

**SUPPLY, INSTALLATION, COMMISSIONING, MAINTENANCE
AND OPERATION OF
GRID CONNECTED SOLAR ROOFTOP SYSTEMS
AT OUR AURANGABAD & NAGPUR REGIONAL OFFICE**

THE MAHARASHTRA STATE CO-OP. BANK LTD., MUMBAI
(Incorporating the Vidarbha Co-op. Bank Ltd.)
Scheduled Bank

Sir Vitaldas Thackersey Memorial Building,
9, Maharashtra Chamber of Commerce Lane,
Fort, Mumbai - 400 001.

FAX NO. 022-22042484

E-MAIL- em@mscбанк.com

Website – www.mscбанк.com

TENDER PARTICULARS

Sl.	Particulars	Details
1.	Tender Notice No.	No.107/E&M/Tech./ 563 /2017-18 DATED 07/12/2017
2.	Name of the Work	Empanelment for Design, Supply, Installation , Commissioning ,Maintenance and Operation of Grid connected Solar Rooftop PV Systems of 40 & 50 kWp capacity each at Aurangabad & Nagpur Regional offices respectively.
3	Experience	Registered SPV Suppliers/ Manufacturers/ System Integrators to take up projects under Net Metering basis, and with requisite experience of Supply, Installation and Commissioning of Grid Connected Solar Projects in the last 3 years as given in below table: Bidder should having minimum 500 kw cumulative experience in roof top power pack in last 3 years. Out of which minimum 100 kw power pack should be installed at single location . Bidder should be MNRE empanelled channel partner under on grid systems, having rating minimum SP 1A, 1B, 1C Experience in Grid connected Rooftop Projects shall only be considered eligible for this purpose.
4.	Minimum Eligibility Financial Criteria	The bidder shall have a liquid assets and/or credit facilities of not less than Rs. 1 crores (credit facility) / Letter of Credits / Solvency Certificates from Banks etc.,) for each one Power plant capacity
5	Tender Processing fee	Rs. 5,000/- plus GST

6.	Last Date and Time of Submission	27/12/2017 by 5.00 PM at MSC BANK Registered Office in Mumbai.
7.	Amount of EMD	Rs.1,00,000/- by way of Demand Draft in favour of The Maharashtra State Coop Bank Ltd., payable at Mumbai or equivalent amount of Bank Guarantee from a nationalized/ scheduled bank.
8.	Validity of offer for acceptance	3 months from the date of opening of Tenders
9.	Pre-bid meeting date & time	15/12/2017 at 3.00 PM at MSC BANK at Head Office in Mumbai.
10.	Technical Bid Opening Time	28/12/2017 at 3.00 PM at MSC BANK at Head Office in Mumbai
11.	Price Bid Opening Time	MSC BANK will intimate to the Technically qualified bidders later.

Note:

1. The Tender document can be downloaded from <http://www.msccbank.com> and the cost of tender document should be enclosed by way of Demand Draft of Rs.5,000/- plus GST in favour of MSC BANK Ltd, payable at Mumbai and this D.D. is to be attached in separate envelopes in the technical bid of the tender document.
2. All relevant required documents along with evidences are to be inserted in technical bid, and only quoted rates (as per Format enclosed) is to be inserted in the financial bid.
3. Financial bid will be opened of those bidders who would duly qualify in the technical bid.

SECTION - I

INTRODUCTION, BID DETAILS AND INSTRUCTIONS TO THE BIDDERS

ELIGIBILITY CRITERIA

- 1 The Bidder should be either a body incorporated in India under the Companies Act, 1956 or 2013 including any amendment thereto and engaged in the business of Solar Power.

A copy of certificate of incorporation shall be furnished in the bid in support of above.

- 2 The bidder should have annual turnover of Rupees 1.0 Crore in any one of the last 3 financial years preceding the Bid Deadline subjected to the condition that the Bidder should at least have completed one financial year.
- 3 The Bid submitted by a Consortium should comply with the following additional requirements failing which shall result in disqualification.

- Number of members in a Consortium should be limited to three (3).
- The Bid should contain the information required for each member of the Consortium
- Each Consortium must nominate a lead member/prime bidder of the Consortium and must submit the Power of Attorney by all members of the Consortium in favour of the lead member/prime bidder.
- Any Company applying as a sole Bidder cannot at the same time be member of any Consortium applying for this Project. Further, a member of a particular Consortium cannot be member of any other Consortium applying for this Project. Any Bidder who submits or participates in more than one Bid for this Project will be disqualified and will also lead to disqualification of the Consortium of which it is a member.
- Members of the Consortium shall enter into a memorandum of understanding (MoU) specific to this Project which shall be submitted with the Tender document. The MoU shall, inter alia:

➤ Convey the intent to form a Consortium, with commitments in accordance with the Tender Document, which would enter into the Project Agreement and subsequently carryout all the responsibilities as Implementing Agency in terms of the Project Agreement, incase the Project is awarded to the Consortium.

➤ Clearly outline the proposed roles and responsibilities of each member at each stage.

The Consortium as a whole must be a sound entity both technically and financially.

SECTION - II

PREPARATION OF TENDER

1 LANGUAGE OF TENDER AND MEASURE

The tender prepared by the tenderer along with all the related documents shall be in English. Unit measurements shall be metric in accordance with International System. All correspondence between the tenderer and MSC BANK shall also be in English.

2. EARNEST MONEY

2.1 The tenderer shall furnish earnest money of Rs. 1,00,000/- as mentioned in the "Particulars of Tender" in the shape of DD in favour of, The Maharashtra State Co-op. Bank Ltd., payable at Mumbai. Bank guarantee can also be submitted in place of DD towards EMD amount from any Nationalized / scheduled bank in favour of THE MAHARASHTRA STATE CO.OP. BANK LTD., Mumbai as a part of the tender. The bank guarantee should be **valid for a period of five years beyond the validity of offer**. Tenders without EMD shall be rejected by MSC BANK as being non-responsive. No interest shall be paid by MSC BANK on the amount of earnest money.

2.2 The earnest money may be forfeited:-

- a) If a Tenderer withdraws his tender during the specified period of Tender.
- b) If the successful Tenderer fails to sign the contract agreement within stipulated period with the user agency.

2.3 At the time of allocation of projects, the bidder shall submit Performance Guarantee of Rs. 5,00,000/- for each system. This Performance Guarantee amount shall be submitted in the form of DD/ Bank guarantee from any nationalized/scheduled bank in favour of "MSC BANK, Mumbai". The bank guarantee should be valid for a period of five years from the date of allocation of project. No interest shall be paid by MSC BANK on the amount of security money deposit.

2.4 The MSC BANK reserves the right of awarding the work.

2.5 The earnest money of all unsuccessful bidders shall be released soon after the selection of bidder(s).

2.6 The Performance Guarantee amount will be returned after successful commissioning of the project.

3 PERIOD OF VALIDITY OF TENDER

3.1 Validity of the offer should be 3 months from the proposed date of opening of the Technical bid. Tenders without this validity will be rejected.

3.2 In exceptional circumstances, MSC BANK may solicit the consent of the Tenderers to an extension of the period of validity of offer. The request and the response there of shall be made in writing.

4 FORMATS AND SIGNING OF TENDER

- 4.1 The tender must contain the name and places of business of the firm/person/persons participating in the tender and must be signed and sealed by the Tenderer with his usual signature. The name and designation of all persons signing the tender document should be written below every signature. Tender by a partnership firm must be furnished with full name of all partners with a copy of partnership deed.
- 4.2 The original copy of the tender should be typed or written in indelible ink and must be signed with the legal name of the corporation/ company by the President/ Managing Director/ Secretary of the firm or a person duly authorized to bid. In case of authorized person the letter of authorization by written power-of-attorney should be enclosed with the technical bid of the tender. The person or persons signing the tender shall initial all pages of the tender document.
- 4.3 The tender shall contain no interlink actions, erasers or overwriting except as necessary to correct the errors made by the tenderer in the preparation of tender. The person or persons signing the tender shall also sign at all such corrections.

5 PRICE AND CURRENCIES

The tenderer shall have to submit their rates in Indian Rupees only including all latest applicable taxes & duties of Govt. of Maharashtra as well as Govt. of India. Moreover, MSC BANK will not be responsible for providing Road permits. It is to be obtained by the selected bidder only and necessary Entry Tax (as admissible) will have to be borne by the selected bidder if any. The rate should be quoted on the prescribed format for Financial Bid (Part II) attached to this tender document.

SECTION III

SUBMISSION OF TENDER

1 SEALING AND MARKING OF TENDER

- 1.1 The tender must be complete in all technical and commercial respect and should contain requisite certificates, drawings, informative literature etc. as required in the tender document.
- 1.2 In Technical bid (sealed envelope) (Envelope-A), following documents are to be inserted:- (1). Copy of Registration 2) Cost of the tender document by way of D.D is to be attached 3) Copy of GST, PAN, 4.) System Test certificates 5) Proof of Company's local office including contact telephone no. of local people. 6) Requisite earnest money, brochures, literature and other documents regarding technical specifications. 7) Proof/documents towards eligibility as per the Financial criteria.

It should be superscripted with **“MSC BANK-TENDER for Supply, Installation, and Commissioning of 40 & 50 kWp Capacity Grid connected SPV Power Plants”.- Technical bid**

- 1.3 The complete tender document downloaded from the website should be submitted by the tenderer in the first envelope (Envelope - A) after furnishing all the required information on relevant pages. Each page of the tender document should be signed & stamped. Tenders with any type of change or modification in any of the terms/ conditions of this document shall be rejected. If necessary, additional papers may be attached by the tenderer to furnish/ submit the required information.
- 1.4 Second sealed envelope (Envelope- B) should contain financial bid only. It should be super scribed with **“MSC BANK-TENDER for Supply, Installation, and Commissioning of 40 & 50 kWp Capacity Grid connected SPV Power Plants”.- financial bid**
The tenderer should submit his duly signed and stamped financial bid on the financial bid format attached with this tender document, after writing the price only.
- 1.5 Any term/condition proposed by the tenderer in his technical bid which is not in accordance with the terms and conditions of the tender document or any financial conditions, payment terms, rebates etc. mentioned in financial bid shall be considered as a conditional tender and will make the tender invalid.

2. DEADLINE FOR SUBMISSION OF TENDER

- 2.1 Tender must be received by MSC BANK till the date & time of submission as specified in tender document.
- 2.2 Any tender received after the specified date & time of submission will be rejected and returned unopened to the Tenderer.

SECTION IV

CONDITIONS OF CONTRACT

1. SCOPE OF WORK

Obtaining No Objection Certificate (NOC)” from Distribution Company (DISCOM) for grid connectivity, complete design, engineering, manufacture, supply, storage, civil work, erection, testing & commissioning of the grid connected rooftop solar PV project including operation and maintenance (O&M) of the project for a period of 5 years after commissioning of the projects as per MSC BANK’s acceptance.

2. LEVELLIZED TARIFF

2.1 The Levellized Tariff of 5 years shall include all the costs related to above Scope of Work. Bidder shall quote for the entire facilities on a “single responsibility” basis such that the total Bid Price covers all the obligations mentioned in the Bidding Documents in respect of Design, Supply, Erection, Testing and Commissioning including Warranty, Operation & Maintenance (for a period of 5 years), goods and services including spares required if any during O&M period. The Bidder has to take all permits, approvals and licenses, Insurance etc., provide training and such other items and services required to complete the scope of work mentioned above.

2.2 The Levellized tariff is on lump sum turnkey basis and the bidder is responsible for the total Scope of work described above.

2.3 The Levellized tariff shall remain firm and fixed and shall be binding on the Successful Bidder till completion of work for payment of subsidy amount irrespective of his actual cost of execution of the project. No escalation will be granted on any reason whatsoever. The bidder shall not be entitled to claim any additional charges, even though it may be necessary to extend the completion period for any reasons whatsoever.

2.4 The Levellized tariff shall be inclusive of all duties and taxes, insurance etc. The prices quoted by the firm shall be complete in all respect and no price variation /adjustment shall be payable by MSC BANK. However, statutory variation of taxes and duties may be paid by the roof top owner.

2.5 The Operation & Maintenance of Solar Photovoltaic Power Plant would include wear, tear, overhauling, machine breakdown, insurance, and replacement of defective modules, invertors / Power Conditioning Unit (PCU), spares, consumables & other parts for a period of 5 years.

The Levelled tariff shall be notified for each category of project. The Levellized tariff shall be in accordance with all terms, conditions, specifications and other conditions of the Contract as accepted by the MSC BANK and incorporated in the agreement.

3. INSURANCE

- 3.1 The Bidder shall be responsible and take an Insurance Policy for transit-cum-storage-cum-erection for all the materials to cover all risks and liabilities for supply of materials on site basis, storage of materials at site, erection, testing and commissioning. The bidder shall also take appropriate insurance during O&M period, if required.
- 3.2 The Bidder shall also take insurance for Third Party Liability covering loss of human life, engineers and workmen and also covering the risks of damage to the third party/material/equipment/properties during execution of the Contract. Before commencement of the work, the Bidder will ensure that all its employees and representatives are covered by suitable insurance against any damage, loss, injury or death arising out of the execution of the work or in carrying out the Contract. Liquidation, Death, Bankruptcy etc., shall be the responsibility of bidder.

4. WARRANTIES AND GUARANTEES

The Bidder shall warrant that the goods supplied under this contract are new, unused, of the most recent or latest technology and incorporate all recent improvements in design and materials. The bidder shall provide warrantee covering the rectification of any and all defects in the design of equipment, materials and workmanship including spare parts for a period of 5 years. The successful bidder has to transfer all the Guarantees/ Warrantees of the different components to the Owner of the project. The responsibility of operation of Warrantee and Guarantee clauses and Claims/ Settlement of issues arising out of said clauses shall be joint responsibility of the Successful bidder of the project and MSC BANK will not be responsible in any way for any claims whatsoever on account of the above.

5. TYPE AND QUALITY OF MATERIALS AND WORKMANSHIP

- 5.1 The design, engineering, manufacture, supply, installation, testing and performance of the equipment shall be in accordance with latest appropriate IEC/ Indian Standards as notified by the MNRE, Govt. of India. Where appropriate Indian Standards and Codes are not available, other suitable standards and codes as approved by the MNRE shall be used.
- 5.2 The specifications of the components should meet the technical specifications notified by MNRE from time to time.
- 5.3 Any supplies which have not been specifically mentioned in this Contract but which are necessary for the design, engineering, manufacture, supply & performance or completeness of the project shall be provided by the Bidder without any extra cost and within the time schedule for efficient and smooth operation and maintenance of the SPV plant.

6. OPERATION & MAINTENANCE (O&M) GUIDELINES TO BE MANDATORILY FOLLOWED BY BIDDERS

- 6.1 The bidder shall be responsible for all the required activities for successful operation and maintenance of the Rooftop Solar PV system for a period of 5 years from the date of commissioning of the plant.
- 6.2 O&M of Solar Power Plant shall be compliant with grid requirements to achieve committed energy generation.
- 6.3 Deputation of qualified and experienced engineer/ technicians till the O&M period at project site.
- 6.4 Periodic cleaning of solar modules.
- 6.5 Periodic checks of the Modules, PCUs and BoS shall be carried out as a part of routine preventive and breakdown maintenance.
- 6.6 Immediate replacement of defective Modules, Invertors/PCUs and other equipment as and when required.
- 6.7 Supply of all spares, consumables and fixtures as required. Such stock shall be maintained for all associated equipment and materials as per manufacturer/ supplier's recommendations.
- 6.8 The entire equipment testing instrument required for Testing, Commissioning and O&M for the healthy operation of the Plant shall be maintained by the Bidder. The testing equipments must be calibrated once every 2 years from NABL accredited labs and the certificate of calibration must be kept for reference as required.
- 6.9 If negligence/ mal-operation on part of the Bidder's operator results in failure of equipment, such equipment should be repaired/ replaced by the Bidder free of cost.
- 6.10 Co-ordination with Owner / DISCOM / CEIG as per the requirement for Joint Metering Report (JMR). The person in charge present at site from bidder's side shall take a joint meter reading in the presence of rooftop owner on a **daily basis**. Furnishing generation data (JMR) each month to MSC BANK positively by 1st week of every month for the previous month.
- 6.11 Online Performance Monitoring, controlling, troubleshooting, maintaining of logs & records. A maintenance record register is to be maintained by the operator with effect from Commissioning to record the daily generation, regular maintenance work carried out as well as any preventive and break down maintenance along with the date of maintenance, reasons for the breakdown, duration of the breakdown, steps taken to attend the breakdown, etc.
- 6.12 For any issues related to operation & maintenance, a toll-free number shall be made available to the rooftop owner/ plant owner to resolve within 72 hours. If not attended within such stipulated time, a complaint may be raised to MSC BANK, pursuant to which, a penalty of Rs. 10,000 for full month or more shall be imposed for both the systems
- 6.13 If any jobs covered in O&M Scope as per this tender document are not carried out by the contractor/ Bidders during the O&M period, the Engineer-In-Charge shall take appropriate action as deemed fit. MSC BANK reserves the right to make surprise checks/ inspection visits at its own or through authorized representative to verify the O&M activities being carried out by the Bidder. Failure to adhere to above guidelines will result in penal action including debarring from participation in next tender.

7. METERING AND GRID CONNECTIVITY

Metering and grid connectivity of the roof top solar PV system under this scheme would be the responsibility of the Bidder in accordance with the prevailing guidelines of the concerned DISCOM and / or CEA (if available by the time of implementation). MSC BANK/ SNA could facilitate connectivity; however, the entire responsibility lies with bidder only.

8. PROGRESS REPORT

The bidder shall submit the progress report monthly to MSC BANK in Prescribed Performa. MSC BANK will have the right to depute it's representatives to ascertain the progress of contract at the premises of works of the bidder.

9. Submission of Project Completion Report (PCR)

The bidder shall submit the Project Completion Report in (soft copy and signed copy) after commissioning of the project as per the Scope of Tender to MSC BANK as per the prescribed formats. Non submission of the report shall be considered as "Breach of Contract" and shall attract punitive actions as per the relevant provisions of the Contract including non-release of subsidy. However, the decision of Engineer-in - charge shall be final in this regard.

10. Submission of O&M Report (OMR)

The bidder shall submit the Monthly O&M Report mandatorily to MSC BANK as per the prescribed formats. Non submission of the report shall be considered as "Breach of Contract" and shall attract punitive actions as per the relevant provisions of the Contract including non-release of subsidy. However, the decision of Engineer-in - charge shall be final in this regard.

11. PROJECT INSPECTION

All Projects progress will be monitored by MSC BANK and the projects will be inspected for quality at any time during commissioning or after the completion of the project either by officer(s) from MSC BANK or any agency/ experts designated / authorised by MSC BANK from time to time. MSC BANK shall depute a technical person(s) from its list of empanelled experts/ agencies from time to time for inspection, Third party verification, monitoring of system installed to oversee, the implementation as per required standards and also to visit the manufacturer's facilities to check the quality of products as well as to visit the system integrators to assess their technical capabilities as and when required. The cost of Inspection shall be borne by Vendor only. The projects shall be inspected at any time during commissioning or after the completion of the project(s)

12. APPLICABLE LAW

The Contract shall be interpreted in accordance with the laws of the Union of India. In case of disputes, the decision of MSC BANK is final and binding.

13. LANGUAGE

All documents, drawings, instructions, design data, calculations, operation, maintenance and safety manuals, reports, labels and any other data shall be in English Language. The contract agreement and all correspondence between the MSC BANK and the bidder shall be in English language.

14. OTHER CONDITIONS

14.1 The Successful bidder shall not transfer, assign or sublet the work under this contract or any substantial part thereof to any other party without the prior consent of MSC BANK in writing.

14.2 The Successful bidder or its subcontractors shall not display the photographs of the work and not take advantage through publicity of the work without written permission of MSC BANK and owner of the Rooftop.

14.3 The Successful bidder or its subcontractors shall not make any other use of any of the documents or information of this contract, except for the purposes of performing the contract.

14.4 MSC BANK will not be bound by any Power of Attorney granted/ issued by the Successful bidder or its subcontractors or by any change in the composition of the firm made during or subsequent to the execution of the contract. However, recognition to such Power of Attorney and change (if any) may be given by MSC BANK after obtaining proper legal advice, the cost of which will be chargeable to the Successful bidder concerned.

15. SUCCESSORS AND ASSIGNEES:

In case the MSC BANK or Successful bidder may undergo any merger or amalgamation or a scheme of arrangement or similar re-organization & this contract is assigned to any entity (ies) partly or wholly, the contract shall be binding mutatis mutandis upon the successor entities & shall continue to remain valid with respect to obligation of the successor entities.

SECTION-V

EVALUATION CRITERIA

1. BID EVALUATION

1.1 BID EVALUATION

The evaluation process comprises the following four steps:

- Step I - Responsiveness check of Techno Commercial Bid
- Step II - Evaluation of Bidder's fulfilment of Eligibility Criteria as per Tender condition
- Step III - Evaluation of Price Bid
- Step IV - Successful Bidders(s) selection

1.2 RESPONSIVENESS CHECK OF TECHNO COMMERCIAL BID

The Techno Commercial Bid submitted by Bidders shall be scrutinized to establish responsiveness to the requirements laid down in the Tender schedule. Any of the following may cause the Bid to be considered "Non-responsive", at the sole discretion of MSC BANK:

- a. Bids that are incomplete, i.e. not accompanied by any of the applicable formats inter alia covering letter, power of attorney supported by a board resolution, Bid Bond, etc.;
- b. Bid not signed by authorized signatory and /or stamped in the manner indicated in this RFS;
- c. Material inconsistencies in the information /documents submitted by the Bidder, affecting the Eligibility Criteria;
- d. Information not submitted in the formats specified in this Tender;
- e. Bid being conditional in nature;
- f. Bid not received by the Bid Deadline;
- g. Bid having Conflict of Interest;
- h. More than one Member of a Bidding Company using the credentials of the same Parent Company /Affiliate;
- i. Bidder delaying in submission of additional information or clarifications sought by MSC BANK as applicable;
- j. Bidder makes any misrepresentation.

Each Bid shall be checked for compliance with the submission requirements set forth in this tender before the evaluation of Bidder's fulfilment of Eligibility Criteria is taken up.

1.3 PRELIMINARY EXAMINATION

- a. The MSC BANK will examine the Bids to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed and stamped and whether the Bids are otherwise in order.
- b. Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total Amount that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total amount shall be corrected. If there is a discrepancy between words and figures, the amount written in words will prevail.

1.4 EVALUATION OF BIDDER'S FULFILMENT OF ELIGIBILITY CRITERIA

Evaluation of Bidder's Eligibility will be carried out based on the information furnished by the Bidder as per the prescribed Formats and related documentary evidence in support of meeting the Eligibility Criteria as specified. Non-availability of information and related documentary evidence for the satisfaction of Eligibility Criteria may cause the Bid non-responsive.

2. EVALUATION OF PRICE BID

Price Bid of the Qualified Bidders shall be opened in the presence of the representatives of such Qualified Bidders, who wish to be present, on the specified date. The evaluation of Price Bid shall be carried out based on the information furnished in Financial Bid (Price Bid). The Price Bid submitted by the Bidders shall be scrutinized to ensure conformity with the Tender. Any Bid not meeting any of the requirements of this Tender may cause the Bid to be considered "Non-responsive" at the sole decision of the MSC BANK.

3. SUCCESSFUL BIDDER(S) SELECTION

The lowest Levelled tariff quoted under each category in all Price Bids of Qualified Bidders shall be notified.

The Lowest Feasible Price discovered for each category of Projects shall be communicated to the Bidders and the Bidder's are required to provide their acceptance for the same, within One Week from the date of notifying.

The Bidder who has quoted the Lowest Feasible Price shall have to mandatorily accept the Price or else forfeit their E.M.D. Other Bidders who accept to abide by the Lowest Feasible Price shall be considered as Successful Bidders, and the E.M.D of Other Tenderers who do not wish to accept the discovered price shall be returned.

The Successful Bidder has to sign an agreement within a period of 15 days from the date of receipt of communication of acceptance of his tender. On failure to do so, his tender will be cancelled, duly forfeiting the E.M.D paid by him without issuing any further notice.

If the Successful Bidder, to whom the Letter of Allocation has been issued does not fulfil any of the conditions specified in Bid document, the MSC BANK reserves the right to cancel the award of the Letter of Allocation of such Successful Bidder.

The MSC BANK at its own discretion, has the right to reject any or all the Bids without assigning any reason whatsoever, at its sole discretion.

There shall be no negotiation on the quoted price/ levelled tariff between the MSC BANK and the Bidder(s) during the process of evaluation.

4. PROJECT ALLOCATION AND SANCTION

- a) The identification of the projects (roof tops) at the time of bidding is not mandatory. The Bidders, however, in their own interest are advised to make a preliminary survey of availability of roof tops for which they intend to Bid and as prescribed in the Tender, as well as issue of Grid connectivity, as non-availability of roof tops and non-completion of other formalities after allocation of project will result in forfeiture of Bid Bond/PBG amount submitted by them.

- b) Successful bidders shall share the time and date stamping photographs of the roofs and location details(Address) with MSC BANK before entering into any legal agreement with the Owner. This has to ensure that the location identified by the Successful bidder is freshly identified and strictly complying the norms provided
- c) For identification of projects, MSC BANK may provide help. However the entire responsibility of finding the buildings lies with the Bidder.
- d) Onus of identifying the buildings/rooftops and completing the other documentation like finalizing the Project report and entering into agreements with the buildings/rooftops owners lies with the Successful Bidder within the above mentioned time frame even for the buildings/rooftops identified by MSC BANK for preferential installation.

6. OTHER CONDITIONS

Bidder has to obtain all the necessary approvals/Consents/Clearances required for Erection, Testing, Commissioning and O&M of the project including Grid connectivity. MSC BANK shall not have any responsibility in this regard.

7. TAX EXEMPTIONS:

Price bids are invited inclusive of Taxes and duties. However, Tax exemptions including certificates of any sort, if available may be dealt with the concerned Department of Govt of India by the bidder. MSC BANK in no case will be responsible for providing any tax exemptions to the bidder.

8. REQUIREMENT OF APPROVALS ON MAKES OF THE COMPONENTS:

The modules should be manufactured in India only. Rest of the components can be procured from any source. However these items should meet the Technical specification and standards mentioned in Tender.

9. LIQUIDATED DAMAGES(LD) FOR DELAY IN PROJECT IMPLEMENTATION

If the bidder fails to commission the sanctioned project within specified time, Liquidated Damages on per day basis calculated for the Performance Security on a 6 months period would be levied. After 6 months the project will get cancelled and the total PBG amount would be forfeited.

Ex: If a project of 1 MWp is delayed by 36 days then the Liquidated Damages will be levied as given below.

Liquidated Damages = ((Performance Security)/180 days)*delayed days = (20,00,000 /180)*36 = Rs.4, 00, 000.

10. TIME OF COMPLETION OF SANCTIONED CAPACITY

The Bidder shall complete the roofs identification, submission of project sanction documents as per the requirement of MSC BANK.Engineering, manufacture, supply, storage, civil work, erection, testing & commissioning of sanctioned project(s) within **times lines indicated in the Tender for different capacities** from the date of issue of allocation letter(s). In case of delay beyond scheduled commissioning period, the bidder shall be liable for Liquidated Damages as state above.

The period of construction given in Time Schedule includes the time required for mobilisation as well as testing, rectifications if any, retesting and completion in all respects to the entire satisfaction of the Engineer-in-Charge.

11. COMMISSIONING /COMPLETION CERTIFICATE:

When the Successful bidder fulfils his obligation under the Contract, he shall be eligible to apply for Completion/Commissioning Certificate. The Engineer-in-Charge shall normally issue to the Successful bidder the Completion Certificate within one month after receiving any application therefore from the Successful bidder after verifying from the completion documents and satisfying himself that the Work has been completed in accordance with and as set out in Contract documents. The Successful bidder, after obtaining the Completion Certificate, is eligible to avail the subsidy as per the tender conditions.

12. DOCUMENT SUBMISSION FOR ISSUE OF COMMISSINONING/ COMPLETION CERTIFICATE

The following documents will be deemed to form the completion documents:

- a. Checklist for inspection of Roof top SPV power plants as per MSC BANK format.
- b. DISCOM consent letter
- c. DISCOM synchronisation letter
- d. CEIG approval
- e. Project completion/satisfaction certificate from roof top owner's/project developers.

13. DEDUCTIONS FROM THE CONTRACT PRICE:

All costs, damages or expenses which MSC BANK may have paid or incurred, which under the provisions of the Contract, the Successful bidder is liable/will be liable, will be claimed by the MSC BANK. All such claims shall be billed by the MSC BANK to the Contractor within 15 (fifteen) days of the receipt of the payment request and if not paid by the Successful bidder within the said period, the MSC BANK may, then, deduct the amount from any moneys due i.e., Performance Security or becoming due to the contractor or Successful bidder under the contract or may be recovered by actions of law or otherwise, if the Successful bidder fails to satisfy the MSC BANK of such claims.

14. CORRUPT OR FRAUDULENT PRACTICES

The MSC BANK requires that Successful Bidders/ Contractors should follow the highest standard of ethics during the execution of contract. In pursuance of this policy, the MSC BANK defines, for the purposes of this provision, the terms set forth as follows :

“corrupt practice” means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the bid process or in contract execution; and

“fraudulent practice” means a misrepresentation of facts in order to influence a bid process or the execution of a contract to the detriment of the MSC BANK.

15. DEBARRED FROM PARTICIPATING IN MSC BANK’S ROOF TOP TENDER

MSC BANK reserves the right to carry out the performance review of each Bidder from the time of submission of Bid onwards. In case it is observed that a bidder has not fulfilled its obligations in meeting the various timelines envisaged, in addition to the other provisions of the RFS, such Bidders may be debarred from participating in MSC BANK’s any future tender for a period as decided by the competent authority of MSC BANK.

SECTION-VI TECHNICAL SPECIFICATIONS

1. DEFINITION

A Grid Tied Solar Rooftop Photo Voltaic (SPV) power plant consists of SPV array, Module Mounting Structure, Power Conditioning Unit (PCU) consisting of Maximum Power Point Tracker (MPPT), Inverter, and Controls & Protections, interconnect cables, Junction boxes, Distribution boxes and switches. PV Array is mounted on a suitable structure. Grid tied SPV system is without battery and should be designed with necessary features to supplement the grid power during day time. Components and parts used in the SPV power plants including the PV modules, metallic structures, cables, junction box, switches, PCUs etc., should conform to the BIS or IEC or international specifications, wherever such specifications are available and applicable. Solar PV system shall consist of following equipment/components. **Most of the material should be of indian made and would be preferred most. Material to be used should be of indian standers.China made material will be rejected outrightly.**

Solar PV modules consisting of required number of **Crystalline** PV cells. Grid interactive Power Conditioning Unit with Remote Monitoring System Mounting structures , Junction Boxes, Earthing and lightening protections, IR/UV protected PVC Cables, pipes and accessories

2. SOLAR PHOTOVOLTAIC MODULES:

2.1.The PV modules used should be made in India.

2.2.The PV modules used must qualify to the latest edition of IEC PV module qualification test or equivalent BIS standards Crystalline Silicon Solar Cell Modules IEC 61215/IS14286. In addition, the modules must conform to IEC 61730 Part-1 - requirements for construction & Part 2 – requirements for testing, for safety qualification or equivalent IS.

- a) For the PV modules to be used in a highly corrosive atmosphere throughout their lifetime, they must qualify to IEC 61701.
- b) The total solar PV array capacity should not be less than allocated capacity (kWp) and should comprise of solar crystalline modules of minimum 300Wp and above wattage. Module capacity less than minimum 300 watts shall not be accepted
- c) Protective devices against surges at the PV module shall be provided. Low voltage drop bypass diodes shall be provided.
- d) PV modules must be tested and approved by one of the IEC authorized test centres.
- e) The module frame shall be made of corrosion resistant materials, preferably having anodized aluminium.
- f) The bidder shall carefully design & accommodate requisite numbers of the modules to achieve the rated power in his bid. MSC BANK shall allow only minor changes at the time of execution.

- g) Other general requirement for the PV modules and subsystems shall be the Following:
 - i. The rated output power of any supplied module shall have tolerance within +/- 3%.
 - ii. The peak-power point voltage and the peak-power point current of any supplied module and/or any module string (series connected modules) shall not vary by more than 2 (two) per cent from the respective arithmetic means for all modules and/or for all module strings, as the case may be.
 - iii. The module shall be provided with a junction box with either provision of external screw terminal connection or sealed type and with arrangement for provision of by-pass diode. The box shall have hinged, weather proof lid with captive screws and cable gland entry points or may be of sealed type and IP-65 rated.
 - iv. I-V curves at STC should be provided by bidder.

3. SOLAR PV MODULES

3.1. Modules deployed must use a RF identification tag. The following information must be mentioned in the RFID used on each modules. This should be inside the laminate only.

- a) Name of the manufacturer of the PV module
- b) Name of the manufacturer of Solar Cells.
- c) Month & year of the manufacture (separate for solar cells and modules)
- d) Country of origin (separately for solar cells and module)
- e) I-V curve for the module Wattage, I_m , V_m and FF for the module
- f) Unique Serial No and Model No of the module
- g) Date and year of obtaining IEC PV module qualification certificate.
- h) Name of the test lab issuing IEC certificate.
- i) Other relevant information on traceability of solar cells and module as per ISO 9001 and ISO 14001

4. WARRANTIES:

a) Material Warranty:

- i. Material Warranty is defined as: 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 five (05) years from the date of sale to the original customer ("Customer")
- 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:

The predicted electrical degradation of power generated not exceeding 20% of the minimum rated power over the 25 year period and not more than 10% after ten years period of the full rated original output.

5. ARRAY 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 for the wind zone of the location where a PV system is proposed to be installed (like Delhi-wind speed of 150 km/ hour). It may be ensured that the design has been certified by a recognized Lab/ Institution in this regard and submit wind loading calculation sheet to MSC BANK. Suitable fastening arrangement such as grouting and calming should be provided to secure the installation against the specific wind speed.
- c. The mounting structure steel shall be as per latest IS 2062: 1992 and galvanization of the mounting structure shall be in compliance of latest IS 4759.
- d. Structural material shall be corrosion resistant and electrolytically compatible with the materials used in the module frame, its fasteners, nuts and bolts.
- e. 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
- f. 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.
- g. The minimum clearance of the structure from the roof level should be 300 mm.

6. JUNCTION BOXES (JBs)

- a) The junction boxes are to be provided in the PV array for termination of connecting cables. The J. Boxes (JBs) shall be made of GRP/FRP/Powder Coated Aluminium /cast aluminium alloy with full dust, water & vermin proof arrangement. All wires/cables must be terminated through cable lugs. The JB's shall be such that input & output termination can be made through suitable cable glands.
- b) Copper bus bars/terminal blocks housed in the junction box with suitable termination threads conforming to IP65 standard and IEC 62208 Hinged door with EPDM rubber gasket to prevent water entry. Single / double compression cable glands. Provision of earthings. It should be placed at 5 feet height or above for ease of accessibility.
- c) Each Junction Box shall have High quality Suitable capacity Metal Oxide Varistors (MOVs) / SPDs, suitable Reverse Blocking Diodes. The Junction Boxes shall have suitable arrangement monitoring and disconnection for each of the groups.
- d) Suitable markings shall be provided on the bus bar for easy identification and the cable ferrules must be fitted at the cable termination points for identification.
- e) All fuses shall have DIN rail mountable fuse holders and shall be housed in thermoplastic IP 65 enclosures with transparent covers.

7. DC DISTRIBUTION BOARD

- a) DC Distribution panel to receive the DC output from the array field.
- b) DC DPBs shall have sheet from enclosure of dust & vermin proof conform to IP 65 protection. The bus bars are made of copper of desired size. Suitable capacity MCBs/MCCB shall be provided for controlling the DC power output to the PCU along with necessary surge arrestors.

8. AC DISTRIBUTION PANEL BOARD:

- a. AC Distribution Panel Board (DPB) shall control the AC power from PCU/ 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 changeover 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, 80 percent 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. Should conform to Indian Electricity Act and rules (till last amendment).
- h. 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

9. PCU/ARRAY SIZE RATIO:

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

10. PCU/ Inverter:

As SPV array produce direct current electricity, it is necessary to convert this direct current into alternating current and adjust the voltage levels to match the grid voltage. 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 (PCU)". In addition, the PCU shall also house MPPT (Maximum Power Point Tracker), an interface between Solar PV array & the Inverter, to the power

conditioning unit/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:

Switching devices	IGBT/MOSFET
Control	Microprocessor /DSP
Nominal AC output voltage and frequency	415V, 3 Phase, 50 Hz (In case single phase inverters are offered, suitable arrangement for balancing the phases must be made.)
Output frequency	50 Hz
Grid Frequency Synchronization range	+ 3 Hz or more

Ambient temperature considered	-20 ^o C to 50 ^o C
Humidity	95 % Non-condensing
Protection of Enclosure	IP-20(Minimum) for indoor.
	IP-65(Minimum) for outdoor.
Grid Frequency Tolerance range	+ 3 or more
Grid Voltage tolerance	-0.20.15
No-load losses	Less than 1% of rated power
Inverter efficiency(minimum)	>93% (In case of 10 kW or above with in-built galvanic isolation)
	>97% (In case of 10 KW or above without in-built galvanic isolation)
Inverter efficiency (minimum)	> 90% (In case of less than 10 kW)
THD	< 3%
PF	> 0.9

- a) PCU/inverter shall be capable of complete automatic operation including wake-up, synchronization & shutdown.
- b) The output of power factor of PCU 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.

- c) Built-in meter and data logger to monitor plant performance through external computer shall be provided.
- d) **Anti-islanding** (Protection against Islanding of grid): The PCU shall have antiislanding protection in conformity to IEEE 1547/UL 1741/ IEC 62116 or equivalent BIS standard.
- e) Successful Bidders shall be responsible for galvanic isolation of solar roof top power plant (>100kW) with electrical grid or LT panel.
- f) In PCU/Inverter, there shall be a direct current isolation provided at the output by means of a suitable isolating transformer. If Isolation Transformer is not incorporated with PCU/Inverter, there shall be a separate Isolation Transformer of suitable rating provided at the output side of PCU/PCU units for capacity more than 100 kW.
- h) The PCU/ 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.
- i) The power conditioning units / inverters should comply with applicable IEC/ equivalent BIS standard for efficiency measurements and environmental tests as per standard codes IEC 61683/IS 61683 and IEC 60068-2 (1,2,14,30)/ Equivalent BIS Std.
- j) The MPPT units environmental testing should qualify IEC 60068-2 (1, 2, 14, 30)/ Equivalent BIS std. The junction boxes/ enclosures should be IP 65 (for outdoor)/ IP 54 (indoor) and as per IEC 529 specifications.
- k) The PCU/ inverters should be tested from the MNRE approved test centres/ NABL/ BIS/ IEC accredited testing- calibration laboratories. In case of imported power conditioning units, these should be approved by international test houses.

INTEGRATION OF P V POWER WITH GRID.

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. Once the grid comes into service PV system shall again be synchronized with grid supply and load requirement would be met to the extent of availability of power. 4 pole isolation of inverter output with respect to the grid power connection need to be provided, as per regulation.

12. DATA ACQUISITION SYSTEM / PLANT MONITORING

- i. Data Acquisition System shall be provided for each of the solar PV .
- ii. Data Logging Provision for plant control and monitoring, time and date stamped system data logs for analysis with the high quality, suitable PC. Metering and Instrumentation for display of systems parameters and status indication to be provided.
- iii. Solar Irradiance: An integrating Pyranometer / Solar cell based irradiation sensor (along with calibration certificate) provided, with the sensor mounted in the plane of the array. Readout integrated with data logging system.

- iv. Temperature: Temperature probes for recording the Solar panel temperature and/or ambient temperature to be provided complete with readouts integrated with the data logging system
- v. The following parameters are accessible via the operating interface display in real time separately for solar power plant:
 - a. AC Voltage.
 - b. AC Output current.
 - c. Output Power
 - d. Power factor.
 - e. DC Input Voltage.
 - f. DC Input Current.
 - g. Time Active.
 - h. Time disabled.
 - i. Time Idle.
 - j. Power produced
- 1) Remote Monitoring and data acquisition through Remote Monitoring System software at the owner / MSC BANK location with latest software/hardware configuration and service connectivity for online / real time data monitoring / control complete to be supplied and operation and maintenance / control to be ensured by the bidder.

13. TRANSFORMER “IF REQUIRED” & METERING:

- a. The bidirectional electronic energy meter as per the requirement shall be installed for the measurement of import/Export of energy.
- b. The bidder must take approval/NOC from the Concerned DISCOM for the connectivity, technical feasibility, and synchronization of SPV plant with distribution network and submit the same to MSC BANK before commissioning of SPV plant.
- c. Reverse power relay shall be provided by bidder (if necessary), as per the local DI houses. SCOM requirement.

14. POWER CONSUMPTION:

Regarding the generated power consumption, priority need to give for internal consumption first and thereafter any excess power can be exported to grid. Finalization of tariff is not under the purview of MSC BANK or MNRE. Decisions of appropriate authority like DISCOM, state regulator may be followed.

15. PROTECTIONS

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

16. LIGHTNING PROTECTION

The SPV power plants shall be provided with lightning & overvoltage protection. The main aim in this protection shall be to reduce the over voltage to a tolerable value before it reaches the PV or other sub system components. The source of over voltage can be lightning, atmosphere disturbances etc. The entire space occupying the SPV array shall be suitably protected against Lightning by deploying required number of Lightning Arrestors. Lightning protection should be provided as per **IEC 62305** standard. The protection against induced high-voltages shall be provided by the use of

metal oxide varistors (MOVs) and suitable earthing such that induced transients find an alternate route to earth.

17. SURGE PROTECTION

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

18. EARTHING PROTECTION

- a) Each array structure of the PV yard should be grounded/ earthed properly as per IS:3043-1987. In addition the lighting arrester/masts should also be earthed inside the array field. Earth Resistance shall be tested in presence of the representative of Department/MSB BANK as and when required after earthing by calibrated earth tester. PCU, ACDB and DCDB should also be earthed properly.
- b) Earth resistance shall not be more than 5 ohms. It shall be ensured that all the earthing points are bonded together to make them at the same potential.

19. 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 4-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 by the utility personnel.

20. CABLES

Cables of appropriate size to be used in the system shall have the following characteristics:

- a. Shall meet IEC 60227/IS 694, IEC 60502/IS1554 standards
- b. Temp. Range: -10°C to $+80^{\circ}\text{C}$.
- c. Voltage rating 660/1000V
- d. Excellent resistance to heat, cold, water, oil, abrasion, UV radiation
- e. Flexible
- f. Sizes of cables between array interconnections, array to junction boxes, junction boxes to Inverter etc. shall be so selected to keep the voltage drop (power loss) of the entire solar system to the minimum (2%)
- g. For the DC cabling, XLPE or, XLPO insulated and sheathed, UV-stabilized single core multi-stranded flexible copper cables shall be used; Multi-core cables shall not be used.
- h. For the AC cabling, PVC or, XLPE insulated and PVC sheathed single or, multi-core multi-stranded flexible copper cables shall be used; Outdoor AC cables shall have a UV-stabilized outer sheath.

- i. The cables (as per IS) should be insulated with a special grade PVC compound formulated for outdoor use. Outer sheath of cables shall be electron beam cross-linked XLPO type and black in colour.
- j. The DC cables from the SPV module array shall run through a UV-stabilized PVC conduit pipe of adequate diameter with a minimum wall thickness of 1.5mm.
- k. Cables and wires used for the interconnection of solar PV modules shall be provided with solar PV connectors (MC4) and couplers
- l. All cables and conduit pipes shall be clamped to the rooftop, walls and ceilings with thermo-plastic clamps at intervals not exceeding 50 cm; the minimum DC cable size shall be 4.0 mm² copper; the minimum AC cable
- m. size shall be 4.0 mm² copper. In three phase systems, the size of the neutral wire size shall be equal to the size of the phase wires.
- n. Cable Routing/ Marking: All cable/wires are to be routed in a GI cable tray and suitably tagged and marked with proper manner by good quality ferule or by other means so that the cable easily identified. In addition, cable drum no. / Batch no. to be embossed/ printed at every one meter.
- o. Cable Jacket should also be electron beam cross-linked XLPO, flame retardant, UV resistant and black in colour.
- p. All cables and connectors for use for installation of solar field must be of solar grade which can withstand harsh environment conditions including High temperatures, UV radiation, rain, humidity, dirt, salt, burial and attack by moss and microbes for 25 years and voltages as per latest IEC standards. DC cables used from solar modules to array junction box shall be solar grade copper (Cu) with XLPO insulation and rated for 1.1kV as per relevant standards only.
- q. The ratings given are approximate. Bidder to indicate size and length as per system design requirement. All the cables required for the plant shall be provided by the bidder. Any change in cabling sizes if desired by the bidder shall be approved after citing appropriate reasons. All cable schedules/ layout drawings shall be approved prior to installation.
- r. Multi Strand, Annealed high conductivity copper conductor PVC type 'A' pressure extruded insulation or XLPE insulation. Overall PVC/XLPE insulation for UV protection Armoured cable for underground laying. All cable trays including covers to be provided. All cables conform to latest
- s. edition of IEC/ equivalent BIS Standards as specified below: BoS item / component Standard Description Standard Number Cables General Test and Measuring Methods, PVC/XLPE insulated cables for working Voltage up to and including 1100 V, UV resistant for outdoor installation IS /IEC 69947.
- t. The total voltage drop on the cable segments from the solar PV modules to the solar grid inverter shall not exceed 2.0%.
- u. The total voltage drop on the cable segments from the solar grid inverter to the building distribution board shall not exceed 2.0%.

CONNECTIVITY:-

The maximum capacity for interconnection with the grid at the specific voltage level shall be as specified in the MERC regulation for grid connectivity and norms of DISCOM and amended from time to time.

21. DRAWINGS & MANUALS:

- a) Two sets of Engineering, electrical drawings and Installation and O&M manuals are to be supplied. Bidders shall provide complete technical data sheets for each equipment giving details of the specifications along with make/makes in their bid along with basic design of the power plant and power evacuation, synchronization along with protection equipment.
- b) Approved ISI and reputed makes for equipment be used.
- c) For complete electro-mechanical works, bidders shall supply complete design, details and drawings for approval to MSC BANK/owners before progressing with the installation work

22. PLANNING AND DESIGNING:

- a) The bidder should carry out Shadow Analysis at the site and accordingly design strings & arrays layout considering optimal usage of space, material and labour. The bidder should submit the array layout drawings along with Shadow Analysis Report to MSC BANK/Owner for approval.
- b) MSC BANK reserves the right to modify the landscaping design, Layout and specification of sub-systems and components at any stage as per local site conditions/requirements.
- c) The bidder shall submit preliminary drawing for approval & based on any modification or recommendation, if any. The bidder submit three sets and soft copy in CD of final drawing for formal approval to proceed with construction work.

26. DRAWINGS TO BE FURNISHED BY BIDDER AFTER AWARD OF CONTRACT

- a. The Contractor shall furnish the following drawings Award/Intent and obtain approval
- b. General arrangement and dimensioned layout
- c. Schematic drawing showing the requirement of SV panel, Power conditioning Unit(s)/ inverter, Junction Boxes, AC and DC Distribution Boards, meters etc.
- d. Structural drawing along with foundation details for the structure.
- e. Itemized bill of material for complete SV plant covering all the components and associated accessories.
- f. Layout of solar Power Array
- g. Shadow analysis of the roof
- h.

27. 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.

28. DISPLAY BOARD

The bidder has to display a board at the project site (above 50kWp) mentioning the following:

- a. Plant Name, Capacity, Location, Type of Renewable Energy plant (Like solar wind etc.), Date of commissioning, details of tie-up with transmission and distribution companies, Power generation and Export FY wise.
 - b. Financial Assistance details from MSC BANK/MNRE/Any other financial institution apart from loan. This information shall not be limited to project site but also be displayed at site offices/head quarter offices of the successful bidder
 - c. The size and type of board and display shall be approved by Engineer-in-charge before site inspection.
29. EMD will be released with final bill and if successful bidder offers (Nonrefundable) bank guarantee for five years then the security deposit will be released with final bill.

TECHNICAL BID FORMAT (ENVELOPE – A)

All pages of the Technical Bid shall be organised section-wise, annexed with proof documents, serially numbered and stitched/or spiral bound intact and submitted) Loose pages shall not be accepted.

1. GENERAL PARTICULARS OF TENDERER

SL.	PARTICULARS	TO BE FUNISHED BY THE TENDERER
1	Name of Tenderer/Firm	
2	Postal Address	
3	E-mail address for communication	
4	Telephone/ Fax No.	
5	Name, designation, address, contact number and Email of the representative of the tenderer to whom all references shall be made.	
6	Nature of the firm (Individual/ Partnership/Consortium/ Pvt. Ltd /Public Ltd. Co. /Public Sector, etc.) Attach attested copy of Registration & Partnership deed/ Memorandum of Association	
7	Address of Service Centre at Aurangabad & Nagpur	
8	Amount and particulars of the Earnest Money Deposited.	
9	Annual Turnover for last three years i.e 2013 -2016 (Attach balance sheets from CA in this regard)	
10	Name and address of the Indian collaboration if any.	
11	PAN NO (Copy of certificate to be enclosed)	
12	GST No.	
13	Has the Tenderer/firm ever been debarred by any institution for undertaking any work? blocks used even	

14	Any other information attached by the Tenderer (Details of Annexure / page no. where its enclosed)	
15	Does Tenderer have any relative Working in MSC BANK? If yes state the Name and designation.	

2.DETAILS ABOUT THE COMPONENTS TO BE USED

S. No	Description	Name of Manufacturer(s)	Manufacturing Plant address
1	Solar PV Modules		
2	Grid Tied Inverter/PCU		

Enclose the Data Sheets of Solar PV Modules and Grid Tied Inverters proposed to be used

3. DETAILS OF EXPERIENCE

Please fill in information about grid Solar PV Systems installed in the last three years.

Sl. No	Description	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17
1	Grid Connected Solar PV Plants in kWp				
2	Total Aggregate Project Cost in Rs.				

Mandatory Documentary Evidences to be submitted:

- A. Work Order Copies
- B. Project Sanction Letter
- C. Project Completion Report/Certificate clearly showing the date of commissioning
- D. CEIG Clearance Certificates (for Projects > 10 kWp)

Signature of the authorised person:

Name of the authorised person:

Designation:

Name and Address of Bidder

Stamp of bidder

DECLARATION

(on Rs.100/- non-judicial stamp paper)

I / WE have gone through carefully all the Tender conditions and solemnly declare that I / we will abide by any penal action such as disqualification or black listing or determination of contract or any other action deemed fit, taken by, the Department against us, if it is found that the statements, documents, certificates produced by us are false / fabricated.

I / WE hereby declare that, I / we have not been blacklisted / debarred / Suspended / demoted in any Government Department in any State due to any reasons.

Signature of the Tenderer

DECLARATION BY THE TENDERER

I/We

.....
.....

(Hereinafter referred to as Tenderer) being desirous of tendering for the work, under this tender and having fully understood the nature of the work and having carefully noted all the terms and conditions, specifications etc. as mentioned in the tender document do hereby declare that

1. The tenderer is fully aware of all the requirements of the tender document and agrees with all provisions of the tender document and accepts all risks, responsibilities and obligations directly or indirectly connected with the performance of the tender.
2. The Tenderer is fully aware of all the relevant information for proper execution of the proposed work, with respect to the proposed place of works/ site, its local environment, approach road and connectivity etc. and is well acquainted with actual and other prevailing working conditions, availability of required materials and labour etc. at site.
3. The Tenderer is capable of executing and completing the work as required in the tender and is financially solvent and sound to execute the tendered work. The tenderer is sufficiently experienced and competent to perform the contract to the satisfaction of MSC BANK. The Tenderer gives the assurance to execute the tendered work as per specifications, terms and conditions of the tender on award of work.
4. The Tenderer has no collusion with other Tenderers, any employee of MSC BANK or with any other person or firm in the preparation of the tender.
5. The Tenderer has not been influenced by any statement or promises by MSC BANK or any of its employees but only by the tender document.
6. The Tenderer is familiar with all general and special laws, acts, ordinances, rules and regulations of the Municipal, District, State and Central Government that may affect the work, its performance or personnel employed therein.
7. The Tenderer has never been debarred from similar type of work by any Government Undertaking /Department. (An undertaking on Non-Judicial Stamp paper worth of Rs. 100/- in this regard shall be submitted)
8. The Tenderer accepts that the earnest money / Performance Guarantee may be absolutely forfeited by MSC BANK if the selected bidder fails to sign the contract or to undertake the work within stipulated time.
9. This offer shall remain valid for acceptance for 3 (Three) months from the proposed date of opening of Tender.
10. All the information and the statements submitted with the tender are true and correct to the best of my knowledge and belief.

Signature of Tenderer

CHECKLIST TO ACOMPANY THE TENDER

S. No	Description	Submitted in Cover 'A'
1	2	3
1	Copy of Contractors valid Registration certificate with MSC BANK	Yes /No
2	Demand draft toward requisite Earnest Money Deposit (issued by any Nationalised/Scheduled bank)	Yes /No
3	Crossed demand draft towards Cost of tender document	Yes /No
4	Copy of PAN card	Yes /No
5	Copy of latest Income Tax Clearance returns submitted along with proof of receipt	Yes /No
6	Copies of GST Registration Certificate.	Yes /No
7	In case of Consortium submit Memorandum of Understanding (MoU) on a non-judicial stamp paper of Rs.100/- duly attested by a notary public.	Yes /No
8	Attach Client list with copy of work order less than Rs.5.00 Crores per MW (Credit facility / letter of credits/solvency certificates from banks etc.,)	Yes /No
9	Availability of local service centres/ technical personnel	Yes /No
10	Information on litigation history in which Bidder is involved.	Yes/No
11	Any other documents/certificate as specified in tender conditions	Yes /No
12	Experience Certificate	Yes /No
13	Declarations as per the formats	Yes /No

FINANCIAL BID FORMAT (ENVELOPE – B)

(TO BE SUBMITTED IN SEPERATE SEALED COVER)

A. Supply, Installation , Commissioning, Maintenance and Operation of Grid Connected Solar Rooftop Systems at Aurangabad & Nagpur Regional offices.

Project	Cost for supply of power from Grid Connected Rooftop Solar PV Power Plant as per MSC BANK/DISCOM Specifications under Net Metering Scheme (Rs)	
	In Figures	In Words
A) 40 kWp for Aurangabad R.O.		
B) 50 kWp for Nagpur R.O.		

B. Comprehensive Annual Maintenance for five years a both the project

Project	Years	Cost for AMC after warranty of Grid Connected Rooftop Solar PV Power Plant as per MSC BANK/ TRANSCO/ DISCOM Specifications under Net Metering Scheme (Rs./Kwh)	
		In Figures	In Words
A) 40 kWp for Aurangabad R.O.	1 st year		
	2 nd year		
	3 rd year		
	4 th year		
	5 th year		
	Total		
B) 50 kWp for Nagpur R.O.	1 st year		
	2 nd year		
	3 rd year		
	4 th year		
	5 th year		
	Total		

Certified that :-

1. Above rates are in accordance with specifications & various terms & conditions mentioned in the tender document.
2. The rates are inclusive of all taxes and duties of Govt. of Maharashtra as well Govt. of India prevailing from time to time.
3. Amount shall be quoted in INR / kWh upto two decimal places.
4. In the event of any discrepancy between the values entered in figures and in words, the values entered in words shall be considered.

Authorised Signature:

Name:

Designation:

Name & Address of the
Company/Consortium

FORMATS FOR SUBMITTING TENDER

Covering Letter

(The covering letter should be on the Letter Head of the Bidding Company)

Ref.No. _____ Date: _____

From: _____ (Insert name and address of Bidding Company)

Tel.#:

Fax#:

E-mail address#

To.

The Joint Manager,

The Maharashtra State Co-op.Bank Ltd.,
General Administration Dep't., 3rd floor,
Sir, Vithaldas Thackersey Memorial Building,
9, Maharashtra Chamber of Commerce Lane,
Fort, Mumbai- 400 001.
Phone No. 022-22800592.

Dear Sir,

Sub: Bid for "Implementation of Grid connected Roof Top Solar PV System at Aurangabad & Nagpur R.O.

1. We, the undersigned.... [insert name of the 'Bidder'] having read, examined and understood in detail the Tender Document for Implementation of Grid connected Roof Top Solar PV System Scheme hereby submit our Bid comprising of Price Bid and Techno Commercial Bid. We confirm that neither we nor any of our Parent Company / Affiliate/Ultimate Parent Company has submitted Bid other than this Bid directly or indirectly in response to the aforesaid RFS.
2. We give our unconditional acceptance to the Tender Documents attached thereto, issued by MSC BANK, as amended. As a token of our acceptance to the Tender Documents, the same have been initialled by us and enclosed to the Bid. We shall ensure that we execute such Tender Documents as per the provisions of the Tender and provisions of such Tender Documents shall be binding on us.

4. Earnest Money Deposit (EMD):

We have enclosed a EMD of Rs.....(Insert Amount), by way of Demand Draft bearing No._____ dated _____

- 5. a. The offered quantum of power by us is 40 kWp (Insert total capacity offered). for Aurangabad R.O.
- b. The offered quantum of power by us is 50 kWp (Insert total capacity offered). for Nagpur R.O.
- 6. We have submitted our Price Bid strictly as per conditions of this Tender, without any deviations, conditions and without mentioning any assumptions or notes for the Price Bid in the said format(s).
- 7. In case we are a Successful Bidder, we shall furnish a declaration at the time of commissioning of the Project to the affect that neither we have availed nor we shall avail in future any subsidy other than received from MSC BANK for implementation of the project.

8. Acceptance

We hereby unconditionally and irrevocably agree and accept that the decision made by MSC BANK in respect of any matter regarding or arising out of the Tender shall be binding on us. We hereby expressly waive any and all claims in respect of Bid process.

We confirm that there are no litigations or disputes against us, which materially affect our ability to fulfil our obligations with regard to execution of projects of capacity offered by us.

8. Familiarity with Relevant Indian Laws & Regulations

We confirm that we have studied the provisions of the relevant Indian laws and regulations as required to enable us to submit this Bid and execute the Tender Documents, in the event of our selection as Successful Bidder. We further undertake and agree that all such factors as mentioned in Tender have been fully examined and considered while submitting the Bid.

9. Contact Person

Details of the contact person are furnished as under:

Name :

Designation :

Company :

Address :

Phone Nos. :
Fax Nos. :
E-mail address :

10. We are enclosing herewith the Envelope-A (Covering letter, Processing fee and EMD, Technical Bid, etc and other documents as per the check list) and Envelope B (Price Bid) containing duly signed formats, each one duly sealed separately, in one original as desired by you in the Tender for your consideration.

It is confirmed that our Bid is consistent with all the requirements of submission as stated in the Tender and subsequent communications from MSC BANK. The information submitted in our Bid is complete, strictly as per the requirements stipulated in the Tender and is correct to the best of our knowledge and understanding. We would be solely responsible for any errors or omissions in our Bid. We confirm that all the terms and conditions of our Bid are valid for acceptance for a period of 3 month from the Bid deadline. We confirm that we have not taken any deviation so as to be deemed non-responsive.

Dated the _____ day of _____, 20....

Thanking you,

We remain,

Yours faithfully,

**Name, Designation and Signature of Authorized Person
(in whose name Power of Attorney/Board Resolution/Declaration)**

POWER OF ATTORNEY

(To be on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution.)

(a) Power of Attorney to be provided by the Bidding Company in favour of its representative as evidence of authorized signatory's authority.

Know all men by these presents, We
(name and address of the registered office of the Bidding Company as applicable) do hereby constitute, appoint and authorize Mr./Ms. (name& residential address) who is presently employed with us and holding the position of as our true and lawful attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to submission of our Bid for implementation of grid connected Roof top solar PV scheme . Limited (MSC BANK), including signing and submission of the Bid and all other documents related to the Bid, including but not limited to undertakings, letters, certificates, acceptances, clarifications, guarantees or any other document which the MSC BANK may require us to submit. The aforesaid Attorney is further authorized for making representations to the MSC BANK and providing information / responses to MSC BANK representing us in all matters before MSC BANK, and generally dealing with MSC BANK in all matters in connection with Bid till the completion of the bidding process as per the terms of the above mentioned

We hereby agree to ratify all acts, deeds and things done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney shall be binding on us and shall always be deemed to have been done by us.

Signed by the within named

..... **(Insert the name of the executant company)**

through the hand of

Mr.

duly authorized by the Board to issue such Power of Attorney

Dated this day of

Accepted

.....

Signature of Attorney

(Name, designation and address of the Attorney)

Attested

.....

(Signature of the executant)

(Name, designation and address of the executant)

.....

Signature and stamp of Notary of the place of execution

Common seal of has been affixed in my/our presence pursuant to Board of Director’s Resolution dated.....

WITNESS

1.

(Signature)

Name.....

Designation

2.

(Signature)

Name.....

Designation

Notes:

The mode of execution of the power of attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and the same should be under common seal of the executant affixed in accordance with the applicable procedure. Further, the person whose signatures are to be provided on the power of attorney shall be duly authorized by the executant(s) in this regard.

The person authorized under this Power of Attorney, in the case of the Bidding Company / Lead Member being a public company, or a private company which is a subsidiary of a public company, in terms of the Companies Act, 1956, with a paid up share capital of more than Rupees Five crores, should be the Managing Director / whole time director/manager appointed under section 269 of the Companies Act, 1956. In all other cases the person authorized should be a director duly authorized by a board resolution duly passed by the Company.

Also, wherever required, the executant(s) should submit for verification the extract of the chartered documents and documents such as a Board resolution / power of attorney, in favour of the person executing this power of attorney for delegation of power hereunder on behalf of the executant(s).

DOCUMENTS REQUIRED FOR PROJECT SANCTION

Following documents will be required to be submitted for project sanction:

1. Agreement between the bidder and the MSC BANK (Notarised original agreement on stamp paper of appropriate value should be enclosed).
2. All Agreement shall generally have reference to the MSC BANK's Tender No. and Letter of Allocation and provisions as per terms and conditions, technical specification and performance parameter in line with the MSC BANK's Tender Document against which Letter of Allocation has been issued.
3. No Objection Certificate from the concerned DISCOM for grid connectivity or CEIG approval (In case CEIG approval is suffice for grid connectivity). Undertaking of Successful Bidder on stamp Paper for indemnification of MSC BANK shall be furnished in case approval of CEIG is only furnished for grid connectivity.

(Not mandatory during project identification, however mandatory for project commissioning/operation).

4. Summary Project Report as per Format at **Annexure**.

OPERATION AND MAINTENANCE GUIDELINES OF GRID CONNECTED PV PLANTS

1. Periodic cleaning of solar modules, preferably once every fortnight.
2. O&M of Solar Power Plant shall be compliant with grid requirements to achieve committed energy generation.
3. Periodic checks of the Modules, PCUs and BoS shall be carried out as a part of routine preventive and breakdown maintenance.
4. Immediate replacement of defective Modules, Invertors/PCUs and other equipment as and when required.
5. Supply of all spares, consumables and fixtures as required. Such stock shall be maintained for all associated equipments and materials as per manufacturer/ supplier's recommendations.
6. All the equipment testing instrument required for Testing, Commissioning and O&M for the healthy operation of the Plant shall be maintained by the Bidder. The testing equipments must be calibrated once every 2 years from NABL accredited labs and the certificate of calibration must be kept for reference as required.
7. If negligence/ mal-operation on part of the Bidder's operator results in failure of equipment, such equipment should be repaired/ replaced by the Bidder free of cost.
8. If any jobs covered in O&M Scope as per RFS are not carried out by the contractor/ Bidders during the O&M period, the Engineer-In-Charge shall take appropriate action as deemed fit.
9. MSC BANK reserves the right to make surprise checks/ inspection visits at its own or through authorized representative to verify the O&M activities being carried out by the Bidder.

Quality Certification, Standards and Testing for Grid-connected Rooftop Solar PV Systems/Power Plants

Quality certification and standards for grid-connected rooftop solar PV systems are essential for the successful mass-scale implementation of this technology. It is also imperative to put in place an efficient and rigorous monitoring mechanism, adherence to these standards. Hence, all components of grid-connected rooftop solar PV system/ plant must conform to the relevant standards and certifications given below:

Solar PV Modules/Panels	
IEC 61215/ IS 14286	Design Qualification and Type Approval for Crystalline Silicon Terrestrial Photovoltaic (PV) Modules
IEC 61701	Salt Mist Corrosion Testing of Photovoltaic (PV) Modules
IEC 61853- Part 1/ IS 16170: Part 1	Photovoltaic (PV) module performance testing and energy rating –: Irradiance and temperature performance measurements, and power rating
IEC 62716	Photovoltaic (PV) Modules – Ammonia (NH ₃) Corrosion Testing (As per the site condition like dairies, toilets)
IEC 61730-1,2	Photovoltaic (PV) Module Safety Qualification – Part 1: Requirements for Construction, Part 2: Requirements for Testing
IEC 62804	Photovoltaic (PV) modules - Test methods for the detection of potential-induced degradation. IEC TS 62804-1: Part 1: Crystalline silicon (mandatory for applications where the system voltage is > 600 VDC and advisory for installations where the system voltage is < 600 VDC)
IEC 62759-1	Photovoltaic (PV) modules – Transportation testing, Part 1: Transportation and shipping of module package units
Solar PV Inverters	
IEC 62109-1, IEC 62109-2	Safety of power converters for use in photovoltaic power systems – Part 1: General requirements, and Safety of power converters

	<p>for use in photovoltaic power systems</p> <p>Part 2: Particular requirements for inverters. Safety compliance (Protection degree IP 65 for outdoor mounting, IP 54 for indoor mounting)</p>
IEC/IS 61683 (as applicable)	Photovoltaic Systems – Power conditioners: Procedure for Measuring Efficiency (10%, 25%, 50%, 75% & 90-100% Loading Conditions)
BS EN 50530 (as applicable)	<p>Overall efficiency of grid-connected photovoltaic inverters:</p> <p>This European Standard provides a procedure for the measurement of the accuracy of the maximum power point tracking (MPPT) of inverters, which are used in grid-connected photovoltaic systems. In that case the inverter energizes a low voltage grid of stable AC voltage and constant frequency. Both the static and dynamic MPPT efficiency is considered.</p>
IEC 62116/ UL 1741/ IEEE 1547 (as applicable)	Utility-interconnected Photovoltaic Inverters - Test Procedure of Islanding Prevention Measures
IEC 60255-27	Measuring relays and protection equipment – Part 27: Product safety requirements
IEC 60068-2 (1, 2, 14, 27, 30 & 64)	<p>Environmental Testing of PV System – Power Conditioners and Inverters</p> <p>a) IEC 60068-2-1: Environmental testing - Part 2-1: Tests - Test A: Cold</p> <p>b) IEC 60068-2-2: Environmental testing - Part 2-2: Tests - Test B: Dry heat</p> <p>c) IEC 60068-2-14: Environmental testing - Part 2-14: Tests - Test N: Change of temperature</p> <p>d) IEC 60068-2-27: Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock</p> <p>e) IEC 60068-2-30: Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)</p> <p>f) IEC 60068-2-64: Environmental testing - Part 2-64: Tests - Test Fh: Vibration, broadband random and guidance</p>
IEC 61000 – 2,3,5 (as applicable)	Electromagnetic Interference (EMI) and Electromagnetic Compatibility (EMC) testing of PV Inverters

Fuses	
IS/IEC 60947 (Part 1, 2 & 3), EN 50521	General safety requirements for connectors, switches, circuit breakers (AC/DC): a) Low-voltage Switchgear and Control-gear, Part 1: General Rules b) Low-Voltage Switchgear and Control-gear, Part 2: Circuit Breakers c) Low-voltage switchgear and Control-gear, Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units d) EN 50521: Connectors for photovoltaic systems – Safety requirements and tests
IEC 60269-6	Low-voltage fuses - Part 6: Supplementary requirements for fuse-links for the protection of solar photovoltaic energy systems
Surge Arrestors	
IEC 62305-4	Lightening Protection Standard
IEC 60364-5-53/IS 15086-5 (SPD)	Electrical installations of buildings - Part 5-53: Selection and erection of electrical equipment - Isolation, switching and control
IEC 61643-11:2011	Low-voltage surge protective devices - Part 11: Surge protective devices connected to low-voltage power systems - Requirements and test methods
Cables	
IEC 60227/IS 694, IEC 60502/IS 1554 (Part 1 & 2)/ IEC69947	General test and measuring method for PVC (Polyvinyl chloride) insulated cables (for working voltages up to and including 1100 V, and UV resistant for outdoor installation)
BS EN 50618	Electric cables for photovoltaic systems (BT(DE/NOT)258), mainly for DC Cables

Earthing /Lightning

IEC 62561 Series (Chemical earthing)	IEC 62561-1 Lightning protection system components (LPSC) - Part 1: Requirements for connection components IEC 62561-2 Lightning protection system components (LPSC) - Part 2: Requirements for conductors and earth electrodes IEC 62561-7 Lightning protection system components (LPSC) - Part 7: Requirements for earthing enhancing compounds
Junction Boxes	
IEC 60529	Junction boxes and solar panel terminal boxes shall be of the thermo-plastic type with IP 65 protection for outdoor use, and IP 54 protection for indoor use
Energy Meter	
IS 16444 or as specified by the DISCOMs	A.C. Static direct connected watt-hour Smart Meter Class 1 and 2 — Specification (with Import & Export/Net energy measurements)
Solar PV Roof Mounting Structure	
IS 2062/IS 4759	Material for the structure mounting