NA | NA |    | Taxes Included |
| 82 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | I&C-100 | PS0679066250 | I&C10--swyd erection activities for CRs  | 1                   | AU |  |  | NA | NA | NA |    | Taxes Included |
| 83 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | I&C-110 | PS0679066268 | I&C11-Stone jelly, fencing for CR yard   | 1                   | AU |  |  | NA | NA | NA |    | Taxes Included |
| 84 |         |              |                                          | Unit Rate in Words: |    |  |  |    |    |    |    |                |
|    | I&C-120 | PS0679066276 | I&C12-Comm cbl lay,termination-SCADA,CRP | 1                   | AU |  |  | NA | NA | NA |    | Taxes Included |

|                     |                                                                                  |              |                                        |    |    |  |    |    |    |  |                |
|---------------------|----------------------------------------------------------------------------------|--------------|----------------------------------------|----|----|--|----|----|----|--|----------------|
| 85                  | I&C-130                                                                          | PS0679066284 | I&C13-Earthing in IRs,CR, Swyd & array | 1  | AU |  | NA | NA | NA |  | Taxes Included |
| Unit Rate in Words: |                                                                                  |              |                                        |    |    |  |    |    |    |  |                |
| 86                  | I&C-140                                                                          | PS0679066292 | I&C14-I&C of Battery & charger         | 1  | AU |  | NA | NA | NA |  | Taxes Included |
| Unit Rate in Words: |                                                                                  |              |                                        |    |    |  |    |    |    |  |                |
| 87                  | I&C-150                                                                          | PS0679066306 | I&C15-I&C of lighting system           | 1  | AU |  | NA | NA | NA |  | Taxes Included |
| Unit Rate in Words: |                                                                                  |              |                                        |    |    |  |    |    |    |  |                |
| 88                  | I&C-160                                                                          | PS0679066314 | I&C16-Comm system & WMS installation   | 1  | AU |  | NA | NA | NA |  | Taxes Included |
| Unit Rate in Words: |                                                                                  |              |                                        |    |    |  |    |    |    |  |                |
| 89                  | I&C-170                                                                          | PS0679066322 | I&C17-I&C of cleaning system           | 1  | AU |  | NA | NA | NA |  | Taxes Included |
| Unit Rate in Words: |                                                                                  |              |                                        |    |    |  |    |    |    |  |                |
| 90                  | I&C-180                                                                          | PS0679066330 | I&C18-I&C of LA ESE                    | 10 | AU |  | NA | NA | NA |  | Taxes Included |
| Unit Rate in Words: |                                                                                  |              |                                        |    |    |  |    |    |    |  |                |
| 91                  | I&C-190                                                                          | PS0679066357 | I&C19-I&C of balance misc items        | 1  | AU |  | NA | NA | NA |  | Taxes Included |
| Unit Rate in Words: |                                                                                  |              |                                        |    |    |  |    |    |    |  |                |
| 92                  | I&C-200                                                                          | PS0679066365 | I&C20-Commissioning,tests,CEA approval | 1  | AU |  | NA | NA | NA |  | Taxes Included |
| Unit Rate in Words: |                                                                                  |              |                                        |    |    |  |    |    |    |  |                |
| 93                  | <b>Freight Charge including Service Tax on Freight: Included in Quoted rates</b> |              |                                        |    |    |  |    |    |    |  |                |

**Note:**

1. The quoted prices shall be on "FOR" basis to project site: **WBSEDCL, CHHARRAH, WEST BENGAL**
2. The quoted prices shall be inclusive of all Taxes & Duties, Packing & Forwarding charges and Freight.
3. However, the percentage of taxes considered against each item shall be indicated in the column for Taxes for the purpose of availing Tax Credit.
4. \*\*ED shall not be considered as the project is under MNRE approval. Hence all inclusive rate for Supply is to be quoted without ED for Supply. However, the prevailing rate of ED shall be indicated in SCC (Annexure B). In case any item is rejected by MNRE, ED shall be reimbursed for that item at actuals.
5. The above format only shall be used for compliance. (reproducing on your letter head is acceptable).
6. Insurance will be in BHEL scope.

**AUTHORISED SIGNATORY WITH SEAL**

## ANNEXURE - C

| List of Documents to be submitted by Vendors/Subcontractors for SPV Contracts.     |                                                                                               | Confirmation on submission | Deviation / Remarks |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------|---------------------|
| <b>IR Documents (Type - A): For all Civil &amp; I&amp;C &amp; O&amp;M</b>          |                                                                                               |                            |                     |
| Sl No.                                                                             | Documents                                                                                     |                            |                     |
| 1                                                                                  | Wage Sheet (Form 17)                                                                          | YES / NO                   |                     |
| 2                                                                                  | Attendance Register (w.r.t Sl No.1)                                                           | YES / NO                   |                     |
| 3                                                                                  | Workman Policy & Additional Insurance (Automotive Liability, Group Servis Insuarncce Policy e | YES / NO                   |                     |
| 4                                                                                  | PF Challan                                                                                    | YES / NO                   |                     |
| 5                                                                                  | ESI (Employee State Insurance)                                                                | YES / NO                   |                     |
| 6                                                                                  | ECR (Electronic Challan Receipt)                                                              | YES / NO                   |                     |
| 7                                                                                  | Bank Statement for PF deposit                                                                 | YES / NO                   |                     |
| 8                                                                                  | RCS (Remittance Confirmation Slip)                                                            | YES / NO                   |                     |
|                                                                                    |                                                                                               |                            |                     |
| <b>Quality Documents (Type - B): For all MMS Civil Works</b>                       |                                                                                               |                            |                     |
| Sl No.                                                                             | Documents                                                                                     |                            |                     |
| 1                                                                                  | FQA (Field Quality Assuarance)                                                                | NA                         |                     |
| 2                                                                                  | Field Content, Slump Test                                                                     | NA                         |                     |
| 3                                                                                  | Gradation of Aggregate (10mm, 20mm)                                                           | NA                         |                     |
| 4                                                                                  | Fine Aggregate Test (for Sand)                                                                | NA                         |                     |
| 5                                                                                  | Cube Test Registered                                                                          | NA                         |                     |
| 6                                                                                  | Material Test Certificate for Steel & Cement                                                  | NA                         |                     |
| 7                                                                                  | Consumption Register for Steel & Invoice                                                      | NA                         |                     |
| 8                                                                                  | Pour Card for Concreting purpose                                                              | NA                         |                     |
| 9                                                                                  | Royalty Reports (10mm, 20mm, Sand)                                                            | NA                         |                     |
| 10                                                                                 | Sand Soundess Test Reports                                                                    | NA                         |                     |
| 11                                                                                 | Slump Test Register                                                                           | NA                         |                     |
| 12                                                                                 | Sieve Analysis, Flakiness Index, Elongation Index - Register to be maintained                 | NA                         |                     |
| 13                                                                                 | Moisture Content Coarse and Fine Aggregate - Register to be maintained                        | NA                         |                     |
| 14                                                                                 | Water Test Report for Concrete                                                                | NA                         |                     |
| 15                                                                                 | Design Mix Report for Concrete                                                                | NA                         |                     |
|                                                                                    |                                                                                               |                            |                     |
| <b>Quality Documents (Type - B): For all Civil related Works</b>                   |                                                                                               |                            |                     |
| Sl No.                                                                             | Documents                                                                                     |                            |                     |
| 1                                                                                  | FQA (Field Quality Assuarance)                                                                | YES / NO                   |                     |
| 2                                                                                  | Field Content, Slump Test                                                                     | YES / NO                   |                     |
| 3                                                                                  | Gradation of Aggregate (10mm, 20mm)                                                           | YES / NO                   |                     |
| 4                                                                                  | Fine Aggregate Test (for Sand)                                                                | YES / NO                   |                     |
| 5                                                                                  | Cube Test Registered                                                                          | YES / NO                   |                     |
| 6                                                                                  | Material Test Certificate for Steel & Cement                                                  | YES / NO                   |                     |
| 7                                                                                  | Consumption Register for Steel & Invoice                                                      | YES / NO                   |                     |
| 8                                                                                  | Pour Card for Concreting purpose                                                              | YES / NO                   |                     |
| 9                                                                                  | Royalty Reports (10mm, 20mm, Sand)                                                            | YES / NO                   |                     |
| 10                                                                                 | Sand Soundess Test Reports                                                                    | YES / NO                   |                     |
| 11                                                                                 | Warpage of Bricks Test Reports                                                                | YES / NO                   |                     |
| 12                                                                                 | Core Cutting (Compaction Test) - Roads & Pathways                                             | YES / NO                   |                     |
| 13                                                                                 | Slump Test Register                                                                           | YES / NO                   |                     |
| 14                                                                                 | Sieve Analysis, Flakiness Index, Elongation Index - Register to be maintained                 | YES / NO                   |                     |
| 15                                                                                 | Moisture Content Coarse and Fine Aggregate - Register to be maintained*                       | YES / NO                   |                     |
| 16                                                                                 | Brick Test Reports                                                                            | YES / NO                   |                     |
| 17                                                                                 | Plastering profile and thickness                                                              | YES / NO                   |                     |
| 18                                                                                 | Compaction test beneath floor of all buildings. - Reports                                     | YES / NO                   |                     |
| 19                                                                                 | Test Certificates for Paint, Glan, Glazing, etc.                                              | YES / NO                   |                     |
| 20                                                                                 | Test Certificates Aluminium Section for doors and windows (Anodisation Certificates also)     | YES / NO                   |                     |
| 21                                                                                 | BBS for Buildings                                                                             | YES / NO                   |                     |
| 22                                                                                 | Water Test Report for Concrete                                                                | YES / NO                   |                     |
| 23                                                                                 | Design Mix Report for Concrete                                                                | YES / NO                   |                     |
|                                                                                    |                                                                                               |                            |                     |
| <b>Quality Documents: for Electrical &amp; Mechanical Installation Works (BOS)</b> |                                                                                               |                            |                     |
| Sl No.                                                                             | Documents                                                                                     |                            |                     |
| 1                                                                                  | FQA (Field Quality Assuarance)                                                                | YES / NO                   |                     |
| 2                                                                                  | Inspection Reports                                                                            | YES / NO                   |                     |
| 3                                                                                  | Guarantee Certificates                                                                        | YES / NO                   |                     |
| 4                                                                                  | Factory Acceptance Test Reports                                                               | YES / NO                   |                     |
| 5                                                                                  | Commissioning Reports                                                                         | YES / NO                   |                     |

**NOTE:**

\* This list of documents is indicative and intended towards all Solar Projects.

\* Apart from the above, any other document required by the Customer and which are mandatory for Billing by BHEL to the Customer, the same needs to be provided by the respective vendors.