



**PURCHASE SPECIFICATION; GROUP: PHOTOVOLTAICS
DESIGN, SUPPLY AND I&C OF BOS ITEMS FOR 5MW_P SPV
POWER PLANT AT BHEL-BHOPAL, MADHYA PRADESH**

PS0679092498/501

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Technical Specification for

**Design, Supply and I&C of Balance of System items For 5 MW Solar PV grid connected power
plant at**

BHEL-Bhopal, MP

Revision details :	Prepared:	Approved:	Date:
	VJ	PM	09.05.2022

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1.0 Introduction

Bharat Heavy Electricals Limited (BHEL), Solar Business Division, Bangalore is setting up a 5 MW Grid Connected SPV Power Plant for BHEL-Bhopal, MP.

The plant will have PV modules of mono-crystalline / poly-crystalline type mounted on module mounting structures. Electrically, the PV array generating DC power which is then inverted to AC by grid-connected power conditioning units (PCU). At the AC output level, PCUs are combined using a multi winding oil-cooled transformer of 5 MVA rating which will step up the voltage to 11KV.

The solar array will have string monitoring combiner boxes (SMBs) that collect the solar PV generated DC power and provide inputs to the PCUs. Control room building will ACDB, SCADA, battery bank, UPS and other associated panels along with store room and toilets.

Note: Vendor has an option to supply either of the centralized PCU or the string Inverter of 1000V rating. In case the vendor is choosing to supply string inverters then SMB and cetralised PCU shall be replaced by String inverters and LT panel for combining of string inverters.

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 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 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)
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3.0 Scope of Supply and work

3.1 Vendor scope- supply and works

The table below indicates the scope of work for the vendor, as briefly outlined. Vendor shall submit the offer (in two part bids) as per this list and quantity.

#	Scope of work (as briefly outlined)	Qty
1	Supply of Items for 5 MW Solar plant This includes the supply of PCU, Inverter transformer, SMB, AC, DC HT cable, SCADA, Lightning arrestor, UPS, ACDB, Aux transformer, earthing system, module cleaning system, cable lugs, glands, fire alarm system, Weather monitoring system, cable tray, earth chambers, checkered plate, AC, Fridge, Furniture, cable tags, sign boards, danger boards, nuts bolts, hardwares, termination kits, jointing kits etc as per the various clauses of this specification	1 Set
4	I&C of Items for 5MW Solar plant This includes, installation, testing and commissioning of SMB, PCU, Inv transformers, Aux transformer, HT Panel, ACDB, FCBC, UPS, panels, , earthing, cable tray, cable laying and terminations as per the various clauses of this specification	1 AU

Details scope of Supply is listed below for better understanding of bidder:

S.No	Item description	Qty	Unit
1	PCU(Either string or Central inverter-outdoor type/Containerised)	5	MW
2	Inverter Transformer	5	MVA
3	String monitoring box	1	Set
5	DC cable from Module to SMB	1	Set
6	DC cable from SMB to PCU	1	Set
7	AC cable from PCU to transformer	1	Set
8	11KV HT cable from Transformer to HT panel	1	Set
9	SCADA system	1	Set
10	Cable ties	1	Set
11	SMB mounting structure & hardware	1	Set
13	MC4 connectors & Y connectors	1	Set
14	HDPE DWC pipe	1	Set
15	All AC & DC Cable lugs with bimetallic washers and hardware	1	Set
16	Cable trays inside CR	1	M
17	Cable tray support structure inside CR	1	ST
18	Cable glands for all the cables AC and DC side	1	Set
19	HT termination kits - indoor	1	ST
20	ACDB	1	No
21	UPS-5 KVA with battery with UPSDB	1	No
22	Weather Monitoring System	1	ST
23	Auxiliary, data and control cables	1	ST
24	Lugs & hardware for data, auxiliary and control cables	1	ST
25	Hardware for array earthing	1	ST



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26	Copper cable and Copper flat for earthing of SMB, SCADA, PCU, transformer etc		
27	Earthing electrodes for entire plant	1	ST
28	ESE LA and earthing	1	ST
29	Module cleaning system	1	ST
30	Identification tags, markers etc.	1	ST
31	Hoarding board	1	ST
32	Display boards and sign boards	1	ST
33	Electrical insulation mat	1	ST
34	Checked plate	1	ST
35	Air conditioner	1	ST
36	Tool kits and instruments	1	ST
37	Office furniture	1	ST
38	Fire alarm system	1	ST
39	safety related items	1	ST
40	Spares	1	ST
41	Installation & Commissioning as per respective clauses in specification	1	AU



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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	~15484 Nos
2	Supply and Erection of Solar array structures with modules mounted on structures (MMS), with each having 40 Nos. of PV modules	~378 sets
3	Supply of 11KV outdoor HT panel	1 set
	BHEL Scope of work	
4	Construction of control room including partitions for SCADA, store and toilets and internal electrification	1 No
5	Construction of equipment foundations for transformer, HT panel, PCU	1 set
6	Construction of boundary wall for the entire plant, pathways, approach road, drains within the solar plant	1 set
7	11KV Transmission line for power evacuation	

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.