Bharat Heavy Electricals Ltd.,

(A Government of India undertaking)

Electronics Division

PB No.2606, Mysore Road, Bangalore-560026, India

Quotations are invited under two part bid system for supply of BOS and I&C for SPV Plant at BHEL Trichy through e-procurement route.

RFQ NO and date	TGPBOS0002 dated 28.11.2017 (E-tender)
RFQ due date & time	12.12.2017 up to 13.00 hrs (IST)
Date, Time & Venue of Part-I Bid Opening	12.12.2017 after 13.30 hrs (IST) (E-tender) – Website - https://bheleps.buyjunction.in
Date, Time & Venue of Price Bid opening	Will be intimated later for technically accepted vendors
Address for Communication & Contact Person in BHEL	Mr. T.G.Pragadeesh (09742576787)/ Mr. Chendhil Kumar R (09449869644), SC&PV MM Department, BHEL Elecrtronics Division, PB NO 2606, Mysore road, Bangalore-560 026. INDIA Email: pragadeeshtg@bheledn.co.in chendhil@bheledn.co.in Telephone number: +91 80 26998377, +91 80 26998391

Annexure-A1

TECHNICAL BID ENCLOSURE FOR COMPLIANCE OF QUOTE : UNPRICED BID (Foreign Vendors)							
RFQ No. TGPBOS0002 Dtd.28.11.2017 Due Date (Tech Bid): 12.12.2017							
Sl No.	**Material Code**	**DESCRIPTION**	**Quantity**	**Unit**	**Quoted**	**HSN/SAC CODES**	**Currency**
1	PS0679074414	Supply of BOS items for 7.5 MW SPV Plant	1	ST	Yes / No		
2	PS0679074422	Installaton & commissioning of 7.5 MW SPV Plant	1	AU	Yes / No		
3	Charges (custom duty, GST, packing, freight, handling, inland transport etc), if any				Yes / No		
4	Total Price						

Vendor to quote for delivery of items up to respective site. Please refer RFQ/Tender for detailed description of items.

Note:

The above format is to be used for Unpriced bid.

Evaluation on complete package basis, L1 of Supply on "FOR Destination" basis to site will only be considered.

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ANNEXURE A2

PRICE BID (Foreign Vendors)							
RFQ No. TGPBOS0002 Dtd.28.11.2017 Due Date (Tech Bid): 12.12.2017							
Sl No.	**Material Code**	**DESCRIPTION**	**Quantity**	**Unit**	**Quoted**	**HSN/SAC CODES**	**Currency**
1	PS0679074414	Supply of BOS items for 7.5 MW SPV Plant	1	ST	Yes / No		
2	PS0679074422	Installaton & commissioning of 7.5 MW SPV Plant	1	AU	Yes / No		
3	Charges (custom duty, GST, packing, freight, handling, inland transport etc), if any				Yes / No		
4	Total Price						

Vendor to quote for delivery of items up to respective site. Please refer RFQ/Tender for detailed description of items.

Note:

The above format is to be used for Priced bid.

Evaluation on complete package basis, L1 of Supply on "FOR Destination" basis to site will only be considered.

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ANNEXURE B1

TECHNICAL BID ENCLOSURE FOR COMPLIANCE OF QUOTE : UNPRICED BID (Indigenous Vendors)								
RFQ No. TGPBOS0002 Dtd.28.11.2017 Due Date (Tech Bid): 12.12.2017								
Sl No.	**Material Code**	**DESCRIPTION**	**QUOTED**	**QTY**	**UNIT**	**HSN/SAC CODES**	**BREAK UP OF TAX STRUCTURE (CGST/SGST/IGST/Service Tax etc) WITH CURRENT RATES**	**Remarks**
1	PS0679074414	Supply of BOS items for 7.5 MW SPV Plant	Yes / No	1	ST			Taxes extra
2	PS0679074422	Installaton & commissioning of 7.5 MW SPV Plant	Yes / No	1	AU			Taxes extra
3	**Freight Charges including GST on Freight		YES/NO	Lumpsum			NA	**Freight : Free of Cost/Extra

Please refer RFQ/Tender for detailed description of items.

Note:

1. The quoted prices shall be on "FOR" basis to project sites.
2. Please indicate taxes clearly applicable as on date.
3. The above format only shall be used for compliance.No changes are acceptable.
4. Tax rates for Supply for Sl No.1-2.
5. Indicate whether freight charges are free of cost or will be charged extra.In absence of clarity, these charges shall be considered free of cost from vendor.(If the offer contains the freight value at actuals, it will be considered as free of cost). **No communication will be sought in this regard.**
6. SUCCESSFUL VENDOR SHALL SUBMIT THE BILLING BREAK UP FOR SUPPLY & I&C FOR APPROVAL AND IMPLEMENTATION.Successful vendor to furnish HSN/SAC codes against each item for billing break-up implementation.
7. Evaluation on complete package basis, L1 of Supply on “FOR” basis to site will only be considered.

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ANNEXURE B2

PRICED BID (Indigenous Vendors)								
RFQ No. TGPBOS0002 Dtd.28.11.2017 Due Date (Tech Bid): 12.12.2017								
Sl No.	Material Code	DESCRIPTION	QTY	UNIT	Unit Rate (Rs.)	Total Value (Rs.) (Rate X Qty)	BREAK UP OF TAX STRUCTURE (CGST/SGST/IGST/Service Tax etc) WITH CURRENT RATES	Remarks
1	PS0679074414	Supply of BOS items for 7.5 MW SPV Plant	1	ST				Taxes extra
	Unit rate in words :							
2	PS0679074422	Installaton & commissioning of 7.5 MW SPV Plant	1	AU				Taxes extra
	Unit rate in words :							
3	**Freight Charges including GST on Freight		Lumpsum				NA	**Freight : Free of Cost/Extra
	Freight charge in words :							

Please refer RFQ/Tender for detailed description of items.

Note:

1. The quoted prices shall be on "FOR" basis to project sites.
2. Please indicate taxes clearly applicable as on date.
3. The above format only shall be used for compliance.No changes are acceptable.
4. Tax rates for Supply for Sl No.1-2.
5. Indicate whether freight charges are free of cost or will be charged extra.In absence of clarity, these charges shall be considered free of cost from vendor.(If the offer contains the freight value at actuals, it will be considered as free of cost). **No communication will be sought in this regard.**
6. SUCCESSFUL VENDOR SHALL SUBMIT THE BILLING BREAK UP FOR SUPPLY & I&C FOR APPROVAL AND IMPLEMENTATION.Successful vendor to furnish HSN/SAC codes against each item for billing break-up implementation.
7. Evaluation on complete package basis, L1 of Supply on “FOR” basis to site will only be considered.

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SPECIAL COMMERCIAL CONDITIONS OF CONTRACT (SCC) - for foreign vendors				
RFQ No. TGPBOS0002 Dtd.28.11.2017 Due Date (Tech Bid): 12.12.2017				
Sl. No.	**Terms**	**BHEL Term**	**Confirmation**	**Deviation/Remarks**
1	**Pre-Qualification Criteria (PQC)**	1) Vendor should have executed at least one contract of indoor/outdoor electrical installation of 11KV minimum in power plants or sub-stations in India with scope including both supply and erection for total value, not less than Rs. 1.5 Crores within last 3 years from date of tender opening. As evidence for this, vendor shall submit (a) certification from clients for completion of supply and erection (b) copies of purchase orders from the clients. 2) Vendor should have achieved annual average financial turnover of Rs. 5 Crores in last three financial years (2014-15, 15-16 and 16-17). Vendor shall submit the audited balance sheets for all the 3 years. In case, for FY 2016-17, audited balance sheet is not available, unaudited balance sheet is acceptable.	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 https://bheleps.buyjunction.in of M/s. Mjunction Services Limited.**	Complied	
		(b) SCC & Annexure A1 to be submitted along with technical bid (Part-I) & **Annexure A2** 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 : 7.5MW SPV Plant at BHEL, Trichy	Complied	
5	**Delivery Period:**	**Supply :** 6 (Six) weeks from PO including drawing or GTP Approval wherever required **I&C:** Within 4 (Four) weeks from supply	Acceptable / Not acceptable	
6	**Payment Term:**	**(a) 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. **(b) I&C:** 100% on completion of I&C/Supervision and certification line item wise on pro-rata basis. **Note :** 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.	Acceptable / Not acceptable	
		(b) For any deviation in payment term, the offer will be liable for loading as per Clause G of ITB.	Acceptable / Not acceptable	
7	**Evalution of L1**	Over all L1 of Supply + I&C on "FOR" basis to site will only be considered.	Complied	
8	**Warranty :**	**Warranty for Supply :** 18 months from supply, 12 months from I&C whichever is earlier. **Warranty/Guarantee for Workmanship & I&C :** 12 months from I&C.	Acceptable / Not acceptable	
9	**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	
		(b) Pre Shipment Inspection charges , if any, shall be considered while evaluating your offer to arive at "Total Cost to BHEL".The charges for the same shall be informed to you before Price Bid Opening/Reverse Auction.	Acceptable / Not acceptable	
10	**Penalty**	**(a) Supply:** 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	
11	**PBG**	PBG shall be furnished in the BHEL prescribed format.	Acceptable / Not acceptable	

12	**Validity:**	Quotation should remain valid for a period of 90 days from the due date.	Acceptable / Not acceptable	
13	**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	
14	**Reverse Auction:**	BHEL reserves the right to conduct Reverse auction.Procedure for the same will be informed by BHEL .	Acceptable / Not acceptable	
15	**DUN No.**	Please mention Dun & Bradstreet No.(DUN No.)		
16	**Consignment Details**	Weight and Dimension of consignment with packing.	Furnished / To be furnished	
17	**Despatch Documents:**	Despatch documents include Air Waybill/Bill of Lading, Invoice, Packing list, PSI letter copy and Warranty certificate.	Acceptable / Not acceptable	
		One copy of Invoice, Packing list and Air Way Bill /Bill of Lading shall be faxed/emailed immediately after despatch. Also one copy of packing list to be kept inside each box for easy identification of material at site.		
18	**Other terms & conditions**	For any other Terms and Conditions, kindly refer to the following: A: ITB (document ref :SCPV: BOS: ITB - Rev 02) B: GCC (document ref: SCPV: BOS: GCC - Rev 02)	Acceptable / Not acceptable	
19	**BOS %**	The percentage of Supply, I&C and O&M for values shall be in the range indicated below(approximately,with overall tallying to 100%) : (a) Supply : 57-63% (b) I&C: 37-43%	Complied	

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SPECIAL COMMERCIAL CONDITIONS OF CONTRACT (SCC) - for indigenous vendors				
RFQ No. TGPBOS0002 Dtd.28.11.2017 Due Date (Tech Bid): 12.12.2017				
Sl No.	**Terms**	**BHEL Term**	**Confirmation**	**Deviation / Remarks**
1	**Pre-Qualification Criteria (PQC)**	1) Vendor should have executed at least one contract of indoor/outdoor electrical installation of 11KV minimum in power plants or sub-stations in India with scope including both supply and erection for total value, not less than Rs. 1.5 Crores within last 3 years from date of tender opening. As evidence for this, vendor shall submit (a) certification from clients for completion of supply and erection (b) copies of purchase orders from the clients. 2) Vendor should have achieved annual average financial turnover of Rs. 5 Crores in last three financial years (2014-15, 15-16 and 16-17). Vendor shall submit the audited balance sheets for all the 3 years. In case, for FY 2016-17, audited balance sheet is not available, unaudited balance sheet is acceptable.	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 https://bheleps.buyjunction.in of M/s. Mjunction Services Limited.**	Complied	
		(b) SCC & Annexure 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.(PVC clause not acceptable).	Complied	
4	**Terms of Delivery**	Free On Road Basis to Project site : 7.5MW SPV Plant at BHEL, Trichy	Complied	
5	**Delivery Period**	**Supply :** 6 (Six) weeks from PO date including drawing/GTP approval wherever required. **I&C:** Within 4 (Four) weeks from supply	Acceptable / Not acceptable	
6	**Payment Term**	**(a) 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. **(b) I&C/Supervision:** 100% on completion of I&C/Supervision and certification line item wise on pro-rata basis. **Note** : 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.	Acceptable / Not acceptable	
		(b) For any deviation in payment term, the offer will be liable for loading as per Clause G of ITB.	Acceptable / Not acceptable	
7	**GST**	**(a)** Kindly provide the tax structure (CGST, SGST, IGST) with current rate applicable.	CGST: ……% SGST: ……% IGST: ……%	
		(b) Kindly furnish your GST No.	GST no……	
8	**Evalution of L1 vendor**	Over all L1 of Supply + I&C on "FOR" basis to site will only be considered.	Complied	
9	**Warranty**	**Warranty for Supply :** 18 months from supply, 12 months from I&C whichever is earlier. **Warranty/Guarantee for Workmanship & I&C :** 12 months from I&C.	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 atleast one week in advance.	Acceptable / Not acceptable	
		(b) Pre Shipment Inspection charges , if any, shall be considered while evaluating your offer to arive at "Total Cost to BHEL".The charges for the same shall be informed to you before Price Bid Opening/Reverse Auction.	Acceptable / Not acceptable	
11	**Penalty**	**(a) Supply:** 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	
12	**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	
13	**PBG**	PBG shall be furnished in the BHEL prescribed format.	Acceptable / Not acceptable	
14	**Despatch Documents**	Complete set of despatch documents in 3 sets shall be forwarded to BHEL directly. Despatch documents include Invoice, 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. One set of Invoice, Packing list and L/R shall be emailed immediately after despatch to BHEL-EDN, Bangalore.	Complied	
15	**Reverse Auction**	BHEL reserves the right to conduct Reverse auction.Procedure for the same will be informed by BHEL .	Acceptable / Not acceptable	
16	**Other terms & conditions**	For any other Terms and Conditions, kindly refer to the following: A: ITB (document ref :SCPV: BOS: ITB - Rev 02) B: GCC (document ref: SCPV: BOS: GCC - Rev 02)	Acceptable / Not acceptable	
17	**Validity**	Quotation should remain valid for a period of 90 days from the due date.	Acceptable / Not acceptable	
18	**Shipment**	Kindly indicate the state from where the shipment will take place.	State/Place	
19	**BOS %**	The percentage of Supply & I&C for values shall be in the range indicated below(approximately,with overall tallying to 100%) : (a) Supply : 57-63% (b) I&C : 37-43%	Complied	

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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: 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. <u>GUIDELINES FOR PREPARATION OF OFFER:</u>

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. <u>GUIDELINES FOR OFFER SUBMISSION:</u>

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. <u>PROCESSING OFFERS RECEIVED:</u>

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.

Sl No	Deviation on	Nature of Deviation / Offered Terms	Loading %
1.	**Payment Terms**	**For Purchase within India :-**	
		1) Credit period less than 45 days	15
		*** For Foreign Purchase :-**	
		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.	**Penalty for Delayed Delivery**	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:

1. ADVANCE PAYMENT/LC: Quotations with "Advance payment/Inland LC" shall be rejected.

2. 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).

3. 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.

4. Non-Compliance of Warranty terms. Offers not complying with Warranty terms as per RFQ Terms is liable for rejection.

5. 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.

6. 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):

1. 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.
    a. PBG shall be from any of the BHEL consortium of bankers **(refer Annexure V)**.
    b. 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. PROVISONS 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

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: 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 transhipment 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) 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).

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).

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 Phytosanitory / 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 notices 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
DO6	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 ALLOTED BY BHEL :

E mail id for c form correspondence :

BHEL PO NO	INVOICE NO	INVOICE DATE	INVOICE AMOUNT	SUPPLY FROM - STATE	SUPPLY TO - STATE	CST TIN NUMBER (SUPPLIER)	INVOICE AMOUNT EXCLUDING FREIGHT	C FORM QTR	YEAR	SUPPLY TO BHEL 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 [1] (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_____[2] 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 ……[3] valued at Rs……[4] (Rupees ----------)/FC……(in words……..) for ……[5] (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…….. [6] 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 ……[7]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…… [8]
b) This Guarantee shall be valid up to ……[9]
c) Unless the Bank is served a written claim or demand on or before _____[10] 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…….

[1] *NAME AND ADDRESS OF EMPLOYER I.e Bharat Heavy Electricals Limited*

[2] *NAME AND ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER.*

[3] *DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE*

[4] *PROJECT/SUPPLY DETAILS*

[5] *BG AMOUNT IN FIGURES AND WORDS*

[6] *VALIDITY DATE*

[7] *DATE OF EXPIRY OF CLAIM PERIOD*

[8] *BG AMOUNT IN FIGURES AND WORDS.*

[9] *VALIDITY DATE*

[10] *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 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 / transfering 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 resposibility 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 Querry, 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:

	Nationalised Banks		**Nationalised Banks**
1	Allahabad Bank	19	Vijaya Bank
2	Andhra Bank		**Public Sector Banks**
3	Bank of Baroda	20	IDBI
4	Canara Bank		**Foreign Banks**
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		**Private Banks**
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 discrepancybetween the unit price and the total price (which is obtained by multiplying the unit price by thequantity), the unit price shall prevail and the total price corrected accordingly, unless in theopinion 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	rahulb@bhelpsnr.co.in / a.chadha@bhelpsnr.co.in	01291101313	
	Himachal Pradesh	PSNR			02011000622	
	Punjab	PSNR			03451148722	
	Haryana	PSNR			06962606884	
	Rajasthan	PSNR			08232903345	
	Uttar Pradesh	PSNR	0120-2416536	rahulb@bhelpsnr.co.in / smittal@bhelpsnr.co.in	09365800914	
	Uttarakhand	Hardwar	01334-285449	alok@bhelhwr.co.in	05001757277 Dated 30th Sep 2005	5000030 Dated 13/03/1965
	Delhi	TBG	0120-6748429	skjindal@bhel.in	07472001760	07472001760
Western States	Madhya Pradesh	Bhopal	0755-2503231	meeta@bhelbpl.co.in	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	mgupta@bhelpswr.co.in	22173202974	
	Gujarat	PSWR	0265-2370321	bhavin@bhelpswr.co.in	24190101571	
	Maharashtra	ROD Mumbai	022-22126061/22187850	mahajani@bhel.in	27060300130V	27060300130C
	Daman & Diu	EDN	080-26998724 / 26998830	theerthagiri@bheledn.co.in	25000009902	
Southern States	Orissa	PSSR	044-28286773	sparida@bhelpssr.co.in , lakshmi@bhelpssr.co.in	21031301916	
	Tamil Nadu	Trichy	0431-2577757/ 2577229	msrao@bheltry.co.in /bharaths@bheltry.co.in	33243560005	239383 dt.11.6.91
	Kerala	PSSR	044-28286773	lakshmi@bhelpssr.co.in	32072043622	
	Karnataka	EDN	080-26998724 / 26998830	theerthagiri@bheledn.co.in	29180069268	00850081
	Telangana	HPEP RC, Puram	040-23185406/ 040-23182238	chand@bhelhyd.co.in sbsv@bhelhyd.co.in	36360151179	
	Andhra Pradesh	HPVP, Vizag	0891-6681298	sarmaass@bhpvl.com	37418632431	
	Puducherry	PSSR				
Eastern States	West Bengal	PSER	033-23216130-3238	amitavac@bhelpser.co.in	19200936019	19200936213
	Bihar	PSER	0612-2231275	rakesh@bhelpser.co.in	10010994046	10010994046
	Jharkhand	PSER	06549-266351(Sh. Parmanand Swaroop)/06534-292179 (Sh. K.K. Ajeet)	pswaroop@bhelpser.co.in (Bokaro) kk.ajit@bhelpser.co.in (Koderma/Abhijeet/North Karanpura) manishk.jain@bhelpser.co.in (Chandrapura)/kpsubbu@bhelpser.co.in kpsubbu@bhelpser.co.in	20352205642 (Bokaro) 20082005255 (Maithon) 20512405410 (Koderma) 20122200394 (Chandrapura) 20620905730(Adhunik) 20650507026(Abhijeet) 20452110016 (North Karanpura)	TG-729(C)
	Mizoram	PSER	033-23216130-3249	anindya@bhelpser.co.in	15501465017	
	Arunachal Pradesh	PSER	033-23216130-3249	anindya@bhelpser.co.in	12020122182	Not Applied
	Assam	PSER	033-23216130-3249	anindya@bhelpser.co.in	18790101415	18179903204
	Tripura	PSER	03821-265209	mkmahato@bhelpser.co.in	16060947071	16060947273
	Sikkim	PSER				
	Meghalaya	PSER				
	Manipur	PSER				
	Nagaland	PSER				

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Technical Specification for

Supply of Balance of System items and Installation & Commissioning

For 7.5 MW Solar PV grid connected power plant at

BHEL-Trichy, Tamilnadu

Revision details :	Prepared:	Approved:	Date:
	LNK / VCP	VKS	23.11.2017

1.0 Introduction

Bharat Heavy Electricals Limited (BHEL), Electronics Division, Bangalore is setting up a 7.5 MW (5MW+2.5MW) Grid Connected SPV Power Plant for BHEL-Trichy, Tamilnadu.

The plant will have PV modules of mono-crystalline / poly-crystalline type mounted on module mounting structures. Electrically, the PV array will have 6 nearly equal segments, each generating DC power of ~1250kWp, which is then inverted to AC by grid-connected power conditioning units (PCU) of 1250KW rating. At the AC output level, every two PCUs are combined using a 3-winding oil-cooled transformer of 2.7 MVA rating which will step up the voltage to 11KV.

The solar array will have 54 string monitoring combiner boxes (SMBs) that collect the solar PV generated DC power and provide inputs to the 6 PCUs housed in centralized control room. Control room building will also house HT switchgear panels, ACDB, SCADA, battery bank, FCBC, UPS and other associated panels along with store room and toilets.

There will be 3 Nos. transformers (2700KVA, 11KV/ 350-350V) located in switchyard adjacent to control room. A typical layout of control room and switchyard is enclosed. The plant will have SCADA integration and PC based monitoring desk to gather DC, AC and other parameters from SMBs, PCUs, weather monitoring equipment, transformers, LT / HT breaker panels.

The output of solar power plant shall be connected by two separate feeders of 5MW and 2.5 MW to 11KV substation through 11KV transmission line which will be in the scope of BHEL.

This technical specification provides requirements of BHEL for supply, installation, commissioning of balance of system items and defect liability period of 6 months. BHEL scope of supply and work is mentioned under section 3.2.

Note:
Vendor shall visit the site to assess all the technical and operational requirements and familiarize with the site conditions before placing the bid.

2.0 Documents enclosed with this specification

1	Tentative Single line diagram of overall power plant
2	Tentative Site layout with locations of solar array, control room and switchyard (Autocad drawing of site layout will be provided on request by vendor through e-mail)
3	Tentative Control Room & Switchyard Layout
4	Tentative drawing of String Monitoring box

3.0 Scope of Supply and work

3.1 Vendor scope of supply and work

The table below indicates the vendor's scope of supply, installation and defect liability period of 6 months as briefly outlined. Quantities mentioned below are indicative only. Vendor shall estimate exact requirement and quote accordingly.

S.No	Item description	Qty	Unit
1	Cable ties	1	Set
2	SMB mounting structure & hardware	54	Set
3	MC4 connectors	1270	Set
4	HDPE DWC pipe 63 mm	2000	M
5	300 sqmm Cable lugs with bimetallic washers and hardware in SMB	108	Set
6	Cable trays inside CR	120	M
7	Cable tray support structure inside CR	1	ST
8	Cable glands 300 sqmm in PCU	108	Nos
9	300 sqmm Cable lugs with bimetallic washers and hardware in PCU	108	Set
10	Cable glands 300 sqmm for transformer	252	Nos
11	Cable lugs with bimetallic washers and hardware for transformer	252	Set
12	Cable trays outside CR	90	M
13	Cable tray support structure outside CR	1	ST
14	11 KV Outdoor LA	6	Nos
15	11 KV Outdoor single-phase metering CTs	12	Nos
16	11 KV Outdoor single-phase metering PTs	12	Nos
17	Outdoor ABT metering panel	2	ST
18	ABT meters	4	Nos
19	RSJ poles	8	Nos
20	11KV GOS Isolators with earth switch	4	Nos
21	GI Support channels, ACSR conductor, pin/disc insulators, clamps and hardware etc. as required.	1	Set
22	HT cable - 11KV(UE), 3CX240 sq.mm	500	M
23	Half-cut RCC hume pipes	1	ST
24	HT termination kits - outdoor	2	ST
25	HT termination kits - indoor	8	ST
26	FCBC-110V, 20A	1	No
27	Battery bank 110V, 100AH	1	No
28	ACDB	1	No
29	UPS-5 KVA with battery with UPSDB	1	No
30	Weather Monitoring System	1	ST
31	DWC pipe for RS485 cable	1	ST
32	Control cables	1	ST
33	12CX2.5sqmm cable	1	ST
34	Lugs & hardware for data, auxiliary and control cables	1	ST
35	25X3 GI flat	1	ST
36	25X6 GI flat	1	ST
37	Earthing electrodes for MMS	1	ST

38	Hardware for array earthing	1	ST
39	SMB earthing electrodes	54	Nos
40	Copper cable -16 sqmm	1	ST
41	Copper cable -2.5 sqmm	1	ST
42	Copper flat- 50X4	1	ST
43	Copper cable -25 sqmm	1	ST
44	Copper cable -70 sqmm	1	ST
45	Earthing electrodes	1	ST
46	Switchyard earthing electrodes	1	ST
47	Earth flat 65X8	1	ST
48	ESE LA and earthing	1	ST
49	Yard lighting system	1	ST
50	Module cleaning system	1	ST
51	Identification tags, markers etc.	1	ST
52	Hoarding board	1	ST
53	Display boards and sign boards	1	ST
54	Electrical insulation mat	1	ST
55	Checkered plate	1	ST
56	Air conditioner	1	ST
57	Tool kits and instruments	1	ST
58	Office furniture	1	ST
59	Fire alarm system	1	ST
60	safety related items	1	ST
61	Spares	1	ST
62	Installation & Commissioning as per respective clauses in specification	1	AU

Note: For all civil related activities in the scope vendor, quality documents (Material test reports, Design mix report etc.) shall be submitted by vendor as per Annexure-C of BHEL tender.

3.2 BHEL scope of supply and work

For the sake of clarity to the vendor, the items that are within the scope of BHEL supply are listed below.

#	BHEL Scope of supply	Qty
1	Supply of Solar PV Modules	~25400 Nos
2	Supply and Erection of Solar array structures with modules mounted on structures (MMS), with each having 20 Nos. of PV modules	1270 sets
3	Supply of Cable, 1Cx 6 sq-mm (for connection of PV modules to string monitoring boxes)	~ 105 km
4	Supply of Cable, 1.1KV, 1C x 300sq-mm (for connection from SMBs up to PCUs and PCUs to transformers)	~ 31 km
5	Supply of String monitoring boxes (24-in, 1-out)	54 Nos
6	Supply of Power conditioning units (PCUs) of 1250 kW rating along with duct	6 Nos
7	Supply of Transformers 2700kVA, 11KV/350V-350V (1 HV winding, 2 LV windings)	3 Nos
10	Supply of 11KV indoor HT panels	1 set
11	Supply of SCADA system with PC, accessories and software	1 set
12	Supply of RS-485 cable and Ethernet LAN cable for SCADA	1 set
	BHEL Scope of work	
13	Construction of control room including partitions for SCADA, store and toilets	1 No
14	Construction of transformer foundations and switchyard fencing in switchyard	1 set
15	Construction of boundary wall for the entire plant, pathways, approach road, drains within the solar plant	1 set

4.0 Documents to be submitted along with offer

1. Clause-wise compliance shall be filled-up in the column provided in this specification, with signature and seal on every page.
2. Company brochure.
3. Project implementation time schedule.
4. Stage-wise manpower schedule.

Note: Wherever approved vendors are provided, in case if it is required to propose additional vendors, the same shall be done with prior approval by BHEL. For all the items wherever approved vendors are not provided, approval of makes shall be obtained from BHEL before placement of P.O on sub-vendors.

5.0 Detailed technical specification for supply, installation and commissioning

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

#	BHEL specification	Vendor compliance (Yes / No) In case of non-compliance or deviation, vendors shall record their comments:
5.1	**Setting up of temporary site office** (1) Vendor shall set up a temporary site office using one porta cabin of minimum 160 sq.ft along with chemical toilet, water tank and septic tanks for BHEL use within 10 days from the date of purchase order to enable speedy commencement of site activities. (2) Porta cabin shall be retained at the site until completion of 1 month after commissioning or till completion of vendor's works whichever is later. (3) Cabin shall be furnished with essential amenities such as one computer with internet connection, printer, two work tables, six chairs and necessary number of power points, lamps, air conditioner and fans. (4) Vendor shall arrange drinking water in site office for the site engineers of BHEL and the staff/employees of vendor. (5) Vendor shall make arrangement for pantry shed for preparation of beverages such as Tea/ Coffee etc. Vendor shall depute office boy-cum-cook for preparation of Tea/Coffee. All the utensils, facilities such as LPG/electric stove and service requirements shall be included in vendor's scope. Consumables such as milk, tea, coffee powder, snacks etc. shall be arranged by BHEL.	
5.2	**Electrical power and water for construction** (1) BHEL shall organize necessary electrical power supply and water supply required for construction activities in vendor's scope and also for the porta cabin on chargeable basis. Vendor shall pay the charges to BHEL based on consumption. Necessary metering arrangement shall be made by vendor.	
5.3	**Construction of temporary yards for safe storage of BHEL as well as vendor supplied items except PV modules and MMS** (1) Vendor shall, at suitable locations at the site, as decided based on discussions with BHEL site engineer, construct a temporary yard for safe storage of all BHEL as well as vendor supplied items except PV Modules and Module mounting structures. This includes storage of all items such as electrical panels (SMBs, PCUs, HT panels, Transformers, Battery banks, Battery chargers, Distribution boards etc), cables, spares, tools, instruments etc. (2) Area of storage yard shall be min. 500 sq.m. However, exact size shall be decided mutually with BHEL based on site conditions. (3) A portion of storage yard area (min. 150 sq.m) shall be provided with suitable temporary roof and side covers (asbestos, FRP, steel sheet etc.,) for storage of critical electrical panels (PCUs, SMBs, Battery, Battery chargers, electrical DBs etc.) in order to ensure that there will not be any water spillage which may	

	damage the equipment. This should be supported by steel poles that shall be grouted using suitable concrete foundations. Height should be appropriately decided to ensure safe operation of hydra for loading/unloading etc., (4) Necessary raised / covered arrangements shall be provided to the individual panels / equipment to ensure that these items are not affected by water at the ground level during time of rain storm, flood etc. (5) Yards shall be fenced all around with a steel gate of width of 4m minimum. Height of fence and gate shall be 2.5m minimum above the ground level. (6) Suitable fencing shall be provided using steel poles at every 3m intervals and barbed wires between the poles. (7) Gate shall be suitably secured to the fencing poles and shall be provided with lock and key. (8) Sufficient watch and ward security personnel shall be provided for the storage yard and complete solar plant erection area on round-the-clock basis.	
5.4	**Receipt, unloading, safe storage and movement of BHEL and vendor supplied items except PV modules and MMS** (1) Vendor shall organize all necessary resources such as labour, machinery and tools (cranes, hydra, forklifts, transportation trucks / trolleys, lifting accessories etc.,) for unloading the BHEL and vendor supplied items except PV Modules and MMS received at the site and subsequent movement to the storage yard. Similar arrangements shall also be made by vendor for movement of the items from storage yard to the point of construction for vendor's scope of works. (2) Vendor shall maintain proper documentation / compilation of all the records related to shipping (invoices, delivery challans etc.) 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. (3) Safeguarding the items from pilferage etc. is responsibility of vendor. For this purpose, vendor shall post adequate watch and ward for the yard on round-the-clock basis. (4) Registers shall be maintained for the yard to keep track of incoming / outgoing items. (5) BHEL will ensure insurance for all the items. Vendor shall provide necessary documentation and assistance to BHEL for making insurance claim in case of damage /theft of BHEL supplied items.	
5.5	**Interconnection of SPV modules to form strings.** Supply of SPV modules is in BHEL scope. Vendor shall interconnect the modules as follows: Each module is fitted integrally with a junction box having positive and negative polarity cables (4 sq-mm). (a) 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. (b) This way, 20 modules shall be connected in series. Each set of connections is called as a series string. (c) 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 and interconnected to the respective SMBs. Vendor shall implement the interconnection as per these drawings. (d) Interconnected cables shall be neatly routed and dressed using UV resistant nylon cable ties of appropriate dimension. (e) These cable ties shall be in vendor scope of supply. Recommended make: 3M,	

	Phoenix contact, Weidmuller, Hellermanntyton, Panduit. BHEL approval shall be obtained by vendor for use of any other make. **Specs:** Nylon cable ties, polyamide 6.6 UV stabilized black, UL94 flammability rating V2, meant for outdoor use. Operating temperature up to 85 deg C. Width of cable tie shall be minimum 4.5 mm. BHEL approval shall be obtained for the selected brand and length of cable tie. (f) Cables shall not be loosely hanging.	
5.6	**Installation of string monitoring boxes** (1) Supply of string monitoring boxes (SMB) is in BHEL scope. These are 24-in and 1-out type. (2) Vendor shall install the SMBs on Module mounting structure in the solar array field as per final array layout. (3) Supply of SMB mounting structures using GI channels/angles and necessary hardware required for installation of SMBs are in the scope of vendor. (4) Drawings of SMB and the fixing arrangement will be provided to the vendor after placement of purchase order. (5) SMB location will be identified by BHEL and will be provided in the wiring layout. (6) SMBs shall be fixed on the structures using necessary hardware which shall be supplied by vendor. (7) All tools necessary for mounting shall be in vendor scope.	
5.7	**Interconnection of SPV string cables to 6 sq-mm cable** (1) Each SPV module string shall be connected to SMB using 1Cx 6 sq-mm cable supplied by BHEL. Overall diameter ~ 6 mm. Diameter under the outer sheath (i.e over the insulation) ~ 4.6 mm. (2) SPV module is provided with positive and negative cables (4 sq-mm) having male and female parts of MC4 type connectors. (3) Vendor shall supply plug connectors of MC4 type, each set having a pair of male and female parts, to join the 6 sq-mm cable with SPV module string. Necessary crimping and termination is in the scope of vendor. (4) MC4 connectors shall have rating of 1000VDC (IEC), rated current of 25A (min.), Type approved by TUV Rheinland for product safety. (5) Approved make: Multi-contact or other reputed equivalent subject to BHEL approval during detailed engineering. (6) Total quantity of MC4 connector sets required = **1270 sets** (each set having a male and a female part). (7) Extra quantity shall also be procured considering possibilities of damages during the installation. Vendor shall ensure that there shall not be any shortage during execution time. (8) Vendor should make available MC4 tool kits of quantity as required during execution for simultaneous working on the array.	
5.8	**Routing of 1Cx 6 sq-mm cable:** (1) 6 sq-mm cables connecting the SPV module strings to SMBs shall be neatly routed along the module mounting structures using cable ties. (2) Cable ties, nylon polyamide 6.6 UV stabilized black, UL94 flammability rating V2, operating temperature up to 85 deg C, shall be used to arrest any possibility of movement or sagging. Cable ties shall be of make: 3M, Phoenix contact, Weidmuller, Hellermanntyton, Panduit. Width of the cable ties shall be a minimum of 4.5 mm. BHEL approval shall be obtained for the selected brand and length of cable tie. (3) Cables shall not be loosely hanging.	

5.9	**Underground laying of 6 sq-mm cables between the rows** (1) Where 6 sq-mm cables run between two rows of structure, HDPE double walled corrugated (DWC) pipe shall be used to guide the cables underground from one row to the other in trenches. (2) HDPE DWC pipe of required length shall be within scope of vendor supply. Vendor to procure necessary quantity of HDPE pipes based on the actual requirement and ensure no shortfall in supply during the time of installation. Qty required~2000 M (3) Inner Diameter (ID) shall be selected to accommodate the number of 6 sq-mm cables to be guided. However, Inner diameter shall be limited to a minimum of 63mm. Make: Tirupati Plastomatics, Jaipur or reputed make, as approved by BHEL. (4) Make, part number, sizes / dimensions, datasheet shall be submitted to BHEL for approval. (5) Details of cable trench: (a) Trench depth = 600 mm minimum. (b) Trench width = 200 mm minimum. (c) Bottom layer shall be sand of IS: 383 with 100mm thick. (d) HDPE conduit shall be laid over the sand layer. (e) Another layer of sand of 100 mm thick. (f) Then, a single layer of class-2 brick (burnt clay type) of 75 mm thickness shall be laid. (g) Trench shall, then, be filled with refill soil and compacted.	
5.10	**Connecting the 6 sq-mm cables on input side of SMBs** (1) 6 sq-mm cables of positive and negative polarities originating from SPV module strings shall be terminated at the input side of SMBs using MC4 connectors. (2) MC4 connectors are fitted on input side of SMBs. Matching MC4 connectors will be supplied by BHEL in loose. (3) Vendor scope includes removal of sleeve at the cable end, crimping with MC4 connectors. These MC4 connectors have to be terminated on to the MC4 connectors that are part of the SMBs supplied by BHEL. (4) All necessary tools such as pliers, strippers, crimping tool etc. shall be within vendor scope.	
5.11	**Connecting the DC power cables on output side of SMBs** (1) Cables of size 1Cx 300 sq-mm (Aluminium, armoured, XLPE insulation, PVC sheathed) shall be terminated at the output side of SMBs. Supply of this cable is in BHEL scope. (2) Overall diameter of cable ~ 32mm. (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 cable glands that are supplied by BHEL along with SMBs. (4) Aluminum Cable lug and bimetallic washer (Cu and Al) shall be in vendor scope of supply. Vendor shall submit catalog and datasheet of lug before procurement. Make: Dowell's /3D / 3M or any other reputed equivalent as shall be approved by BHEL. Quantity required **~ 108 Nos**. (5) 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 of SMB. Hardware should be SS304. Spring washers should be Zn coated. (6) All necessary tools such as pliers, strippers, crimping tool etc., required to complete the work shall be within vendor scope.	

5.12	**Cable trenches for laying power cables from SMB to inverters:** (1) 1Cx 300 sq-mm (Aluminium, armoured, XLPE insulation, PVC sheath) cables of positive and negative polarities are routed from SMB box to power conditioning units (PCUs) located at control room. (2) These cables shall be laid underground from the point near SMB to control room. (3) Two cables (+, -) from each of the SMBs have to be routed to respective inverters. (4) Tentative Array layout with location of SMBs and control room is enclosed for vendor's reference and for estimation purpose. Exact solar array layout will be provided by BHEL after placing purchase order. Vendor shall prepare and furnish cable routing layout as per standards for approval by BHEL. (5) Vendor shall estimate the length of cable trench. Generally these power cables will be packed in 1000 m drums. Vendor has to carefully plan laying of farther cables first to ensure cut lengths can be used for shorter cables. Any shortage of cable occurring because of vendor's works will be in the scope of the vendor. (6) Vendor shall construct the underground trench as follows: (a) Trench depth = 750 mm minimum. (b) Trench width shall vary en route to control room, based on the number of cables. As the cables join from SMBs en route, bunching takes place and the width of trench shall increase. Max trench width expected = 2m. (c) Sand as per IS: 383 of 100 mm layer thickness shall be laid at the bottom most level of trench. (d) 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. (e) Over the layer of cables, one more layer of sand of 100mm shall be laid. (f) Then, a single layer of class-2 brick (burnt clay type) of 75 mm thickness shall be laid. (g) Trench shall then be filled up with refill soil. (h) Subsequently, land over the cable trench shall be leveled and compacted suitably. The cables shall be laid inside Class-B GI pipes/ RCC hume pipes of suitable size under road crossings, drains, sewerage lines, entry and exit points of the buildings or where there are chances of mechanical damage Only terminal cable joints shall be accepted. No cable joints to join two cable ends is acceptable. Supply of GI/RCC hume pipes is in the scope of vendor.	
5.13	**Installation (indoor) of PCUs, HT panels, battery bank, FCBC battery charger panel, SCADA panel, ACDB, located inside control room together with cable trays in cable trench:** (1) 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 control, inverter and security rooms: a. PCU panels: 6 sets (each ~2500 Kg) b. 110V DC Battery bank: 1 sets c. FCBC battery charger panel: 1 No d. ACDB panel: 1 No e. SCADA panel: 1 Nos (~500 Kg each) f. Control desk with PCs and accessories: 1 set (2) 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.	

	(3) 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. (4) Vendor shall supply and install cable trays of required length and corner bends as required within control room for laying DC, AC & signal cables over the trays. Vendor shall supply cable trays as follows: a. Ladder type GI cable trays b. Hot dip galvanized c. Depth = 40 mm min. d. Width = 600 mm min. (5) Vendor shall fix the cable trays on the projecting steel sections in cable trench of control room. Supply and works related to the appropriate placement of these steel sections will be in the vendor's scope. (6) Adjacent cable trays shall be interconnected using suitable hardware items that shall be in vendor scope of supply. (7) Cables shall be laid over the cable trays and neatly dressed using appropriate cable ties etc. (8) Cables from AC side of PCU coming out from control room shall be laid over ladder type cable trays up to LV side of 2700 KVA inverter transformer. (9) 7RX1Cx300 sq.mm cables per phase are routed from control room to transformers in switchyard on cable trays through openings in the walls of control room. These openings shall be closed sealant or foam to prevent entry of rain water and rodents.	
5.14	**Power cable terminations on DC side of PCUs** (1) On DC side, for each PCU, vendor shall carry out the required number of cable terminations for 9 positive and 9 negative inputs connections by unsleeving, crimping and connecting. (2) BHEL shall supply the cables (1CX300 sq.mm Aluminum, armored, XLPE insulation, PVC sheath). (3) All cable glands, cable lugs, bolts, nuts and washers required for termination on DC side of PCU shall be supplied by the vendor. Qty of lugs required **~108 Nos.** (4) All tools and accessories required to carry out the termination shall be within scope of vendor.	
5.15	**Power cable terminations on AC (LT) side for PCUs and transformers** (1) On AC side, 3-phase 3-wire power cable interconnections shall be made between PCUs and transformers using 7 runs of 1Cx300mm^2 Aluminum, armored, XLPE insulated cable per phase. Supply of this cable is in BHEL's scope. (2) For AC cable terminations at PCU end transformer end, vendor shall supply the required number of cable glands, cable lugs, bolts, nuts, plain washers, spring washers. Aluminum lugs with bimetallic washer (Al-Cu) shall be supplied. Bolts, nuts, plain washers shall be of SS304 type. Spring washers shall be zinc plated steel. Make of lug: Dowell's /3D / 3M or any other reputed equivalent as shall be approved by BHEL. Quantity of lugs required **~ 252 Nos**. (3) BHEL will furnish the exact diameter of the cable at an appropriate time during the period of execution. Vendor shall make suitable size cut-outs using hole–saw cutters in the gland plates of the transformers for entry and exit of cables. (4) Vendor shall make the measurements between the equipment, cut the cables to the required lengths, fix them with glands, unsleeve them at the ends, crimp them with the lugs and terminate them at the respective bus bar provisions within the panels. (5) All tools and accessories required to carry out the termination shall be within scope of vendor.	

	(6) Cable tray supporting structure shall be installed between control room wall and LV side of transformer using ISA angles of minimum 75x6 arranged in vertical and horizontal orientations and joined using welding. The level of structure shall be at a minimum height of 400 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. Cable shall be laid on ladder type cable trays. 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. Drawing of cable supporting structure shall be submitted to BHEL for approval. (7) Quantity of cable support structure with cover =6 sets. (8) Supply of cable trays and tray support structures is in the scope of vendor.	
5.16	**Installation of 2700kVA, 11KV /350-350V transformers supplied by BHEL** (1) Transformers are located in switchyard adjacent to control room. (2) Construction of RCC foundations of transformers shall be in BHEL scope. (3) Transformer and its accessory parts such as radiators, cable boxes, hardware etc. 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. (4) Vendor shall provide all necessary support and assistance to the representative of transformer manufacturer during installation: (a) Oil filling in all transformers. (b) Measurement of parameters: insulation resistance, Winding resistance etc. (c) Connections to marshalling box	
5.17	**Installation of Isolators, Lightning arresters, metering CTs and metering PTs on four pole structures in outdoor switchyard at Control Room** Outdoor switchyard at control room shall consist of two four pole structures one each for 5MW and 2.5MW feeders. Each four pole structure shall consist of following items: 1. 11 KV Outdoor LA (3 Nos) 2. 11 KV Outdoor single-phase metering CTs (6 Nos) 3. 11 KV Outdoor single-phase metering PTs (6 Nos) 4. Outdoor ABT metering panel with main and check ABT meters (1 Set) 5. RSJ poles (4 Nos) 6. 11KV GOS Isolators with earth switch (2 Nos) 7. GI Support channels, ACSR conductor, pin/disc insulators, clamps and hardware etc. as required. Supply and installation of all these items including civil works required for four pole structure are in the scope of vendor. Vendor shall submit general arrangement and detailed drawings with bill of materials/quantities of the four pole structure set as per relevant TANGEDCO/CEA standards, with individual item description, quantity, make, specs / ratings etc. for BHEL approval. Metering panels shall be installed near to four pole structures on concrete platforms as per TANGEDCO guidelines.	

	Vendor shall submit GTPs and GA drawings of all the items such as LA, CT, PT, ABT meters, metering panels, ACSR conductor, GOS, insulators, RSJ poles etc. Note: All metal parts of Four pole structures shall be galvanized. All 11KV panel and switchyard works shall be carried out by a licensed electrical contractor as per TANGEDCO/ CEA regulations.	
5.18	**Cable trench and laying of HT power cables** (1) Output from inverter transformers shall be connected to incoming feeders of indoor HT Switchgear panels. (2) From outgoing feeders of HT panels, HT cable shall be laid up to four pole structures located in outdoor switchyard adjacent to control room. (3) Vendor shall construct underground cable trench for laying HT cables in switchyard as listed below. Trench shall be constructed: (a) Between the inverter transformers and incoming HT panels (1 run of 3CX240 sq-mm cable) – 3 sets (one set for each transformer). (b) Between outgoing HT panels to four pole structures (1 run of 3CX240 sq-mm cable) -2 sets (one set for each outgoing HT panel). (4) Supply of HT cable shall be in the scope of vendor. Quantity required **~500m.** (5) Specification for HT cable: 11KV (UE), 3CX240 sq.mm, Aluminum Conductor, XLPE insulated, Armored, PVC sheathed as per IS 7098 (Part-2). (6) Vendor shall lay these cables layer wise providing adequate separation as per the relevant IS standards. Vendor shall indicate the IS standards employed. (7) Half-cut RCC hume pipes shall be provided over HT cables in switchyard. (8) Trench layout and trench drawings shall be submitted to BHEL for approval.	
5.19	**Power cable terminations on AC HT side (11KV)** (1) Vendor shall carry out HT power cable terminations on HV side of 2700 kVA transformers (3 sets), on all feeders of HT panels (5 sets) and on four pole structures (2 sets). HT termination kits and all necessary hardware shall be within vendor scope of supply. HT termination kits shall be indoor / outdoor type suitable for 11KV, 3CX240 cable. Make: Raychem, 3M or reputed equivalent as shall be approved by BHEL. (2) Quantity of termination kits required shall be **8 sets** of indoor type for 11KV 3Cx240 sq-mm cable, **2 sets** of outdoor type for 11KV 3Cx240 sq-mm cable. Quantity indicated above is the exact requirement. Vendor shall ensure procurement of additional quantity of termination kits, if required at no additional cost to BHEL to tide over any contingencies during installation. (3) All tools and accessories required to carry out the termination shall be within the scope of vendor. (4) 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. (5) Vendor shall provide support mechanism using clamps and GI pipes for HT cables wherever required so that the connecting terminals are not damaged due to mechanical load of cable.	
5.20	**Supply and installation of FCBC, Battery banks** One set of 110V, 20A Float cum boost charger and 110V, 100AH, VRLA type battery bank required for breaker panels shall be supplied and installed at control room by the vendor. Battery bank shall be rated at 10 hours discharge rate. Vendor shall submit, GA and GTP of battery and charger for approval. FCBC shall have minimum of five outgoing feeders.	

5.21	**Supply and installation of ACDB Panel** One number ACDB shall be supplied and installed by the vendor in the control room for internal loads of solar plant. Vendor shall submit the single line diagram, GA drawing showing the details of feeders for HT panels, transformers, internal lighting, module cleaning pumps, FCBC, Air conditioner, periphery lighting and other loads in the plant. Vendor shall ensure equal loading in all the three phases. The number of feeders and their capacity shall be decided during detailed Engineering stage. CONSTRUCTION FEATURES: The ACDB panel shall be made of CRCA sheet steel of 2mm thick and shall be fully dust and vermin proof, providing a degree of protection of IP-20. Panel shall be provided with hinged doors with handle and locking facility for switch on interlock of doors. Doors shall be gasketted all round with Neoprene gaskets. The DB shall have two earthing terminals on either side for earthing. The required cable glands for the cables shall also be supplied with DBs. The incoming MCCB of rating 100A shall be hand operated, air break, quick make and quick break type with short circuit breaking capacity of not less than 50kA. The Outgoing MCBs shall conform to IS-8828 (latest edition) and shall have a minimum interrupting rating of 10 kA. The ACDB shall be provided with of 3-phase, 4 wire, 0.5 class Multi-Function Meter (MFM) for measuring auxiliary power consumption. The MFMs shall have a RS-485 Modbus communication port to communicate with the central PC system (SCADA).	
5.22	**Supply and installation of UPS** Vendor shall supply and install 1No. 5KVA UPS in the control room for auxiliary supply to PCUs, SCADA panels, PCs and emergency lighting. Vendor shall supply battery for UPS with a backup of 2 hours. Vendor shall submit the sizing calculations for battery considering design margin, temperature correction factors and safety margins for approval.	
5.23	**Supply, installation of weather monitoring station** Vendor shall supply and install Weather monitoring Station (WMS) on top of control room. Exact location shall be decided by BHEL during execution. WMS shall consist of Pyranometer (1 No.), Anemometer (1 No.), Module temperature sensor (1No.) and Ambient temperature sensor (1 No.). All the sensors of WMS shall be provided with output of 4-20mA signal. Converters if any required for conversion of sensor output to 4-20mA shall be in the scope of vendor. All necessary communication/ signal cables required for termination of WMS sensors in SCADA panel shall be in the scope of vendor. Supply and installation of Galvanized Mounting structure for WMS along with pedestal is in the scope of vendor. Approved makes: Kipp & Zonen/ Campbell Instruments / Aeron Systems / Dynalab / Metone / Hukeflex or any other reputed make as shall be approved by BHEL. BHEL approval shall be obtained for make and GTP prior to procurement.	

	Detailed technical specifications of the equipment are given below. **PYRANOMETER:** l. Spectral Response- 300 to 2800 nano meters. 2. Sensitivity- 8 to 20 µV/W/m2 3. Operating temperature range: 0 deg to +70 deg. 4. Resolution: Min +1W/m2 5. Output: Analog form 4-20 mA 6. Standard: ISO 9060 -second class or equivalent. 7. Maximum operational irradiance: 2000W/m2 8. Response Time (95%) : <30s 9. IP rating: IP65(minimum) Pyranometer shall be supplied with necessary cables. Sample calibration certificate with calibration traceability to World Radiation Reference (WRR) World Radiation Centre (WRC)/ IMD shall be furnished along with the offer. **ANEMOMETER:** Anemometer shall be 3-cup tubular stainless steel type. Velocity range shall be up to 45 m/s and accuracy limit of 0.5 m/s up to 10 m/sec. **AMBIENT TEMPERATURE SENSOR:** PT100 sensors mounted inside a radiation shield, communication cable of adequate length, temperature range: -40 to +60 degC with accuracy of +/- 0.2 degC. **MODULE TEMPERATURE SENSOR:** Module temperature sensor shall be fixed to one of PV modules using heat conducting tape and output shall be connected to nearest SMB. Temperature range: 0 to +80 degC with accuracy of +/- 0.2degC.	
5.24	**Power cable terminations at ACDB panel** (1) Auxiliary power of approx. 30KW shall be provided by BHEL up to control room using LT power cable of suitable size. Supply and laying of this cable shall be in BHEL scope. (2) Vendor shall carry out termination on input and output side of ACDB. Cable glands, cable lugs, bolts, nuts, plain washers and spring washers shall be within vendor scope of supply.	
5.25	**Erection of switchyard fencing with gate** Supply, installation including civil works of Switchyard fencing with gate is in BHEL scope.	
5.26	**Switchyard leveling, jelly spreading** (1) After installation of switchyard equipment such as transformers and four pole structures vendor shall level the ground with an appropriate magnitude and direction of slope to facilitate draining of rain water away from switchyard. Accordingly, to prevent stagnation of water within switchyard, vendor shall, wherever necessary, fill up the land with suitable soil and compact the filled-up portions either manually or with rollers, as applicable, as per site conditions, to achieve required slope. (2) Stone jellies of 20mm or 40mm shall be spread uniformly with a layer of minimum 100 mm thick throughout the switchyard area.	

5.27	**Support and assistance for SCADA integration for the power plant** (1) SCADA of power plant comprises of data station panel and PC based control desk with software to collect, store, process and report the data parameters of power plant as follows: (a) String monitoring boxes in solar array field: string current, voltage, box temperature, module temperature, status of SPD and load break switch in SMBs (b) Weather monitoring equipment: solar irradiation, ambient temperature, wind velocity. (c) Power conditioning units: DC input /AC output parameters of inverters, grid data, fault status and events logged, etc. (d) HT panels: status of breakers, status of protection relays of transformers, Multi Function meters. (e) Transformers: oil/winding temperatures (f) Energy export to the grid from ABT meters etc. (2) Vendor shall carry out following activities: (a) Formation of underground cable trenches and cable laying and termination for data communication cables from SMBs to SMBs (daisy chain) and from end SMB of each loop to SCADA, from transformers, VCB panels to SCADA. (b) Data cable laying from PCUs, VCBs, ACDB panels to SCADA. (c) Data cable terminations at PCUs, ACDB panels, transformers and VCB panels.	
5.28	**Cable trenches for laying data communication cables (RS485) from SMBs to SMBs and control room.** (1) Data communication (RS 485) cables shall be laid between SMBs to form daisy chain loop (Not more than10 SMBs in one loop) and from the end SMB of each loop, RS485 cable shall be laid to the SCADA panel in the control room. Communication Cables shall be laid in HDPE DWC pipes of minimum ID 25mm. (2) Supply of this RS 485 communication cable shall be in BHEL scope. Supply of DWC pipes shall be in vendor's scope. (3) These data cables shall be laid underground using separate cable trench. In other words, these cables shall not be laid 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. (4) Underground laying shall be ensured even within the daisy-chain looping between adjacent SMBs. (5) Cable trench shall be as per details below: (a) Trench depth = 600mm minimum (b) Trench width shall be 200mm minimum (c) Bottom layer shall be sand as per IS: 383 with 100mm layer thickness. (d) Data cable shall be laid over the sand. (e) Another layer of sand, 100 mm thick, shall be laid. (f) A single layer of brick, class-2, 75mm thick, shall be laid over the sand. (g) Trench, then, shall be filled up with refill soil and compacted.	
5.29	**Data & Control cable terminations in control room and switchyard** Vendor shall carry out following data cable terminations at 2700 kVA transformers, VCB panels, ACDB panels and PCUs. (1) Terminations at marshalling box of 4 sets of 2700kVA transformers (Buchholz relay, pressure release valve, low oil level, WTI, OTI, Analog 4-20mA signals of OTI and WTI etc). (2) Terminations at VCB panels (Buchholz relay, pressure release valve, low oil	

	level, WTI, OC/EF relay, OV/UV relay, MFM etc) for SCADA. RS485 cable for MFM and numerical relay to SCADA shall be supplied by BHEL. (3) Terminations at 8 PCUs of 1250kW for RS485 MODBUS communication over TCP/IP cable connections using LAN cables. Supply of LAN cable is in BHEL scope. (4) Terminations at ACDB panel. (5) All the cables required for the above terminations except for PCUs shall be within vendor scope of supply. Cable specification as follows: Cable, 1.1kV grade, copper conductor, stranded, PVC type-A insulation, twisted pair, overall shielded with aluminium backed mylar sheet, inner sheath of extruded PVC type ST1, Galvanized steel strip / round wire armoured as per IS, outer sheath of extruded FRLS PVC type ST1, conforming to IS:1554 / part-1 with latest amendments up to date. (6) Vendor shall submit the cable schedule for data, control and communication cables. Control cables shall be 2.5 sq-mm minimum, copper conductor, PVC, armoured. Communication cables shall be 0.5 sq-mm minimum, copper conductor, PVC, armoured. (7) Supply and termination of control cables from VCB panels to transformer: 12core X 2.5 sq-mm **~150m**. (8) Vendor has to lay the control cable from each transformer to VCB panel with 12Cx2.5 sq.mm cable. Cable Specification is as follows: Cable, 1.1kV grade, copper conductor, stranded, PVC type-A insulation, ATC drain wire of 2.5 sq.mm, inner sheath of extruded PVC type ST1, Galvanized steel strip / round wire armoured as per IS, outer sheath of extruded FRLS PVC type ST1, conforming to IS: 1554 / part-1 with latest amendments up to date. (9) Make of cables: Polycab, Advanced cables, Lapp, KEI or any other reputed equivalent as shall be approved by BHEL. (11) Cable lugs and all hardware required for making the above terminations shall be in vendor scope of supply. **Note:** Along with the above activities, DC/AC power supply cable laying and terminations shall be also be carried out for transformers and VCB panels using 2Cx2.5 sq-mm copper, armoured, PVC cables which is in vendor scope of supply. Cable shall be laid from FCBC (for DC) and ACDB panel (for AC).	
5.30	**Earthing of solar array structures** (1) Vendor shall interconnect solar array structures using welding of min. 25x3 mm GI strips. (2) Every row of such interconnected structures shall be terminated in a earthing electrode of 3000 mm long, hot dip galvanized and metal coated for rust proof, OD of minimum 50 mm shall be supplied by vendor. (3) Vendor to ensure that every earthed structure is provided with two alternate paths to earth. Accordingly, vendor shall provide suitable number of earth pits and ensure that the earth resistance of all earthed structures is less than 1 ohm. (4) Earth pit shall be drilled and earthing electrode shall be placed in the pit, filled with back filling chemical compound all around the electrode as per manufacturer's datasheet/ installation instructions. (5) Earth chambers of brick masonry shall be constructed. All items of earth chambers, including lid, shall be in vendor scope of supply. (6) Earth chambers shall be interconnected in the solar array field, using min. 25x6 mm GI strip that shall be laid underground. (7) 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 (25x3 mm) running from structure leg and the GI strips (25x6mm) from	

	adjacent electrodes shall be terminated at this link, which shall, in turn, be connected to the electrode. Joining of 25x6 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. For each earth pit, necessary Test Point shall have to be provided. (8) All GI strips, earthing electrodes and all hardware (nuts, bolts, washers of SS304) shall be in vendor scope of supply. (9) Vendor shall provide calculations for earthing, layout drawings showing earth chamber locations during detailed engineering. (10) For SMB earthing, independent earth electrodes of min. 2000 mm length shall be provided separately for each SMB. SMB earthing shall not be interconnected with module mounting structure earthing. Quantity required **~54 Nos.** (11) Power SPD inside SMB shall be earthed using min. 16 sq.mm copper cable and communication SPD shall be earthed using min. 2.5 sq.mm copper cable as per SMB recommendations which will be finalized during drawing approval.	
5.31	**Earthing lines for control room panels – PCUs, Battery banks, FCBC charger, ACDB, SCADA panels, etc.** (1) 50x4 copper strips shall be laid in the cable trenches of control room. Copper strips of required length shall be in vendor scope of supply. (2) Strips shall be covered by heat-shrinkable sleeves. Sleeves and Heater gun for heat-shrinking the sleeves over copper strips shall be organized by vendor. (3) Copper strips shall be anchored to the cable trench wall using insulation bush supports that will be in the scope of vendor. (4) Expansion bolts of appropriate size (Minimum M8) shall be used to fix the insulation bush supports. (5) Vendor shall provide the earthing line layout drawing along with calculations. Minimum one No. earthing pit shall be considered for each of control room panels such as PCUs, ACDB, battery charger etc. All the earth chambers shall be interconnected using 50X4 copper earth strip. (6) Copper strips shall be connected to the earthing terminals of all the control room panels except PCUs using min. 25 sq-mm copper, unarmoured, PVC cables that shall be supplied by the vendor. Cable lugs and hardware (bolts, nuts, washers etc shall be of SS304) required for connecting the 25 sq-mm cable to the earth terminals of panels and also to the copper strip end shall be in vendor scope of supply. (7) These chambers shall be located near the control room. Exact locations will be intimated by BHEL site engineer. (8) Connection between earth chamber and copper earthing strip shall be made using cable, 1Cx 25sq-mm, copper, unarmoured, 1100V, PVC cables as per IS:1554 (part-1) that shall be in vendor scope of supply. (9) For PCU earthing, min. 70 sq.mm copper cable shall be used as per PCU manufacturer recommendations. Quantity **~ 20 m.** (10) Routing of 1Cx25 sq-mm cables to electrode earth chambers shall be using 1-inch CPVC pipes, joints, bends and elbows that shall be in vendor scope of supply. Routing shall be underground outside the inverter and control room, at a depth of ~450mm below the ground level. Required length of CPVC pipe shall be supplied. Number of CPVC joints and elbows shall be as applicable. (11) Expansion bolts, cable lugs and all hardware required for this activity shall be within vendor scope of supply.	

5.32	**Earthing of switchyard equipment and fencing** Vendor shall install Ground mat for switchyard as per IS. The minimum quantity of earthing electrodes equipment wise is as below: (1) Inverter Transformers body earth – 3x 2 Nos each = 6 Nos. (2) Inverter Transformers shield earth – 3x 2 Nos each = 6 Nos. (3) 4P structure body earth – 1 No each (4) Lightning arrestors– 3 Nos per four pole (5) Switchyard fencing – Quantity as required Vendor shall submit earthing design calculation as per standards. GI strips of min. 50x6 mm shall be used for forming a grid for all the body earthing in order to achieve a good earth resistance value. Extra number of electrodes may be supplied and installed if the overall resistance in switchyard shall be more than 0.5 ohm. GI strips shall be laid underground at a depth of ~ 500 mm. Earth electrodes, GI strips, all hardware required for making the connections shall be within vendor scope of supply.	
5.33	**Lightning arrestors (ESE) type** (1) Vendor shall supply and install Early streamer emission lightning arrestors as per standards: UNE 21186 and NF C-17 102, Make: Ingesco/ABB/equivalent as shall be approved by BHEL, with minimum protection radius of 100 m. with counters and earthing systems. (2) Quantity : As required to cover the entire area of the plant and control room building as per manufacturer recommendations. (3) Lightning arrestors shall be mounted on top of a mast of height 5m minimum above ground level using GI pipe of 100 mm minimum average diameter; 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. (4) Minimum two earthing chambers per lightning arrestor set using earthing electrodes shall be constructed as per manufacturer's recommendations. (5) All mechanical and electrical connections, cables, junction boxes, hardware etc shall be within vendor scope. (6) Vendor shall submit general arrangement and detailed drawings with bill of materials / quantities of the overall lightning arrestor arrangement including foundation pedestal details to BHEL for approval.	
5.34	**Yard lights for switchyard, approach roads and compound wall (periphery lighting):** (1) Vendor shall supply and install required number of lights in switchyards, approach road and pre-cast type compound wall to maintain minimum LUX requirement of 20 LUX. (2) Light fitting, Bajaj/Havells/Equivalent make LED type shall be supplied and fitted on the GI bend pipes/poles/angles available in compound wall using necessary hardware. (3) Adequate spacing between the poles shall be provided to ensure the minimum lux requirement. (4) Underground armoured, PVC insulated, copper/ Aluminum cables of suitable size and required length shall be laid for power supply. Supply of these cables is in the scope of the vendor. Vendor shall submit cable sizing calculation for approval.	

	(5) Junction box shall be at a height of 1m above ground level. MCB of suitable rating along with junction box shall be provided for each pole. (6) The Junction box shall be made of stainless steel or FRP (IP65), Dust & vermin Proof and shall have suitable brass or copper made connector terminal, MCB (1A, single pole) of Schneider or reputed make, glands for incoming and outgoing cables. (7) The junction box, cable lugs, steel bracket for mounting the box on the lighting pole and all hardware items shall be in vendor scope. (8) Provision for timer based ON/OFF control shall be made for yard lighting in ACDB. (9) Glands shall be located at the bottom side of Junction box. (10) Necessary underground cabling work is in the scope of the vendor. (11) Vendor shall submit the lighting layout, lighting illumination calculations, cable trench layout, shadow calculation, foundation pedestal details, detailed BOM for BHEL approval. (12) Vendor shall ensure that equal loading is distributed in all the three phases. (13) Supply of necessary hardware such as nuts, bolts, washers (SS304) is in the scope of vendor. (14) Vendor to ensure the lighting arrangement does not cast shadows on the PV modules. (15) All necessary tools and tackles shall be in the scope of vendor.	
5.35	**Cable trench formation and laying of cables for yard lights** Vendor shall construct the underground trench of required length for laying the cables for yard lights (1) Trench depth = 600 mm minimum (2) Trench width = 200 mm minimum (3) Sand as per IS: 383 of 100 mm layer thickness shall be laid at the bottom most level of trench. (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. (5) Over the layer of cables, one more layer of sand of 100mm shall be laid. (6) Then, a single layer of class-2 brick of 75 mm thickness shall be laid. (7) Trench shall then be filled up with refill soil.	
5.36	**Cable terminations and supply of cables and CPVC pipes for yard lights** (1) Cable termination: (a) Termination of cables, including unsleeving, crimping, connecting to the junction box and lamp shall be within scope of vendor. (b) Similarly, cables shall be terminated at the ACDB panel within the control room. (2) Vendor shall supply following cables of required length: (a) 4-core, Cu/Al, armoured, PVC cable from JB of one pole to JB of adjacent pole (size of cable shall be finalized based on cable sizing calculation to be submitted by vendor) (b) 2Cx 1.5 sq-mm Cu/Al, unarmoured, PVC cable from JB to light fitting (3) Vendor shall supply following 1-inch CPVC pipes of required length:	
5.37	**Water supply for O&M, electrical cabling and plumbing works.** (1) BHEL will provide water outlet point near to plant boundary. Vendor shall lay pipe line from the outlet location to water storage tank to be located on the control room building. (2) Pressure pump of required capacity (3 phase) with all necessary electrical cabling up to the ACDB located in control room shall be provided from pumping	

	water storage tanks. Vendor shall submit the calculations for deciding pump rating and cable size. (3) Casing as required shall be provided for the pump. (4) Pump and the electrical cables shall be in vendor scope of supply. Cable (Armoured, PVC) of suitable size depending on pump rating and of required length 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. (5) Pump make: CGL, Suguna, Kirloskar, or other make for which BHEL approval shall be taken. Vendor shall supply and install of PVC water storage tanks of 5000 liters capacity each on control room (2 Nos.).	
5.38	**SPV module cleaning system** (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. Supply of CPVC pipe shall be in vendor's scope. (2) Centrifugal 3-phase booster pump of required capacity shall be supplied and installed at control room to draw the water from storage tanks to solar array field for solar PV module cleaning. Vendor shall furnish design/pressure calculations for selection of pump size. (3) Starter and DP switch shall be supplied and installed in control room for operating the pump. (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 of required dimension, Cu, armoured, PVC cable shall be supplied and used. (5) CPVC pipelines shall be laid underground (at a depth of ~500 mm below ground level). (6) There shall be adequate nos of 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. (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. (8) Hosepipes (ribbed, flexible) of 50m long shall be provided for connecting the hose to the nearest ball valve/nipple. The other end shall be provided with nozzle/appropriate gun to direct the pressurized water on the module for cleaning.6 such sets shall be provided. (9) Vendor shall ensure adequate pressure of water is available for module cleaning. (10) Vendor shall submit detailed scheme with BOM etc. for module cleaning system from storage tank to solar array field.	
5.39	**Identification markings using paint and cable tags, as applicable to the individual cases and as approved by BHEL, shall be provided:** (1) String monitoring junction boxes: Identification marking by way of painting on nearby module structure.	

(2) All equipment such as PCUs, transformers, VCB panels, CT, PT, GOS and metering panels shall be provided with suitable identification markings using painting, with inscriptions as approved by BHEL.
(3) Cable sizes with arrow marks in switchyard (for HT cables) using painting.
(4) Identification markings for all the earth chambers (using painting) with inscriptions as approved by BHEL.
(5) Cable tags using aluminium 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, ACDB panel etc.

5.40 Cable markers

(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 at appropriate locations for following cases:
   a) For DC cable from string monitoring boxes to respective inverters
   b) For data communication cables from string monitoring boxes to control room
   c) For cables of yard lights of solar array field, compound wall/chain-link fencing and switchyard fencing
   d) For electrical cables of pump connections
   e) For HT (11KV) cables within switchyard
   f) For CPVC water pipelines
(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.
(3) Cable markers shall have a minimum height of 300 mm above the ground level.
(4) Cable markers shall be suitably painted.

5.41 Hoarding board for the solar power plant.

(1) 1 No. hoarding for the plant shall be made of 1500x1800x 3mm thick MS plate. Approximate dimension of board 1500x1800 mm.
(2) Board shall be given a red oxide coat and painted background. Colour for background and letters shall be as approved by BHEL site in-charge.
(3) 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.
(4) 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.
(5) Bottom level of board shall be at a height of 1.8 m above the ground level.
(6) Vendor shall submit the drawing of hoarding arrangement to BHEL for approval.

5.42 Display boards and sign boards

1	Board displaying instruction chart for restoration of person from Electric Shock	1 No
2	Board displaying instruction chart for artificial respiration	1 No
3	Board displaying dos and don’ts.	1 No
4	Board displaying fire extinguishers details and operations	1 No
5	“No smoking” board	5 No
6	Board showing list of O&M staff with name, qualification and work responsibility	1 No
7	Board showing list of contact details of BHEL, O&M team, O&M security, police station, fire service, hospital, medical store etc with names, address, mobile numbers etc	1 No

8	Danger boards with details such as value of voltage etc for string monitoring boxes, PCUs, LT panels, Transformers, HT panels, Four pole structures in switchyard etc.	Qty as required
9	Identification boards, of suitable sizes, within control room such as scada room, store room, battery room, security room, gents / ladies toilets, pantry etc shall be supplied by vendor. BHEL will provide the list.	Qty as required

(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.
(b) For others, flex banner with design & printing shall be used.

Required number of danger notice plates shall be provided wherever necessary Suitable size of each Danger Notice plates shall be provided as per statutory requirement , made of mild steel sheet and at least 2mm thick, and vitreous enameled white on both sides, and with inscription in signal red colours on front side as required. The inscriptions shall be in Tamil and English language.

5.43 Electrical insulation mat

(1) Vendor shall supply required number of electrical insulating mats as follows:
   (a) Make: Vardhman House Private Ltd or reputed equivalent as shall be approved by BHEL.
   (b) Colour: Black.
   (c) Max use voltage = 1.1 KV/ 11KV depending on location
   (d) Marking of IS standard shall be there on the mat
(2) Test certificate shall be provided by vendor
(3) Vendor shall lay the mats in front of electrical panels (PCUs, HT panels, FCBC, ACDB panels) in control room.

5.44 Checkered plate for closing the cable trenches (a) behind the panels such as PCUs, VCB panels , ACDB panels etc. in control room and also (b) other open areas of cable trench

(1) Vendor shall supply and install Checkered plate. Plate shall have a suitable handle (welded to the plate) to facilitate ease of lifting and movements.
(2) Plate thickness = 6mm min.
(3) Width = 1000 mm max, total length as required
(4) These width and length dimensions are indicative. Actual dimensions shall be based on site conditions.
(5) Plate shall be red oxide coated followed by black painting.
(6) BHEL approval shall be obtained for overall arrangement of checkered plate.

5.45 Air conditioner

Vendor shall supply and install 1 No. Split air conditioners of 1.5T capacity (min BEE 3 star rating) with stabilizers in SCADA room. Make: LG, Videocon, Bluestar, Godrej or reputed equivalent that shall be approved by BHEL. Construction of SCADA room and partitioning is in the scope of BHEL.

5.46 Tool kits and instruments

Vendor shall supply the following tool kits and instruments:

A. Measuring instruments

1	Digital Earth Resistance Tester	Cambridge Instruments/equivalent	1 Nos
2	Digital multimeter	Reputed make	2 Nos
3	AC-DC Clamp Meter	Lutron/equivalent	2 Nos

5	Digital thermometer	Reputed Make	1 Nos
6	Megger – 5KV	Shanti Electric Instruments, Nippen/equivalent	1 Nos
7	Electrical Tester	Reputed Make	4 Nos

Note: Make / model number etc. shall be approved by BHEL prior to procurement.

B. Tool kits

1	Double ended flat spanners of sizes 6mm to 32mm	1 Set
2	Double ended ring spanners of sizes 6mm to 32mm	1 Set
3	Double ended tubular box spanners of sizes 6mm to 32mm	1 Set
4	Screwdriver Set	2 Set
5	Crimping tool with Dye range 50-400sq-mm cable, mechanical gear power, hand operated	1 Set
6	Crimping tool up to 6 sq-mm cable	2 set
7	Drilling machine AC, hand operated, with bit size up to 20 mm	1 set
8	Measuring Tape, 5m	4 Nos
9	Measuring Tape, 50 m	2 Nos
10	Allen Key set	2 Set
11	Adjustable spanner 2-inch size	2 No
12	Hammer	4 Nos
13	Rough file kit	2 Set
14	Platform balance, 50Kg range, 100g accuracy	1 No
15	Cutting Pliers	4 Nos
16	Nose Pliers	4 Nos
17	Vacuum cleaner, of industrial type, for control room sweeping / cleaning.	1 No.
18	Blowers for cleaning the panels	1 No.
19	MC4 tool kits consisting of crimping plier, open end spanner set, stripping plier, socket wrenches	4 Sets

Note: Prior to procurement, vendor shall obtain approval from BHEL for the make and specification of the items.

5.47 Office furniture

Vendor shall supply and install the following:

1	Executive table, wooden type with draws and side racks	1 No
2	Chairs, swivel type, with arm rest	6 Nos
4	PC table	1 No
5	Storage almirah	1 No
6	Filing cabinets	1 No

Make: Godrej or reputed equivalent as shall be approved by BHEL. BHEL approval shall be obtained, for the type of office furniture, for which catalog with model numbers, sizes / dimensions etc shall be submitted to BHEL.

5.48 Fire alarm system for control room:

(1) Fire alarm system with smoke detectors, hooters, manual call points, an electronic control panels and interconnection wiring shall be supplied and installed. Make: Zicom/ Notifier /Ravel or any other reputed equivalent as shall be approved by BHEL.

(2) Control panels 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.

(3) Smoke detectors shall be of conventional / optical / photoelectric type. It shall not be of ionization type that employs radioactive materials.

(4) Electrical hooters shall sound the alarm upon detection of smoke by the detectors.

(5) Manual call point shall be with high-gloss finish, alarm LED provision, breakable glass unit, hammer and chain.

(6) All the system components shall be installed and commissioned using suitable wiring using copper cable, min. 2C x 1.5 sq-mm, armoured, fire retardant low smoke PVC, of required length, as approved by BHEL. Cable shall be laid in PVC conduit and fixed to the ceiling of control room.

(7) Sufficient quantity of sensors, alarms, hooter, manual call points etc. shall be supplied and installed as per the necessary statutory requirements. Vendor should ensure the design of fire protection system in line with the regulations of the Fire Safety department of the state.

(8) Vendor shall submit fire alarm layout/scheme along with the detailed BOM to BHEL for approval.

(9) Fire alarm control panels shall have provision for RS-485 Modbus output so that status can be monitored in plant SCADA system.

5.49 Other safety related items

(1) Safety gadgets:

1	Gas Mask	2 Nos
2	First Aid Box with essential medicines and bandage cotton, antibiotic cream, Dettol, etc.	2 set
3	Hand Gloves 11 KV for GOS operation	2 sets
4	Hand Gloves 1KV for Maintenance of SMB	2 sets
5	Discharge rod	2 Nos
6	Safety Helmet	5 Nos
7	Rain Coat	2 Nos

(2) Fire extinguishers and sand buckets, as per the regulations of the Fire safety department of the state, shall be supplied and commissioned at the power plant. BHEL approval shall be obtained for locations at which they shall be kept. Quantities mentioned below are minimum. Vendor to comply the requirements of statutory bodies.

1	Dry powder fire extinguisher (stored pressure type)	Capacity: 9 Kg IS: 2171, IS:10658 CM/L-7759096 Suitability for Class A, B & C fire, related to solid combustibles, flammable liquid and gases.	6 Nos

		2	Carbon di-oxide (CO2) type fire extinguisher with trolley	Capacity: 9 Kg IS: 2878 Suitability for Class B&C fires Involving flammable liquids & gases, electronic equipment.	6 Nos	
		2	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.	4 sets	
5.50	**Spares to be supplied along with main supply:** a) MC4 Connectors – 130 Pairs b) Indoor type HT termination kit - 1 set c) Outdoor type HT termination kit - 1 set d) Weather Monitoring System spares: Pyranometer-1 No., Anemometer-1 No., and Temperature sensor – 1No.					
5.51	**Pre-commissioning inspections / checks / tests and coordination with state departments for necessary approvals and clearances for commissioning, synchronization with grid and post-commissioning operation of the plant:** (B) Vendor shall carry out following minimum pre-commissioning checks: (1) Verification of firmness of terminations in all electrical equipment: SMBs, PCUs, VCB panels, transformers, 4Pstructure items (GOS, LAs etc), SCADA stations, weather monitoring equipment and PV array earthing. (2) Verification of earthing for all these electrical equipment. (3) Measurement and verification of parameters at string monitoring boxes at solar array field: string current, voltage, combined SMB output current, module temperature, SMB temperature. (4) Measurement and verification of parameters on DC input side of PCUs: DC current and voltage; Vendor shall support the PCU engineer on these tests. (5) Insulation resistance measurements (megger tests) for all the electrical equipment of control room and switchyard. (6) Functional checks for PCUs: Vendor shall support the PCU engineer during the pre-commissioning tests. (7) Functional checks for transformer marshalling box: Availability of AC/DC power supply, (b) Responses of the relays at VCB panels and corresponding indications at annunciation panel by simulating the alarm / trip of Buchholz, PRV, WTI, OTI, LOLA at marshalling box. (8) Functional checks for VCB panels: (a) Availability of AC/DC power supplies (b) VCB on/ off, (c) spring charging, (d) LED indications, (e) functioning of electromagnetic and numerical relays, (f) responses at VCB panels to operations from SCADA (g) indications on windows, alarm accept/reset operations /SCADA. (b) Verification of interlock operations related to incomer and outgoer VCBs. (9) Verification of parameters at SCADA station: (a) DC/AC parameters from					

SMBs, HT panels, ACDB panels, Metering panels, (b) status of ACB/VCB breakers and transformer protection relays, (c) weather monitoring parameters.

(10) Functional checks on SCADA software: mimic diagrams, trend graphs, remote accessibility etc.

(11) Earth resistance measurements at the electrode chambers for solar array, control room panels and switch yard equipment.

(C) Pre-commissioning tests on transformers, CTs, PTs, Lightning arrestors, GOS switches, vacuum circuit breaker, relays, etc:

(1) 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 STATE ELECTRICITY SUPPLY & TRANSMISSION BOARDS/CEIG/SECI etc., requirements.

(a) Transformers: IR tests, ratio tests, excitation current measurement, magnetic balance test on HV, short circuit test, excitation test LV side, vector group test.

(b) 11KV vacuum circuit breaker panels: 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

(c) Relays in VCB panels: open/close, tripping, primary injection tests.

(d) Lightning arrestors: IR tests

(e) GOS switches: IR and contact resistance tests.

(2) Appropriate testing agency shall be arranged for the tests.

(3) Vendor shall coordinate / liaison with concerned STATE ELECTRICITY SUPPLY & TRANSMISSION BOARDS/MRT departments to fix up test schedules and witness by their representatives.

(4) Vendor shall prepare and submit the reports to STATE ELECTRICITY SUPPLY & TRANSMISSION BOARDS/MRT/CEIG/SECI and obtain their approval through necessary liaison activities.

(D) Vendor shall coordinate and liaison with STATE ELECTRICITY SUPPLY & TRANSMISSION BOARDS/CEIG etc., prepare and submit the applications with necessary enclosures on behalf of BHEL and obtain their approval:

(a) Approval for BHEL drawings

(b) Approval for synchronization of plant with grid.

(c) CEIG inspection of power plant

(d) Provisional CEIG clearance to proceed with commissioning

(E) Vendor shall take approval of BHEL for appointing Electrical consultant for the entire SPV plant and switch yard to comply with CEIG norms and getting approvals.

(F) 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.

Note: Scope of coordinating with state departments such as STATE ELECTRICITY SUPPLY & TRANSMISSION BOARDS, 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 and all other expenses in the above process shall be in the scope of vendor.

6.0 Tests at manufacturer / sub-vendor works and witnessing by BHEL

6.1	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. 1) Lightning Arrestors 2) CTs and PTs 3) Gang operated switch with earth switch 4) ACSR conductor 5) All cables under vendor scope (LT, data, control and communication cables) 6) Earthing electrodes & earth strip 7) Lightning arrestor (ESE) 8) Fire alarm system 9) ACDB 10) FCBC, Battery bank 11) UPS with battery **Note:** In case the item is bought out from dealers, test certificates, as per relevant IS / IEC standards, as issued by manufacturer shall be submitted to BHEL. However, prior approval shall be obtained from BHEL for procurement of the item from dealers.	

7.0 General conditions applicable during installation and commissioning phase

7.1	All machinery such as cranes, hydra, JCBs, forklifts, transport trucks, trolleys etc necessary for movement of materials shall be organized by the vendor.	
7.2	All necessary tools and tackles such as crimping tool (including heavy duty tools for crimping cables), 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 etc shall be organized by the vendor.	
7.3	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 etc shall be organized by the vendor.	
7.4	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.	
7.5	Vendor shall organize all necessary steps to meet statutory requirements such as labour license, PF, ESI etc and also ensure compliance with relevant acts such as minimum wages act, income tax act, employee insurance act, BOCW act etc for their labour deployed at site.	
7.6	Vendor shall maintain updated labour register, with name, age, qualification, salary, attendance details etc at the site. Vendor has to satisfy all the statutory requirements as per the labour law regulations in the state.	
7.7	Vendor shall use danger boards, wherever required, to ensure safety of the persons during the work at site.	
7.8	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.	
7.9	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 etc, vendor shall finish the land neatly with necessary leveling, rolling etc.	
7.10	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.	
7.11	Any damages on the building, structures etc attributable to the acts of labour / employees of vendor shall be rectified and made good by the vendor at their own cost.	
7.12	No child labour shall be employed for execution of the present contract.	
7.13	**Any miscellaneous materials, which are found essential for technical completion of the contract as per regulations/standards 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.**	
7.14	**In certain cases, approximate quantities are only mentioned. This is for the purpose of providing guidance to vendors and are as per BHEL estimation. Such quantities shall, therefore, be considered only indicative. Vendor shall, however, take into account the exact quantities that shall be required to meet the functional requirements of I&C activities as per clause 5.0.**	
7.15	Special instruction for earthing: 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) etc 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.	
7.18	Vendor has to design all the foundations required as per this specification based on the soil report and site conditions and to be submitted to BHEL for approval before construction. However, minimum requirements are specified in this specification for ready reference. Soil report will be made available to vendor after placement of PO upon request.	
7.19	Supply and installation of all auxiliary supply cables from ACDB to various plant equipment viz., FCBC, building lighting etc., shall be in the scope of the vendor which will be intimated from time to time.	
7.20	All cable terminations shall be done in such a way that bending radius of the cable is strictly as per IS: 1255	
7.21	In case project is not completed as per BHEL scope due to reasons arising out of materials from BHEL end/vendor's end, contractor has to complete the job at later stage without any extra charges. No overrun charges shall be paid in case of extension of project schedules	
7.22	Vendor shall prepare and submit as-built drawings after execution of works.	

8.0 Defect Liability Period

8.1	Date of commencement of defect liability period : Zero date for defect liability period shall be the actual date on which the complete 7.5 MW capacity is commissioned with synchronization / export of power to 11kV grid and completion of all the works in the scope of the vendor.	
8.2	Work during defect liability period: Vendor shall post competent person/s at site on daily basis to attend the problems that may arise in the plant during defect liability period within 24 hours.	

9.0 Documents to be submitted for BHEL approval after receipt of purchase order

9.1	BHEL approval shall be obtained for the following technical documents, which shall be submitted to BHEL in phased manner based on priority sequence of activities. However, it shall be ensured that all documents are submitted within 14 days from date of purchase order.	
9.2	Vendor, make, model number / part number, specification / sizes / dimensions / drawings / datasheets of all the vendor supplied items.	
9.3	General arrangement drawings / schemes / layouts etc with bill of materials / quantities shall be submitted for the following (list is indicative and not limited to): (1) SMB Mounting structure (2) Cable trench layout in array yard, switchyard (3) GTP and drawings of Switchyard equipment – GOS, LA, ACSR, CT, PT (4) Details of power, control, communication cable (5) ESE Lightning arrestor arrangement with foundation details (6) Yard lights –switchyard, compound wall, approach road. (7) Water pipeline layout from storage tank to solar array field for module cleaning system with pressure calculations (8) Fire alarm system scheme / layout (9) Cable support structures and cable ladders within control room (10) Cable support structure for LT cables between inverters and transformers	
9.4	Quality assurance plans for items listed under clause 6.0	
9.5	Detailed activity-time chart for project implementation.	
9.6	Detailed manpower deployment schedule.	

10.0 Codes and Standards:

IS:7098 (Part -II)	Specification for XLPE insulated PVC sheathed cables. Part-I: For working voltages from 3.3 KV up to and including 33 KV
IS:1554 (Part-I)	Specification for PVC insulated cables for working voltages upto and including 1100V
IS : 3975	Low Carbon Galvanized steel wires, formed wires and tapes for armouring of cables
IS : 4905	Methods for random sampling
IS : 5831	PVC insulation and sheath of electrical cables
IS : 8130	Conductors for insulated electrical cables and flexible cords
IS : 10418	Specification for drums for electric cables
IS : 10810	Methods of tests for cables
IS: 1255	Code of practice for installation and maintenance of power cables up to and including 33 KV rating

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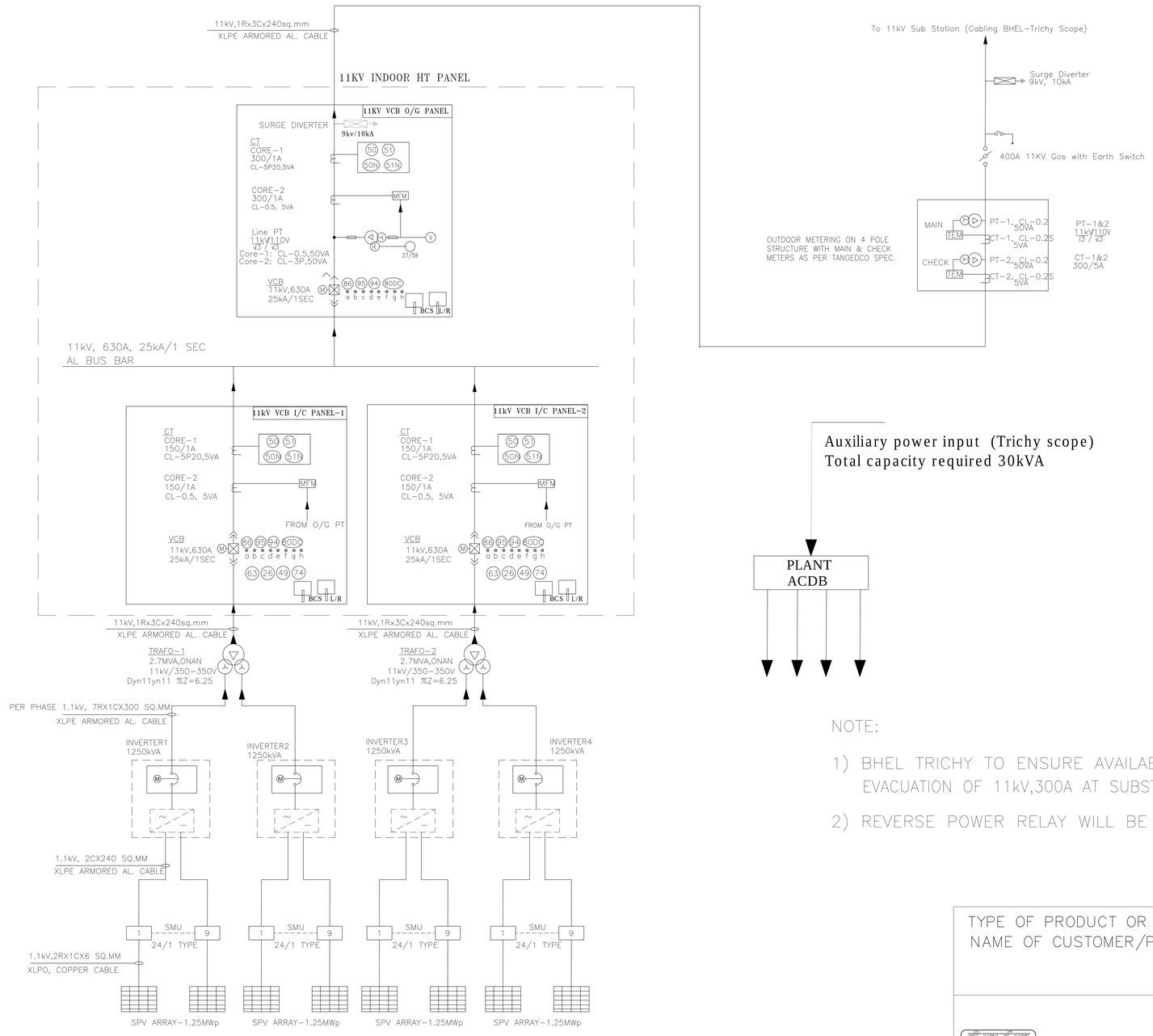
DRAWING NO. 3-679-05-00908

Note: This drawing is tentative and for tender purpose only.



LEGEND DETAILS

SL. NO.	SYMBOL	DESCRIPTION
1		TRANSFORMER 2.7MVA
2		VCB 11kV,630A 25kA/1SEC
3		SURGE DIVERTER, 9kV/10kA
4	86	MASTER TRIP RELAY
5	95	TRIP CIRCUIT SUPERVISION RELAY
6	94	ANTI PUMPING RELAY
7	63	BUCHHOLZ RELAY
8	26	MAGNETIC OIL LEVEL GAUGE
9	49	WINDING TEMP INDICATOR AND OIL TEMP INDICATOR
10	74	PRESSURE RELIEF DEVICE
11	a	VCB ON
12	b	VCB OFF
13	c	SPRING CHARGE
14	d	AUTO TRIP
15	e	TRIP CIRCUIT HEALTHY
16	f	SERVICE POSITION
17	g	TEST POSITION
18	h	DC SUPPLY HEALTHY
19	50	INST OVER CURRENT RELAY
20	51	IDMT OVER CURRENT RELAY
21	50N	NEUTRAL INSTANTANEOUS OVER CURRENT RELAY
22	51N	IDMT EARTH FAULT RELAY
23	MFM	MULTI FUNCTION METER
24		CURRENT TRANSFORMER
25	27	UNDER VOLTAGE RELAY
26	59	OVER VOLTAGE RELAY
27		POTENTIAL TRANSFORMER
28		FUSE
29	TEM	TARIFF ENERGY METER
30	80DC	DC FAILURE INDICATION
31		INVERTER, 1250kVA

NOTE:

1) BHEL TRICHY TO ENSURE AVAILABILITY OF SPARE FEEDER FOR SOLAR PLANT POWER EVACUATION OF 11kV,300A AT SUBSTATION.

2) REVERSE POWER RELAY WILL BE INSTALLED AT 11kV INCOMER OF BHEL-TRICHY SUBSTATION

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: 5 MWp SOLAR PV POWER PLANT BHEL TRICHY

BHARAT HEAVY ELECTRICALS LIMITED.
ELECTRONICS DIVISION, BANGALORE

	NAME	SIGN.	DATE
DRN			
CKD	VCP		NOV'17
APPD	MS		NOV'17

No. OF VAR

REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED

DEPT. | CODE | FOR UNSPECIFIED-TOLERANCES REFER ED 0230499 | SCALE | WEIGHT(Kg) | REF. TO ASSY. DRG. | ITEM NO. | No. OF ITEM

TITLE: SINGLE LINE DIAGRAM (SLD)

DRAWING NO. 3-679-05-00908 | REV. 00

SHEET NO. 01 | NO. OF SHEETS 01

REF. DRG.NO. | SIGN & DATE | INVENTORY NO.

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DRAWING NO. 3-679-05-00909

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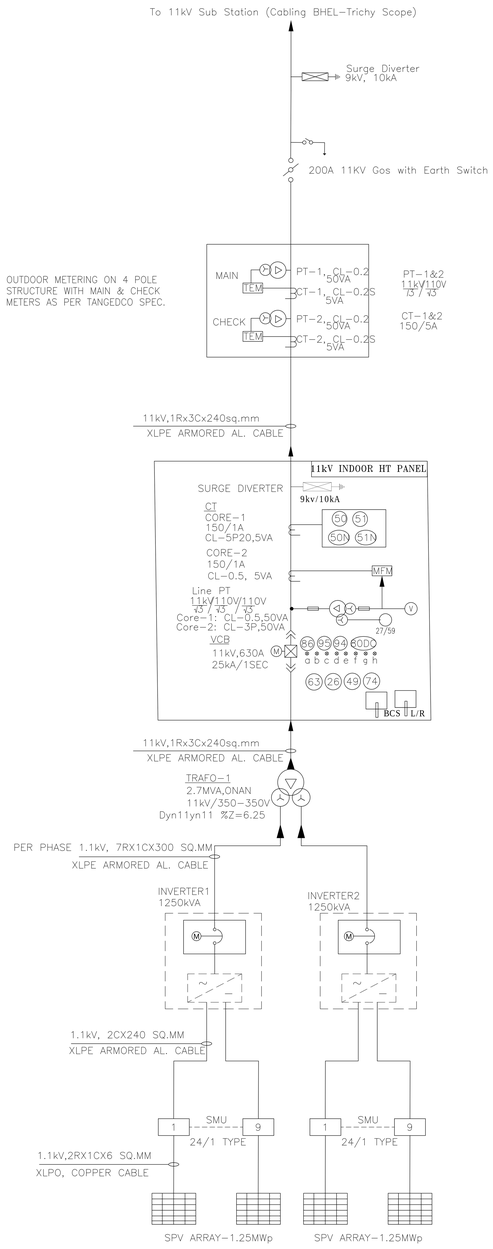

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27		POTENTIAL TRANSFORMER
28		FUSE
29	TEM	TARIFF ENERGY METER
30	60DC	DC FAILURE INDICATION
31		INVERTER, 1250kVA

NOTE:

1) BHEL TRICHY TO ENSURE AVAILABILITY OF SPARE FEEDER FOR SOLAR PLANT POWER EVACUATION OF 11kV,150A AT SUBSTATION.

2) REVERSE POWER RELAY WILL BE INSTALLED AT 11kV INCOMER OF BHEL-TRICHY SUBSTATION

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: 2.5 MWp SOLAR PV POWER PLANT BHEL TRICHY

BHARAT HEAVY ELECTRICALS LIMITED.
ELECTRONICS DIVISION, BANGALORE

	NAME	SIGN.	DATE
DRN			
CKD	VCP		NOV'17
APPD	MS		NOV'17

No. OF VAR

DEPT.	FOR UNSPECIFIED-TOLERANCES REFER ED 0230499	SCALE	WEIGHT(Kg)	REF. TO ASSY. DRG.	ITEM NO.	No. OF ITEM
CODE						

TITLE: SINGLE LINE DIAGRAM (SLD)

DRAWING NO. 3-679-05-00909 REV. 00

SHEET NO. 01 NO. OF SHEETS 01

REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED

REF. DRG.NO. | SIGN & DATE | INVENTORY NO.

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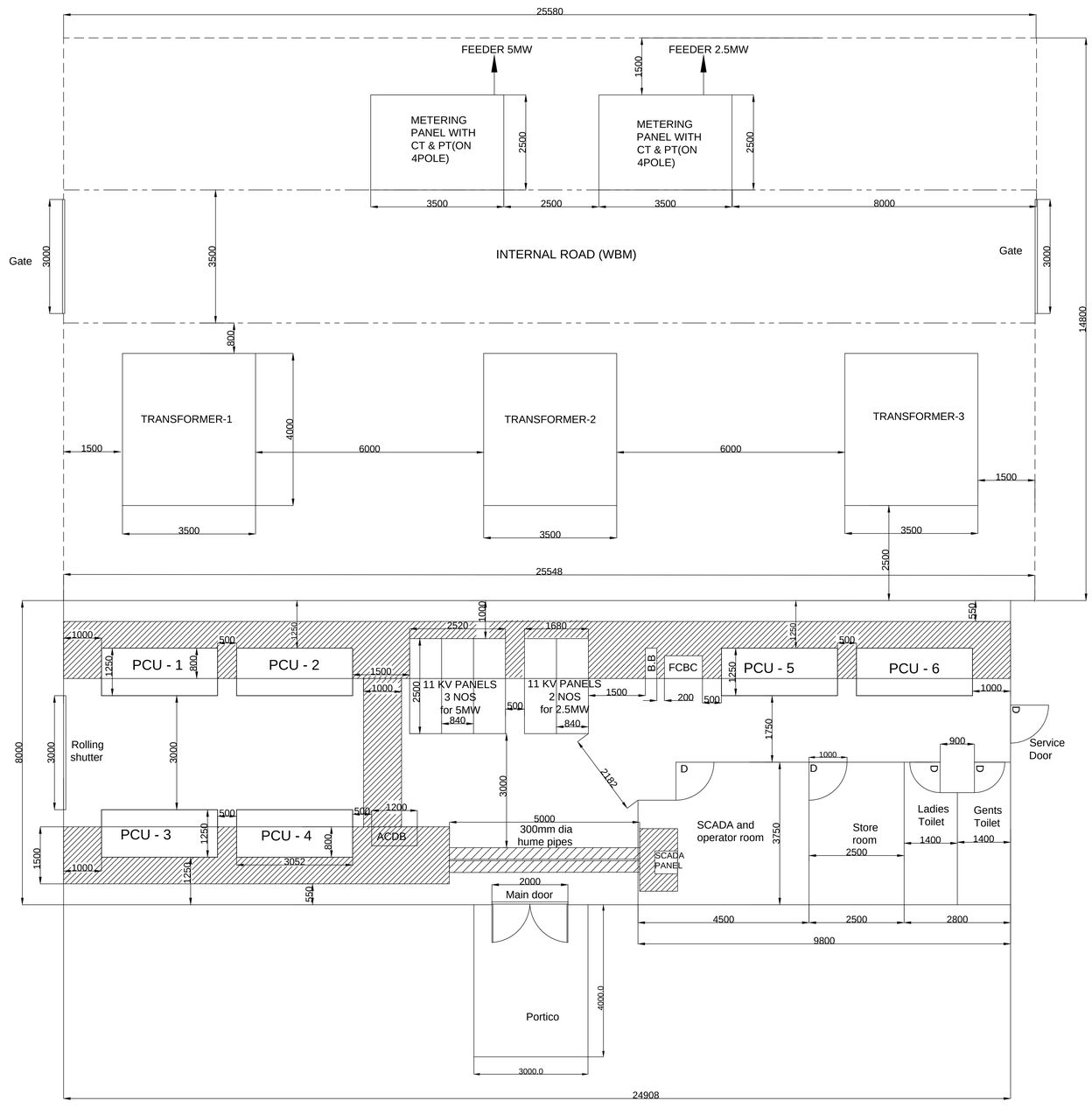
DRG. No. 3-679-05-00906

Note: This drawing is tentative and for tender purpose only.



NOTES :

1. 3 TRANSFORMERS EACH OF FOOTPRINT - 3.5X4 M
2. 6 PCUS EACH OF FOOTPRINT - 3.052X1.25 M
3. APPROX FLOOR AREA OF CONTROL ROOM = 199.2 Sqm.
4. TENTATIVE TRENCH LAYOUT DEPICTED.
5. ALL DIMENSIONS ARE IN mm.
6. ORIENTATION OF BUILDING TO SUIT 11KV EVACUVATION LINE POINT AND ACCESS TO ROAD.

REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED
01	21.11.17	REVISED AS PER BHEL-TRICHY COMMENTS DATED 16.11.17	00	08.11.17	FIRST ISSUE

	NAME	SIGN	DATE
DRAWN	AS		081117
CHECKED	PM		081117
APPROVED	MS		081117

DEPT. SC&PV CODE 439

BHARAT HEAVY ELECTRICALS LIMITED
ELECTRONICS DIVISION, BANGALORE

CARD CODE

PROJECT: BHEL TRICHY 7.5MW SPV PLANT — No. OF SHTS 01

TITLE: LAYOUT OF CONTROL ROOM & SWITCH YARD — SHT No. 01

M.O. No. — DRG. No. 3-679-05-00906 — REV 01

REF. DRG. No. — SIGN. & DATE — INVENTORY No.

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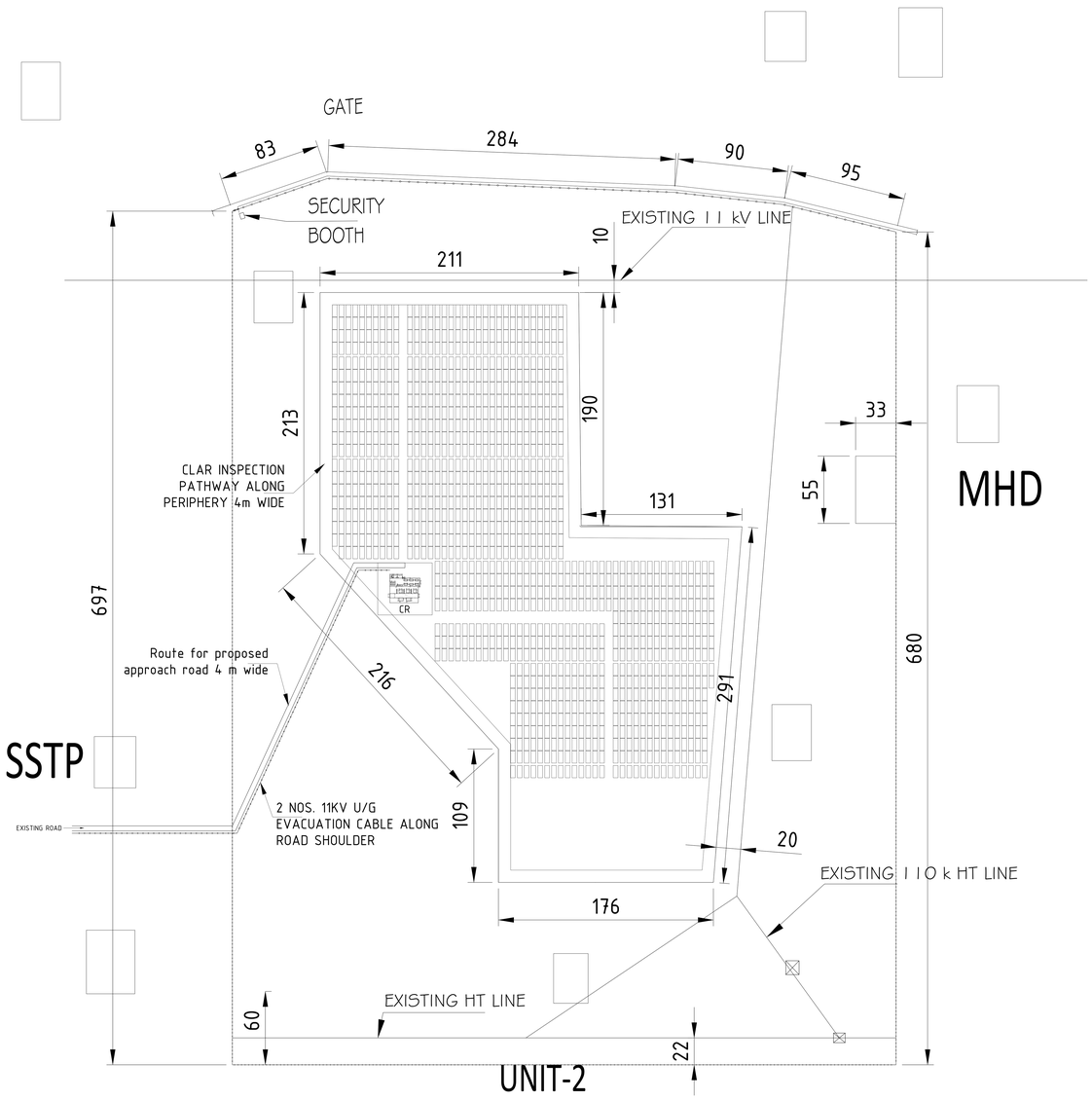
DRG. No. 3-679-05-895



N

Note: This drawing is tentative and for tender purpose only.

1. POSITION OF CONTROL ROOM IS AS PER OPTIMUM LENGTH OF DC CABLE AND AVOIDING CROSSING OF 11KV HT & PV ARRAY CABLE.
2. TOTAL NUMBER OF MMS TABLES = 1213 Nos.

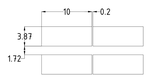


TABLE ARRANGEMENT

	20 MODULE TABLE
	CONTROL ROOM & SWITCH YARD

PROJECT : 7.5MWp SOLAR POWER PROJECT
CUSTOMER : BHEL TRICHY.

REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED

	NAME	SIGN	DATE
DRAWN	NY		071117
CHECKED	PM		071117
APPROVED	MS		071117

DISTRIBUTION OF PRINTS

DEPT.	CODE
SC&PV	439

BHARAT HEAVY ELECTRICALS LIMITED.
ELECTRONICS DIVISION, BANGALORE

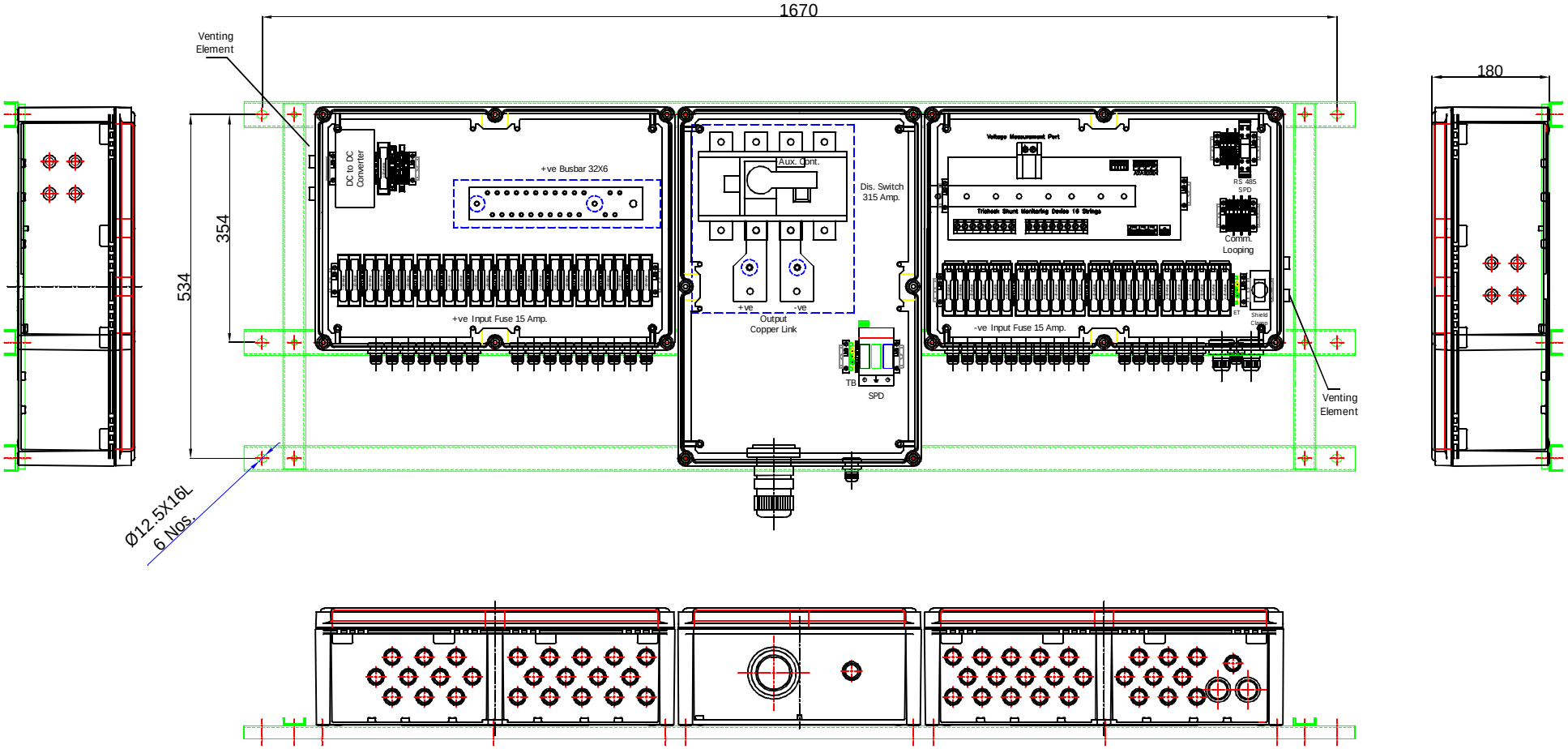
TITLE: LAYOUT

No. OF SHEETS	01
SHEET No.	01
REV	01

BHEL DRG. No. 3-679-05-895

REF. DRG. No.
SIGN. & DATE
INVENTORY No.

TENTATIVE DRAWING OF SMB



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