TENDER FOR

DESIGN, FABRICATION, SUPPLY, INSTALLATION, TESTING AND COMMISIONING OF 75 KWP DISTRIBUTED ON THE TERRACE OF COLLEGE BUILDING OF DNYANOPASAK SHIKSHAN MANDAL'S COLLEGE OF ARTS, COMMERCE AND SCIENCE, PARBHANI GRID- CONNECTED SOLAR PV POWER PLANT

Tender Reference No.

DSM/75KWP/SOLAR/2021

https://mahatenders.gov.in

TENDER DOCUMENT

Dnyanopasak Shikshan Mandal's

College of Arts, Commerce and Science, Parbhani-431401

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SECTION-I

BID INVITATION

- **Brief Description of the Bidding Process**

  Dnyanopasak Shikshan Mandal's College of Arts, Commerce and Science, Parbhani invites eligible bidder to submit a bid in accordance with the provisions of this Tender Document. In this Tender Document, the term "Bidder", which expression shall, unless repugnant to the context, include all parties who have submitted bids in response to this Tender Document within the stipulated time frame for submission.

- The Bidders shall submit the bids in two parts by following e-tendering process described in bidding documents. First part comprises of the technical bid and the second part comprise of the financial bid in accordance with this Tender Document.
- In terms of the Tender Document, a Bidder will be required to deposit non- refundable Tender document fee, along with its tender, the refundable Earnest Money Deposit (EMD).
- Principal and committee Member of Dnyanopasak Shikshan Mandal's College of Arts, Commerce and Science, Parbhani will open the technical bid of the Bidder, by e-tendering process. The financial bid will be opened for those bidders which are qualified in technical bid.

BIDDING INFORMATION

1	Tender Reference No.	DSM/75 KWP/SOLAR/2021
2	Date of sale of Tender document	15.03.2021 to 20.03.2021
3	Queries send before or on Email Id: - **dsmparbhani@rediffmail.com**	17.03.2021 Time 18.00
4	Last date and Time of submission of Bids	20.03.2021 18.00 pm
5	Date & Time of opening of Technical Bid	22.03.2021 11.00am

6	Estimated Cost.	Rs.3000000/-
7	Earnest Money Deposit (EMD) in Demand Draft (DD) in favour of Dnyanopasak Shikshan Mandal's College of Arts, Commerce and Science, Parbhani	Rs. 30000/-
8	Security Deposit:	3% of contract value by Demand Draft (DD) in favorof The Principal of Dnyanopasak Shikshan Mandal's College of Arts, Commerce and Science, Parbhani
9	Address for communication and Venue for Tender opening	Dnyanopasak Shikshan Mandal's College of Arts, Commerce and Science, Parbhani
10	Tender Document fee	Rs. 1,000/- (Rs. One Thousand Only) Non-refundable & Non-Transferable) to be submitted ontime.

The date & time of opening of Price Bid will be announced later.

Sd/-

Principal
Dnyanopasak Shikshan Mandal's College of Arts, Commerce and Science, Parbhani

SECTION-II

INFORMATION AND INSTRUCTION TO BIDDERS

Dnyanopasak Shikshan Mandal's College of Arts, Commerce and Science, Parbhani, invites bids from eligible bidders for “works” include Design, Fabrication, Supply, Installation, Testing, Commissioning and Maintenance of 75KWP distributed on The Terrace of College Building of Dnyanopasak Shikshan Mandal's College of Arts, Commerce and Science, Parbhani. Grid connected solar PV power plant.

1. SCOPE OFCONTRACT -The Scope of contract is as below:

- Dnyanopasak Shikshan Mandal's College of Arts, Commerce and Science, Parbhani., invites bids from eligible bidders for “works” include Design, Fabrication, Supply, Installation, Testing, Commissioning and Maintenance of 75KWP distributed on THE TERRACE OF COLLEGE BUILDING Grid connected solar PV plant.

- Free replacement of defective components of systems within Comprehensive Maintenance Contract period (CMC) of 5 years after commissioning for efficient running of the Grid-connected Solar Photovoltaic Power Plants and Off-Grid solar PV Plant.
- Successful Bidder(s) will be responsible to register these projects by management arrangements and rules, regulations and modalities as per MNRE and the contractor for effective implementation of the project

- The Works are to be carried out at Dnyanopasak Shikshan Mandal's College of Arts, Commerce and Science, Parbhani., in the State of Maharashtra.
- The successful Bidder will be required to complete the works within the stipulated time as specified in the tender document. The bidder shall ensure that at site Solar Photovoltaic Power Plants should be installed and commissioned within **60 Days** from the date of receipt of workorder.
- Selected bidder is bound to maintain the system as per the rules and regulations and modalities as prescribed by MNRE for effective functioning of the project.
- Bids shall be complete and cover all Works described in the tender. However, if any item of works required for completing the projects shall be deemed to be included in bidder's scope irrespective of whether it is specifically mentioned or not in the tender document.
- Selected Bidder is bound to carry out all the procedure related to installation of Net Meter on the site of the project.
- Bidder should obtain statutory permissions from statutory bodies wherever required for execution of works.
- **Bidder shall quote for the complete systems.** Partial bids or bids which do not cover the entire scope of the project will be treated as incomplete and not responsive to the terms and conditions of tender are liable to be rejected.

2. ELIGIBILTY

The bidder shall provide sufficient documentary evidences to satisfy the following conditions.

- They should provide valid registration certificate issued by certificate, GoI. Verified by GOI / GoM
- Shall manufacture/supply the material (module, inverter & battery) only as per the standards mention in tender document.
- The Bidder should have installed & commissioned 75 KWP capacity (single or cumulative) Grid-connected roof top mounted net metering systems the list of projects commissioned has to be submitted along with the tender. The copy of the Commissioning certificate and Work order / Contract / Agreement / from the Client / Owner shall be submitted.
- The Bidder Should Have Installed of total capacity 175 KWP & at lest single project should be of 40 KWP IS must.
- The Bidders those already worked with the same collage will prefeed.
- For submission of the bid (Grid connected), bidder must have to fulfill following criteria.
- Must have field service setup to provide good after sale services including necessary repair and maintenance in the state of Maharashtra, to carry out repair/replacement work within 72 hours from the time of reporting the fault as and when required over the period of 5 years i.e. CMC period.
- Bidders Services Center Under **250** km in Collage Location is Must.
- Collage Site Visit is Must before tender submission, & Upload Site Visit Report in Technical Bid.
- Has provided goods after sale services for the works done by him during last three years.
- **Joint venture not allowed**

- Must have average annual turnover of minimum 75 Lakh during last three years, with balance sheet.
- Participating vendor should be certified as per latest ISO standard.

- All above criteria shall be strictly followed. Bidder should quote only if he is eligible.

3. STANDARDS/CERTIFICATES

- The goods supplied and works executed under this contract shall confirm to the standards mentioned in the technical specification and where no applicable standard is mentioned, the latest version of Indian Standard Institution or Bureau of Indian Specification shall be applicable.
- The Bidder shall submit all the valid test certificates and reports of the system components following the latest MNRE Guidelines and the same components shall be supplied for which the test reports/certificates are submitted.
- The manufacturer shall provide an indicator, which will show the status of charging.
- The manufacturer should submit test certificate of Module.

4. INSTRUCTIONS

- Bidder shall Submit Information, Experience Certificates, Test Reports and other such relevant document's specified in the list of other important documents.
- The technical proposals confirming to eligibility criteria and found satisfactory will be taken up for detailed technical evaluation. A technical evaluation committee shall evaluate the Bids submitted by bidders for detailed scrutiny. During evaluation of the technical bids, college may at its discretion ask the bidders for clarification of their bid.
- In case bidder does not fulfill the technical bid the financial bid shall not be opened & he shall be disqualified from further bidding process.
- Price Proposals of bidders qualifying above conditions shall be subsequently opened. The time and date of the opening of the Price bid shall be intimated on web site of college.
- Bids submitted without EMD will be rejected.
- The Bidder shall upload copies of
- GST registration Certificate. PAN issued by appropriate authority.
- Income Tax Returns of previous three assessment years.
- College reserve the right to reject or accept any or all tenders without assigning any reasons thereof.

- The work order is not transferable. Subletting is not allowed.
- The final right to award the works lies with college, preference can be given to the vendor who have done installation in the educational institutions and governments sectors their norms.
- College will not entertain any claim at any stage of successful bidder on the plea that the bidder was not having sufficiently acquainted himself to the site conditions.

5. COST OF BIDDING

The bidder shall bear all costs associated with the preparation and submission of bid and college will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.

6. LANGUAGE OF BID

All documents, drawings, instructions, design data, calculations, operation, maintenance and safety manuals, reports, labels and any other date shall be in English Language. The contract agreement and all correspondence between the college and the bidder shall be in English language. Supporting documents and printed literature furnished by the bidder if provided in another language it shall be accompanied by an accurate translation of the relevant passages in the English language duly authenticated and certified by the bidder (exception for bidders from Maharashtra). Supporting materials, which are not translated into English, may not be considered. For the purpose of interpretation and evaluation of the Application, the English language translation shall prevail.

7. DOCUMENTS COMPRISINGTHEBID

The Bid prepared by the Bidder shall be submitted in 'Two parts viz. Technical and financial bids comprising the following components.

Part I - Technical Proposal: (Envelop I)

Bidder shall submit relevant certificates to fulfill the eligibility criteria prescribed in the tender document along with following documents/information.

- Bidder should submit self-attested affidavit of 3% security deposit.
- Bidder's Information Sheet
- Annual Turnover
- Self-Certification of No Barr/nonfailure/blacklisted
- Details of Registered Office for carrying of Maintenance work.
- Installation and Performance Credentials

- Experience for installation and commissioning of SPV powerplants
- Experience/set-up of after sales service
- Sheet of physical technical specifications and description of actual materials which are to be used in installation of project
- Undertaking of Guaranteed Generation Certificate on Rs.100 stamp paper
- Standards maintained for various components to be used in the project
- Safety consideration for system protection
- Warranty certification of equipment's/components
- The Bidder is expected to verify all instructions, forms, terms and specifications in the Tender Document. Failure to furnish all information required in the tender document will be at the Bidder's risk and may result in rejection of the bid.

Part II - Financial bid (Envelop II)

Financial Bid shall contain:

- The bidder should quote the price as against total tender estimate as shown in the tender document.
- The price quoted in the bid will be inclusive of all taxes, duties, insurance and all incidental charges for successful DESIGN, FABRICATION, SUPPLY, INSTALLATION, TESTING AND COMMISIONING OF 75 KWP DISTRIBUTED ON THE TERRACE OF COLLEGE BUILDING OF DNYANOPASAK SHIKSHAN MANDAL'S COLLEGE OF ARTS, COMMERCE AND SCIENCE, PARBHANI GRID- CONNECTED SOLAR PV POWER PLANT
- Prices shall be quoted in Indian Rupees only.
- In no circumstances, escalation in the price's wills been trained.
- Financial Bid uploaded with an adjustable price quotation will be treated as non-responsive and will be rejected.
- Any Bid not in accordance with above clauses of this Section will be rejected.

8. EARNEST MONEY DEPOSIT (EMD), SECURITY DEPOSIT (SD) & FORFEITING OFEMD:

A) EARNESTMONEYDEPOSIT:

The Earnest Money Deposit for this project of Rs. 30000/- should be paid by in on-line gateway. No interest shall be payable on the amount of Earnest Money. It shall be retained by online. EMD shall be returned to unsuccessful Bidders after acceptance of work order by successful Bidder and EMD of successful Bidder shall be returned after

submission of security deposit.

FORFEITING OF EMD:

The EMD paid or submitted by the Bidder shall be forfeited if:

1. The Bidder withdraws his tender before finalization of workorder.
2. The Bidder does not accept workorder.
3. The Bidder violates any of the terms and conditions of the tender.
4. The Bidder fails to deposit requisite Security deposit.
5. The Bidder fails / refuses to execute the contract, in this case college shall have full right to claim damages thereof in addition to the forfeiture of EMD.

B) SECURITY DEPOSIT:

1. The Tenderer shall have to submit an self-attested affidavit mentioning that 3% of additional performance security will be issued by BG/DD/of any Nationalize or Scheduled bank in favor of the Principal, Dnyanopasak Shikshan Mandal's College of Arts, Commerce and Science, Parbhani at the time of allotting final workorder.
2. Failure to comply with the terms of security deposit shall result into cancellation of work order without any further reference to the Bidder and the EMD shall be forfeited.
3. The security deposit shall be liable to be forfeited wholly or partly at the sole discretion of the college, if the Bidder either fails to execute the work of above projects or fails to fulfill the contractual obligations or fails to settle in full his dues to the college
4. In case of premature termination of the contract, the security deposit will be forfeited and the College will be at liberty to recover the losses suffered by it &if additional cost is to be paid, the same shall be recovered from the Bidder.
5. The College is empowered to recover from the security deposit for any sum due and for any other sum that may be fixed by the College as being the amount or loss or losses or damages suffered by it due to delay in performance and / or non-performance and / or partial performance of any of the conditions of the contract and / or non-performance of guarantee obligations.
6. The security deposit shall be released to the Bidder only after contract is completed to the satisfaction of the College on request application of bidder.

9. PRICEVARIATION

Under any circumstances & for any reasons, escalation in the contract value will not be considered by College.

10. TIMEFRAME

The time frame for the completion of work is **60 Days** from the date of issue of work order.

11. PERIOD OF VALIDITY OF BID

- Bids shall remain valid for **180 days** after the date of opening of Technical Bid. A Bid valid for a shorter period shall be rejected by College as non-responsive.
- In exceptional circumstances, College may solicit the Bidder's consent to extend the period of validity. The request and the responses thereto shall be made in writing. The EMD provided shall also be suitably extended. A Bidder granting the request will not be required nor permitted to modify its bid.

12. MODE OF SUBMISSIONS OF BID

- The Bids shall be submitted electronically in the e-tender platform only.
- Bids sent by any other mode like in person, post, Telex or Fax or e-mail will be rejected.
- College may at its discretion ask Bidder to submit the hard copy of any of the document submitted on e-tender platform

13. DEADLINE FOR SUBMISSIONOFBIDS

- Bids must be uploaded by the bidder through e-tender process not later than the time and date specified in the invitation for Bids.
- The College may, at the discretion, extend this deadline for submission of bids by issuing an addendum, in which case all rights and obligations of College and Bidders previously subject to the deadline will thereafter be subject to the deadline as extended.

14. CLARIFICATION OF BIDS

During evaluation of Bids, College may, at its discretion, ask the Bidder for a clarification of its bid. The request for clarification and the response shall be in writing and no change in prices or substances of the Bid shall be sought, offered or permitted.

15. PRELIMNARY EXAMINATION

- The College 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 whether the bids are generally in order.
- Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected. If there is a discrepancy between words and figures, the lower of the two will prevail. If the Bidder does not accept the correction of errors, its bid will be rejected.
- The Bidder is required to carefully examine the Technical Specification, terms and Conditions of Contract, and other details relating to supplies as given in the Bid Document.
- The Bidder shall be deemed to have examined the bid document including the agreement/ contract to have obtained information on all matters whatsoever that might affect to execute the project activity and to have satisfied himself as to the adequacy of his bid. The bidder shall be deemed to have known the scope, nature and magnitude of the supplies and the requirements of material and labor involved etc. and as to all supplies, he has to complete in accordance with the Bid document.
- Bidder is advised to submit the bid on the basis of conditions stipulated in the Bid Document.
- Bidder's standard terms and conditions if any will not be considered. The cancellation / alteration / amendment / modification in Bid documents shall not be accepted by College
- Bid not submitted as per the instructions to bidders is liable to be rejected. Bid shall confirm in all respects with requirements and conditions referred in this bid document.

16. ACCEPTANCE OR REJECTION OF BIDS

- College reserves the right to accept or reject any bid or all the bids and to annul the bidding process and reject all bids at any time prior to award of contract, without thereby incurring any liability or any obligation to inform the affected bidder or bidders of the grounds for the said action.
- Any Bid with incomplete information is liable for rejection.
- For each category of pre-qualification criteria, the documentary evidence is to be

produced duly attested by the authorized representative of the bidder and serially numbered. If the documentary proof is not submitted for any/all criteria the Bid is liable for rejection.

- If any information given by the bidder is found to be false/ fictitious, the Bidder will be debarred for 3 years from participating in any other tenders of College and will be blacklisted.

17. CRITERIA FOR BIDS EVALAUTION

Step 1: Test of Responsiveness

- Prior to evaluation of Bids, College shall determine whether each Bid is responsive to the requirements of the tender document. A Bid shall be considered responsive only if all documents as outlined in the tender document for two stage bid process are submitted as per the predefined format.
- The College reserves the right to reject any Bid which is non-responsive and no request for alteration, modification, substitution or withdrawal shall be entertained by the College in respect of such Bid.

Step 2: Bid Evaluation

- Bid evaluation will be carried out considering the information furnished by Bidders as per the Tender documents. Based on technical/ qualifying criteria preferred bidders will be shortlisted.

Technical Evaluation

- Only Technical Proposals conforming to minimum eligibility criteria and found to be responsive will be taken up for detailed technical evaluation. A technical/ tender committee shall evaluate the Bids submitted by bidders for a detailed scrutiny. During evaluation of Bids, College may, at its discretion, ask the bidders for clarification of their Proposals. Bidder shall submit relevant certificates to fulfil the eligibility criteria prescribed in the tender document along with following documents/information.
  - Bidder's Information Sheet
  - Annual Turnover
  - Self-Certification of No Barr/nonfailure/blacklisted
  - Details of Registered Office for carrying out the Maintenance work for 05 years.
  - Installation and Performance Credentials
  - Experience for installation and commissioning of SPV powerplants.

- Experience/set-up of after sales service at least of 100 KW
- Sheet of physical technical specifications and description of actual materials which are to be used in installation of project.
- Undertaking of Guaranteed Generation Certificate on Rs.100 stamp paper.
- Standards maintained for various components to be used in the project.
- Safety consideration for system protection.
- Warranty certification of equipment's/components.
- Documents of licensed Electrical Contractor who will be supervising the project.

Financial Evaluation

The price bids of the eligible bidders will then be evaluated in the manner provided below;

- At the outset, the price bids of all the Bidders who are technically qualified in technical evaluation shall be opened as per official orders.
- The bidder's names, the Bid Prices, total amount of each bid and other details as College may consider appropriate, will be announced and recorded by College at the opening. Final evaluated sheet will be declared on GOM e-Tender site.
- Bidder that has quoted the lowest price (inclusive of all the taxes/duties) without breach any technical specification as per terms and condition shall be declared as the preferred Bidder.
- The work orders shall be issued to the successful bidder who ever qualifies in the complete process as mentioned above.

18. AWARD CRITERIA AND AWARDOFCONTRACT

College will award the contract to the successful bidder whose bids has been determined to be substantially responsive and has been determined as the lowest evaluated bid as per the criteria mentioned above, provided further that the bidder is determined to be qualified to perform the contract satisfactorily. The undertaking, annexure mentioned in tender document, document related to eligibility must be compulsorily submitted by the awarded bidder.

19. CORRUPT OR FRADUL ENTPRACTICES

College requires that Bidders shall observe the highest standard of ethics during the execution of contracts. In pursuance of this policy,---------- 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 procurement process or in contract execution; and
- "fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Government, and includes collusive practice among Bidders (prior to or after tender submission) designed to establish tender prices at artificial non- competitive levels and to deprive the Government of the benefits of free and open competition;
- will reject a proposal for award if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;
- will declare a firm ineligible for a period of 3 years, if it at any time it determines that the firm has engaged in corrupt or fraudulent practices in competing for awarded work at Government financed contract, or in executing, a contract.

20. CONDITIONS FOR ISSUING WORK ORDER TO LOWEST BIDDER

- If declared L1, as per financial bid evaluation, the bidder has to submit description and physical specification of materials in detail which will be used in project along with a letter of undertaking on the letter head of bidder's company mentioning similar material (with same specification and description) will be used/replicated at all awarded project sites.
- The bidder has to submit documents related to labour insurance and material insurance made by him, also 1% labourcess is deducted from the bill of bidder as the Govt. Rule.
- An undertaking by the bidder on Rs.100/- stamp paper mentioning his establishment of required service stations near the project sites within jurisdiction of ---------- division, names of his site engineer/ ----------& their contact phone numbers, also contact number & address of local personnel of the company who is responsible for carrying out comprehensive maintenance contract (CMC) of the project for5years.

- Security Deposit of 3% (or 3% + additional below percentage of Tender cost if quoted) of the total contract value on the same day on which work order is issued by demand draft of nationalized/schedule bank in favor of Principal K.M.E. Society's G.M. Momin Women's College, Bhiwandi.

21. TERMS OF PAYMENT:

a. All Payment Successfully done After 100% Work Completion.

It will be released after supply, installation & successful commissioning of the systems duly certified by Bidder, Officer of Division office college& authorized person of Beneficiary, along with following documents:

- Joint Inspection Report duly signed by beneficiary; Bidder representative College official.
- Submission of Complete Project Insurance policy documents effective from date of commissioning of the project for period of 05 years covering damage by natural calamities, fire, forceful damage of project, theft, etc.
- System Photograph accompanying College official taken during joint inspection.
- Warranty/Guaranty Certificate of materials used in project.
- Serial Wise Test Reports of Panel comprising I-V curve and detail parameters of each panel.
- Test Report of inverter and batteries (if applicable)
- Comprehensive Maintenance Contract (CMC) document as per clause mentioned in section IV "Technical Specification of SPV Solar Plant" for 5 years on the letter head of bidder.
- RFID Reader must be carried at the time of inspection. The report generated from RFID Tag of each panel at the time of inspection is to be compulsorily submitted.
- 3% of security deposit will be refunded after 1 month of final installation and commissioning of system if, it is working satisfactorily

Deduction:

1. The TDS at the source will be deducted as per the Govt. rule and regulations.
2. College will issue necessary certificates of TDS deduction
3. 'C' / 'D' form will not issue by College
4. Note that if bidder does not provide insurance against Labour and Material College will process insurance at "Director of Insurance" and will deduct 1% of contract value against insurance claimed by them and 1% of contract value deduction against

"Labour Welfare Cess" from payment towards successful bidder.

22. TIME FRAME:

- The time frame for the completion of work is **60 Days** from the date of issue of workorder.
- Bidder should follow the project timelines and also bound to complete the progress of project work as per given below mild stones or else he will be liable for Penalty against incomplete milestone.

Sr. No.	Milestone	Work Status
1	Day 1- 15 days	>40% Completion of work
2	Next 16-30 days	>50- 60% Completion of work
3	Next 31-60 days	70-100% Commissioning and Acceptance of Solar powerprojects

23. TIME EXTENSION

- No extension will be given after deadline of date for completion of work as the said work very urgent to complete within the targeted date.

24. PENALTY CLAUSE

- If the systems are not installed and commissioned within the stipulated period as mentioned in the work order the Bidder shall be required to pay penalty of 1/2% (half percent) of balance amount per week, maximum up to 10% of the total cost of the systems and the amount shall be recovered either from the amount due to the Bidder or from Security Deposit.
- If Successful bidder is not able to complete the project in due time the same shall be got done through other contractor and the Successful bidder has to bear all the cost incurred against the balance work left by him for the completion of project.

SECTION – III

GENERAL CONDITIONS OF CONTRACT (GCC)

1. General Terms and Conditions:

The following are the General Terms and Conditions of Contract for Supply, Installation and commissioning of SPV Power Plant, as per the specifications given in the document.

a) Bidder shall be responsible for any damage occurred, if any, at the site during the execution of work.

The Bidder should provide appropriate tools and equipment's to the workmen and ensure that those are in proper working condition and the workmen use the appropriate tools and take precaution "PLEASE NOTE THAT ANY ACCIDENT TO THE WORK MEN / PUBLIC / ANIMALS / PROPERTY BOTH MOVABLE AND IMMOVABLE SHALL BE ENTIRE AND SOLE RESPONSIBILITY OF THE BIDDER AND ANY PROCEEDING ARRISING OUT OF THE SAME SHALL BE AT THE BIDDER'S RISK AND COST, Dnyanopasak Shikshan Mandal's College of Arts, Commerce and Science, Parbhani-431401 OR ITS EMPLOYEES WILL NOT BE RESPONSIBLE FOR ANY SUCHINCIDENT".

b) Bidder should provide necessary manufacture's test certificates for materials being used for the work. Power curve of all the panels erected by manufacturers shall be provided to the College

c) The selected Bidder is bound to work on the guideline provided by College from time to time. Guidelines if issued in future by College, the changes proposed will also be applicable without augmentation in project cost till the completion of 5 years CMC period.

d) The Bidder shall carry out the work strictly according to the specifications as per given in Section-IV and complete the work within stipulated time.

e) It is the responsibility of Bidder to submit the reports for systems installed & commissioned and certificates for undertaking the responsibility of maintenance of the systems to College with a copy to Beneficiary. Bidder shall also impart training to the user for regular Maintenance of the systems and certificate in this respect should be submitted.

f) Bidders should give Guarantee against any manufacturing defects from the date of commissioning up to 5 years CMC period. For any manufacturing defects, supplier shall replace defective parts at free of cost during the CMC period and shall keep the system functional.

g) College officials will do inspection as and when necessary, during the execution of work and thereafter subsequent to installation and commissioning of the work for the purpose of issuing final completion certificate.

h) In the event of any discrepancy observed in specifications, the specifications given by College will be final. In the event of dispute arising any time, related to this work and document, decision of the College or his nominee shall be final.

i) College at its discretion may visit supplier's factory for testing / inspection at any time during the period of supply and installation of the systems.

j) College will not pay any interest on any amount, due to the Bidders.

k) During the inspection, if any deviations in Technical Specifications are observed, College reserves right to test any solar module / system at any authorized test center of MNRE. Bidder shall provide the facilities for getting the sample tested & the supplier shall bear the cost for the same.

l) If the supplier fails to complete the work or partially completes it then, College reserve right to cancel the work order and get it done from other supplier and any loss due to this shall be recovered either from any amount due to the supplier or from their Security Deposit.

m) At the time of inspection of College, manufacturer or supplier has to submit the I.V. curves and test reports of supplied PV modules to respective officer.

n) The Wiring must be carried out in casing-capping / conduit which are suitable as per site condition.

o) It will be responsibility of the Bidder for procurement and installation of Net Meter in the system. (All approval from electricity board college needs to be provided required documents.)

p) It will be responsibility of the bidder to provide required WIFI system through any network for real time monitoring of the system using internet and downloading of data for initial one year period, later the bidder/supplier may handover the WIFI system to the beneficiary for its maintenance.

q) It will be responsibility of the Bidder to ensure the satisfactory performance of the system.

r) The Bidder shall provide the display board of size 3ft x 3ft that gives detailed information of system along with the contact details of manufacturer. This will help the beneficiary during 5 years CMC period.

s) The Bidder shall comply with the provision of contract labour (Regulation and Abolition) Act 1970, minimum wages Act 1948, payment of the wages Act 1963 Workmen's Compensation Act 1961, the contract labour (Regulation and Abolition) Act 1979 and all other related Acts and any modification thereof or any law relating thereto and rules made there under from time to time.

t) If previous performance of any Bidder found unsatisfactory, he will be disqualified.

u) If any information / confirmation on any point of these tender conditions are required Bidder may contact / write to Email. Id (dsmparbhani@rediffmail.com) giving tender reference no. etc.

v) In the event of dispute during installation & commissioning of the systems related to the work and documents, decision of the College shall be final.

w) The College reserves the rights to distribute the work among the Bidders who are eligible and have submitted the offers.

x) Once the Bidder submit his offer and subsequently if not interested to work, in such case College will forfeit his EMD amount.

y) At the time of placing work order and during the implementation College can revise the technical terms and conditions if revised by MNRE, which will be binding on the Bidder.

aa) The College reserves the right to select L2 Bidder or another qualified bidder.
i.e. second lowest Bidder to complete the work, if L1 i.e. lowest Bidder fails to fulfil tender conditions or fails to complete the work.

bb) It is binding on the successful Bidder to submit original certificates, documents required by College

cc) The bidder must acknowledge that all the work of the project must be in the observance of licensed electrical contractor. The responsibility of electrical works, safety precautions and safety parameters of the project will be of licensed electrical contractor and awarded bidder, which must as per standards specified.

2. Communications

- Wherever provision is made for the giving or issue of any notice, instruction, consent, approval, certificate or determination by any person, unless otherwise specified such communication shall be in writing and shall not be unreasonably withheld or delayed.
- Project review coordination meetings between the Beneficiary, College's Representative and Contractor shall be conducted on a regular basis or as and when required by the College, at locations decided by the College for Contractor's progress and plans for completing the remaining Works, to deal with matters affecting the progress of the Works, and to decide on responsibility for actions required to be taken. Decisions taken and instructions issued during the coordination meetings, as recorded in the Minutes, shall have the same force and effect as if they were written communications issued in this accordance.

- **The estimated work cost of the systems is given below.**

Sr.No.	Name of the work	Capacity	Estimate cost (Rs. in Lakhs)
1	Design, Fabrication, Supply, Installation, Testing, Commissioning and Maintenance of 75KWP distributed on - **Dnyanopasak Shikshan Mandal's College of Arts, Commerce and Science, Parbhani** Grid connected solar PV power plant.	75 KWP	30.00
	Total		30.00

The total estimated cost for the system is Rs. 30.00 Lakhs. Hence bidder has to submit the EMD amount Rs. 30000/- (Rupees Thirty Thousand only)

3. Manner of Execution

Execution of work shall be carried out in the approved manner as outlined in the technical specifications or where not outlined, in accordance with relevant MNRE / BIS / Indian Standard Specifications, to the reasonable satisfaction of The Employer.

- The Contractor/Agency should successfully complete the project within timeframe set out by the employer and mutually agreed between Contractor / Agency and Employer.
- College shall not be responsible for any loss or damage of any material when installing SPV powerplants.
- Undertake necessary activities during the warranty period as set out in this Contract.
- It is the responsibility of successful bidder to make the insurance of SPV system from the date of commissioning for the CMC period by following standard procedure.

4. Application

These General Conditions shall apply to the extent that they are not superseded by provisions in other parts of the contract.

5. Standards

The design, engineering, manufacture, supply, installation, testing and performance of the equipment shall be in accordance with latest appropriate IEC/ Indian Standards and as detailed in the Technical specifications Section as per the MNRE requirements of the bid document and Annexur A. The goods supplied under this contract shall confirm to the Standards mentioned, where appropriate Standards and Codes are not available, other suitable standards and codes as approved by the authoritative Indian Standards shall be used.

6. Inspection:

- The projects will be inspected for quality at any time during commissioning or after the completion of the project by College
- Bidder shall inform College in writing when any portion of the work is ready for inspection (site wise) giving sufficient notice to enable College to depute officials to inspect the same without affecting the further progress of the work. The work shall not be considered in accordance with the terms of the contract until the competent person from College certifies in writing to that effect.
- The cost of Inspection shall be borne by Bidder only.
- Bidder shall carry RFID tag reader for verification of panel details, kit for testing earthing, meter for measuring structure's angle, multimeter etc.
- Bidder has to strictly follow the specifications given in the work order while carrying out the execution of work. During inspection if it is found that Bidder has deviated from the specifications, Bidder has to do the alteration / modification / reconstructions as per the given specifications at his own cost &risk.

7. Transportation

Where the Contractor/Agency is required under the contract to transport the goods to specified locations defined as Project sites, transport to such places including insurance, as shall be specified in the contract, shall be arranged by the Contractor / Agency, and the contract price shall include transportation costs.

8. Assignment

The Contractor / Agency shall not assign, in whole or in part to any third party, its obligations to perform under the contract, except with College's prior written consent.

9. Sub-contracts

1. Sub contract is strictly prohibited.
2. JV Not Allowed.

10. Termination for Default

College without prejudice to any other remedy for breach of contract, by written notice of default sent to the Contractor/ Agency, terminate the contract in whole or part:

- If the Contractor / Agency fails to deliver any or all the goods within the period(s) or within any extension thereof granted by the---------- or
- If the Contractor / Agency, in the judgment of College has engaged in corrupt or fraudulent practices in competing for or in executing the contract.

In the event College terminates the contract in whole or in part, College may procure, upon such terms and in such manner as it deems. Appropriate goods or services similar to those undelivered and the Contractor / Agency shall be liable to College for any excess costs for such similar goods or services. However, the Contractor / Agency shall continue the performance of the contract to the extent not terminated.

11. Applicable Law

The contract shall be interpreted in accordance with the laws of the Union of India.

12. Notices

Any notice given by one party to the other pursuant to this contract shall be sent to other party in writing or by cable, telex or facsimile and confirmed in writing to the other party's address specified. A notice shall be effective when delivered or on the notice's effective date, whichever is later.

13. Packing

- The Bidder shall provide such packing of the goods as is required to prevent their damage or deterioration during transit to their final destination as indicated in the contract.
- The packing shall be sufficient to withstand, without limitation, rough handling and exposure to extreme temperatures during transit and open storage.
- Packing case size and weights shall take into consideration, where appropriate, the remoteness of the good’s final destination and the absence of heavy handlings facilities at all points in transit.
- The packing, marking and documentation within and outside the item shall comply strictlywithsuchspecialrequirementsasshallbeprovidedforinthecontractincluding

additional requirements, if any and in any subsequent instructions ordered by the College.

14. Danger plates:

The bidder shall provide at least 8 Danger Notice Plates at each project site of 200 mm X 150 mm made of mild steel sheet, minimum 2 mm thick and vitreous enameled white on both sides and with inscription in signal red colour on front side as required. The inscription shall be in English and local language.

15. Insurance:

- 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.
- 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.

- The bidder shall provide insurance coverage ex-factory until commissioning and acceptance for replacement or repair of any part of the consignment due to damage or loss.
- The bidder shall provide insurance coverage of Complete Project documents effective from date of commissioning of the project for period of 05 years covering damage by natural calamities, fire, forceful majeure, theft, etc.

16. 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 from the date of commissioning of project. 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 and the owner of the project and College will not be responsible in any way for any claims what

soever on account of the above.

Undertaking

(On Rs.100/- Stamp Paper)

I_____,Age-_____,Years,Occup.-_____-

_____,Address ....., the (authorized signatory) ofM/s .....(Company) hereby state that, I/my companyis intending to participate for tender no. TENDER NO----------, Design, Fabrication, Supply, Installation, Testing, Commissioning and Maintenance of 75KWP distributed on --------- Grid connected solar PV plant under roof top net metering with 5 years of Comprehensive maintenance and RMS monitoring system along with insurance of project for 5 years at....., ... I have read all the terms & conditions mentioned in the Tender document of the ---------- --.I hereby further undertake and declare that all the terms & conditions mentioned in each and every page of the said tender document along with the clarifications released, if any, are binding on me / my company and I am fully aware that, in case of breach of any term or condition of the said Tender document, I am/my company is liable to be disqualified from the said tender process.

Sign:

Name of authorized Signatory: Name of

Company with Stamp:

Format: Commitment from the Tenderer

(To be submitted separately on Rs.100 stamp paper)

We here by confirm that the from proposed 75KWP distributed Grid connected Solar PV Plant metering along with insurance of project for 5 years and installation. We will provide the assured generation of 4 to 5 units per day per KW calculated as 95 to 105 units per month at energy meter in control cabin/room as certified by joint meter reading of manufacturer's representative and user's representative.

Date :

Place: Signature of the Tenderer

Seal

(To be submitted on Rs. 100/- stamp paper)

Affidavit

I .....(Name) hasdonethe projectof.....KWfor.....(Beneficiary Name), Tender No..... hereby declare that the above-mentioned project is commissioned by abiding following:

The standards and norms set by Ministry of New and Renewable Energy (MNRE) is maintained while installation of project.

The project has been installed under the supervision of electrical contractor/supervisor; the electrical parameters involved in the project have been considered under supervision of electrical contractor/supervisor.

All electrical norms are followed, electrical safety measures are taken in consideration and the project is electrically safe. Electrical contractor/supervisor has authorized the electrical safety measures and norms.

The mechanical safety norms while designing and installation of structure are strictly followed. The solar hot dip structure is tested, approved from engineer and is capable of bearing the load of solar panels, withstand natural parameters (wind, rain) over the duration of project life.

The roof of the building is capable of bearing the load of hot dip galvanized structure and solar panel over the period of project life.

I will be responsible for maintenance of the project over the period of Comprehensive Maintenance Contract (CMC) i.e., 5 years and for the remaining 20 years the beneficiary is responsible for undertaking the maintenance work of the project.

In case of any mishap from the solar project with the parameter mentioned above, I will be responsible. I hereby undertake for the above.

Sign of Project Developer: .....

Stamp: .....

Sign:

Beneficiary Name: .....

Address:.....

.....

---------- Official Sign:

Office Stamp:

SECTION-IV

TECHNICAL SPECIFICATION

TECHNICAL SPECIFICATION OF SPV POWER PLANT

(75KWP distributed Grid connected Solar PV Plant metering including plant cleaning system and RMS system along with insurance of project for 5 years

1. DEFINITION

- **Technology Selection – Solar Modules, Inverters, Cables, Layout optimization**
- **Design and Optimization of Solar System**
- **Supply & Installation of Solar Modules as per specified bill of material**
- **Supply & Installation of mounting structures for solar modules**
- **Supply, Installation & commissioning of Solar Power Conditioning Unit(Solar Inverters)**
- **Installation of DC/ AC cabling for the entire solar plant under the scope**
- **Earthing for module mounting structure, Inverters.**
- **Supply, Installation and Commissioning of:**
  - ✓ **Lightening Arrestors**
  - ✓ **Combiner Boxes (If applicable)**
  - ✓ **Cabling and Termination**
  - ✓ **Data Logging Equipment**
- **Plant Trials prior to commissioning**
- **Commissioning: Synchronization of solar PV power plant with grid and evacuation of solar power into local grid.**
- **Installation and commissioning of net meter.**
- **Project Details**
  - ✓ **Proposed Plant Capacity – 75 kWp**
  - ✓ **Proposed System Type - Grid Tied, Net Metering**
  - ✓ **Installation type – Rooftop**

Additional Terms & Specification

- Client will provide all necessary document support for net metering.
- Client will provide water and electricity free of charge during the site execution, mounting structure assembly to SaurGuru at no cost.
- Client will provide IP address and internet connectivity for remote monitoring system.
- Client will provide temporary storage space for project material (solar modules, cables, structural etc.)

- Client will ensure periodic cleaning of solar modules with good quality water (TDS <100) after its installation.
- Additional modification in LT panel (if required) will be provided by Client.
- Provision of South facing shadow free area.
- Statutory approvals from local authorities (if required) etc.

Construction of Control Room.

2. . DETAILS OF MATERIALS

Sr. No.	Item Description	Specifications	Indicative Make
1	**Solar PV Modules**	335 Wp Polycrystalline Silicon Photovoltaic Module, Quantity: 224 Nos.	Waaree/Vikram or equivalent
2	**PV Module Mounting Structure**	Made from Galvanized	Reputed equipment
3	**Grid-Tie Inverter**	75 kVA, 3 Phase, 440V, Quantity 1 Nos	ABB/DELTA/Polycab or equivalent
4	**Cables**	DC – 1C x 4 sq. mm, Cu AC – As per detailed design	Polycab or equivalent reputed make
5	**Termination Boxes**	With indication, protective devices and MCBs	Reputed make
6	**Protection Devices**	Lightening Arrester Earthing Protection (independent for LA, Inverters and PV Modules)	Reputed make
7	**Data Logging**	Daily power generation and monthly power generation report	Provided by inverter manufacturer
8	**Net Meter**	440V, 200 A, 3 Phase Quantity: 1 No.	SECURE OR EQUIVALENT MSEDCL approved make

6. DETAILS OF CRITICAL COMPONENT

6.1 SOLAR MODULES

FEATURES:

- **255-325Wp Multi-Crystalline Solar Module from reputed supplier.**
- **Superior Module Efficiency as per International Benchmarks.**
- **60/72 cells module with anti-reflective coated glass –improves light transmission.**
- **Superior resistance to PID (potential induced degradation).**
- **Modules that have passed reliability test (IEC standards: IEC 61215).**
- **Sand and Dust Storm Resistance**
- **Up to 25 Years power output warranty**
- **10 Years product warranty**

TECHNICAL DATA:

Peak Power (Pmax) :	320Wp
Max Power Current (Imp):	8.7 A
Short Circuit Current (Isc):	9.42 A
No. of Cells:	72
Max Power Voltage (Vmp):	36.8V
Open Circuit Voltage (Voc):	45.3 V
Tolerance	0, +5
Module Efficiency (%):	16.49
Weight	22.5 kg
Front Cover(Material and Thickness	Tempered and low iron glass, 3.2 mm
Frame	Anodized aluminium alloy
Junction Box	IP65/IP 67, 3 bypass diode

3. **INVERTER**

FEATURES:

- **Transformer less Inverter**
- **Dual MPP Trackers**
- **Peak Efficiency up to 98.6%**
- **Connects up to 10 Strings**
- **Ergonomic Grip Design**
- **Ultra Compact Size**
- **Built-in Energy-logger**
- **IP65 Protection Level**
- **Built-in AC/DC Switch**

TECHNICAL DATA:

INPUT	
Max. DC Power	62.5 kWp
Max. Input Voltage	1000 V
DC Voltage Range	200 - 1000 V
MPPT Voltage Range	520 - 800 V
Start-up Voltage	> 250 V
Nominal DC Voltage	600 V
Max. Input Current per MPPT	50 A
Total Input Current	100 A
No. of Independent MPP Trackers	2
Unbalanced Input (%)	33 / 67
Input Connection Type	10 pair MC4
DC Disconnection Switch	Yes (Inbuilt)
PROTECTION	
AC/DC Disconnection Switch	Yes
Ground Fault Monitoring /Grid Monitoring	Yes
DC Reverse Polarity Protection	Yes
DC Over Voltage / Current Limitation Protection	Yes
DC Short Circuit Protection	Yes
DC String Fuse (Positive & Negative)	Yes, PV Fuse - 1000V, 15A
AC Short Circuit Protection	Yes
AC Over Voltage / Current Limitation Protection	Yes
Surge Protection - Inbuilt	Yes, Type 2 DC - (One for each MPPT)

OUTPUT	
Rated Output Power	50 kVA
Max. Output Current	76 A
Nominal AC Voltage	3 Ph, 400 V
AC Voltage Range	400 V ± 20 % (320~480)
Nominal Frequency	50 Hz
Frequency Range	45 Hz - 55 Hz
Power Factor at Rated Power	Unity
Reactive Power (Adjustable)	0.8 Lagging ~ 0.8 Leading
THD	<3% at Rated Power
No. of Conductors (user settable)	4/5 Wire (L1,L2,L3,N,PE)
GENERAL DATA	
Dimension (H/W/D)	740 x 612 x 278 mm
Weight (kg)	70
Operating Temperature Range	-20 to +60 Degree Celsius
Relative Humidity	0~100%, Non-condensing
Operating Elevation	< 2000 m
Degree of Protection	IP65
Noise Level (Typical)	<65 dB (1m Front Panel)
Self Consumption at Night	< 2 Watts
EFFICIENCY	
Maximum Efficiency	98.60%
Euro Efficiency	98.40%

Warranties:

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")

i. Defects and/or failures due to manufacturing

ii. 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 soleoption

Performance Warranty:

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

Inverter

The PCU required shall be of 70KVA distributed College to convey DC power produced by SPV modules into AC power and adjust the voltage & frequency levels to meet the local grid conditions.

Other important Features/Protections of PCU:

1. Mains (Grid) over-under voltage and frequency protection.
2. Over load capacity (for 10 sec) should be 200% of continuous rating.
3. The PCU shall be self-commuted and shall utilize a circuit topology and components suitable for meeting the specifications listed above at high conversion efficiency and with higher liability.
4. The PCU shall be provided with MPPT (Maximum Power Point Tracing) features,

so that maximum possible power can be obtained from the PV module.

5. The PCU shall be self-commuted and shall utilize a circuit topology/ DSP technology to meet the specifications listed above at high conversion efficiency and with high reliability. The PCU shall by Hybrid One and shall give the preference to feed the Loads from Solar Energy being produced and shall draw the additional power from mains to meet the load requirements in case load is more than solar energy being produced. Conversely it should feed the solar power to the Grid if the load is less than the solar energy generated.
6. Full proof protection against grid is landing which ensures that the PV power and the grid power get disconnected immediately in the event of grid failure.
7. 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,
8. The charge controller (if any) / 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 IEC529specifications.
9. The PCU / inverters should be tested from the MNRE approved test centers / NABL /BIS / IEC accredited testing- calibration laboratories. In case of imported power conditioning units, these should be approved by international testhouses.
10. The PCU shall be capable of operating in parallel with the grid utility service and shall be capable of interrupting line-to-line fault currents and line-to-ground faultcurrents.
11. The PCU shall be able to withstand an unbalanced output load to the extent of 50%.
12. The PCU shall go to the shutdown/standby mode with its contacts open under the following conditions before attempting and automatic restart after an appropriate time delay in insufficient solar power output.

13.(a) Utility-Grid Over or Under Voltage

The PCU shall restart after an over or under voltage shutdown when the utility grid voltage has returned to within limits for a minimum of two minutes.

(b) Utility-Grid Over or Under Frequency

The PCU shall restart after an over or under frequency shutdown when the utility grid voltage has returned to the within limits for minimum of two minutes.

The permissible level of under/over voltage and under/over grid frequency is to be specified by the tenderer.

(c) The PCU shall not produce Electromagnetic interference (EMI) which may cause malfunctioning of electronic and electrical instruments including communication equipment, which are located within the facility in which the PCU is housed.

14. Communication Mod bus protocol with LAN / WAN options along with remote access facility and SCADA package with latest monitoring systems.
15. The inverter with MPPT shall be used with the powerplant.
16. The sine wave output of the inverter shall be suitable for connecting to 415V, 3 phase AC LT voltage grid.
17. The inverter shall incorporate transformer isolated output (transformer-less inverters shall be used with suitable external transformers), grid islanding protection disconnection of grid & PV power in case of failure of Grid supply suitable DC / AC fuses / circuit breakers and voltage surge protection. Fuses used in the DC circuit shall be DC rated.
18. The inverter shall have internal protection against any sustained faults and/or lightening in DC and mains AC grid circuits.
19. The peak inverter efficiency inclusive of built-in isolation transformer shall exceed 94%. (Typical commercial inverter efficiency normally more than 97%, and transformer efficiency is normally more than 97%)
20. The kVA ratings of inverter should be chosen as per the PV system wattage.
21. The output power factor should be of suitable range to supply or sink reactive power.
22. Inverter shall provide panel for display of PV array DC voltage, current and power, 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. Remote monitoring of inverter parameters should also be available.
23. The inverter shall include adequate internal cooling arrangements (exhaust fan and ducting) for operation in anon-A environment.

Factory Testing:

1. The PCU shall be tested to demonstrate operation of its control system and the ability to be automatically synchronized and connected in parallel with a utility service, prior to its shipment.
2. Operation of all controls, protective and instrumentation circuits shall be demonstrated by direct test if feasible or by simulation operation conditions for all parameters that cannot be directlytested.
3. Special attention shall be given to demonstration of utility service interface protection circuits and functions, including calibration and functional trip tests of faults and isolation protectionequipment.
4. Operation of startup, disconnect and shutdown controls shall also be tested and demonstrate. Stable operation of the PCU and response to control signals shall also be tested and demonstrated.
5. Factory testing shall not only be limited to measurement of phase currents, efficiencies, harmonic content and power factor, but shall also include all other necessary tests/simulation required and requested by the Purchasers Engineers. Tests may be performed at 20%, 30%, 75% & 100% of the rated nominalpower.
6. A Factory Test Report (FTR) shall be supplied with the unit after all tests. The FTR shall include detailed description of all parameters tested qualified andwarranted.

PROTECTIONS:

LIGHTNING PROTECTION

The SPV power plants shall be provided with lightning & over voltage 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 NFC 20-102:2011 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.

SURGE PROTECTION

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

Earthing

1. PV array, DC equipment, Inverter, AC equipment and distribution wiring shall be earthed as per IS: 3043-1987.
2. Equipment grounding (Earthing) shall connect all non-current carrying metal receptacles, electrical boxes, appliance frames, chassis and PV panel mounting structures in one long run. The grounding wire should not be switched, fused or interrupted.
3. The complete earthing system shall be electrically connected to provide return to earth from all equipment independent of mechanical connection.
4. The equipment grounding wire shall be connected to PV powerplant.
5. A separate grounding electrode shall be installed using earth pit per power plant. Test point shall be provided for each pit.
6. An earth bus and a test point shall be provided inside each control room.
7. Earthing system design should be as per the standard practices.

CABLES & WIRES

Cabling in the yard and control room: Cabling in the yard shall be carried out as per IE Rules. All other cabling above ground should be suitably mounted on cable trays with proper covers.

- Wires: Only FRLS copper wires of appropriate size and of reputed make shall have to be used.
- Cables Ends: All connections are to be made through suitable cable/lug/terminals; crimped properly & with use of Cable Glands.
- Cable Marking: All cable/wires are to be marked in proper manner by good quality ferule or by other means so that the cable can be easily identified. Any change in cabling schedule/sizes if desired by the bidder/supplier be got approved after citing appropriate reasons, All cable schedules/layout drawings have to be got approved from ‘he purchaser prior to installation. All cable tests and measurement methods should confirm to IEC60189.

Electrical Safety, Earthing Protection

Electrical Safety

- Internal Faults: In built protection for internal faults including excess temperature, commutation failure and overload and cooling fan failure (if fitted)is obligatory.

- Over Voltage Protection: Over Voltage Protection against atmospheric lightning discharge to the PV array is required. Protection is to be provided against voltage fluctuations and internal faults in the power conditioner, operational errors and switchingtransients.
- Earth fault supervision: An integrated earth fault device shall have to be provided to detect eventual earth fault on DC side and shall send message to the supervisorysystem.
- Cabling practice: Cable connections must be made using PVC Cu cables, as per BIS standards. All cable connections must be made using suitable terminations for effective contact. The PVC Cu cables must be run in GL trays with covers forprotection.
- Fast acting semiconductor type current limiting fuses at the main bus bar to protect from the grid short circuitcontribution.
- The PCU shall include an easily accessible emergency OFF button located at an appropriate position on the unit.
- The PCU shall include ground lugs for equipment and PV arraygrounding.
- All exposed surfaces of ferrous parts shall be thoroughly cleaned, primed, and painted or otherwise suitably protected to survive a nominal 30 years design life of theunit.
- The PCU enclosure shall be weatherproof and capable of surviving climatic changes and should keep the PCU intact under all conditions in the room where it will be housed. The INVERTER shall be located indoor and should be either wall / pad mounted. Moisture condensation and entry of rodents and insects shall be prevented in the PCUenclosure.
- Components and circuit boards mounted inside the enclosures shall be clearly identified with appropriate permanent designations, which shall also serve to identify the items on the supplieddrawings.
- All doors, covers, panels and cable exits shall be gasket or otherwise designed to limit the entry of dust and moisture. All doors shall be equipped with locks. All openings shall be provided with grills or screens with openings no larger than 0.95 cm. (about3x8inch).
- In the design and fabrication of the PCU the site temperature (5° to 55°C), incident sunlight and the effect of ambient temperature on component life shall be considered carefully. Similar consideration shall be given to the heat sinking and thermal for blocking diodes and similarcomponents.

EARTHING PROTECTION

Each array structure of the PV yard should be grounded properly. In addition the lighting arrester/masts should also be provided inside the array field. Provision should be kept be provided inside the array field. Provision should be kept for shorting and grounding of the PV array at the time of maintenance work. All metal casing/shielding of the plant should be thoroughly grounded in accordance with Indian electricity Act. /IE Rules. Earth resistance

should be tested in presence of the representative of NRHM after earthing by calibrated earth tester. PCU ACDB & DCDB should be earthed properly.

Danger boards should be provided as and where necessary as per IE Act/IE rules as amended up to date. Three signage shall be provided one each at battery –cum- control room, solar array area and main entry from administrative block

Balance of Systems (BoS)

1. String / Array combiner boxes shall incorporate DC string circuit breakers, DC array disconnect switch, lightning and over voltage protectors, any other protection equipment, screw type terminal strips and strain-relief cable glands.
2. All DC and AC cables shall be terminated using suitable crimped cable lugs/sockets and screw type terminal strips. No soldered cable termination shall be accepted.
3. Only terminal cable joints shall be accepted. No cable joint to join two cable ends shall be accepted.
4. Suitable Ground Fault Detector Interrupter (GFDI) shall be incorporated either with the inverter or with the array combiner box. (If Applicable)
5. String/Array combiner boxes shall be secured onto walls or metal structures erected separately on the terrace.
6. Conduits / concealed cable trays shall be provided for all DC cabling on the Roof top. Conduits / concealed cable trays shall be adequately secured onto the roof top/wall.
7. The AC cable type shall be PVC / XLPE insulated, suitably armored, 1100V grade multi-stranded copper conductor. Appropriate color coding shall be used.
8. 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.
9. The DC and AC cables of adequate electrical voltage and current ratings shall be also rated for 'in conduit wet and outdoor use'.
10. The total DC cable losses shall be maximum of 2% of the plant rated DC capacity over the specified ambient temperature range.
11. The DC and AC cable size shall be selected to maintain losses within specified limits over the entire lengths of the cables.
12. DC cables from array combiner box on the rooftop to DC distribution box in the control room and DC/ AC cabling between inverter and distribution boxes shall be laid inside cable duct where available or secured with conduits/concealed cable trays where duct is not available.
13. The DC and AC distribution boxes shall be wall mounted inside control room/open space.
14. DC distribution box shall incorporate DC disconnect switch, lightening surge protectors, any other protection equipment, screw type terminal strips and strain- relief cable glands.

15. AC distribution box shall incorporate AC circuit breaker, surge voltage protectors, any other protection equipment, plant energy meter, screw type terminal strips and strain-relief cable glands.
16. The total AC cable losses shall be maximum of 1% of the plant AC output over the specified ambient temperaturerange.
17. All cable conduits shall be GI/HDPEtype.
18. All cable trays shall be powder coated steel or GI orequivalent.

Civil

1. For structural purpose, the panels plus support system that works as a distortion- free integral structuralunit.
2. The panel assembly should at most 5m x 5m in plan area. The max height of panel above roof surface does not exceed 1.2m.
3. The vertical projection area of the longer side of the panels does not exceed W/100 in sq m where W is the gross load of the panel assembly in kg (weight of panels, connections, frames, bracings, pedestals, wiring, circuitryetc.).
4. PV array shall be installed in the space free from any obstruction and /orshadow.
5. Drainage and roof treatment should not affected by theinstallation.
6. PV array shall be installed utilizing maximum space to minimize effects of shadows due to adjacent PV panel rows. The gross weight of the panel assembly should at most 45 kg/sq m (W divided by the planarea).
7. 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. There is at least 1m clear spacing all around the panel assembly (panel edge to panel edge between assemblies, and panel edge to parapet wall / room onsides).
8. The maximum column spacing should be 8.5 m c/c or less. The pedestal is placed directly on the roof, over existing roof treatment, without making any structural connection to the roofsurface.
9. The panel assembly should have at least 4 pedestal supports. The minimum spacing between pedestals is 2.0 m c/c in any direction. Each pedestal is made of cement concrete. Each pedestal can transmit at most 200 kg load on roof. The plan dimension of pedestal does not exceed 450mm x 450 mm, and height does not exceed 300 mm.
10. Ample clearance shall be provided in the layout of the inverter and DC / AC distribution boxes for adequate cooling and ease of maintenance.
11. The Supplier will supply and install required size of Water Tank, pump, pipe etc. for cleaning the PV modules.

12. The supplier shall specify installation details of the PV Panel assembly with appropriate diagrams and drawings. Such details shall include, but not limited to, the following;
    a) Determination of true south at the site;
    b) Array tilt angle to the horizontal, with permitted tolerance;
    c) Details with drawings for fixing the modules;
    d) Details with drawings of fixing the junction/terminal boxes;
    e) Interconnection details inside the junction/terminal boxes;
    f) Structure installation details and drawings;
    g) Electrical grounding(earthing);
    h) Inter-panel / Inter-row distances with allowed tolerances; and
    i) Safety precautions to betaken.

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. The panel support and panel-to- support connection both must be designed by vendor to withstand adequately high wind forces. Civil Works permission does not guarantee safety against flying/falling panels in the event of a storm or any other accident.

Mechanical

1. PV panel assembly may consist of different number of modules with maximum of 10 PV modules.
2. Each panel assembly shall incorporate one bird repellent spike at a level higher than the panel upper edge. The location of the spike should be selected for minimum shadow effect.
3. Support structure of panel assembly shall be fabricated using corrosion resistant GI or anodized aluminum or equivalent metal sections.
4. Array support structure welded joints and fasteners shall be adequately treated to resist corrosion.
5. The support structure shall be free from corrosion when installed.
6. PV modules shall be secured to support structure using screw fasteners and/or metal clamps. Screw fasters shall use existing mounting holes provided by module manufacturer. No additional holes shall be drilled on module frames. Module fasteners / clamps shall be adequately treated to resist corrosion.
7. The support structure shall withstand wind loading of up to150km/hr.
8. Adequate spacing shall be provided between any two modules secured on panel assembly for improved wind resistance.

9. The structure shall be designed to withstand operating environmental conditions for a period of minimum20years.
10. It is required to design the grid structure (on which PV module will be installed) in such a way that all loads are transferred to the existing columns of the buildings. Such grid design should be presented to ----------, which will be certified by structural engineers.
11. The panel assembly structure should be installed in a manner to leave sufficient space for repair and maintenance aspects of the roof tops, particularly for leakages.
12. Installation of panel assembly should not tamper with the water proofing ofroofs.

ARRAY STRUCTURE

a) Hot dip galvanized (minimum of 100 Microns) 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 ratiorequirements.

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. Suitable fastening arrangement such as grouting and calming should be provided to secure the installation against the specific windspeed.

c) The mounting structure steel shall be as per latest IS 2062: 1992 and galvanization of the mounting structure shall be in compliance of latestIS4759.

d) Structural material shall be corrosion resistant and electrolytically compatible with the materials used in the module frame, its fasteners, nuts and bolts. aluminum structures also can be used which can withstand the wind speed of respective wind zone. Necessary protection towards rusting need to be provided either by coatingoranodization.

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 SPVpanels

f) The bidder need to supply suitable structures based on the quality of roof and considering the load baring capacity of the roof / civil structures of the proposedbuilding.

Electrical:

1. LT distribution grid specifications 415V +/- 5%, 50Hz and frequency variation as per IE rules or as per requirement.
2. The output of the inverter shall be transformer isolated and shall be fed into 415V, 3 phase AC LT grid supplied via LT Air circuit Breaker.
3. The inverter output shall be connected to LT line prior to the LT/DG changeover switch. The mandatory is landing protection provided by inverter shall is olatet he Solar PV powerplant.
4. The time of day (TOD) 3 phase, digital AC load energy meter shall be installed in the Main Distribution Box to monitor energy drawn by building load and in the AC distribution box to monitor energy generated by Solar PV powerplant.
5. The load energy meter operation shall be completely independent of the plant AC energy meter.
6. The energy meters shall be provided with communication interface and necessary data cables for remote monitoring.

Data Acquisition System

1. Data Acquisition System shall be provided for both Grid connected solar PV plants.
2. Computerized DC String / Array monitoring and AC output monitoring shall be provided as part of the inverter and/or string/array combiner box or separately.
3. 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.
4. The time interval between two sets of data shall not be more than 3 minutes. (A minimum of 20 samples of data shall be recorded per hour)
5. Data Acquisition System shall have real time clock, internal reliable battery backup and data storage capacity to record data round the clock for a period of minimum one year.
6. Computerized AC energy monitoring shall be in addition to the digital AC energy meter.
7. The date shall be recorded in a common work sheet chronologically date wise. The data file shall be MS Excel compatible. The data shall be represented in both tabular and graphical form.
8. All instantaneous data shall be shown on the computer screen.
9. Software shall be provided for USB download and analysis of DC and AC parametric data for the plant.
10. Provision for internet monitoring and download of data shall be also incorporated.

11. Software for centralized internet monitoring system shall be also provided for downloadandanalysisofcumulativedataoftheplantandthedataofthesolar radiation and environment monitoring system.
12. A data logging system (Hardware and Software) for plant control and monitoring shall be provided.
13. Remote Supervisory Control and data acquisition through SCADA or equivalent software at the purchasers location with latest software/hardwareconfiguration.
14. Disconnection and Islanding: Disconnection of the PV plant in the event of loss of the main grid supply is to be achieved by in built protection within the power conditioner; this may be achieved through rate of change of current, phase angle, unbalanced voltage or reactive loadvariants.
15. Operation outside the limits of power quality as described in the technical data sheet should cause the power conditioner to disconnect the grid. Additional parameters requiring automatic disconnection are : Neutral voltage displacement Over current Earth fault and reverse power in case of the above, cases, tripping time should be less than (15 seconds Response time in case of grid failure due to switch off or failure based shut down should be well within seconds. In case of use of two PCUs capacity suitable equipment for synchronizing the AC output of both the PCUs to the ACDB/Grid should beprovided. Automatic reconnection after the grid failure shouldrestore.
16. PCU shall have the facility to reconnect the PCU automatically to the grid, following restoration of grid, subsequent to grid failure condition. And also the facility to connect the system with load at grid failure condition for essential power supply.

Operating Environment

1. Temperature: 5 to 55 Deg.C.
2. Relative Humidity: 100% @ 40Deg.C
3. Precipitation: 2.46 mm per day (Annualaverage)
4. Clearness Index: 0.62 (Annualaverage)
5. Wind Speed: up to150km/hr.
6. Corrosion: high
7. Dust: moderate tohigh
8. Bird Interference:high
9. Bird Droppings: frequentandlarge
10. Trees: large and in abundance.

Plant cleaning system

Plant cleaning system needs to be provided for easy cleaning of solar panels, complete with supply, transportation, insurance, installation and commissioning along with 10 yrs comprehensive maintenance at site.

Any allied work related to mechanical, civil, electrical, plumbing job for successful functioning of the Plant cleaning system as per the specific requirements of the manufacturer.

CONNECTIVITY

The maximum capacity for interconnection with the grid at a specific voltage level shall be as specified in the Distribution Code/Supply Code of the State and amended from time to time. Following criteria have been suggested for selection of voltage level in the distribution system for Ready reference of the solar suppliers.

Plant Capacity	Connecting voltage
75KWP distributed at College	230V/ 440V

Utilities may have voltage levels other than above; DISCOMS may be consulted before Finalization of the voltage level and specification is made accordingly.

Testing, Certification and Approval Schedule

All components, sub-assemblies and system test parameters shall be verified on site to ensure they meet the specifications.

Plant Power Performance Ratio Testing

The successful bidder shall be required to meet minimum guaranteed generation with Performance Ratio (PR) at the time of commissioning and related Capacity Utilization Factor (CUF) as per the GHI levels of the location during the O&M period. PR should be shown minimum of 75% at the time of inspection for initial commissioning acceptance to qualify for release of applicable incentive. Minimum CUF of 15% should be maintained for a period of 5 years. Correction shall be applied based on available solar radiation.

Plant Energy Performance Ratio Testing

The overall energy performance ratio of the system shall exceed 75%. (Sum total of the system energy losses shall not exceed 20%). For global solar insolation in the Plane of Array (PoA) of 5 kWh/ m^2 (5 Peak Sun Hours) for the day. 24KWp PV power plant AC energy output shall be minimum of **90.0 KWH** (24KWx0.75x5Hrs) for the day at College

Maintenance (O&M)

1. Cleaning of solar PV modules with soft water, wet and dry mops: Weekly
2. DC String / Array and AC Inverter monitoring: Continuous and computerized.
3. AC Energy monitoring: Continuous and computerized.
4. Visual Inspection of the plant: Monthly
5. Functional Checks of Protection Components and Switchgear: Quarterly.
6. Spring Clean PV Array and Installation Area: Quarterly.
7. Inverter, transformer, data acquisition, energy meters and power evacuation checks: Half Yearly.
8. Support structure and terrace water- proofing checks: Yearly.
9. O & M log sheet shall be provided and maintained.
10. The repair/replacement work shall be completed within 48 hours from the time of reporting the fault.
11. A half yearly performance report of the plant inclusive of energy generation data shall be provided as per approved format.
12. All recorded data for the first 5 years shall be preserved in both manual and computer format and submitted at handover.

2. COMPREHENSIVE MAINTENANCE CONTRACT (CMC)

(i) The complete Solar PV Power Plants must be guaranteed against any manufacturing / design/ installation defects for a minimum period of 5 years.

(ii) PV modules used in Solar PV Power Plants must be guaranteed for their output peak watt capacity, which should not be less than 90% at the end of 12 years and 80% at the end of 20 years.

(iii) During the CMC period, MNRE / users will have all the rights to cross check the performance of the Solar PV Power Plants. College may carry out the frequent inspections of the Solar PV Power Plants installed and randomly pick up its components to get them tested at Govt. / MNRE approved any test center. If during such tests any part is not found as per the specified technical parameters,

College will take the necessary action. The decision of College in this regard will be final and binding on the bidder.

Warranties and Guarantees

1. Solar Modules: Workmanship/ product replacement for10 years.
2. Solar Modules: 90% power output for 10 years & 80% power output for 20 years.
3. Inverter: Workmanship/product replacement for 5 years, service for 20 years
4. Power Evacuation and Metering Equipment: Workmanship/product replacement for10 years, service for 20 years
5. BoS: Parts and Workmanship for 10 years, service for 20 years.
6. Power Plant Installation: Workmanship for 10 years, service for 20 years
7. PV Array Installation: Structural for 20 years
8. Power plant power performanceratio-min 75%
9. Power plant energy performanceratio-min.75%

Standards and Compliance

1. IEC 60364-7-712: Electrical Installations of Buildings: Requirements for Solar PV power supply systems.
2. IEC 62027 or similar: Utility Interface Standard for PV power plants >10kW.
3. IEC 62103, 62109 and 62040 (UL 2041): Safety of Static Inverters – Mechanical land Electrical safety aspects.
4. IEC 62116: Testing procedure of Islanding Prevention Methods for Utility- Interactive PV Inverters.
5. PV Modules: IEC 62030- Safety qualification testing, IEC 62001 – Operation in corrosive atmosphere
6. IEC 61215 : Crystalline Silicon PV Modules qualification.
7. IEC CERTIFICATE PRESCEIBE BY GVT OF INDIA FOREDUCATIONALINSTITUTE.
8. String/array junction boxes : IP65, Protection Class II, IEC60439-1,3.
9. Surge Protection Devices: Type 2, DC1000Vrated.
10. PV module / string / string combiner box interconnects: MC4 compatible. DC 1000Vrated.
11. The central inverter shall be ratedforIP54.
12. The DC/AC distribution boxes shall beratedIP54.
13. The data acquisition systems shall be ratedforIP54.
14. All DC and AC cables, conduits, cable trays, hardware: relevant IS.
15. Make in india certificate, BIS Certificate, ISO and RoH Certificates.
16. Earthling System: relevant IS.
17. PV array support structure: relevant IS.
18. Quality Certification, Standards and Testing for Grid-Connected Rooftop Solar PV Systems/ Power Plants should be maintained as per Annexure A.

APPENDIX- I (A)

Bidder's Information Sheet

Bidder shall provide the information requested in the corresponding Information Sheets included hereunder.

Sr. No.	**Particulars**	
1.	Name & Mailing Address of firm	
2.	Contact Person Name, Designation & Contact No.	
3.	E-mail Address for correspondence	
4.	Firm Website Address	
5.	Firm Status (Private / PSU / Incorporate / Proprietor)	
6.	Establish Year of firm	
7.	PAN/ TAN No.	
8.	Firm Registration No / ROC	
9.	STR/ VAT / TIN No	
10.	Turnover 2017-18, 2018-19, 2019-20 (in Crores Rs.)	
11.	Company Profile (<100 words)	
12.	Skilled manpower	
13.	Experience in SPV Power Plant (<100 words)	
14.	Experience in other solar projects (<100 words)	
15.	Solar related Product Range	
16.	Experience in Guarantee, Maintenance & After Sales Services (Years)	
17.	Accreditation	

Sr. No.	**Particulars**	
18.	List of ISI, ISO, Other certificate	
19.	Technical specification for solar photovoltaic cell / panel/module- Make	
20.	Technical specification for Battery- optional –quantity and make	
21.	Technical specification for Junction boxes- quantity and make	
22.	Technical specification for Inverter / Controller -quantity and make	
23.	Technical specification for Cables- quantity and make	
24.	Other Technical specification, if any	
20.	Has any Govt. / Under - taking ever debarred the company / firm from executing any work?	
26.	Special Remarks, if any	
27.	Attached are copies of the necessary original documents.	
I.		
II.		
III.		

It is certified that the information provided above is true to the best of my knowledge and belief. If any information found to be concealed, suppressed or incorrect at later date, our tender shall be liable to be rejected and our company may be debarred from executing any business with ----------.

Date:

Signature of Bidder
Name:
Designation:

APPENDIX-I(B)

Annual Turnover

Each Bidder must fill in this form including private/public limited company.

Annual Turnover Data for last 3 Years (FY, 2017-18 & 2018-19, 2019-20,)	
Year	**Rs in Lac**
2017-19	
2018-19	
2019-20	
Total	

The information supplied should be the Annual Turnover of the Bidder in terms of the amounts billed to clients for each year for work in progress or completed.

Signature of Applicant

Certified by Applicant's Auditor
(Affix Stamp)

APPENDIX- II

Experience for supply and Commissioning of Solar Power Plants

Sr. No.	Name of Project	Plant Capacity	Year of Work	Current Status of Project / Client's Certificate

*Self attested copy of work order attached herewith

Signature of Bidder

Name

Designation

Company

Date

Annexur A

QUALITY CERTIFICATION, STANDARDS AND TESTING

FOR GRID- CONNECTED ROOFTOP SOLAR PV SYSTEMS/ POWER PLANTS

Quality certification and standards for grid-connected rooftop or ground mounted 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 (NH3) 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
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 for use in photovoltaic power systems Part 2: Particular requirements for inverters. Safety compliance (Protection degree IP 65 for outdoor mounting, IP 54 for indoormounting)

IEC/IS 61683 (as applicable)	Photovoltaic Systems – Power conditioners: Procedure for Measuring Efficiency (10%, 20%, 50%, 75% & 90-100% Loading Conditions)

IEC 62116/ UL1741/ IEEE 1547 (as applicable)	Utility-interconnected Photovoltaic Inverters - Test Procedure of Islanding Prevention Measures
IEC 60205-27	Measuring relays and protection equipment – Part 27: Product safety requirements
IEC 60068- 2 /IEC 62093 (as applicable)	Environmental Testing of PV System – Power Conditioners and Inverters
Fuses	
IS/IEC 60947(Part 1, 2 & 3), EN50521	General safety requirements for connectors, switches, circuit breakers (AC/DC): a) Low-voltage Switchgear and Control-gear, Part 1:Generalrules b) Low-Voltage Switchgear and Control-gear, Part 2:CircuitBreakers c) Low-voltage switchgear and Control-gear, Part 3: Switches, disconnectors, switch-disconnectors andfuse-combinationunits d) EN50521:Connectorsforphotovoltaicsystems–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	
BFC 17 -102: 2011	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 /IS694, IEC 60502 /IS1554 (Part 1 & 2) / IEC 69947 (as applicable)	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)208), mainly for DC Cables
Earthing /Lightning	
IEC 62061 Series (Chemical earthing) (as applicable)	IEC 62061-1 Lightning protection system components (LPSC) - Part 1: Requirements for connection components IEC 62061-2 Lightning protection system components (LPSC) - Part 2: Requirements for conductors and earth electrodes IEC 62061-7 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

Note: Equivalent standards may be used for different system components of the plants.

ANNEXURE - B

Check List

All the necessary Documents / Certificates should be uploaded as in proper sequence as mentioned below:

1. Original tender document duly signed and stamped on each page or Undertaking (Rs.100) and declaration that all the terms & conditions mentioned in each and every page of the said tender document with further clarifications released if any are acceptable.
2. Name of authorized person (power of attorney) for submitting the document.
3. Name of the Banker.
4. Copy of the recently paid Income Tax Challan/Return, Latest CA certified balance sheet of last three years, PAN number, registration certificates of VAT, service tax, professional tax etc. (Self-Attested)
5. Information on Infrastructure for maintenance work.
6. Registration Certificate of the firm.
7. Information of Licensed Electrical Contractor.
8. Bidder's Information Sheet **Appendix-I(A)**.
9. Annual Turnover **Appendix-I(B)**.
10. Experience for supply and commissioning of Solar Power Plants **Appendix-II** (along with the self-attested copies of work order).
11. IEC certification as per standard.
12. Commitment in respect of generation separate for Grid connected solar power plants in the prescribed format given the tender.
13. Any Other Required Documents.

END OF DOCUMENT