	<p>BHOPAL SAHAKARI DUGDH SANGH MARYADIT</p> <p>HABIBGANJ, BHOPAL 462024</p> <p>AN ISO 9001 : 2015 Certified Organization</p> <p>E-mail: engg.bsds@gmail.com</p> <p>Phone 0755-2478250 Fax : 0755-2450896</p>
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Ref No: 02 /Engg/BSDS/2024

Dated: 30.05.2024

NOTICE INVITING E-TENDER (2nd Call)

Bhopal Sahakari Dugdha Sangh Maryadit, Bhopal (BSDSM), an ISO certified cooperative organization, invites online e tender for Design, Supply, Installation, Commissioning, Testing, Trial run and CAMC of On Grid Synchronized Solar Power Plant of various capacity at various/different locations/places of Bhopal Sahakari Dugdh Sangh Bhopal. The tender documents containing the terms and conditions can be purchased online & downloaded through following website <http://www.mptenders.gov.in> from 31.05.2024 onwards. The tender will be opened in the office of the undersigned as mentioned in tender time schedule(key date). The detailed Tender Form can be seen (only for reference) at our website: www.sanchidairy.com/www.sanchibhopal.com. CEO BSDS reserves all the rights to accept or reject any offer or all the offers without assigning any reasons thereto. Any changes/amendments will be notify on www.sanchibhopal.com only and not on at any other platforms.

Name of item	EMD (Rs)	Tender Fee (Rs)	Bid submission due date & time	Technical Bid opening Date & time
Design, Supply, Installation, Commissioning, Testing, Trial run and CAMC of On Grid Synchronized Solar Power Plant of various capacity at various/different locations/places of Bhopal Sahakari Dugdh Sangh Bhopal	200000/-	1000/-	13.06.2024 03:00 PM	14.06.2024 03:00 PM

CHIEF EXECUTIVE OFFICER

BHOPAL SAHAKARI DUGDHA SANGH MARYADIT HABIBGANJ BHOPAL

NOTICE INVITING TENDER

S.NO	PARTICULAR	DETAILS OF WORK
1.	Name of Works	Design, Supply, Installation, Commissioning, Testing, Trial run and CAMC of On Grid Synchronized Solar Power Plant of various capacity at Bhopal Sahakari Dugdh Sangh Bhopal.
2.	Location of Work	Various/different locations/places of Bhopal Sahakari Dugdh Sangh Bhopal
3.	Earnest Money Deposit	EMD RS. 200000/- (Rs. Two Lacs Only)
4.	Cost of Tender Document	Rs. 1000/- (One Thousand Only), Through Online mode/medium
5.	Tender Document Details	Annexure-A - General Terms & Conditions Annexure-B - Form A Annexure-C - Price Bid Annexure-D - Technical Specification Annexure -E - Qualification/Eligibility Criteria
6.	Place of Purchasing Tender Document	www.mptenders.gov.in
7.	Place of Submission of Tender Document	www.mptenders.gov.in
8.	Last Date for Receipt of Tender	13.06.2024 03:00 PM
9.	Date of Technical Bid Opening	14.06.2024 03:00 PM
10	Date of Financial Bid Opening	AS PER THE SYSTEM PROCESS AFTER TECHNICAL BID OPENING

INTRODUCTION

Bhopal Sahakari Dugdh Sangh Maryadit Bhopal invites e-tender from reputed manufacturer/Distributor of Solar Power Plant for its Main dairy plant, mini dairy plant, cattle feed factory Pachama(up to 480KWp), different chilling centers(3KWp to 150KWp) (15 nos.), different BMC(1KWp to 100KWp) (379 nos.), different DCS.

1. GENERAL TERMS & CONDITIONS

1. Design, supply, installation, commissioning of on grid solar PV Power Plant and net metering system.
2. **Installation of PV modules** with required fixtures, Junction boxes, cables, Power Conditioning Unit and connect to the one or more LT feeders
3. **Bidders may visit the site to know the exact requirement and site conditions before quoting for the tender. Any claim of ignorance about the system or responsibility shall not be entertained in later stage.**
4. Supply of the complete systems, including all necessary components, sub-components, spares, tools etc. Power plant shall be installed as per the specifications provided in the technical offer.
5. Making arrangements of ladder / cranes or etc. for shifting of all the items to the Roof-Top of the Main press building for installation.
6. Fabrications, supply and the installation of suitable support for the PV panels and other components whichever is required with the accessories.
7. The plant shall feed AC power to the Low Tension (LT) distribution grid power supplies.
8. The plant shall monitor solar generated energy using plant AC energy meter/energy meter inbuilt in inverter independent of load energy monitoring.
9. Array support structure shall be fabricated using corrosion resistant GI or anodized aluminium or equivalent metal sections. Array support structure welded joints and fasteners shall be adequately treated to resist corrosion.
10. The individual string/array combiner boxes and DC cabling shall be installed at a closer distance to PV panels.
11. The inverters shall be installed nearer to the PV panels in a weather proof cabinet.
12. One junction box (IP -65) shall be provided with bus bar arrangement at roof top to interconnect inverter output and to connect output cables to sub-station.
13. Civil work (grouting) for PV structure.
 - a. The individual Solar PV array shall be installed on existing roof top of the building using fixed PV array support structure.
 - b. PV array shall be installed in the space free from any obstruction and / or shadow by utilizing maximum space.
 - c. Adequate spacing shall be provided between two panel frames and rows of panels to facilitate personnel protection, ease of installation, replacement, cleaning of panels and electrical maintenance.
 - d. The array structure shall support SPV modules at a given orientation and absorb and

- transfer the mechanical loads to the roof top columns properly. All nuts and bolts shall be of very good quality stainless steel/ Cadmium coated.
- e. PV panel frames shall be fixed and grouted with fasteners and filling chemical for waterproofing and strength of structure/ RCC blocks, which in turn shall be secure the structure in a seamless manner with no impact on waterproofing of the existing structure. In case damages happened to the existing waterproofing then it should get repaired by the supplier. Additional waterproofing shall be provided in the areas where RCC blocks are secured, if required.
 14. Contractor shall provide pedestals if required for mounting of the PCU'S and control panels.
 15. It is contractor's sole responsibility for liaising, Co-ordination etc., and to obtain all the approvals from the Central Electricity Authority / MP DISCOM or any other relevant statutory bodies as required for completion of the project.
 16. The bidder must also provide 2 sets of documents in English, containing detailed operation and maintenance manual, Wiring diagram and GA Drawing, after completion.
 17. Training to the user for operation and maintenance of the system.
 18. The quantities mentioned in schedule of items are tentative and may vary as per the site requirement. The structure design may change or reconsidered as per geographical need of site.
 19. The contractor has to arrange all the required materials, tools and tackles, labour, transportation etc., at his own cost.
 20. Contractor shall supply the miscellaneous materials like junction box, anchor fasteners, screws, bolts and nuts, cable glands and lugs etc. and carry out associated minor works for successful completion of work. Contractor shall do any other related jobs that are not mentioned above, but found necessary at the time of execution to complete the job in all respect.
 21. **The contractor will be responsible for supply of any other item required to accomplish the work even if it's not stated in the BOQ.** The quantity of items such as junction box, anchor fasteners, screws, bolts and nuts, cable, cable glands and lugs etc. may vary from the one prescribed in BOQ.
 22. The materials supplied and work executed shall comply with relevant I.S. Standard and I.E. Rules. BSDS shall have the right to reject any materials and workmanship, if it is found not in conformity with specification, approved brand and terms and conditions.
 23. Latest revision of all applicable IE codes, regulations shall govern the design, manufacture, installation, testing and commissioning of this work even when the requirement of the specification is less stringent than the codes, regulations and standards. In the event of requirement of the specification exceeds the corresponding codes, regulations or standards, the specification shall govern.
 24. Certificate for module from IEC or equivalent to be submitted as part of the bid offer.
 25. Pre-Bid Visit: The bidders must visit the premises and have clear understanding about the place, scope of work; volume of work, requirement of skill levels of workforce, etc., and any doubt/clarification may be cleared/ done before submitting their offers. Any claim of ignorance about the system or responsibility shall not be entertained at a later stage.

2. DECLARATION:

The submission of a tender by a tenderer implies that he/she has read the notice and conditions of the tender and the terms and conditions of contract and has made himself/herself aware of scope and specifications of the supplies to be made and the destination where the supplies have to be made and satisfied himself/herself regarding the quality and specifications of the articles.

3. TENDER SUBMISSION:

- a. Tenders received by e-mail will not be considered.
- b. The tenderer(s) should clearly state in their offer the address, telephone, e-mail, PAN and GST Numbers. Any change in the address should immediately be communicated to the Chief Executive Officer, Bhopal Sahakari Dugdh Sangh Mydt, Bhopal and correspondence thereafter will be made at the changed address.
- c. Negligence on the part of tenderer in filling the tender form offers him/her no right to withdraw the tender after it has been opened.
- d. The acceptance of the tender and award of the purchase order will be the sole right of the Chief Executive Officer, Bhopal Sah. Dugdha Sangh Mydt. who does not bind himself to accept a tender in whole or in part or reject any or all the tenders received without assigning any reasons and no explanation can be demanded of the cause of rejection of the tender by any tenderer.
- e. The Chief Executive Officer, BSDSM reserves the right to place order for whole requirement with any tenderer or split the orders among one or more tenderers or not to purchase at all any item even after rate approval.
- f. Each tender should be accompanied with copy of PAN, GST Registration.
- g. The tenderers should submit the rates online only. The conditional tenders are liable to be rejected.
- h. No person or firm is permitted to submit more than one tender under different names.
- i. The tenderer shall not sublet the contract or assign to any other party or parties, the whole or any portion of the contract without prior written permission of Chief Executive Officer, BSDSM.
- j. Tenderer shall fill all the details of the unit in form- A, in Annexure B. (To be uploaded –mandatory.)

3.1 Bid Validity

Bid shall be valid for a period of 90 days from the date of opening.

3.2 Documents composing the Bid

3.3 Technical bid: (To be uploaded online mandatory)

1. Form A filled with copy of PAN, GST Registration, Company/Firm Registration.
2. Online EMD transaction acknowledgement or EMD exemption certificate. (if applicable see Sr. No. 3.6.2)

3.4 Commercial/Financial Bid

Commercial/Financial Bid form online (submit online only)

3.5 Bid price

Price indicated on the price schedule shall be inclusive of Basic cost of solar power plant, installation & training charges, pkg/frdg, freight if any. GST (all taxes extra)

***This is the general illustration for 40 kw capacity Solar Power Plant However bidder may use specifications/capacities as per different Solar Plant Capacity while quoting rates.**

3.6 Earnest Money Deposit (Rs. 200000.00)

1. EMD should be submitted online only and attach copy of proof for payment of EMD in technical bid.
2. **MSME industries of The Madhya Pradesh State** will be exempted from payment of the EMD of the tender. MSME certificate should be of relevant category of supplies/materials/works. (MSME Certificate to be uploaded online mandatory)
3. Any tender which is not accompanied by Earnest Money deposit are liable to be rejected. Earnest money deposit of unsuccessful tenderers will be returned within 90 days from the date of opening of the tender. The earnest money deposit of the successful tenderers will be released on completion of supply/work as the case may be within the stipulated period.
4. No interest will be paid on the earnest money for the period during which (the EMD) lies in deposit with Bhopal Sahakari Dugdha Sangh. Maryadit.
EMD may be forfeited:
 - If successful Bidder/supplier fails/denies to perform work
 - If any bidder/supplier withdraw its bid during the bid validity period
5. If need be, negotiations will be done for prices and as well as terms & conditions of material supply only with the party which offers the lowest rate.
6. No price escalation/change of offered discount will be accepted in the future with the intention of benefiting any tenderer. However if there is price escalation in raw material, that will be taken care of. The lowest rate/discount shall not be the only criteria for approving the tender.

4. LIQUIDATED DAMAGES:

4.1 Delivery date are fixed for supply of material they shall be strictly adhered too. In case they are not followed, or in case of delay in execution or non-execution of the order, the Dugdha Sangh reserves the right either to cancel the order and make alternative purchases from other sources, at the risk and cost & expenses of the defaulting supplier. In case the supplies are not affected as per the schedules, the liquidated damages may be charged on the goods not so delivered as under:-

4.2 If the tenderer fails to make supply as per purchase order without any valid reason, the order would be treated as cancelled and the firm may be blacklisted for future dealings and EMD also would be forfeited by the management.

4.3 If the qualified tenderer fails to make supply the materials as per specification, BSDS Bhopal will have right to purchase materials from the other bidders whom participated in the same tender and willing to supply the material on L-1 approved rates for which BSDS will take the consent of other bidders too. For the issue of purchase order the proportionate ratio will be 60:40. The L-1 bidder fails to supply materials then the entire requirement shall be fulfilled through the other bidders and if the other bidders didn't agree to supply the material on L-1 approved rates the difference amount would be charged from deposited EMD or their pending bills of L-1 bidders.

5.1 Time schedule:

The work must be completed within 180 days from the date of issue of Notification of Award. Any further delay will attract liquidated damages.

5. PAYMENT:

- a) 70% of actual material value supplied shall be made after receipt of the material at site and acceptance of the material.
- b) Remaining 20% of payment shall be made within 30 days of installation, commissioning and acceptance. Latest returns of GST should be submitted along with the bill/invoice.
- c) Remaining 10% against advance Bank Guarantee (ABG) **OR** only after final acceptance and satisfactory performance of the system. Latest returns of GST should be submitted along with the bill/invoice.

6. TERMINATION OF CONTRACT:

If any act of commission or omission of a unit under contract brings Bhopal Sah. Dugdha Sangh Mydt. to dispute, then Bhopal Sahakari Dugdha Sangh Mydt. shall be competent to debar/blacklist the unit from further business.

7. CONSEQUENCES OF BREACH OF AGREEMENT:

If any firm under the contract commits breach of any of the conditions, it shall be lawful for the Chief Executive Officer, Bhopal Sahakari Dugdha Sangh Mydt. to cancel the contract and to purchase material from any other alternate sources on the risk and cost of the defaulting unit.

8. DISPUTE ARBITRATION & FINAL AUTHORITY:

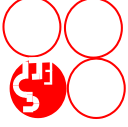
It should be clearly understood that in the event of a successful tenderer failing to accept and execute the supply order, then decision of the Chief Executive Officer, Bhopal Sahakari Dugdha Sangh Mydt., in this respect will be final and binding on the successful tenderer.

8.1 In any case of dispute between material / services supplier and Bhopal Sahakari Dugdha Sangh matter will be presented to MD, MPCDF for resolution.

8.2. All disputes between renderers and BSDS matter will be put to MD, MPCDF for resolution. In case no resolution action will be taken as per Arbitration Act. 1996.

8.3 For all disputes, the venue for legal courses shall be at Bhopal.

8.4 If the tender opening date become any govt. holiday then the next day may be considered for tender opening.

	<p>BHOPAL SAHAKARI DUGDH SANGH MARYADIT</p> <p>HABIBGANJ, BHOPAL 462024</p> <p>AN ISO 9001 : 2015 Certified Organization</p> <p>E-mail: engg.bsds@gmail.com</p> <p>Phone 0755-2478250 Fax : 0755-2450896</p>
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ANNEXURE-B

Form – A
(Filled and Scanned copy to be uploaded -mandatory)

To,
Chief Executive Officer
BSDSM, Bhopal


Date :

Dear Sir,

I/We hereby furnish below some particulars about our BSDSM/unit which will form a part of our offer submission:

1. Name of the Co./Unit : _____
2. Address of the Co./Unit : _____
3. Telephone /Mobile Nos: _____
Email ID : _____
4. Name of the CEO/Proprietor/ Partner : _____
5. Name and designation of other Authorized signatory of the Co./Unit : _____
6. Particulars of Regn. Certificate Issued by the competent authority (Regn No. & Date) : _____
7. We are manufacturer/distributor of _____ Co. dated _____ (OEM certificate to be attached)
8. GST NO _____ dated _____
9. PAN Number (Permanent Account Number- Income Tax) : _____
10. Have your Co./Unit or its sister concern ever been black listed/ debarred by BSDSM or its sister Milk Unions or GOI /GOMP & its undertaking ? YES / NO

**Seal & Signature of the
Authorized Signatory of the Co./Unit**

	<p>BHOPAL SAHAKARI DUGDH SANGH MARYADIT HABIBGANJ, BHOPAL 462024 AN ISO 9001 : 2015 Certified Organization E-mail: engg.bsds@gmail.com Phone 0755-2478250 Fax : 0755-2450896</p>
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ANNEXURE -C

PRICE BID
[To be submitted online only]

NIT Ref. No.	
NAME OF BIDDER:	

S.No	DESCRIPTION	Capacity	Price (In Rs.)	CAMC Price for 5 years (In Rs.)
1	Design, Supply, Installation, Commissioning, Testing, Trial run and CAMC of On Grid Synchronized Solar Power Plant of various capacity at various/different locations/places of Bhopal Sahakari Dugdh Sangh Bhopal	1 kW		
		2 kW		
		3 kW		
		5 kW		
		10 kW		
		20 Kw		
		40 kW		
		100 kW		
		150 kW		
		480 kW		

Note:- GST Extra as actual

***This is the general illustration for 40 kw capacity Solar Power Plant However bidder may use specifications/capacities as per different Solar Plant Capacity while quoting rates.**

TECHNICAL SPECIFICATION

1. WARRANTY:

a) Manufacturer's Warranty:

- (i) The manufacturer should warrant the Solar Module(s) to be free from the defects and/or failures specified below for a period not less than Ten (10) years from the date of acceptance of the system and issue of FAC.
- (ii) Defects and/or failures due to manufacturing
- (iii) Defects and/or failures due to quality of materials
- (iv) Non conformity to specifications due to faulty manufacturing and/or inspection processes. If the solar Module(s) fails to conform to this warranty, the manufacturer will repair or replace the solar module(s), at the Owners sole option.

b) Performance Warranty:

- (i) The power performance shall not be below 90% power output at 10 years and 80% power output at 25 years.

ARRAY STRUCTURE (MODULE MOUNTING STRUCTURE):

- a) Hot dip galvanized MS mounting structures may be used for mounting the modules/ panels/arrays. Each structure should have angle of inclination as per the site conditions to take maximum insolation. However to accommodate more capacity the angle inclination may be reduced until the plant meets the specified performance ratio requirements.
- b) The Mounting structure shall be so designed to withstand the speed of the wind i.e 150 Km/ Hour. Suitable fastening arrangement such as grouting and calming should be provided to secure the installation against the specific wind speed.
- c) Structural material shall be corrosion resistant and electrolytically compatible with the materials used in the module frame, its fasteners, nuts and bolts. Aluminium structures also can be used which can withstand the wind speed of 150Km/Hour, Necessary protection towards rusting need to be provided either by coating or anodization.
- d) The fasteners used should be made up of stainless steel. The structures shall be designed to allow easy replacement of any module. The array structure shall be so designed that it will occupy minimum space without sacrificing the output from the SPV panels
- e) Regarding civil structures the bidder need to take care of the load bearing capacity of the roof and need arrange suitable structures based on the quality of roof. The total load of the structure (when installed with PV modules) on the terrace should be less than 60 kg/m².
- f) Other than shed The minimum clearance of the structure from the roof level should be 750mm.
- g) The structure shall be grouted with fasteners with chemical sealing to withstand the required wind velocity. Angle of inclination shall be as per site requirement.
- For Pillars: Cement: Concrete: Sand Ratio: 1:2:4
- Fasteners shall be grouted in the Slab of roof up to depth of 50 mm.
- Sufficient numbers of vertical post shall be provided so that the structure may not get bent.

2. SPECIFICATIONS FOR INVERTER:

Conversion shall be achieved using an electronic Inverter and the associated control and protection devices. All these components of the system are termed the “Power Conditioning Unit”. In addition, the PCU shall also house MPPT (Maximum Power Point Tracker), an interface between Solar PV array & the Inverter should also be DG set interactive, if necessary. Inverter output should be compatible with the grid frequency. Typical technical features of the inverter shall be as follows:

Parameters	Detailed Specifications
Switching devices	IGBT
Capacity	The combined wattage of all the Inverter shall not be less than the rated solar PV capacity of the power plant.
Control	Microprocessor /DSP
Nominal Voltage	230V/415V as the case may be.
Voltage range	Single Phase: Shall work from 180 Volts to 270 Volts; Three Phase: Shall work from 180 Volts to 270 Volts per phase
Operating frequency/ range	50 Hz(47to52 Hz)
Grid Frequency Synchronization range	± 3 Hz or more (shall also compatible for Synchronization with DG Set)
Waveform	Sine Wave
Harmonics	AC side total harmonic current distortion<5%
Ripple	DC voltage ripple content shall not be more than1%.
Efficiency	1. The inverters should be tested as per IEC standards/ as per latestMNRE Specification. The following criteria should be followed : 2. The benchmarking efficiency criteria for the Grid tied (central/string) inverter <ul style="list-style-type: none"> • At nominal voltage and full load is >93% • For load >25% is >92%. 3. No load losses should not be more than 5%.
Losses	Maximum losses in sleep mode: 2W per 5kW Maximum losses in stand-by mode:10W
Casing protection levels	Degree of protection: Minimum IP-21 and 22 for indoor use and IP65 certification for outdoor use
Temperature	Should withstand from 0°C to + 45 deg. Celsius
Humidity	Should withstand up to 95% (relative humidity)
Operation	Completely automatic including wake up, synchronization
MPPT	Maximum power point tracker shall be integrated in the inverter to maximize energy drawn from the array. MPPT range must be suitable to individual array voltages in power packs
Protections	Mains Under / Over Voltage
	Over current
	Over/Undergridfrequency

	Over temperature
	Short circuit
	Lightening
	Surge voltage induced at output due to external source
	Anti Islanding (for grid synch. Mode)
System Monitoring Parameters	Inverter voltage & current Mains Voltage, Current & Frequency
Recommended LCD Display on Front Panel	Accurate displays on the front panel:
	DC input voltage
	DC current
	AC Voltage (all 3 phases, in case of 3 phase)
	AC current (all 3 phases in case of 3 phase)
	Ambient temperature
	Instantaneous & cumulative output power
	Daily DC energy produced
Communication interface	RS 485 / RS 232
Power Factor	> 0.9
THD	<3%
Test Certificates	The inverter should be tested from the MNRE approved test centres / NABL /BIS /IEC accredited/48 authorized testing- calibration laboratories. In case of imported power conditioning units, these should be approved by international test.

- a) Three phase inverter shall be used if grid supply is of three phase.
- b) Inverter shall be capable of complete automatic operation including wake-up, synchronization & shutdown.
- c) The output of power factor of inverter is suitable for all voltage ranges or sink of reactive power, Inverter should have internal protection arrangement against any sustainable fault in feeder line and against the lightning on feeder.
- d) Built-in meter and data logger to monitor plant performance through external computer shall be provided (Providing Computer is not part of DNIT & is in the scope of user).
- e) Anti-islanding (Protection against Islanding of grid): The inverter shall have anti islanding protection in conformity to IEEE 1547/UL 1741/ IEC 62116/IS16169 or equivalent BIS standard.
- f) The inverter generated harmonics, flicker, DC injection limits, Voltage Range, Frequency Range and Anti-Islanding measures at the point of connection to the utility services should follow the latest CEA (Technical Standards for Connectivity Distribution Generation Resources) Guidelines.
- g) The inverter should comply with applicable IEC/ equivalent BIS standard for efficiency measurements and environmental tests.
- h) The junction boxes/ enclosures should be IP 65 (for outdoor)/ IP 54 (indoor) and as per IEC 529 specifications.

3. INTEGRATION OF SPV POWER WITH GRID:

- (i) The output power from SPV would be fed to the inverters which converts DC produced by SPV array to AC and feeds it into the main electricity grid after synchronization. In case of grid failure, or low or high voltage, solar PV system shall be out of synchronization and shall be disconnected from the grid. 4 pole isolation of inverter output with respect to the grid connection need to be provided. Solar Generation Meter(s) or bidirectional energy meter, as per CERC (Central Electricity Regulatory Commission) Net Metering Regulations should also be installed in the campus/building of beneficiary.
- (ii) The solar generation meter or Bi-directional meter along with CT/PT (if required) with Surge Protection Device (SPD) should be of 0.2S accuracy class is in the scope of bidder. For LT connection the accuracy shall be as per requirement of DISCOMs.
- (i) CEA guideline 2013 (amended from time to time) for interconnecting solar power with Grid shall be followed.
- (ii) **Certification of Islanding protection in the inverter from the manufacturer of the equipment shall be mandatory.** This shall be arranged by the successful bidder from the manufacturer.
- (iii) Technical Standards for Interconnection:

Sl. No.	Parameters	Requirements	Reference
1	Overall Grid Standards	Reference to regulations	Central Electricity Authority (Grid Standards) Regulations 2010
2	Equipment	Applicable industry standards	IEC standards/IS
3	Safety and Supply	Reference to regulations, Chapter III (General Safety Requirements)	Central Electricity Authority (Measures of Safety and Electricity Supply) Regulations, 2010 and subsequent amendments
4	Meters	Reference to regulations and additional conditions issued by the Commission.	Central Electricity Authority (Installation & Operation of Meters) regulations 2006 and subsequent amendments
5	Harmonic current	Harmonic current injections from a generating station shall not exceed the limits specified in IEEE 519	IEEE 519 relevant CEA (Technical Standards for Connectivity of the distributed generation resource) regulations

			2013 and subsequent Amendments
6	Synchronization	Photovoltaic system must be equipped with a grid frequency synchronization device, if the system is using synchronizer inherently built into the inverter than no separate synchronizer is required.	Relevant CEA (Technical Standards for Connectivity of the distributed generation resources) regulations 2013 and subsequent amendments.
7	Voltage	The voltage- operating window should minimize nuisance tripping and should be under operating range of 80% to 110% of the nominal connected voltage. Beyond a clearing time of 2 seconds, the Photovoltaic system must isolate itself from the grid.	Relevant CEA (Technical Standards for Connectivity of the distributed generation resources) regulations 2013 and subsequent amendments.
8	Flicker	Operation of Photovoltaic system shouldn't cause voltage flicker in excess of the limits stated in IEC 61000 or other equivalent Indian standards, if any	Relevant CEA Regulations 2013 and subsequent if any, (Technical Standards for Connectivity of the distributed generation resource)
9	Frequency	When the Distribution system frequency deviates outside the specified conditions (52 Hz on upper side and 47 Hz on lower side up to 0.2 sec), the Photovoltaic system shouldn't energize the grid and should shift to island mode.	
10	Power Factor	While the output of the inverter is greater than 50%, a lagging power factor of greater than 0.9 shall be maintained	

11	Islanding and Disconnection	The Photovoltaic system in the event of voltage or frequency variations must island/disconnect itself within IEC standard on stipulated period	
12	Overload and Overheat	The inverter should have the facility to automatically switch off in case of overload or overheating and should restart when normal conditions are restored	
13	Cable	For interconnecting Modules, Connecting modules and junction Boxes and junction boxes to inverter, DC copper cable of proper sizes shall be used. To connect inverter with AC panel aluminum cable of proper size shall be used.	Relevant CEA regulations 2013 and subsequent if any, (Technical Standards for Connectivity of the distributed generation resource)

4. **JUNCTION BOXES FOR CABLES FROM SOLAR ARRAY:**

The junction boxes shall be made up of FRP (Hensel or equivalent make)/PP/ABS with dust, water and vermin proof. It should be provided with proper locking arrangements.

Series / Array Junction Box (SJB/AJB) (whichever is required): All the arrays of the modules shall be connected to DCCB. AJB shall have terminals of bus-bar arrangement of appropriate size. Junction boxes shall have suitable cable entry with suitable glanding arrangement for both input and output cables. Suitable markings on the bus bars shall have to be provided to identify the bus bars etc. Suitable ferrules shall also have to be provided to identify interconnections. Every AJB should have suitable arrangement Reverse Blocking diode of suitable rating. Suitable SPD, suitable Isolation switches to isolate the DC input to Inverter has to be installed in AJB for protection purpose. Thus AJB should have DC isolator for disconnecting the arrays from inverter input. If in any case diodes, HRC Fuses, SPDs and isolators are installed in the string inverters, then there is need to install these again in AJB. If some of these safety gadgets are not installed in String Inverter it should be installed in AJB. Cable interconnection arrangement shall be within conduit pipe on saddles installed properly. Cable connection should be done in such a manner that

fault findings if any, can be identified easily. The cables should be connected in such a manner that clamp meter can be comfortably inserted around the individual cables to measure the data like current, voltage etc. AJB should also be marked as A1, A2, & so on. Wherever conduits are laid on wall/roof or ground, then it should be suitably laid in cable tray or appropriate civil structure which should be at least four inches above roof/ground level.

However, if the inverter is equipped with Junction Box, the cables should not be connected directly to the ports provided in the inverter, dc cable will be connecting SPV to inverter via DCDB.

5. PROTECTION & SAFETY:

Both AC & DC lines have suitable MCB/MCCB, Contractors, SPD, HRC Fuse etc to allow safe start up and shut down before & after string inverter installed in the system. String inverters should have protections for overload, surge current, high Temperature, over/ under voltage and over/ under frequency & reverse polarity. The complete operation process & safety instructions should be printed on the sticker & suitably pasted on the near inverters.

Inverter should have safety measures to protect inverter from reverse short circuit current due to lightning or line faults of distribution network.

5.1 Inverter should be suitably placed in covered area on a suitable platform or wall mounted or concrete platform (on rubber mat) with complete safety measure as per norms.

5.2 INVERTER/ARRAY SIZE RATIO:

- The combined wattage of all inverters should not be less than rated capacity of power plant under STC in KW.
- Maximum power point tracker shall be integrated in the inverter to maximize energy drawn from the array.

5.3 AC COMBINER BOX BOARD (ACCB):

This shall consist of box shall consist of grid interface panel of good quality FRP/ suitable powder coated metal casing. Proper rating MCCB & HRC fuse and AC SPDs shall be installed to protect feeders from the short circuit current and surges as per the requirement of the site. Net meter duly tested by DISCOMs (Meter testing Division) with appropriate CT (if required) or One Digital Energy Meter (0.2S Class), ISI make, Single/Three Phase good quality shall have to be installed at suitable place to measure the power generated from SPV Power Plant, as per HERC Net Metering Regulations.

Operation AC Isolator Switch of Grid Connectivity should be such that it can be switched ON or OFF without opening the ACCB.

5.4 CABLES/WIRE:

All cables should be of copper as per IS and should be of 650V/1.1 KV grade as per requirement. All connections should be properly made through suitable lug/terminal crimped with use of suitable proper cable glands. The size of cables/wires should be designed considering the line losses, maximum load on line, keeping voltage drop within permissible limit and other related factors. The cable/wire should be of ISI/ISO mark for overhead distribution. For normal configuration the minimum suggested sizes of cables are:

Module to module/AJB	AC/ DC Cable
AJBs to MJB/DCCB/Inverter	According to capacity of solar plant minimum 4/6 sq mm (Single core) DC Cable, with respect to current ratings of designing
Inverter to ACCB / Distribution board	AC Cable as per design & rating

5.6 CABLE TRAY:

All the cables should be laid in appropriate GI cable tray as per the requirement of the site, No cable should be laid directly on ground or wall, cable tray should be laid such that there is gap of at least two inches above ground/roof.

5.7 DISPLAY BOARD:

The bidder has to display a board at the project site mentioning the following:

- Plant Name, Capacity, Location, Date of commissioning.

• Danger Boards :

Danger boards should be provided as and where necessary as per IE Act. /IE rules as amended up to date.

6. AC DISTRIBUTION PANEL BOARD:

- a) AC Distribution Panel Board (DPB) shall control the AC power from inverter, and should have necessary surge arrestors. Interconnection from ACDB to mains at LT Bus bar while in grid tied mode.
- b) All switches and the circuit breakers, connectors should conform to IEC 60947, part I, II and III / IS60947 part I, II and III.
- c) The switches, cabling work should be undertaken by the bidder as part of the project.
- d) All the Panel's shall be metal clad, totally enclosed, rigid, floor mounted, air – insulated, cubical type suitable for operation on three phase / single phase, 415 or 230 volts, 50 Hz
- e) The panels shall be designed for minimum expected ambient

temperature of 45 degree Celsius, 80percent humidity and dusty weather.

f) All indoor panels will have protection of IP54 or better. All outdoor panels will have protection of IP65 or better.

g) All the 415 AC or 230 volts devices / equipment like bus support insulators, circuit breakers, SPDs, VTs etc., mounted inside the switchgear shall be suitable for continuous operation and satisfactory performance under the following supply conditions.

Variation in supply voltage	+/- 10 %
Variation in supply frequency	+/- 3 Hz

7. DATA ACQUISITION SYSTEM / PLANT MONITORING

(i) For systems web based remote monitoring access of which shall also be provided access to BSDS.

(ii) PV array energy production: Digital Energy Meters to log the actual value of AC/ DC voltage, Current & Energy generated by the PV system provided. Energy meter along with CT/PT should be of 0.2S accuracy class.

(iii) String and array DC Voltage, Current and Power, Inverter AC output voltage and current (All 3 phases and lines), AC power (Active, Reactive and Apparent), Power Factor and AC energy (All 3 phases and cumulative) and frequency shall be monitored.

(iv) All instantaneous data shall be shown on the computer screen.

(v) Software shall be provided for USB download and analysis of DC and AC parametric data for individual plant.

(vi) Provision for instantaneous Internet monitoring and download of historical data shall be also incorporated.

PRIORITY FOR POWER CONSUMPTION:

Regarding the generated power consumption, in case of string inverter, priority need to be given for internal consumption first and thereafter any excess power can be exported to grid.

PROTECTIONS

The system should be provided with all necessary protections like earthing, Lightning, and grid anti- islanding as follows:

Lightning And Over Voltage Protection:

The SPV Power Plant shall be provided with lightning and over voltage protection. The principal aim in this protection is to reduce the over voltage to a tolerable value before it reaches the PV or other sub- systems components. The source of over voltage can be lightning or any other atmospheric disturbance. The Lightning Arrestor (LA) is to be made on the basis of the necessary meteorological data of the location of the projects. Necessary foundation for

holding the LA is to be arranged keeping in view the wind speed of the site and flexibility in maintenance in future. Each LA shall have to be earthed through suitable size earth bus with earth pits. The earthing pit shall have to be made as per IS 3043. LA shall be installed to protect the array field, all machines and control panels installed in the control rooms. Number of LA shall vary with the capacity of SPV Power Plant & location. Number of LA should be in such a manner that total layout of solar modules should the effective coverage of LA's.

Earthing Protection:

Each array structure of the PV yard shall be grounded properly. In each array every module should be connected to each other with copper wires, lug teathed washers addition the lightening arrestor/masts shall also be provided inside the array field. Provision shall be kept for shorting and grounding of the PV array at the time of maintenance work. All metal casing/shielding of the plant shall be thoroughly grounded in accordance with Indian Electricity Act/IE rules as amended up to date. The earthing pit shall be made as per IS: 3043. All the array structures and equipments/control systems shall be compulsorily connected to the earth, separately. Number of earthing shall vary with the capacity of SPV Power Plant & location. G.I./Copper strips/Copper wire should be used for earthing instead of G.I. wires, LA should be installed to protect the array field & machines installed in the control rooms. Number of LA shall vary with the capacity of SPV Power Plant & location. Earth resistance shall not be more than 5 ohms.

Surge Protection:

Internal surge protection shall consist of three MOV type surge-arrestors connected from +ve and -ve terminals to earth (via Y arrangement)

Grid Islanding:

- a) In the event of a power failure on the electric grid, it is required that any independent, power- producing inverters attached to the grid turn off in a short period of time. This prevents the DC-to- AC inverters from continuing to feed power into small sections of the grid, known as "islands." Powered islands present a risk to workers who may expect the area to be unpowered, and they may also damage grid-tied equipment. The Rooftop PV system shall be equipped with islanding protection. In addition to disconnection from the grid (due to islanding protection) disconnection due to under and over voltage conditions shall also be provided.
- b) A manual disconnect pole isolation switch beside automatic disconnection to grid would have to be provided at utility end to isolate the grid connection by the utility personnel to carry out any maintenance. This switch shall be locked, if required, by the utility personnel

CONNECTIVITY:

The user have to take approval/NOC from the Concerned DISCOM for the connectivity, technical feasibility, and synchronization of SPV plant with distribution network before commissioning of SPV plant, however the supplier have to extend all technical help to the user for preparing the documents required for getting the above clearance from DISCOM.

Reverse power relay shall be provided by bidder (if necessary), as per the local DISCOM requirement. The maximum capacity for interconnection with the grid at a specific voltage level shall be as specified in the Distribution Code/Supply Code and amended from time to time. Connecting voltage shall be three phase or as per site requirement based on the availability of grid level and as per DISCOM. DISCOM may be consulted before finalization of the voltage level and system shall be designed accordingly.

SAFETY MEASURES:

The bidder shall take entire responsibility for electrical safety of the installation(s) including connectivity with the grid and follow all the safety rules & regulations applicable as per Electricity Act, 2003 and CEA guidelines etc. All work shall be carried out in accordance with the latest edition of the Indian Electricity Act and rules formed there under and as amended from time to time.

CODES AND STANDARDS:

The quality of equipment supplied shall be controlled to meet the guidelines for engineering design included in the standards and codes listed in the relevant ISI and other standards, such as :

- i. IEEE 928 Recommended Criteria for Terrestrial PV Power Systems.
- ii. IEEE 929 Recommended Practice for Utility Interface of Residential and Intermediate PV Systems.
- iii. IEEE 519 Guide for Harmonic Control and Reactive Compensation of Static Power Controllers.
- iv. The inverter manufacturer should attach efficiency certificate from Independent Third party Testing laboratory i.e. IEC, TUV, SNL/ERTL & STQC. Inverter should confirm to IEC 61683 for efficiency measurements and IEC 60068 2 for environmental testing.
- v. IEC 62116 for Anti Islanding
- vi. IEC 62109-1, EC 62109-2 for safety
IEC 61727 FOR UTILITY INTERFACE.

FINAL ACCEPTANCE CERTIFICATE:

The successful bidder shall establish the generation of power of minimum 150 Units per day for a period of 10 days. After successful generation of 150 Units of power for Ten days, the FAC will be issued.

COMPREHENSIVE ANNUAL MAINTENANCE CHARGES:

Comprehensive Annual Maintenance Contract shall start after one year from the date of acceptance as per Final Acceptance Certificate (FAC). The annual maintenance charges shall be quoted by the bidders for a period of 5 years. The CAMC charges quoted in the price schedule will be paid quarterly in advance each year. (Amount quoted divided by 5 for each year will be paid at quarterly in advance).

During CAMC, the bidder will check the Solar Power Plant every quarter for effective performance in line with conditions specified elsewhere in the bid document. During this period, the bidder shall be responsible for supply of all spare parts, as required from time to time for scheduled and preventive maintenance, major overhauling of the plant, replacement of defective modules, inverters, PCU’s etc. A minimum set of spares shall be maintained in the plant itself for the entire period of CAMC which upon its use shall be replenished.

UTILITIES:

BSDS shall provide a single point of connection for Water and Electricity. Successful bidder shall make arrangements to draw the same from this point. Electricity and water shall be provided free of cost.

SCHEDULE OF ITEMS AND MAKE OFFERED

Sl. No	DESCRIPTION	UNIT	Qty	Make Offered
1.1	Solar PV module (Mono crystalline) - Minimum 500 Wp each, for a total capacity of 40 KW as perspecifications	Nos	Max. 80	
1.2	Grid Tied String Inverter: 415V AC, 50Hz,	Nos	As Required	
1.3	Module mounting structure	Lot	1	
1.4	DC Copper cable of suitable size (Panel to DC Junction Box), size: - 1 core, 4/ 6 sq. mm	Mts	70	
1.5	DC Copper cable of suitable size (DC Junction Box to Inverter), size: - 1 core, 4 / 6 sq. mm	Mts	40	
1.6	PVC Aluminium cable of suitable size (Inverter to AC Junction Box Panel), size: -3 1/2core, 70/ 95 sq. mm	Mts	15	

***This is the general illustration for 40 kw capacity Solar Power Plant However bidder may use specifications/capacities as per different Solar Plant Capacity while quoting rates.**

1.7	PVC Aluminium cable of suitable size (AC Junction Box to DISCOM meter Cubicle) size: -3½ Core, 70 / 95 sq. mm	Mts	80	
1.8	DC Junction Box (if required)	Set	2	
1.9	AC Junction Box	Set	1	
1.10	Lightning Arresters	Set	As required	
1.11	Earthing Kit Separate for AC, DC & LA	Set	As required	
1.12	NET Meter / Energy Meter in a out door box	Nos	1	
1.13	Miscellaneous items required for completing the installation	Lot	1	

[Supplier/Bidders shall fill the following format and submit along with bid]

a) The items supplied under this contract shall be of following make and standards

1)	PV Array	BHEL/ BOSCH/REIL /Kirloskar/Tata /Havells/Panasonic Indian MakeOnly
2)	Inverter/PCU	ABB/ DELTA/ Kirloskar /SMA /SCHNEIDER
3)	Cables	Finolex / Polycab / Havells / Wacab or reputed make as per IS standards
4)	AC &DC Junction Box	L&T / Equivalent
5)	Earthing Kit	Trust power/ Remedies/Ashlok / Equivalent
6)	Lightning Arrestor	Trust power/ Remedies/Hex / equivalent
7)	Switches/Circuit Breakers /Connectors Junction Boxes /Enclosures for Inverters/Charge Controllers/Luminaries	Make L&T/Havells/C&S/ SCHNEIDER

DECLARATION

We hereby declare that the equipment supplied shall meet the relevant IEC / IS / IEEE / Equivalent Standard.

It is confirmed that I/We shall carry out the works as per Technical specification and tender conditions. Necessary warranty and test certificates for desired materials shall be submitted when asked for.

I /we, also confirm that No material without conforming to the Specifications in the Contract will be used for the Works without prior written approval and instruction of the BSDS Officers in charge.

Dated this _____ day
of _____
for & on behalf of

(Signature of authorized signatory with date Name and designation)

QUALIFICATION/ELIGIBILITY CRITERIA

1. Participants should be distributor/OEM
(Attached Certificate Online Only)
2. Participants should have relevant experience of more than 7 years
(Attached Certificate Online Only)
3. Participants should have experience of at least 120 kw solar power system or more in single work order from Central Govt./PSU/State Govt.
(Attached Certificate Online Only)
4. Average turnover in previous five financial years should be more than 60 lakhs and should be more than 1 Cr. In previous 3 years.
(Attached CA Certified Certificate Online Only)
5. GST Certificate
(Attached Certificate Online Only)
6. PAN
(Attached Certificate Online Only)
7. Tender Document with Sign and Stamp on each page
(Attached Scan Copy Online Only)
8. Form -A
(Form A filled and Attached Scan Copy Online Only)