JAMIA HAMDARD

(Deemed to be University)
HAMDARD NAGAR, NEW DELHI - 110062
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TENDER DOCUMENT

FOR

Design, Supply, Installation, Testing and Commissioning (SITC) of Grid connected (net metering) rooftop solar power system without BESS of tentative capacity of 465 KW (peak) under CAPEX Mode

at

JAMIA HAMDARD CAMPUS

Submitted by:

Name:

Address:

Contact No:

Email ID:

JAMIA HAMDARD
(DEEMED TO BE UNIVERSITY)
HAMDARD NAGAR, NEW DELHI-110062

TENDER NOTICE

Date: 10/11/2021

Jamia Hamdard, New Delhi invites sealed items rates Tenders in **two envelope system** (Technical & Financial Bid) from reputed contractors registered with MNRE or Govt. of NCT Delhi approved channel partner for the below mentioned work. Tender Documents are attached herewith. Last date of submission of the Tender is **30/11/2021 up to 3.00 PM.** The bidders also advised to visit the site to satisfy themselves before submitting the Bids. The buildings to be equipped with the Solar Power System are, Central Library Building, Hamdard Archive Research Centre, JLN Boys &Girls Hostel, Ibn e Batuta Boys' Hostel & Ibn e Sina girls Hostel and Porta Cabin (Extension of Ibn e Sina Girls Hostel). Bidders not fulfilling the Eligibility Criteria will be rejected. Eligibility Criteria is mentioned in Tender clause 1

NAME OF WORK	Design, Supply, Installation, Testing and Commissioning (SITC) of grid connected (net metering) rooftop solar power system without Battery Energy Storage System (BESS) of tentative capacity of 465 KWp under CAPEX Mode.
ESTIMATED COST	4.8 Crores
EARNEST MONEY:	9.6 Lacs. Demand Draft in favour of "Jamia Hamdard" New Delhi
TENDER COST:	5000/- Demand Draft in favour of "Jamia Hamdard" New Delhi
TIME PERIOD	3 months from date of issue of work-order.
PRE-BID MEETING:	**25/11/2021**

The Tender duly filled should be dropped in the Tender Box kept in Purchase Section, Admin Block on or before **30/11/2021 up to 3.00 PM** along with demand draft of earnest money & Tender fee in sealed envelope clearly specifying the name of work. The DDs shall be in favor of Jamia Hamdard payable at New Delhi. The Technical Bid shall be opened on **30/11/2021 at 3.30 PM** by the tender committee in presence of available interested parties. Date & time for opening of Financial bid will be intimated later to the technically qualified bidders.

Jamia Hamdard reserves the right to reject any or all tenders or split the tenders without assigning any reason. Decision of Jamia Hamdard in this regard will be the final and binding on all applicants.

Registrar

1. Eligibility Criteria

1.1 Bidder should have MNRE or Govt. of NCT Delhi approved channel partner having minimum three years' experience in SITC of grid connected (net metering) rooftop solar panels in Government/Semi Government/PSUs/Large MNCs as on 01.06.2021.

1.2 The Minimum Average Annual Turnover of the bidder should not be less than 3.0 Crore in the last 3 financial years i.e. for the year 2018-19, 2019-20 & 2020-21.

1.3 The Bidder in any circumstances should not have violated any of the conditions regarding manufacturing / supplying of orders and should not have been black listed by the Government/Semi Government organization.

1.4 Vendor should have executed a direct purchase order with single point responsibility for Design Engineering, Manufacture, Installation & Commissioning of roof top off grid / grid connected (net metering) SPV power plants not less 200KWp individual capacity (minimum 2 numbers) in a central / state Govt. / Public sector undertaking / Public Limited Company / Private Limited Company. These SPV power plants should be working successfully for at least one year from date of commissioning. Certification by vendor for his own SPV power plant will not be acceptable.

1.5 Bidders should have executed similar nature of work of at least one contract of value of 80% of Estimated Cost or two contracts of similar nature of work of 60% of Estimated Cost or three contacts of similar natures of works of 40% of Estimated Cost in last 7 years.

1.6 O&M Certificate for at least one year for any type of Solar project from any central / state Govt. / Public sector undertaking / Public Limited Company /Private Limited Company.

1.7 The firm should have valid EPFO, ESI, and GSTIN registration.

1.8 Bankers certificate for credit worthiness/Solvency not less than Rs. 1.80 Crore.

1.9 Net Worth of the Company should not be less than Rs. 70 Lakhs.

1.10 The contractor should submit IT Return acknowledgement for last three years ending 31st Mar, 2021

1.11 Must have service setup in Delhi.

(Please enclose all documentary proof for eligibility criteria)

2. INSTRUCTIONS TO THE TENDERERS

2.1 Scope of work: The successful tenderer shall be in a position to Design, Supply, Installation, Testing and Commissioning (SITC) of grid connected (net metering) rooftop solar power system without Battery Energy Storage System (BESS) of tentative capacity of 465 KWp under CAPEX Mode strictly followed as the BOQ provided in tender. The work should be completed in all respect including of Net metering and Obtaining all associated statutory and regulatory compliances and approvals for successful construction, commissioning and operation of plant. Comprehensive operation & maintenance of the SPV plant for 03 (three) years as mentioned in detailed tender clause 3.35 from the date of commissioning or Operational Acceptance, whichever is later, as detailed in technical specification, including supply and storage of all spare parts, consumables, repairs/ replacement of any defective equipment etc

2.2 Documents to be submitted along with Technical Bids

a. Copies of valid registration Certificate.
b. Complete list of machinery and equipment and details of Technical Manpower along with supporting staff and in house Design capability duly signed and sealed on company's letter head.
c. Copies of completion and Performance Certificates (duly attested) for similar scope of works issued by the officer of the client/Deptt. of the rank of Executive Engineer/equivalent or the Head of the Institution will have to be furnished along with the Technical Bid. The completion certificate must clearly indicate the following:
    - The date of completion of work with cost of completed work with letters of successful completion. Nature and scope of work, Time period of completion (attach client's list).
    - Similar work means Design Supply Installation Testing and commissioning of Solar Power Plants (Roof Top) work.
    - The firms are advised to enclose attested copies of valid PAN, EPFO, ESI, and GSTIN.
d. Earnest Money, **Rs. 9.6 Lakhs** (compulsory) to be submitted in the form of DD in favour of Jamia Hamdard.
e. Tender Cost (Compulsory), **Rs. 5000** (non-refundable) in the form of DD in favour of Jamia Hamdard.
f. Company's financial performance documents (Audited balance sheet, and profit and loss statement.
g. Copies of work orders for similar nature of work as specified above in last 7 years.
h. Entire tender document and each page of all document submitted should be duly signed & stamped by the bidder as self attestation.
i. Copies of IT return acknowledgement for last three years ending 31st Mar, 2021.

2.3 Submission of Bids

Submission of Tender: Tenders should be submitted in two Parts i.e. "Technical bid" (Part-A) and "Price bid" (Part-B) in two separate sealed envelopes. Both the parts should be further put in a single sealed envelope super-scribing NIT No. & name of work, due date for opening, bidder's name & address. The tender duly filled in may be sent to above mentioned address either by post or hand delivered in the tender box kept in the Purchase Section, Admin Block. It should not be handed over to any employee of the Jamia Hamdard. No tender shall be accepted later than the time schedule specified in NIT.

Any clarifications/amendments/corrigenda etc., to NIT before last date of submission of bid will only be available on our website: www.jamiahamdard.edu. Therefore bidders are advised to keep visiting our website.

a. **Technical Bid (Part-A)** shall contain all documents as stated in clause (1)

b. **Price Bid (Part-B)**: In this bid, the bidder is required to quote his item rates in the BOQ attached in accordance with the scope of work, terms & conditions & technical specifications enclosed. The rates/price quoted by contractor should be all inclusive i.e. should include design, all material cost, labour, services, plant/machinery/tools & tackles, ladders & scaffolding required for work, freight, Insurance, transport/cartage of materials/labour and all other expenses not specifically mentioned but reasonably implied. Nothing over and above these rates shall be payable to contractor. Further nothing extra in rates will be considered for any variations in tender quantities or due to any site difficulties. It is mandatory for bidder to quote all items rate as asked for in the BOQ/ PRICE schedule. Failure in not filling some item rates will lead to rejection of tender. The bidders should quote unconditional rates, neatly written without any overwriting and all pages should be duly signed & stamped. Jamia Hamdard reserves the rights to increase or decrease the quantum of work during the execution of work and to accept/reject full/part proposals without assigning any reason thereof.

3. Terms and Conditions

3.1 Jamia Hamdard is at liberty to make additions/deletions/modifications/amendments in the tender document and the applicants are bound by the same.

3.2 The tender proposal, completed in all respects, should be signed by the authorized signatory of the applicant on all the pages of the application document at bottom right side corner in token of acceptance of the terms and conditions of the tender and for the purpose of identification. This is to ascertain that the applicant has quoted against all relevant items.

3.3 *Applicants are advised to visit and examine to be fully satisfy themselves before submitting their applications as to the nature of work/project to be executed and the other aspects pertaining to and/or impacting the work/project and shall themselves obtain all necessary information/clarification as to the risks, contingencies and other circumstances which may influence or affect the work/project.*

3.4 The tenderers will not be entitled to any claim of compensation, financial or otherwise, for difficulties, if any, faced or losses incurred by them on account of submission of the tender.

3.5 It is mandatory to all the bidders participating in the price bid to quote their rates for each and every item in figures and words as well.

3.6 In case, vendor fails to quote their rates for any one or more tender items, their tender shall be treated as "Incomplete Tender" and shall be liable for rejection.

3.7 The capacities are tentative which may increase/decrease after final survey of the site by the lowest vendor. Jamia Hamdard reserves its right to ask the lowest vendor to install solar system at few more locations at the same rate during the validity period of the tender. The validity period may be treated for six months from the date of opening of the tender.

3.8 The tenderer must use only the Price Bid format issued by the Jamia Hamdard, to fill in the rates. Any addition/alteration in the text of the tender made by the tenderer shall not be considered. Such tender/s may be considered invalid by the Jamia Hamdard at its discretion.

3.9 Failure to comply with either of these conditions will render the tender void at the University's option. No advice whatsoever especially on any change in rate, specifications or conditions after the opening of the tender will be entertained. If on check there are differences between the rates given by the vendor in words and figures or in the amount worked out by him the following procedure shall be followed:
a. When there is a difference between the rates in figures and in words, the rates that correspond with the rate written either in figures or in words, then the rate quoted by the vendors in words shall be taken as correct.

3.10 When the amount of an item is not worked out by the vendor or it does not correspond with the rate written either in figures or in words, then the amount corresponding to the rate quoted by the vendors in words shall be taken as correct.

3.11 When the rates quoted by the vendor in figures and in words tallies but the amount is not worked out correctly, the rate quoted by the vendor shall be taken as correct and not the amount.

3.12 Arbitration:

If any dispute or difference of any kind what-so-ever shall arise between Jamia Hamdard and the contractor in connection with or arising out of this contract or the execution of work, there under shall be referred to an arbitrator to be appointed by mutual consent of the parties hearing. If the party cannot agree on the appointment of the Arbitrator within a period of One month from the notification by one party to the other of existence of such dispute, then the Arbitrator shall be nominated by the Vice Chancellor, Jamia Hamdard. The provisions of the Arbitration and Conciliation Act'1996 will be applicable and the award made their under shall be final and binding upon the parties hereto, subject to legal remedies available under the Law. This agreement shall be governed by the Law of India for the time being in force. The Jurisdiction shall be Delhi / New Delhi.

3.13 Each page of the Tender Document should be signed by the authorized person or persons submitting the tender in token of his/their having acquainted himself/themselves with the General Conditions of Contract. General specifications, Special Conditions, etc. as laid down. Any tender with any of the documents not so signed will be liable to be rejected.

3.14 The tender submitted on behalf of a firm shall be signed by all the partners of the firm or by a partner who has the necessary authority on behalf of the firm to enter into the proposed contract. Otherwise the tender may be rejected by the University.

3.15 Jamia Hamdard does not bind itself to accept the lowest or any tender and reserves to itself the right to accept or reject any or all the tenders, either in whole or in part, without assigning any reasons for doing so.

3.16 The Tenderer shall carry out all the work strictly in accordance with details and instructions of the University's concerned Officials. If in the opinion of the University's Officials, changes have to be made in the design and with the prior approval in writing of the University they desire the Tenderer to carry out the same, the Tenderer shall carry out the same. The University's Officials decision in such cases shall be final.

3.17 The tenderer shall not be entitled to any compensation for any loss suffered by him on account of delays in commencing or executing the work, whatever the cause of delays may be including delays arising out of modifications to the work entrusted to him or in any subcontract connected therewith or delays in awarding contracts for other trades of the project or in commencement or completion of such works or in procuring government controlled or other building materials or in obtaining water and power connections for construction purpose or for any other reason whatsoever and the University shall not be liable for any claim in respect thereof. The University does not accept liability for any sum besides the tender amount, subject to such variations as are provided for herein.

3.18 All security and safety regulations and guidelines as per the applicable law are to be followed. All guidelines/directions of the university Security Division must be followed. All Covid-19 safety guidelines issued time to time by Govt. must strictly followed.

3.19 The successful tenderer is bound to carry out any or all items of work necessary for the completion of the job even though such items are not included in the quantities and rates. The tenderer shall guarantee that the work shall be free from any defects whatsoever during the contract period.

3.20 Jamia Hamdard have right to increase and decrease the quantum of the work and preference of the buildings where solar system need to be installed during the contract period.

3.21 The work shall be carried out building wise. i.e. successfully competition of the from each building. The location of the buildings are mentioned in the tender.

3.22 Any defects or shortcomings found during execution of work and during the defects liability period from the completion of the entire work shall be attended/rectified by the tenderer without any extra cost to the Jamia Hamdard. In case of failure to do so within 10 days from such notice from the University, Jamia Hamdard may get such rectification works carried out through any other firm and expenditure incurred by the university shall be recovered from any money due to the Vendor.

3.23 Power Supply

3.23.1 Contractor has to arrange for the construction power supply of their own. However, subject to availability, University may provide access to the nearest available point in his location for supply power at only one point, from where the Contractor will make his own arrangement for temporary distribution through a temporary energy meter (sealed by The University). All the works will be done as per the applicable regulations with information to the Engineer-in- Charge/Project Manager. The temporary line will be removed forthwith after the completion of work or if there is any hindrance caused to the other works due to the alignment of these lines, the Contractor will re-route or remove the temporary lines at his own cost. The Contractor at his own cost will also provide suitable electric meters, fuses, switches, etc. for purposes of payment to the University which should be in the custody and control of the University. The cost of power supply shall be payable to the University by the Contractor. The University shall not, however, guarantee the supply of electricity nor have any liability in respect thereof. No claim for compensation for any failure or short supply of electricity will be admissible.

3.23.2 It shall be the responsibility of the Contractor to provide and maintain the complete installation on the load side of the supply with due regard to safety requirement at site. All cabling, equipment, installations etc. shall comply in all respects with the latest statutory requirements and safety provisions i.e., as per the Central/ State Electricity Acts and Rules etc. The Contractor will ensure that his equipment and Electrical Wiring etc., are installed, modified, maintained by a licensed Electrician/ Supervisor.

3.23.3 At all times, IEA regulations shall be followed failing which the University has a right to disconnect the power supply without any reference to the Contractor. No claim shall be entertained for such disconnection. Power supply will be reconnected only after production of fresh certificate from authorized electrical supervisors.

3.23.4 The University is not liable for any loss or damage to the Contractor's equipment as a result of variation in voltage or frequency or interruption in power supply or other loss to the Contractor arising there from.

3.33. TERMS OF PAYMENT:

3.33.1 Sixty five percent (65%) payments shall be paid against supply, receipt and acceptance of Materials at site on submission of documents for each building wise as per clause 3.21, Contractor's detailed invoice & packing list identifying contents of each shipment, evidence of dispatch (GR/ LR copy), Manufacturer's/ Contractor's Guarantee certificate of Quality, submission of the certificate.

3.33.2 Thirty five percent (35%) payments shall be paid against successful, testing and commissioning of materials at site and Operational Acceptance of the Facility (Part/Complete facility). pursuant to successful Guarantee Tests and demonstration of Performance Ratio (PR) including submission of all as-built drawings and documents.

3.33.3 A security deposit equal to 05 % of the value of work will be deducted from Contractor's bills and shall be refunded after the completion of defect liability period of **one (1) year** after ensuring successful performance of the system executed by the contractor. No interest will be payable in the case of delay in payment.

3.33.4 The final payment linked with successful Operation acceptance shall be released subjected to following: All "As- Built" Drawings and documents are submitted.

3.33.5 Detailed Engineering Document with detailed specification, schematic drawing, circuit drawing, cable routing plans and test results, manuals for all deliverable items, Operation, Maintenance & Safety Instruction Manual and other information about the project are submitted.

3.33.6 Bill of material of the installed Facility is submitted.

3.33.7 Inventory of recommended and mandatory spares including special tools and tackles at project Site are provided

3.33.8 All the required approvals and NOC's as required, are submitted

3.33.9 List of deviation from the approved drawings with reason for deviation is submitted

3.33.10 List of punch points, duly signed, is provided.

3.33.11 Certificates of final levels as set out for various works

3.33.12 Certificates of tests performed for various Works.

3.33.13 Material appropriation, Statement for the materials issued by the Jamia Hamdard, if applicable for the Work and list of surplus materials returned to the University store duly supported by necessary documents.

3.33.14 Warranty certificates for each equipment are handed over to the University and 'Statutory approvals/ permits/ NOC are handed over to the University.

3.33.15 The contractor will be liable for any loss, damage or casualty happened to the equipment or person during work. All Labour laws as amended time to time by Govt. of India will be strictly followed.

3.34 Delay and Extension of Time :

If in the opinion of University Engineers, works be delayed by force majeure such as (a) war / hostilities, (b) riots or civil commotion, (c) earthquakes, fire tempest, lightening or other natural /physical disasters, etc., (d) restrictions imposed by the Government which prevent or delay the execution of the order or by any other reasons, a suitable extension of time will be given and no extra claim will be paid by the University whatsoever.

3.35 Operation & Maintenance

The Operation and Maintenance shall be comprehensive. The maintenance service provided shall ensure project functioning of the Solar PV system as a whole and Power Evacuation System to the extent covered in the Contract. All preventive / routine maintenance and breakdown / corrective Maintenance required for ensuring maximum uptime shall have to be provided. Accordingly, the Comprehensive Operation & Maintenance shall have two distinct components as described below:

3.35.1 **Preventive / Routine Maintenance:**

This shall be done by the Contractor regularly and shall include activities such as cleaning and Checking the health of the Solar PV system, cleaning of module surface, tightening of all electrical Connections, and any other activity including the associated civil works, as mentioned in Technical Standard (TS), wear and tear that may be required for proper functioning of the Solar PV system as a whole. Necessary Maintenance activities, Preventive and Routine for Transformers and associated switch gears and Transmission line also shall be included.

3.35.2 **Breakdown / Corrective maintenance:**

Whenever a fault occurs, the Contractor has to attend to rectify the fault & the fault must be rectified within the 72 hours from the time of occurrence of fault. The Contractor must maintain all the records pertaining to all such faults and necessary measures taken.

3.35.3 The date of Comprehensive Operation & Maintenance Contract period shall begin from the date of Operational acceptance. However, operation of the Power Plant means operation of system as per TS and workmanship in order to keep the project trouble free covering the O&M period. The Contractor must demonstrate the committed CUF at the end of every year in accordance with commitment made in line with the Performance guarantees.

3.36 **Serviceability Level Agreement (SLA)**

3.36.1 Contractor shall make efforts to maintain 100 % serviceability of complete Plant including all other associated infrastructure developed by the Contractor during execution of project as its scope of work & the respective report of the same shall be submitted to the University.

3.36.2 Contractor shall maintain a Complaint log book, which shall include the timing of logging of complaint including unique Complaint number, time of closure of complaint & its Root Cause Analysis.

3.36.3 Contractor will be responsible for maintaining the Insurance Policy for the complete Plant and Facilities during the O&M period also. He shall maintain seamless insurance cover during Construction and O&M phases. Copy of policies shall be given to the University.

3.36.4. Such rectification work carried out by University doesn't exempts/relieves Contractor from its responsibility towards subsequent operation, maintenance, repair & replacement of such component/ infrastructure of the Plant or meeting the performance parameters of the Plant.

3.36.5 O&M Routine & Manpower: Contractor shall provide Preventive / Routine Maintenance schedule based on Original Equipment manufacturer and good engineering practices. The team deployed for the O&M must have the sufficient experience of executing the similar tasks. However, Contractor shall engage additional manpower as and when need arise.

3.36.6 Bidder is requested to provide the list of all the spares required to maintain the facility for O&M period. Contractor agrees to supply such spare parts, as recommended or otherwise required for the effective and hassle-free operation and maintenance of the Facilities. However, the Contractor, with its previous experience, is to provide a list of spares including specifications, supplier details.

3.37 Drawings to be supplied by the Contractor

3.37 .1 The drawings/ data which are to be furnished by the Contractor shall be furnished within the specified time.

3.37.2 Where approval/ review of drawings before manufacture/ construction/ fabrication has been specified, it shall be Contractor's responsibility to have these drawings prepared as per the TS and get it approved before proceeding with manufacture/ construction/ fabrication as the case may be any change that may have become necessary in these drawings during the execution of the work shall have to be carried out by the Contractor at no extra cost. All as built drawings shall bear the certification stamp duly signed by both the Contractor and Engineer-in-Charge.

3.37.3 The Drawings submitted by the Contractor shall be reviewed by the Engineer-in-Charge as far as practicable within 10 (Ten) working days. The Contractor shall incorporate any modifications and/ or corrections as highlighted/notified and submit the drawings for approval. Any delays arising out of failure by the Contractor to rectify the drawing in good time shall not alter the Contract Completion Time.

3.37.4 All GA & GFC drawings shall be provided in soft as well as Hard form in appropriate format/size to Employer for review & approval. All as built drawings showing all corrections, adjustments & deviations, if any, etc shall be furnished by the Contractor in 04 (Four) Hard Copies & a soft copy for record purpose to the University immediately after the operational acceptance.

3.38 Shifting of existing services (Civil & Electrical):

The sifting of existing services like water supply lines, water storage tanks, manholes, drainage system, cables, DBs etc and other related services will be done by the contractor, if required, and the payment will be made as per actual work done at site based on the analysis of prevailing market rates + plus GST+ with overhead C.P. @15%.

4.0 TECHNICAL SPECIFICATIONS/SCOPE OF WORK

4.1

4.2 Scope of work:

The successful tenderer shall be in a position to Design, Supply, Installation, Testing and Commissioning (SITC) of grid connected (net metering) rooftop solar power system (without batteries) of tentative capacity of 465 Kwp under CAPEX Mode strictly followed as the BOQ provided in tender.

Study the existing power system of the Campus and space available on roof top at proposed locations for installation of solar PV system. Design the solar system as per specifications mentioned in BOQ and gets it approved by the University before installation.

4.2.1 Design, supply, installation, testing and commissioning the grid connected (net metering) Roof Top Solar Power Plant as per BIS specifications and BOM/BOQ of tender.

4.2.2 Liaison with CERA/BSES/Electricity Company for statutory approval to connect the solar power with the grid and also with MNRE or Central/State Government for obtaining capital subsidy, if applicable. No extra payment shall be made by the University for Liaisoning works to the vendor. **However, statutory fees paid by the vendor to the Government Departments/Electricity Boards for approval/NOC etc. shall be reimbursed to the vendor on submission of original payment receipt to the University.**

4.2.3 Conduct end user training on operation and maintenance for identified group of employees along with appropriate training tools such as detailed training manuals, presentations containing appropriate flow charts etc.

4.2.4 Prepare all the as-built drawings in soft copy and hardcopy. All operating manuals, user manuals, system manuals, etc, as required.

4.2.5 Post Commissioning Support during the contract period at their own cost.

4.2.6 The tenderer will have to prepare terrace area layout plan.

4.2.7 Location and design of PV module structure should be such that the existing infrastructure on terrace is not disturbed.

4.2.8 **Fabrication works are to be done at factory or after the approval of the Competent Authority if is to be done in campus and submit structural stability certificate from the structural engineer/reputed engineering college in the area that designed MS structure can sustain the wind pressure of 170 Kmph with the load of solar panels**.

4.2.9 The tenderer has to visit the site and only after being satisfied about the entire nature of work, has to submit the bid.

4.2.10 The supporting MS section/ girders should be located at a height such as to completely avoid the parapet wall shadows from falling onto the PV modules.

4.2.11 Replacement of existing conventional energy meter with bidirectional energy meter for net metering and grid connection etc. This will also include the replacement of CT/PT, metering box etc. if required, in the scope of the vendor.

4.3 System Description

The Photovoltaic (PV) Grid connect system consists mainly of three components viz. the solar photovoltaic (SPV) array, Module Mounting Structure and the inverter. The PV array converts the solar energy into direct current (DC) electric energy. The Module mounting structure is used to hold the module in position. The DC power is converted to alternating current (AC) power by the Inverter and fed into the building power system through metering panel and isolation panel.

4.4 **PV Modules**

4.4.1 The PV modules must be indigenous and conform to the model as given in the BOQ.

4.4.2 The power output of the modules should be a minimum of installed capacity. Photo/ electric conversion efficiency of SPV module shall be greater than or equal to 20%. The modules used shall be grouped in an optimum number of strings with module-to module cable connections.

4.4.3 The modules shall be held fixed on MS hot-dipped powder coated structures. The modules shall be inclined at optimum horizontal tilt angle facing due south depending on the site location. The DC output from the modules shall be fed to Array junction box and the strings are to be paralleled at Sub Main & Main Junction Boxes.

4.4.4 The output of the main junction box shall be fed to DC distribution board (DCDB).

4.4.5 The environmental requirements/ infrastructure to be provided in the control room will be **in tenderers' scope**.

4.4.6 The AC power output of the inverter shall be fed to the AC Distribution Board of the building through the metering panel & isolation panel.

4.5 **Array structure/ PV panel structure**

4.5.1 Wherever required, suitable number of PV panel structures shall be provided.

4.5.2 The structure will be MS hot-dipped power coated to make them non-corrosive and long lasting, and also give enough working space for other installations on terrace.

4.5.3 Structures shall be supplied complete with all members to be compatible for allowing easy installation at the rooftop site.

4.5.4 The structures shall be designed to allow easy replacement of any module.

4.5.5 Each structure will have a provision to adjust its angle of inclination to the horizontal as per the site condition and will be capable of withstanding a wind load of 170 Km/hr after grouting and installation. The vendor has to submit the installation drawings approved by the registered structural engineer that designed structure and grouting method is capable of minimum withstanding a wind pressure of 170 Km/hr.

4.5.6 The front end of the SPV array must be 1 meter above the roof surface. Grouting material for SPV structure shall be as per M15 (1:2:4) concrete specifications.

4.5.7 The structures shall be designed for simple mechanical and electrical installation. There shall be no requirement of welding or complex machinery at the installation site.

4.5.8 If prior civil work or support platform is absolutely essential to install the structures,

4.5.9 Detailed engineering drawings and instructions for such prior civil work shall be carried out prior to the supply of goods.

4.5.10 The supplier shall specify installation details of the PV modules and the support structures with appropriate diagrams and drawings.

4.5.11 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 for fixing the junction/terminal boxes e) Interconnection details inside the junction/terminal boxes f) Structure installation details and drawings Electrical grounding (earthling) Interpanel/Inter-row distances with allowed tolerances i) Safety precautions to be taken.

4.5.12 The array structure shall support PV modules at a given orientation and absorb and transfer the mechanical loads to the roof top columns properly.

4.5.13 All nuts and bolts shall be of very good quality stainless steel.

4.5.14 Detailed design and Drawing shall have to submit to in the E&M Department, Jamia Hamdard for acceptance and approval before execution of work.

4.6 **Cabling practice** :

4.6.1 Solar cable/DC cable

Cable	**From**	**To**	**Conductor/ Insulation**	**Voltage Rating**	**Applicable Standard**
Solar cable/DC cable	Module	PCU/Inverter	Copper/ XLPO	1.1 kV DC/ 1.5 kV DC	IEC 62930/ EN 50618

Cable connections must be made using PVC Copper cables, as per BIS standards. All cable connections must be made using suitable terminations for effective contact. Only FRLS cables and wires of appropriate sizes and reputed make as per BOQ shall have to be used. All doors, covers, panels and cable exits shall be gasketed or otherwise designed to limit the entry of dust of moisture. All doors shall be equipped with locks.

Cable installation shall be as per IS 1255. Only terminal cable joints shall be accepted. No cable joint to join two cable ends shall be accepted.

4.7 **Earthing:** The structure of the PV arrays will be grounded properly using adequate number of earthing. All metal casing / shielding of the system shall be thoroughly grounded to ensure safety of the solar systems.

4.8 **Lightning and O/V protection:** The SPV systems 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. c) All wiring/cables should be in proper conduit or suitable casing and wires should not be hanging loose. d) All connections are to be made through suitable cable/lug/terminals; crimped properly & with use of Cable Glands. e) Switches / Circuit Breakers / Connectors-safety IS/ IEC 20947 part I, II & III, EN 50521 f) Fuses/ MCBs to be provided to protect against short circuit conditions. g) Details of solar power system design and layout for all systems shall be submitted along with ENVIRONMENT/MAINTENANCE/ SAFETY DESIGN PARAMETERS.

4.7.1 Environment All components and materials are to be designed and selected for long service life under local environment conditions.

4.9 Maintenance consideration

4.8.1 Particular attention shall be given to keep components simple, rugged and easily accessible for routine maintenance and components replacement.

4.8.2 Major assemblies and components such as, electrical components/controls shall be interchangeable and easily removable/replaceable without extensive dismantling of other assemblies of components.

4.8.3 **All wiring shall be of a uniform colour coding and marking system throughout indicating wiring terminations** to permit rapid effective tracing and trouble shooting. Maintenance manual shall reflect said colour coding/markings. d) To facilitate identification, each item of equipment shall have a name plate of corrosion resistant metal attached in a conspicuous location.

4.9 Safety considerations

4.9.1 All components shall be designed to have fail proof performance. In the event of an equipment failure or external influence such as improper operation, power failure or other adverse conditions affecting the proper function of the system or equipment, the said system or equipment **shall revert to a safe state**.

4.9.2 All the components of the systems viz PV modules, Electronics, etc should have type approval / test certificates **as per MNRE guide lines** i) All components and materials used in the system

should be of good quality & conform to the BIS / IEC standards / specifications, wherever available / applicable. j) Each system should have number plate with name & logo of the manufacturer and the month / year of installation. k) Operation and Maintenance / Instruction Manual (with Do's and Don'ts) to be provided with each system.

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

4.10. PCU/ Inverter:

4.10.1 As SPV array produce direct current electricity, it is necessary to convert this direct current into alternating current and adjust the voltage levels to match the grid voltage. Conversion shall be achieved using an electronic Inverter and the associated control and protection devices. All these components of the system are termed the "Power Conditioning Unit (PCU)". In addition, the PCU shall also house MPPT (Maximum Power Point Tracker), an interface between Solar PV array & the Inverter, to the power conditioning unit/inverter should also be DG set interactive. If necessary. Inverter output should be compatible with the grid frequency.

4.10.2 Three phase PCU/ inverter shall be used with each power plant system (10kW and/or above) but In case of less than 10kW single phase inverter can be used.

PCU/inverter shall be capable of complete automatic operation including wake-up, synchronization & shutdown.

4.10.3 The output of power factor of PCU inverter is suitable for all voltage ranges or sink of reactive power, inverter should have internal protection arrangement against any sustainable fault in feeder line and against the lightning on feeder.

Built-in meter and data logger to monitor plant performance through external computer shall be provided.

4.10.4 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.

4.10.5 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 IEC 529 specifications.

4.10.5 The PCU/ inverters should be tested from the MNRE approved test centres / NABL /BIS /IEC accredited testing- calibration laboratories. In case of imported power conditioning units, these should be approved by international test houses.

4.11 INTEGRATION OF PV POWER WITH GRID:

4.11.1 The output power from SPV would be fed to the inverters which converts DC produced by SPV array to AC and feeds it into the main electricity grid after synchronization. In case of grid failure, or low or high voltage, solar PV system shall be out of synchronization and shall be disconnected from the grid. Once the DG set comes into service PV system shall again be synchronized with DG supply and load requirement would be met to the extent of availability of power. 4 pole isolation of inverter output with respect to the grid/ DG power connection need to be provided.

4.12. DATA ACQUISITION SYSTEM / PLANT MONITORING

4.12.1 Data Acquisition System shall be provided for each of the solar PV plant.
4.12.2 Data Logging Provision for plant control and monitoring, time and date stamped system data logs for analysis with the high quality, suitable PC. Metering and Instrumentation for display of systems parameters and status indication to be provided.
4.12.3 Solar Irradiance: An integrating Pyranometer / Solar cell based irradiation sensor (along with calibration certificate) provided, with the sensor mounted in the plane of the array. Readout integrated with data logging system.
4.13.4 Temperature: Temperature probes for recording the Solar panel temperature and/or ambient temperature to be provided complete with readouts integrated with the data logging system
4.13.5 The following parameters are accessible via the operating interface display in real time separately for solar power plant: a. AC Voltage. b. AC Output current. c. Output Power d. Power factor. e. DC Input Voltage. f. DC Input Current. g. Time Active. h. Time disabled. i. Time Idle. j. Power produced k. Protective function limits (Viz-AC Over voltage, AC Under voltage, over frequency, under frequency ground fault, PV starting voltage, PV stopping voltage.
4.13.6 All major parameters available on the digital bus and logging facility for energy auditing through the internal microprocessor and read on the digital front panel at any time) and logging facility (the current values, previous values for up to a month and the average values) should be made available for energy auditing through the internal microprocessor and should be read on the digital front panel.
4.13.7 PV array energy production: Digital Energy Meters to log the actual value of AC/ DC voltage, Current & Energy generated by the PV system provided. Energy meter along with CT/PT should be of 0.5 accuracy class.
4.13.8 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.
4.13.9 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.
4.13.10 Computerized AC energy monitoring shall be in addition to the digital AC energy meter.
4.13.11 The data 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.
4.13.12 All instantaneous data shall be shown on the computer screen.
4.13.13 Software shall be provided for USB download and analysis of DC and AC parametric data for individual plant.
4.13.14 Provision for Internet monitoring and download of data shall be also incorporated.
4.13.15 Remote Server and Software for centralized Internet monitoring system shall be also provided for download and analysis of cumulative data of all the plants and the data of the solar radiation and temperature monitoring system.
4.13.16 Ambient / Solar PV module back surface temperature shall be also monitored on continuous basis.
4.13.17 Simultaneous monitoring of DC and AC electrical voltage, current, power, energy and other data of the plant for correlation with solar and environment data shall be provided.
4.13.18 Remote Monitoring and data acquisition through Remote Monitoring System software at the owner location with latest software/hardware configuration and service connectivity for online / real time data monitoring/control complete to be supplied and operation and maintenance/control to be ensured by the supplier. Provision for interfacing these data on server and portal in future shall be kept.

4.14 GRID ISLANDING:

In the event of a power failure on the electric grid, it is required that any independent power-producing inverters attached to the grid turn off in a short period of time. This prevents the DC-to-AC inverters from continuing to feed power into small sections of the grid, known as "islands." Powered islands present a risk to workers who may expect the area to be unpowered, and they may also damage grid-tied equipment. The Rooftop PV system shall be equipped with islanding protection. In addition to disconnection from the grid (due to islanding protection) disconnection due to under and over voltage conditions shall also be provided.

4.15PLANNING AND DESIGNING:

4.15.1 The bidder should carry out Shadow Analysis at the site and accordingly design strings & arrays layout considering optimal usage of space, material and labor. The bidder should submit the array layout drawings along with Shadow Analysis Report to Executive Engineer for approval.

4.15.2 Jamia Hamdard reserves the right to modify the landscaping design, Layout and specification of sub-systems and components at any stage as per local site conditions/requirements.

4.15.3 The bidder shall submit preliminary drawing for approval & based on any modification or recommendation, if any. The bidder submit four sets and soft copy in CD of final drawing for formal approval to proceed with construction work.

4.16DRAWINGS TO BE FURNISHED BY BIDDER AFTER AWARD OF CONTRACT

4.16.1 The Contractor shall furnish the following drawings Award/Intent and obtain approval

4.16.2 General arrangement and dimensioned layout

4.16.3 Schematic drawing showing the requirement of SV panel, Power conditioning Unit(s)/ inverter, Junction Boxes, AC and DC Distribution Boards, meters etc.

4.16.4 Structural drawing along with foundation details for the structure.

4.16.5 Itemized bill of material for complete SV plant covering all the components and associated accessories.

4.16.6 Layout of solar Power Array

4.16.7 Shadow analysis of the roof

5.0 SPECIAL CONDITIONS

5.1 During working at site, some restrictions may be imposed by Engineer-in-Charge/Security staff of Jamia Hamdard or Local Authorities regarding safety and security etc., the contractor shall be bound to follow all such restrictions/instruction & nothing extra shall be payable on this account.

5.2 No compensation shall be payable to the contractor for any damage caused by rains lightening, wind, storm, floods Tornado, earth quakes or other natural calamities during the execution of work. He shall make good all such damages at his own cost; and no claim on this account will be entertained.

5.3 No Labour hutment shall be allowed in the premises. All laborers should leave the site after day's work. The security & Watch ward of site contractor materials/work etc. shall be at his cost only.

5.4 All rates quoted by the tenderers shall be complete inclusive of all taxes, duties, Labour, Tool & Plant, Transportation etc., and the same shall remain firm for the entire contract period and extended contract period, if any.

5.5 The materials used for carrying out the work shall be of best locally available quality and the contractor has to carry out the necessary testing of the material as ordered by the Engineer-In-Charge for its conformity and all testing charges shall be borne by the contractor. The material specification will be strictly followed.

5.6 The contractor shall be fully responsible for the any injury or damage caused to the workmen deployed by him at site for carrying out the work and Jamia Hamdard has nothing to do with such happenings and in no way shall be held responsible for the same.

5.7 All communication should be addressed to the **Executive Engineer, Jamia Hamdard, Hamdard Nagar, New Delhi – 110062.**

5.8 The Bidder shall not involve himself or any of his representatives in Price manipulation of any kind directly or indirectly by communicating with other suppliers / bidders.

5.9 The Bidder shall not divulge either his Bids or any other exclusive details of Jamia Hamdard to any other party.

5.10 Jamia Hamdard decision on award of Contract shall be final and binding on all the Bidders.

5.11 Jamia Hamdard reserves their rights to extend, reschedule or cancel any tender within its sole discretion.

5.12 Jamia Hamdard provider shall not have any liability to Bidders for any interruption or delay in access to the site irrespective of the cause.

5.13 Jamia Hamdard is not responsible for any damages, including damages that result from, but are not limited to negligence.

5.14 Jamia Hamdard will not be held responsible for consequential damages, including but not limited to systems problems, inability to use the system, loss of electronic information etc.

Signature of Contractor

6.0 **EVALUATION OF PRICE BID**

6.1 The Bidders qualified in the Technical Bid evaluation as per eligibility criteria as mentioned in the tender shall only be allowed to participate in the price bidding.

6.2 Jamia Hamdard reserves its rights to accept any or to reject all the bids without assigning any reasons therefore and no correspondence shall be entertained in this regard.

We have read and understood the abovementioned prequalification criteria and shall abide by the same.

Signature of the Vendor
with Seal
Name: …….
Place: …….
Date: ……

Price Bid

Combined BOQ for all the buildings which are proposed for SITC of Solar Plants

S.No.	Item & Description	Qty	Unit	Rate	GST %	Amount
1.	Supply, Installation, Testing and Commissioning of HIT MODULES 325 Watt PV CELLS on the ms structure as per norms **(make: Panasonic)**	1430	Set			
2.	Supply, Installation, Testing and Commissioning of 50KW INVERTERS for the same solar system as per Norms (Core1) **(make: SMA/Delta)**	3	Set			
3.	Supply, Installation, Testing and Commissioning of 110KW INVERTERS for the same solar system as per Norms (Core2) (**make: SMA/Delta**)	2	Set			
4.	Providing, fixing, testing and commissioning of 25KW INVERTERS for the same solar system as per Norms (Tripower25) **(make: SMA/Delta)**	1	Set			
5.	Providing, fixing, testing and commissioning of 20KW INVERTERS for the same solar system as per Norms (Tripower20) **(make: SMA/Delta)**	4	Set			
6.	Providing, fixing, testing and commissioning of 15KW INVERTERS for the same solar system as per Norms (Tripower15) **(make: SMA/Delta)**	1	Set.			
7.	Supply and laying DC cable 4 sqmm on Wiremesh Cable tray with cover, bend and other accessories with complete in all respect **(make: Polycab/Havells)**	10300	Rmt.			
8.	Supply and laying DC cable 6 sqmm on Wiremesh Cable tray with cover, bend and other accessories with complete in all respect **(make: Polycab/Havells)**	400	Rmt.			
9.	Supply and laying of 4Cx 16 mm² Aluminum armored AC CABLES with Cable tray laying only on roof and complete with cable end terminations as required as per norm **(make: Polycab/Havells)**	70	Rmt.			
10.	Supply and laying of 4Cx 25 mm² Aluminum armored AC CABLES with Cable tray laying only on roof and complete with cable end terminations as required as per norm **(make: Polycab/Havells)**	60	Rmt.			
11.	Supply and laying of 4Cx 50 mm² Aluminum armored AC CABLES with Cable tray laying only on roof and complete with cable end terminations as required as per norm **(make: Polycab/Havells)**	300	Rmt.			
12.	Supply and laying of 4Cx 120 mm² Aluminum armored AC CABLES with Cable tray laying only on roof and complete with cable end terminations as required as per norm **(make: Polycab/Havells)**	220	Rmt.			
13.	Supply and laying of 4Cx 150 mm² Aluminum armored AC CABLES with Cable tray laying only on roof and complete with cable end terminations as required as per norm **(make: Polycab/Havells)**	Rate only	Rmt.			
14.	Supply and laying of 4CX10 SQMM AC CABLE CU UNARMOUD complete in all	70	Rmt.			

	respect as per requirement **(make: Polycab/ Havells)**					
15.	Supply and laying of 4CX16 SQMM AC CABLE CU UNARMOUD complete in all respect as per requirement **(make: Polycab/Havells)**	30	Rmt.			
16.	Supply and laying of CABLE TRAY Wiremesh type cable tray of GI with accessories. 100X55 mm * 3.9 mm wire gauge for sprinkler system **(OBO/Legrand/Unistrut)**	1350	Rmt.			
17.	Supply and laying of CABLE TRAY Perforated type cable tray of GI with coupler plates 200X60mm * 0.7 mm thick for AL armored cable routing **(OBO/Legrand/Unistrut)**	260	Rmt.			
18.	Supply, Installation, Testing and Commissioning of SPRINKLER TYPE MODULE CLEANING SYSTEM complete with CPVC piping with accessories and water pump of 1HP to be attached with the structure of the module etc. complete **(Astral)**	2	Set			
19.	Supply, Installation, Testing and Commissioning of SPRINKLER TYPE MODULE CLEANING SYSTEM complete with CPVC piping with accessories and water pump of 2HP to be attached with the structure of the module etc. complete **(Astral)**	8	Set			
20.	Supply, Installation, Testing and Commissioning of SPRINKLER TYPE MODULE CLEANING SYSTEM complete with CPVC piping with accessories and water pump of 3HP to be attached with the structure of the module etc. complete **(Astral)**	1	Set			
21.	Supply, fixing, testing and commissioning of No of Interceptor rod type LIGHTING ARRESTOR complete as per norms. As per IEC 62305 with complete down conductor using GI strip of 30X3mm and using OBO make mounting arrangement for the walls. **(OBO/Furse/Ingesco)**	15	Set			
22.	Supply, Installation, Testing and Commissioning of Earthing Kit - 25 mm dia. CU bonded (250 micron), 3mtr long, UL listed (Chemical Earthing with Clamps) with Accessories Providing and laying of required EARTHING SYSTEM for whole solar system GI /Copper (GI earthing for equipment & structure, Cu earthing for from module to module with complete earth pits per requirements and as per norms) **(OBO/Furse/Ingesco)**	27	Set			
23.	Supply, Installation, Testing and Commissioning of Solar Mounting Structure With Accessories and Providing ,fabrication and fixing of Hot dipped GI STRUCTURES with 80- 120 micron zinc coating capable of withstanding wind speed of 170km/hr plus Accessories and including civil work as required etc in all respects complete **(TATA/JINDAL-HISSAR 'B')**	20,500	Set			
24.	Supply and laying of Armored fiber cables end terminations as required as per norms. **(Make D-Link/AMP)**	900	Set			

25.	Supply, Installation, Testing and Commissioning of Smart DCDB Monitoring Box 12 IN 12 OUT PANEL as per given BOM 6nos SPD Type 1+2, Class B+C Solar 1000 DC SPD brand (OBO), with remote signaling contact plus SPD for SMC card, Fuse plus holder (Mersin), Power Supply(230 AC, O/p 12/24 DC) Omron, String Monitoring card(Kernel),Terminals (Connect well),End stopper (Connect well), Gland (OBO), Transparent Box (IP65) (RSS/HENSEL) **(make: OBO/SCHNEIDER/EMERSON)**	3	Set			
26.	Supply, Installation, Testing and Commissioning of Smart DCDB Monitoring Box 24 IN 24 OUT PANEL as per given BOM 12nos SPD Type 1+2, Class B+C Solar 1000 DC SPD, with remote signaling contact(OBO) plus SPD for SMC card, Fuse plus holder (Mersin), Power Supply(230 AC, O/p 12/24 DC) Omron, String Monitoring card(Kernel),Terminals(Connect well), End stopper (Connect well), Gland(OBO),Transparent Box(IP65)(RSS/HENSEL) **(make: OBO/SCHNEIDER/EMERSON)**	2	Set			
27.	Supply, Installation, Testing and Commissioning of Smart DCDB Monitoring Box 6 IN 6 OUT PANEL as per given BOM 2Nos SPD Type 1+2, Class B+C Solar 1000 DC SPD, with remote signaling contact plus one spd for SMC card, Fuse plus holder (Mersin), Power Supply(230 AC, O/p 12/24 DC) Omron, String Monitoring card(Kernel),Terminals (Connect well),End stopper(Connect well), Gland(OBO),Transparent Box(IP65)(RSS/HENSEL) **(make: OBO/SCHNEIDER/EMERSON)**	6	Set			
28.	Supply, Installation, Testing and Commissioning of AC Combiner Box with outdoor Housing with (100+100) Amps MCCBAL bus bar etc. complete (IP 65) with Class B+C SPD for Power line protection, Uc:320V,3P+**NPE** **(make: MCCB:L&T/Schneider and SPD: Emerson/Schneider/OBO)**	1	Set			
29.	Supply, Installation, Testing and Commissioning of AC Combiner Box with outdoor Housing with 200 Amps MCCB(Schneider/L&T) AL bus bar etc. complete (IP 65) with Class B+C SPD for Power line protection, Uc:320V,3P+NPE **(make: MCCB:L&T/Schneider and SPD: Emerson/Schneider/OBO)**	2	Set			
30.	Supply, Installation, Testing and Commissioning of AC Combiner Box with outdoor Housing with 63+63)Amps MCCB(Schneider/L&T) AL bus bar etc. complete (IP 65) with Class B+C SPD for Power line protection, Uc:320V,3P+NPE **(make; MCCB:L&T/Schneider and SPD: Emerson/Schneider/OBO)**	2	Set			

31.	Supply, Installation, Testing and Commissioning of AC Combiner Box with outdoor Housing with 100amps MCCB(Schneider/L&T) AL bus bar etc. complete (IP 65) with Class B+C SPD for Power line protection, Uc:320V,3P+NPE **(make: MCCB:L&T/Schneider and SPD: Emerson/Schneider/OBO)**	1	Set			
32.	Supply, Installation, Testing and Commissioning of AC Combiner Box with outdoor Housing with (200+63)Amps MCCB(Schneider/L&T) AL bus bar etc. complete (IP 65) with Class B+C SPD for Power line protection,Uc:320V,3P+NP **(make: MCCB:L&T/Schneider and SPD:Emerson/Schneider/OBO**)	1	Set			
33.	Supply, Installation, Testing and Commissioning of AC Combiner Box with outdoor Housing with 63 Amps MCCB(Schneider/L&T) AL bus bar etc. complete (IP 65) with Class B+C SPD for Power line protection, Uc:320V,3P+NPE **(make: MCCB:L&T/Schneider and SPD: Emerson/Schneider/OBO)**	1	Set			
34.	Supply, Installation, Testing and Commissioning of ACDB with Indoor Housing with MCCB 200Amps **(Make SCHNEIDER/L&T)**	3	Set			
35.	Supply, Installation, Testing and Commissioning of ACDB with Indoor Housing with MCCB MCCB 250 Amps **(make: SCHNEIDER/L&T)**	Rate only	Set			
36.	Supply, Installation, Testing and Commissioning of ACDB with Indoor Housing with MCCB 100Amps **(make: SCHNEIDER/L&T)**	3	Set			
37.	Supply, Installation, Testing and Commissioning of ACDB with Indoor Housing with MCCB 63Amps **(make: SCHNEIDER/L&T)**	2	Set			
38.	Providing , fixing ,testing and commissioning of SENSORS in the same solar system as per norms Pyranometer Sensor **(make: Rain wise/ Kipp & Zonen)**	1	Set			
39.	SITC of Dust Sensor is a simple air monitoring module with onboard Sharp GP2Y1010AU0F Make: Waveshare)	1	Set			
40.	Providing, fixing, testing and commissioning of SENSORS in the same solar system as per norms. Module Temp. Sensor **(make: Rain wise/ Kipp & Zonen)**	1	Set			
41.	Providing, fixing, testing and commissioning of SENSORS in the same solar system as per norms. Ambient Temp Sensor **(make: Rain wise/ Kipp & Zonen)**	1	Set			
42.	Providing , fixing ,testing and commissioning of SENSORS in the same solar system as per norms Wind speed sensor **(make: Rain wise/Kipp & Zonen)**	1	Set			
43.	Remote Monitoring Module and input output module Supply fixing testing and commissioning of Inverter monitoring system	1	Set			

	as per norms/integrated sensors display. **(make: SMA)**					
44.	Supply and installation of generator synch with 5 year web service cost in built. Supply of Simpli. SYNC Main ACDB For Single DG Sync as per given BOM .Touch Screen, 4.3" with Suitable, Memory and Communication Capabilities. Supply of Multi Function Meter, with Serial Communication Port, CL1**(make: DRS)**	1	Set			
45.	Solar Check Meter	7	Set			
46.	Bi-Directional Meter	1	Set			
47.	GI strip 30x3mm **(make: OBO)**	1320	Set			
48.	Supply and Laying of 100x55 x3.9m mm wire mesh cable tray with all accessories like bend, tee, elbow, clamp, cover etc. for DC stringing **(make: OBO)**	1550	Rmt.			
49.	Supply including installation of ABC dry Power type fire extinguishers with Stored pressure - 2Kgs	14	Set			
50.	Operation and Maintenance including panel cleaning, water and electricity will be provided free of cost by the management at each rooftop duration of the contract will be 3 Year	1	Job			
			Total Amount			
			GST Amount			
			Grand Total			
	Total in words:					

(**Signature of the authorized person with company/firm stamp**)
Date:

Building wise BOQ for reference:

1. For HARC Building

S.No.	Item & Description	Qty
1	Panasonic HIT Panel 325 watt Providing ,fixing, testing and commissioning of HIT MODULES 325 Watt PV CELLS on the ms structure as per norms	294
2	Providing ,fixing, testing and commissioning of INVERTERS for the same solar system as per Norms (Core 1)	2
3	DC cable 4 Sqmm with Cable routing with Wiremesh Cable tray with cover, bend and other accessories	2,000.00
4	Supply and laying of AC armoured CABLES complete with cable end terminations as required as per norm 4Cx 50 mm² AL	80
5	Supply and laying of AC armoured CABLES complete with cableend terminations as required as per norm 4Cx 120 mm² AL	60
6	CABLE TRAY Wiremesh type cable tray of GI with accessories. 100X55 mm * 3.9 mm wire gauge for sprinkler system	200
7	CABLE TRAY Perforated type cable tray of GI with coupler plates 200X60mm * 0.7 mm thick for AL armoured cable routing	90
8	SPRINKLER TYPE MODULE CLEANING SYSTEM complete with CPVC piping with accessories and water pump of 2HP(2nos) to be attached with the structure of the module etc. complete	1
9	Supply, fixing, testing and commissioning of Interceptor rod type LIGHTING ARRESTOR complete as per norms.As per IEC 62305.	2
10	Earthing Kit - 25 mm dia. CU bonded (250 micron), 3mtr long, UL listed (Chemical Earthing with Clamps) with Accessories Providing and laying of required EARTHING SYSTEM for whole solar system GI /Copper (GI earthing for equipment & structure, Cu earthing for from module to module with complete earth pits per requirements and as per norms)OBO	4
11	Solar Mounting Structure With Accessories Providing ,fabrication and fixing of Hot dipped GI STRUCTURES with 80- 120 micron zinc coating capable of withstanding wind speed of 170km/hr plus Accessories and including civil work as required etc in all respects complete	4,000.00
12	Supply and laying of Armoured fiber cables end terminations as required as per norms. Make D-Link	150
13	Supply for Smart DCDB Monitoring Box 12 IN 12 OUT PANEL as per given BOM 6 nos SPD Type 1+2, Class B+C Solar 1000 DC SPD brand (OBO), with remote signaling contact plus SPD for SMC card,Fuse plus holder (Mersen), Power Supply(230 AC, O/p 12/24 DC) Omoron,String Monitoring card(Kernel),Terminals(Connectwell),End stopper(Connectwell), Gland(OBO),Transparent Box(IP65)(RSS/HENSEL)	2
14	AC Combiner Box with outdoor Housing with 2 nos 100 Amps MCCB AL bus bar etc. complete (IP 65) with Class B+C SPD for Power line protection, Uc:320V,3P+NPE	1
15	ACDB with Outdoor Housing with MCCB MCCB 200Amps (Make SCHNEIDER /L&T)	1
16	Solar Check Meter	1
17	GI strip 30x3mm	250
18	Supply and Laying of 100x55 x3.9m mm wire mesh cable tray with all accessories like bend, tee, elbow, clamp, cover etc. for DC stringing	250

2. For Central Library Building

S.No.	Item & Description	Qty
1	Panasonic HIT Panel 325 watt Providing ,fixing,testing and commissioning of HIT MODULES 325 Watt PV CELLS on the ms structure as per norms	308
2	Providng ,fixing,testing and commmissiong of INVERTERS for thesame solar system as per Norms(Core 2)	1
3	DC cable 4 Sqmm with Cable routing with Wiremesh Cable tray with cover, bend and other accessories	2,000.00
4	supply and laying of AC armoured CABLES complete with cableend terminations as required as per norm 4Cx 120 mm² AL	100
5	CABLE TRAY Wiremesh type cable tray of GI with accessories. 100X55 mm * 3.9 mm wire gauge for sprinkler system	250
6	CABLE TRAY Perforated type cable tray of GI with coupler plates 200X60mm * 0.6 mm thick for cable routing	50
7	SPRINKLER TYPE MODULE CLEANING SYSTEM complete with CPVC piping with accessories and water pump of 3HP(1nos) to be attached with the structure of the module etc. complete	1
8	Supply, fixing , testing and commissioning of Interceptor rod type LIGHTING ARRESTOR complete as per norms .As per IEC 62305.	3
9	Earthing Kit - 25 mm dia. CU bonded (250 micron), 3mtr long, UL listed (Chemical Earthing with Clamps) with Accesseries Providing and laying of required EARTHING SYSTEM for whole solar system GI /Copper (GI earthing for equipment & structure, Cu earthing for from module to module with complete earth pits per requirements and as per norms)OBO	4
10	Solar Mounting Structure With Accessories Providing ,fabrication and fixing of Hot dipped GI STRUCTURES with 80- 120 micron zinc coating capable of withstanding wind speed of 170km/hr plus Accessories and including civil work as required etc in all respects complete	4,500.00
11	Supply and laying of Armoured fiber cables end terminations as required as per norms. Make D-Link	150
12	Supply for Smart DCDB Monitoring Box 24 IN 24 OUT PANEL as per given BOM 12 nos SPD Type 1+2, Class B+C Solar 1000 DC SPD, with remote signaling contact(OBO) plus SPD for SMC card,Fuse plus holder (Mersen), Power Supply(230 AC, O/p 12/24 DC) Omoron,String Monitoring card(Kernel),Terminals(Connectwell),End stopper(Connectwell), Gland(OBO),Transparent Box(IP65)(RSS/HENSEL)	1
13	AC Combiner Box with outdoor Housing with 200amps MCCB(Schenider/L&T) AL bus bar etc. complete (IP 65) with Class B+C SPD for Power line protection, Uc:320V,3P+NPE	1
14	ACDB with Outdoor Housing with MCCB MCCB 200Amps (Make SCHNEIDER /L&T)	1
15	Solar Check Meter	1
16	GI strip 30x3mm	320
17	Supply and Laying of 100x55 x3.9m mm wire mesh cable tray with all accessories like bend, tee, elbow, clamp, cover etc. for stringing	500

3. For JLN International Hostel

S. No.	Item & Description	Qty
1	Panasonic HIT Panel 325 watt Providing ,fixing, testing and commissioning of HIT MODULES 325 Watt PV CELLS on the ms structure as per norms	104
2	Providing ,fixing, testing and commmissiong of INVERTERS for the same solar system as per Norms(STP 15KW)	1
3	Providing ,fixing, testing and commmissiong of INVERTERS for the same solar system as per Norms(STP 20KW)	1
4	Module stringing 1C x 4 SQMM CU Supply and laying of following DC CABLEs in wall trunking complete with cable end terminations as required as per norms	800
5	AJB TO INVERTER 4C x 16 SQMM CU Unarmored	10
6	supply and laying of AC armoured CABLES complete with cable end terminations as required as per norm4Cx 25 mm² AL	120
7	CABLE TRAY Wiremesh type cable tray of GI with accessories. 100X55 mm * 3.9 mm wire gauge for sprinkler system	120
8	CABLE TRAY Perforated type cable tray of GI with coupler plates 200X60mm * 0.6 mm thick for cable routing	20
9	SPRINKLER TYPE MODULE CLEANING SYSTEM complete with CPVC piping with accessories and water pump of 1HP(2nos) to be attached with the structure of the module etc. complete	1
10	Supply ,fixing , testing and commissioning of Interceptor rod type LIGHTING ARRESTOR complete as per norms. As per IEC 62305.	3
11	Earthing Kit - 25 mm dia. CU bonded (250 micron), 3mtr long, UL listed (Chemical Earthing with Clamps) with Accessories Providing and laying of required EARTHING SYSTEM for whole solar system GI /Copper (GI earthing for equipment & structure, Cu earthing for from module to module with complete earth pits per requirements and as per norms)OBO	6
12	Solar Mounting Structure With Accessories Providing ,fabrication and fixing of Hot dipped GI STRUCTURES with 80- 120 micron zinc coating capable of withstanding wind speed of 170km/hr plus Accessories and including civil work as required etc in all respects complete	1,500.00
13	Supply and laying of Armoured fiber cables end terminations as required as per norms. Make D-Link	120
14	Supply for Smart DCDB Monitoring Box 4 IN 4 OUT PANEL as per given BOM 2 nos SPD Type 1+2, Class B+C Solar 1000 DC SPD with remote signaling contact brand(OBO) plus SPD for SMC card, Fuse plus holder (Mersen), Power Supply(230 AC, O/p 12/24 DC) Omoron,String Monitoring card(Kernel),Terminals(Connectwell),End stopper(Connect well), Gland(OBO),Transparent Box(IP65)(RSS/HENSEL)	2
15	AC Combiner Box with outdoor Housing with 63 Amps MCCB(Schenider/L&T) AL bus bar etc. complete (IP 65) with Class B+C SPD for Power line protection, Uc:320V,3P+NPE	2
16	Solar Check Meter	1
17	GI strip 30x3mm	200
18	Supply and Laying of 100x55 x3.9m mm wire mesh cable tray with all accessories like bend, tee, elbow, clamp, cover etc. for stringing	150

4. For Ibn e Batuta Hostel

S.No.	Item & Description	Qty
1	Panasonic HIT Panel 325 watt Providing ,fixing, testing and commissioning of HIT MODULES 325 Watt PV CELLS on the ms structure as per norms	154
2	Providing ,fixing, testing and commmissiong of INVERTERS for the same solar system as per Norms(Core 1)	1
3	Module stringing 1C x 4 SQMM CU Supply and laying of following DC CABLEs in wall trunking complete with cable end terminations as required as per norms	1,500.00
4	AC CABLE AL ARMOUD 4CX50SQMM	120
5	CABLE TRAY Wiremesh type cable tray of GI with accessories. 100X55 mm * 3.9 mm wire gauge for sprinkler system	150
6	CABLE TRAY Perforated type cable tray of GI with coupler plates 200X60mm * 0.6 mm thick for cable routing	50
7	SPRINKLER TYPE MODULE CLEANING SYSTEM complete with CPVC piping with accessories and water pump of 2HP(1nos) to be attached with the structure of the module etc. complete	1
8	Supply ,fixing , testing and commissioning of Interceptor rod type LIGHTING ARRESTOR complete as per norms.As per IEC 62305.	2
9	Earthing Kit - 25 mm dia. CU bonded (250 micron), 3mtr long, UL listed (Chemical Earthing with Clamps) with Accesseries Providing and laying of required EARTHING SYSTEM for whole solar system GI /Copper (GI earthing for equipment & structure, Cu earthing for from module to module with complete earth pits per requirements and as per norms)OBO	3
10	Solar Mounting Structure With Accessories Providing ,fabrication and fixing of Hot dipped GI STRUCTURES with 80- 120 micron zinc coating capable of withstanding wind speed of 170km/hr plus Accessories and including civil work as required etc in all respects complete	2,500.00
11	Supply and laying of Armored fiber cables end terminations as required as per norms. Make D-Link	120
12	Supply for Smart DCDB Monitoring Box 12 IN 12 OUT PANEL as per given BOM 6 nos SPD Type 1+2, Class B+C Solar 1000 DC SPD with remote signaling contact brand (OBO), plus SPD for SMC card, Fuse plus holder (Mersen), Power Supply(230 AC, O/p 12/24 DC) Omoron,String Monitoring card(Kernel),Terminals(Connectwell), End stopper(Connectwell), Gland(OBO),Transparent Box(IP65)(RSS/HENSEL)	1
13	AC Combiner Box with outdoor Housing with 100 Amps MCCB(Schenider/L&T) AL bus bar etc. complete (IP 65) with Class B+C SPD for Power line protection, Uc:320V,3P+NPE	1
14	ACDB with Outdoor Housing with MCCB MCCB 100Amps (Make SCHNEIDER /L&T)	1
15	Solar Check Meter	1
16	GI strip 30x3mm	120
17	Supply and Laying of 100x55 x3.9m mm wire mesh cable tray with all accessories like bend, tee, elbow, clamp, cover etc. for stringing	150

5. For Ibn E Sina Girls Hostel

S.No.	Item & Description	Qty
1	Panasonic HIT Panel 325 watt Providing ,fixing, testing and commissioning of HIT MODULES 325 Watt PV CELLS on the ms structure as per norms	120
2	Providing ,fixing, testing and commmissiong of INVERTERS for the same solar system as per Norms(STP 20KW)	2
3	Module stringing 1C x 4 SQMM CU Supply and laying of following DC CABLEs in wiremesh cable tray mentioned below complete with cable end terminations as required as per norms	1,000.00
4	AJB TO INVERTER 4C x 16 SQMM CU Unarmoured	15
5	AC CABLE AL ARMOUD 4CX16SQMM	50
	AC CABLE AL ARMOUD 4CX50SQMM	50
6	CABLE TRAY Wiremesh type cable tray of GI with accessories. 100X55 mm * 3.9 mm wire gauge for sprinkler system	150
7	SPRINKLER TYPE MODULE CLEANING SYSTEM complete with CPVC piping with accessories and water pump of 2HP(1nos) to be attached with the structure of the module etc. complete	1
8	Supply, fixing , testing and commissioning of Interceptor rod type LIGHTING ARRESTOR complete as per norms.As per IEC 62305.	2
9	Earthing Kit - 25 mm dia. CU bonded (250 micron), 3mtr long, UL listed (Chemical Earthing with Clamps) with Accesseries Providing and laying of required EARTHING SYSTEM for whole solar system GI /Copper (GI earthing for equipment & structure, Cu earthing for from module to module with complete earth pits per requirements and as per norms)OBO	3
10	Solar Mounting Structure With Accessories Providing ,fabrication and fixing of Hot dipped GI STRUCTURES with 80- 120 micron zinc coating capable of withstanding wind speed of 170km/hr plus Accessories and including civil work as required etc in all respects complete	1,500.00
11	Supply and laying of Armoured fiber cables end terminations as required as per norms. Make D-Link	120
12	Supply for Smart DCDB Monitoring Box 5 IN 5 OUT PANEL as per given BOM 2 Nos SPD Type 1+2, Class B+C Solar 1000 DC SPD, with remote signaling contact plus one spd for SMC card,Fuse plus holder (Mersen), Power Supply(230 AC, O/p 12/24 DC) Omoron,String Monitoring card(Kernel),Terminals(Connectwell), End stopper(Connectwell), Gland(OBO),Transparent Box(IP65)(RSS/HENSEL)	2
13	AC Combiner Box with outdoor Housing with 2 nos 63 Amps MCCB(Schenider/L&T) AL bus bar etc. complete (IP 65) with Class B+C SPD for Power line protection, Uc:320V,3P+NPE	1
14	ACDB with Outdoor Housing with MCCB MCCB 100 Amps (Make SCHNEIDER /L&T)	1
16	Solar Check Meter	1
15	GI strip 30x3mm	180
16	Supply and Laying of 100x55 x3.9m mm wire mesh cable tray with all accessories like bend, tee, elbow, clamp, cover etc. for stringing	200

6. For Porta Cabin (Extension of Ibn e Sina Girls Hostel) Part-A

S.No	Item & Description	Qty
1	Panasonic HIT Panel 325 watt Providing ,fixing, testing and commissioning of HIT MODULES 325 Watt PV CELLS on the ms structure as per norms	140
2	Providing ,fixing, testing and commmissiong of INVERTERS for the same solar system as per Norms(STP 20KW)	1
3	Providing ,fixing, testing and commmissiong of INVERTERS for the same solar system as per Norms(STP 25KW)	1
4	DC cable 4 Sqmm with Cable routing with Wiremesh Cable tray with cover, bend and other accessories	1,000.00
5	AC CABLE CU UNARMOUD 4CX16 SQMM	30.00
6	supply and laying of AC armoured CABLES complete with cable end terminations as required as per norm4Cx 50 mm² AL	50
7	CABLE TRAY Wiremesh type cable tray of GI with accessories. 100X55 mm * 3.9 mm wire gauge for sprinkler system	200
8	SPRINKLER TYPE MODULE CLEANING SYSTEM complete with CPVC piping with accessories and water pump of 2HP(1nos) to be attached with the structure of the module etc. complete	1
9	Supply, fixing, testing and commissioning of Interceptor rod type LIGHTING ARRESTOR complete as per norms. As per IEC 62305.	1
10	Earthing Kit - 25 mm dia. CU bonded (250 micron), 3mtr long, UL listed (Chemical Earthing with Clamps) with Accesseries Providing and laying of required EARTHING SYSTEM for whole solar system GI /Copper (GI earthing for equipment & structure, Cu earthing for from module to module with complete earth pits per requirements and as per norms)OBO	3
11	Solar Mounting Structure With Accessories Providing ,fabrication and fixing of Hot dipped GI STRUCTURES with 80- 120 micron zinc coating capable of withstanding wind speed of 170km/hr plus Accessories and including civil work as required etc in all respects complete	2,000.00
12	Supply and laying of Armored fiber cables end terminations as required as per norms. Make D-Link	120
13	Supply for Smart DCDB Monitoring Box 6 IN 6 OUT PANEL as per given BOM 4 nos SPD Type 1+2, Class B+C Solar 1000 DC SPD, with remote signaling contact(OBO) plus SPD for SMC card,Fuse plus holder (Mersen), Power Supply(230 AC, O/p 12/24 DC) Omoron,String Monitoring card(Kernel),Terminals(Connectwell),End stopper(Connectwell), Gland(OBO),Transparent Box(IP65)(RSS/HENSEL)	2
14	AC Combiner Box with outdoor Housing with (63+63) Amps MCCB(Schenider/L&T) AL bus bar etc. complete (IP 65) with Class B+C SPD for Power line protection, Uc:320V,3P+NPE	1
15	ACDB with Outdoor Housing with MCCB MCCB 100Amps	1
16	Solar Check Meter	1
17	GI strip 30X3 mm	100
18	Supply and Laying of 100x55 x3.9m mm wire mesh cable tray with all accessories like bend, tee, elbow, clamp, cover etc. for DC stringing	100
19	For fixing and installation of solar check meter within building	1

Part-B

S.No.	Item & Description	Qty
1	Panasonic HIT Panel 325 watt Providing ,fixing,testing and commissioning of HIT MODULES 325 Watt PV CELLS on the ms structure as per norms	308
2	Providng ,fixing,testing and commmissiong of INVERTERS for thesame solar system as per Norms(Core 2)	1
3	DC cable 4 Sqmm with Cable routing with Wiremesh Cable tray with cover, bend and other accessories	2,000.00
4	DC cable 6 Sqmm with Cable routing with Wiremesh Cable tray with cover, bend and other accessories	400
5	supply and laying of AC armoured CABLES complete with cableend terminations as required as per norm4Cx 120 mm² AL	60
6	CABLE TRAY Wiremesh type cable tray of GI with accessories. 100X55 mm * 3.9 mm wire gauge for sprinkler system	230
7	CABLE TRAY Perforated type cable tray of GI with coupler plates 200X60mm * 0.6 mm thick for AL armoured cable routing	50
8	SPRINKLER TYPE MODULE CLEANING SYSTEM complete with CPVC piping with accessories and water pump of 2HP(2nos) to be attached with the structure of the module etc. complete	1
9	Supply ,fixing , testing and commissioning of Interceptor rod type LIGHTING ARRESTOR complete as per norms.As per IEC 62305.	2
10	Earthing Kit - 25 mm dia. CU bonded (250 micron), 3mtr long, UL listed (Chemical Earthing with Clamps) with Accesseries Providing and laying of required EARTHING SYSTEM for whole solar systemGI /Copper (GI earthing for equipment & structure, Cu earthing for from module to module with complete earth pits per requirements and as per norms)OBO	4
11	Solar Mounting Structure With Accessories Providing ,fabrication and fixing of Hot dipped GI STRUCTURES with 80- 120 micron zinc coating capable of withstanding wind speed of 170km/hr plus Accessories and including civil work as required etc in all respects complete	4,500.00
12	Supply and laying of Armoured fiber cables end terminations as required as per norms. Make D-Link	120
13	Supply for Smart DCDB Monitoring Box 24 IN 24 OUT PANEL as per given BOM 12 nos SPD Type 1+2, Class B+C Solar 1000 DC SPD, with remote signaling contact(OBO) plus SPD for SMC card, Fuse plus holder (Mersen), Power Supply(230 AC, O/p 12/24 DC) Omoron,String Monitoring card(Kernel),Terminals(Connect well),End stopper(Connect well), Gland(OBO),Transparent Box(IP65)(RSS/HENSEL)	1
14	AC Combiner Box with outdoor Housing with 1 nos 200 Amps MCCB(Schenider/L&T) AL bus bar etc. complete (IP 65) with Class B+C SPD for Power line protection, Uc:320V,3P+NPE	1
15	ACDB with Outdoor Housing with MCCB MCCB 200Amps	1
16	Solar Check Meter	1
17	GI strip 30X3 mm	150
18	Supply and Laying of 100x55 x3.9m mm wire mesh cable tray with all accessories like bend, tee, elbow, clamp, cover etc. for DC stringing	200
19	For fixing and installation of solar check meter within building	1