

No.: ICSI/INFRA/SOLAR

Date: 10.02.2021

**TENDER DOCUMENT
VOL I
(TECHNICAL BID)**

**DESIGN, SUPPLY, INSTALLATION & IMPLEMENTATION OF 8 KW ON-GRID
(GRID CONNECTED) ROOF TOP SOLAR PV SYSTEM**

AT

**ICSI MYSURU CHAPTER
125, NATIONAL HOUSING CO-OPERATIVE SOCIETY LIMITED LAYOUT
OPP. J K TYRES LTD., OFF. KRS ROAD,
MYSURU,
KARNATAKA- 570016**

Pages – (1 – 38)



**THE INSTITUTE OF
Company Secretaries of India**
भारतीय कम्पनी सचिव संस्थान
IN PURSUIT OF PROFESSIONAL EXCELLENCE
Statutory body under an Act of Parliament
(Under the jurisdiction of Ministry of Corporate Affairs)

INDEX

SR. NO.	DESCRIPTION		PAGES
TECHNICAL BID			
1	Section – I	Notice Inviting Tender	3-3
2	Section - II	Salient Features of Tender	4-6
3	Section –III	Instruction to Tenderers	7-9
4	Section- IV	Eligibility	10
5	Section – V	General Condition of Tender	11-19
6	Section –VI	Special Condition of Tender	20-23
7	Section –VII	Technical Specifications	24-36
8	Section – VIII	List of Makes	37-37
9	Section – IX	Bidders Declaration	38-38

SECTION I
NOTICE INVITING TENDER

The Institute of Company Secretaries of India (ICSI), invites tender from the prospective/Eligible Bidders for Design, Supply, erection, testing, commissioning & Implementation of 8 KW (Approx.) Grid Connected Roof Top Solar PV System at Institute's Building Mysuru Chapter 125, National Housing Co-operative Society Limited Layout Opp. J.K. Tyres Ltd., Off. KRS Road Mysuru- 570016, having approximate clear Roof Top Area of 1160 Sq.ft. (Approx.), having similar work experiences and credentials.

Sl. No.	Particulars	Data
1	Name of Work	Design, Supply, erection, testing, commissioning & Implementation of 8 KW (Approx.) Grid Connected Roof Top Solar PV System at Institute's Building Mysuru Chapter 125, National Housing Co-operative Society Limited Layout Opp. J.K. Tyres Ltd., Off. KRS Road Mysuru- 570016.
2	Estimated Cost	Rs. 3,60,000/-
3	Period of Completion	45 Days
4	Cost of tender (Non-Refundable)	Rs. 500/-
5	Earnest Money Deposit (Refundable)	Rs. 7,200/-
6	Last Date & Time for Submission of tender	03 rd March, 2021 upto 3:00 PM
7	Pre-Bid Meeting	18 th February, 2021 at 2:30 PM either physically or through VC (VC link Will be published on Institute's website).
8	Date of Opening of Technical Bid	03 rd March, 2021, 4:00 PM

Bidder shall submit bid proposal along with the cost of tender document (non-refundable) & Earnest Money Deposit (refundable) complete in all respect as per the Bid Information sheet. The technical bids will be opened in presence of authorized representatives of bidders/ applicants, who wish to be present.

Bid documents, which include Volume I: Technical Bid (Notice Inviting Tender, Eligibility criteria, "Technical Specifications", various conditions of contract, formats, etc.) and Volume II (Financial Bid), which can be downloaded from website <https://www.icsi.edu/tenders/>.

Any amendment (s)/corrigendum/clarifications with respect to this Bid shall be uploaded on Institute's website only. The Bidder should regularly visit/ follow up for any Amendment/Corrigendum/Clarification on the above website.

Incomplete tender document Bid proposals received without or lesser than the prescribed Documents, Information, Cost of Tender Document, EMD will not be considered. In the event of any date indicated above is a declared Holiday, the next working day shall become operative for the respective purpose mentioned herein.

**The Chairperson,
Mysuru Chapter
The ICSI**

SECTION- II
SALIENT FEATURES OF THE TENDER

1.	Type of Contract	Item Rate Basis
2.	Validity of offer	60 days from the date of opening of the offers. The same may be extended for a further period of 60 days with concurrence of the Tenderers.
3. i)	Earnest Money Deposit (Refundable)	Rs. 7,200/- by Demand Draft (DD) / pay order drawn in favour of Mysore Chapter of ICSI , payable at Mysuru
ii)	Cost of Tender documents (Non-refundable)	Rs. 500/- by DD/pay order drawn in favour of Mysore Chapter of ICSI , payable at Mysuru
4.	Eligibility	As per Section IV
5.	Place of submission / opening of bids	Mysuru Chapter 125, National Housing Co-operative Society Limited Layout Opp. J.K. Tyres Ltd., Off. KRS Road Mysuru- 570016
6.	Mode of submission of Tender documents	May be submitted by hand or through Post/Courier so as to reach before the due date & time
8.	Mobilization advance	No mobilization advance.
9.	Period of completion	45 Days time for completion of Work from 7 th day of award of work.

10.	Payments Terms	<p>a. 60% of the total contract price after delivery of materials such as Solar Panels, Array structure etc. at site on pro-rata basis against the purchase invoice.</p> <p>b. 30% of the total contract price after complete Supply, installation, testing, commissioning and handing over of the system, and submission of g documents like warranty/ Guarantee certificates of solar modular's, Inverter, structure stability certificates, SLD diagrams, products manuals etc.</p> <p>c. Balance 10% to be retained till expiry of defect liability period or same may be refunded against equivalent amount of bank guarantee valid for a period of sixty days beyond the date of completion of all contractual obligations (i.e., defect liability period of 1 year from the completion of entire work).</p>
11.	Minimum value of Running Bill	Rs. 2 Lakh
12.	Period of honoring of certificates	21 days from the date of joint verification and certification of bill.
13.	(a) Defect Liability period	12 months from the date of testing, commissioning and handing over of the system.
14.	(b) Warranty of Solar Panels (c) Warranty of Inverter	Minimum 25 Years Minimum 5 Years
15.	Liquidated Damages	0.5% per week or part thereof for delay beyond the stipulated completion period subject to the maximum of 10% of total Contract Price.
16.	Language for communication	English
17.	Insurance, Custom Duties, GST & any other applicable taxes	To be provided and paid by Contractor (price quoted during Tender submission to include all applicable taxes) i.e., net to the Institute.
18.	Assignment & Subletting	Not allowed
19.	Rates of B.O.Q's items	To be quoted all inclusive and including all materials, applicable taxes, GST, charges, surcharges, royalties etc.
20.	Period of submitting final bill by Contractor	One (1) month from the date of completion
21.	Labour-Cess	As per applicable laws of local statutory / Govt. Authority to be submitted directly by the Contractor.

22.	Water and Electricity	Water & Electricity required for the Installation will be provided at single point by Owner, free of cost. The Contractor shall make his own arrangements for required distribution for work meeting the safety regulation as per statutory requirement. Backup power in the form of DG set may be arranged by the contractor.
23.	Income tax/GST deduction	At prevailing rates from each bill
<p><u>Important Note:</u> Prospective Bidders are requested to remain updated for any notices/amendments/clarifications etc. to the Tender document through the website</p> <p>No separate notifications will be issued for such notices/amendments/clarification etc. in the print media or individually.</p>		

SECTION- III
INSTRUCTIONS TO THE TENDERER

Sealed Tenders are invited from eligible/prospective Contractors for Design, Supply, erection, testing, commissioning & Implementation of 8 KW (Approx.) Grid Connected Roof Top Solar PV System at Institute's Building Mysuru Chapter 125, National Housing Co-operative Society Limited Layout Opp. J.K. Tyres Ltd., off. KRS Road Mysuru-570016. The last date of receipt of the offer in a sealed envelope addressed to

The Chairperson, Mysuru Chapter
The Institute of Company Secretaries of India,
125, National Housing Co-operative Society Limited
Layout Opp. J.K. Tyres Ltd., Off. KRS Road
Mysuru- 570016,

Super scribing "Offer for Design, Supply, Installation & Implementation of Grid Connected Roof Top Solar PV System at Mysuru Chapter of ICSI" through Registered Post/Speed Post/courier is on or before 03rd March, 2021 till 3:00 PM and the same may be also dropped before the aforesaid cut-off date & time in a sealed tender box kept in the Reception of above mentioned Office along with prescribed Earnest Money Deposit (refundable) and cost of tender documents (non-refundable) as per the details mentioned in the tender documents.

The Sealed envelope (containing sealed envelope-1 and envelope-2) shall contain following documents:

Envelope 1 –

- Technical Bid (duly filled up, signed and stamped on each page).
- Prescribed EMD and Cost of Tender Paper.
- Prescribed Enclosures.
- Documents showing relevant work experience in last 5 years.
- Authorization Letter of Signatory, as and if applicable.

Envelope 2 –

- Financial Bid – Duly filled up BOQ along with Time-line for Completion of Work sign and stamped on each page

1. Each of the tender documents are required to be signed by the person or persons submitting the tender in token of his/ their having acquainted himself/ themselves with all the conditions/ specification, as laid down. Any tender with any of the document not so signed may be rejected.
2. **The Technical clarification, if any required, may be obtained from the Asst. Engineer (Construction), Dte. of Infra., ICSI (P.no.011-45341041) on any working day during normal working hours i.e. 9:00 AM to 5:30 PM. The bidder may visit the site on any working days in coordination with Office-In-Charge – Mysuru Chapter (Mr. N. Dhanabal) (Contact No. 0821-2516065).**
3. **The Queries related to the tender may be sent through email on email ID mysuru@icsi.edu. The queries will be addressed during the Pre-Bid meeting scheduled on 18th February, 2021 at 2:30 PM.**

4. The party submitting the tender must obtain for himself on his own responsibility and expenses all the information, which may be necessary for the purpose of filling this tender and for entering into contract for the execution of the same and must examine and inspect the site of the work to get acquainted with all local conditions and matters pertaining thereto.
5. Any additions and alternations made in filling the tender must be attested and counter-signed by the tenderer. Over-writing of figures is not permitted. Failure to comply with either of these conditions will render the tender invalid. No request, advice or any change in rates or conditions after submission of the tender will be entertained.
6. The tenderers shall submit Earnest Money Deposit (EMD) of Rs. 7,200/-in the form of Demand Draft drawn in any of the Nationalized / Scheduled Bank in favour of **Mysore Chapter of ICSI, payable at Mysuru**. The EMD of the unsuccessful tenderers will be refunded without any interest within 30 days, subsequent to decision of awarding the Contract. Any tender not accompanied by the requisite Earnest Money in Demand Draft will not be considered and shall stand rejected. It may be noted that conditional Tender shall be summarily rejected. The EMD of the Tenderer shall be forfeited in the following circumstances:-
 - (i) The Tenderer withdraws his bid;
 - (ii) The Tenderer either fails to start the work within period of 7 calendar days or after the receipt of letter of acceptance of tender or the Work Order;
 - (iii) The Tenderer fails to supply materials / deliver services as per the terms and conditions of the Tender and Purchase / Work Order.
 - (iv) Any other justified reasons e.g. misleading or wrong information in the Bid, violation of the terms and conditions of the tender, involvement in forming ring / cartel, submission of multiple bids in different names etc.
7. The successful tenderers shall within 3 (working) days of the receipt of work-order from Institute shall give written acceptance of the work-order and commence the work immediately after receipt of Work-Order.
8. All compensations or other money payable by the Contractor to ICSI under the terms of this contract may be deducted from the Security Deposit or from any sum that may be or may become due to the Contractor on any account whatsoever and in the event of the Security Money being reduced by reason of any such deductions the Contractor shall within 7 days of being asked to do so make good in cash or cheque any sum or sums which have been deducted from his Security money.
9. In case, where the same item of work is mentioned at more than one place in the Schedule of quantities, the lowest of the rates quoted by the Contractor for the item shall be taken for the payment of that item.
10. ICSI shall have the right to assess the competencies and capabilities of the tenderer(s) by going through the credentials given in the Technical Bid and on the basis of such credentials, the ICSI may reject the candidature of the tenderer without assigning any reason and decision of the ICSI shall be final. In such case(s) the Financial Bid shall not be opened for that particular tenderer.
11. The acceptance of tender shall rest with the ICSI. ICSI does not bind itself to accept the lowest tender and reserves to itself the right to reject any or all the tenders received without assigning any reason(s) whatsoever and any notice to

tenderer(s). Non acceptance of any tender shall not make the ICSI liable for compensation or damages of any kind. ICSI further reserves the right to accept a tender other than the lowest or to annul the entire tendering process with or without notice or reasons. Such decisions by ICSI shall be final and shall not attract any liability whatsoever consequent upon such decisions.

12. The Financial Bids of only those parties who qualify in the technical evaluation/scrutiny shall be opened and scheduled time and date for opening the Financial Bids shall be communicated separately to all qualified bidders.
13. ICSI reserves the right of accepting the tender in whole or in part without assigning any reason and such decision shall be final. The part acceptance of the tender shall not violate the terms and conditions of the tender and contract and the tenderer shall execute the work at the specified rates without any extra charges or compensation within the stipulated period.

**The Chairperson,
Mysuru Chapter
The ICSI.**

SECTION – IV

ELIGIBILITY OF TENDERER

A. QUALIFICATION REQUIREMENTS

1. The Bidder should be a body incorporated in India under the Companies Act, 1956 or 2013 including any amendment thereto and engaged in the business of Solar Power **(A copy of certificate of incorporation shall be furnished along with the bid in support of above).**
2. The Contractor shall be registered / empanelled with MNRE and/or any of the Central and/or State Solar Nodal Agency.
3. The Contractor should have valid GST Registration Certificate.
4. The Bidder should have installed & commissioned at least one Grid connected Solar PV Power Project having a capacity of not less than 8 kW in last 5 years, which should have been commissioned at least six months prior to last date of submission of present Tender Documents. The list of projects commissioned in last 5 years at least 6 months prior to the last date of submission of Present Tender Documents, indicating whether the project is grid connected, along with a copy of the Commissioning certificate and Work order / Contract / Agreement/ from the Government Bodies and/or reputed Client/Owner (Companies, Organizations, Firms etc.) shall be submitted.
5. The tenderer shall be financially sound and should have achieved an average annual financial turnover of Rs. 4 Lakh in last three consecutive financial years ending on 31.03.2020.

B. DOCUMENTS REQUIRED TO BE SUBMITTED FOR ELIGIBILITY

The Tenderer shall submit documents in respect of possessing Qualifying requirements as under duly certified and stamped by his authorized signatory:

- a) A copy of certificate of incorporation shall be furnished along with the bid in support of above
- b) GST Registration Certificate.
- c) List of Jobs undertaken with details and value meeting the above conditions.
- d) Copies of work orders issued by reputed Organization/Firm/Institute(customers)
- e) Copies of completion certificates issued by customers.
- f) Copies of audited profit and loss accounts accompanied by relevant schedules for turnover figures.

SECTION - V

GENERAL CONDITIONS OF CONTRACT

1. DEFINITIONS:

- (a) "Owner/Institute" Shall mean **Institute of Company Secretaries of India** having its Head Office at **ICSI House, 22, Institutional Area, Lodhi, New Delhi 110003** and shall include its legal Representative(s) / assign(s) or authorized officer.
- (b) "Engineer-inCharge" Shall mean the Technical/representative of the ICSI designated to Supervise the work from time to time.
- (c) "Contractor" Shall mean the individual or firm or company, undertaking the work and shall include legal personal representatives of such individual or the persons comprising such firm or company or the successors of such individual or firm or company and the permitted assignee of such individual or firm or company.
- (d) "Contract" Means the documents forming the tender (both Technical and Financial bid) and Work Order/ acceptance thereof and the formal agreement executed between the competent authority on behalf of The Secretary, ICSI House, 22, Institutional Area, Lodhi Road, New Delhi-110003, and the Contractor, together with the documents referred to there in including these conditions, the specifications, designs, drawings and instructions issued from time to time by the Engineer-In-Charge/ and all these documents taken together, shall be deemed to form one contract and shall be complementary to one another.
- (e) "**B.I.S**" Shall mean specifications of Bureau of Indian Standards(BIS);
- (f) "**Bid**" Shall mean the Techno Commercial and Price Bid submitted by the Bidder along with all documents/credentials/attachments annexure etc., in response to the Tender Notice, in accordance with the terms and conditions hereof.
- (g) "**Capacity Utilization Factor**"(CUF) shall mean the ratio of actual energy generated by SPV project over the year to the equivalent energy output at its rated capacity over the yearly period. $CUF = \frac{\text{actual annual energy generated from the plant in kWh}}{\text{(installed plant capacity in kW * 365 * 24)}}$.

In the contract, the following expressions shall, unless the context otherwise requires have the meanings, hereby respectively assigned to them:

- i. The expression works or work shall, mean and include works mentioned under head Scope of Work.

- ii. The site shall mean Institute's Building Mysuru Chapter 125, National Housing Co-operative Society Limited Layout Opp. J.K. Tyres Ltd., off. KRS Road Mysuru- 570016.
- iii. Schedule(s) referred to in these conditions shall mean the relevant schedule(s).
- iv. Tendered Value means the value of the entire work as stipulated in the letter of Intent/award of work.

2. SCOPE OF WORK:

Design, Supply, erection, testing, commissioning & Implementation of 8 KW (Approx.) Grid Connected Roof Top Solar PV System at Institute's Building Mysuru Chapter 125, National Housing Co-operative Society Limited Layout Opp. J.K. Tyres Ltd., off. KRS Road Mysuru-570016, having approximate clear Roof Top Area of 1160 Sq.ft. (Approx.) and allied works.

The above mentioned scope of work shall include followings:

- a) Design (i.e. layout, orientation, single-line-diagram etc.) of Roof Top Solar PV System based on the feasibility study including structural design certificate of the site and submitting the shop drawing for Institute's approval.
- b) Supply, erection, testing and commissioning & Implementation including warranty of 8 KW (and/or subject availability of clear roof area excluding area to be left for circulation) Grid Connected Roof Top Solar PV System.
- c) The systems shall be complete with PV modules, inverter, metering, junction boxes, AC, DC distribution boards and cables, communication interface, and any other equipment necessary for safe and efficient operation of the system.
- d) The work shall also include interconnection of PV system with the existing grid supplying power to the building.
- e) The civil works for installation of complete system shall also be in scope of Contractor including Enclosing of the base of pedestal by a Concrete block of required size with proper anchoring, to ensure better stability of the system and water-proofing of the roof by the vendor.(note the Contractor shall ensure that there is no damage to the Water-proofing of the Roof).
- f) The equipment offered shall conform in all respects to high standards of engineering, design and workmanship and be capable of performing in commercial operation up to Bidder's guarantee in a manner acceptable to Institute, who will interpret the meaning of drawings and specifications and shall have the power to reject any work or materials, which in his judgment are not in full accordance therewith.
- g) It shall be the responsibility of the Bidder to ensure that all the works as per scope of the specification are completed for safe and efficient working of the system.
- h) All the necessary co-ordination with regard to sub-contracted items (if any) shall be carried out by the Contractor. The Institute will communicate only with the Contractor for all matters pertaining to this contract.

- i) Considering the reliability of the grid, no electrical storage batteries are envisaged as excess electricity generated by the solar panels, which is not required by the equipment/devices in the building premises, shall be exported to the grid.
- j) Obtaining No Objection Certificate (NOC) from Electrical Distribution Company/Authority (DISCOM) or other Authority for the Solar Power System, wherever applicable.
- k) Cleaning the site after completion and removal of malba / debris from the site with his own arrangement and cost.
- l) Structural stability certificate issued by the vendor that system has been designed & installed as per MNRE guidelines and the structure can withstand wind load of 150 kmph or more as per the location/region.

3. CONTRACT VALUE:

The total Contract value for proposed work, mentioned under heading "Scope of Work", shall be the amount derived on the basis of the rates quoted by the Contractor in their Financial Bid.

The above contract amount is inclusive of all taxes (including GST and any applicable as per central & state government norms), and duties, mentioned here but not limited to, Customs, Excise, Countervailing duties with cess, Overall cess on Duty component, Port Clearance charges, Transit Insurance, Inland transportation, Loading, Unloading, levies, royalties etc. all at the rates prevailing on the date of opening of tender.

3. TIME OF COMPLETION:

Time is the essence of the Contract. The overall period for completion from the 7th day of issuance of work order is 45 days. No extension of time will be allowed for the completion of works in all respect.

The Contractor shall carry out and complete the work on the terms and conditions mentioned herein and contained in Contract, as per working drawings issued, and to the entire satisfaction of the Owner.

4. ESCALATION:

The rates quoted by the Contractor shall be firm till completion of project & no escalation of prices in material, labor or other inputs including taxes shall be payable to the contractor even if the contract period is extended by Owner for any reason whatsoever. However, quantities of items given in BOQ may vary and payment will be made as per actual quantity executed.

5. MOBILISATION ADVANCE:

No mobilization advance to be paid.

6. LIQUIDATED DAMAGES:

In case of delay in completion of work beyond scheduled period, Contractor shall have to pay penalty amounting to 0.5% of total contract price per week or part thereof for delay beyond

the completion period subject to the max of 10% of total Contract Price.

7. COMPENSATION:

Without prejudice to the foregoing, the Contractor shall be accountable and responsible to compensate and pay damages to ICSI for any loss/ damage/ claim/ liability, whatsoever, caused either directly or indirectly by the Contractor to the ICSI.

8. INDEMNITY:

Contractor shall be solely liable for and shall indemnify the Institute, its officers, employees, directors, consultants and agents (“Representatives”) against all liabilities, losses, claims and expenses of any nature whatsoever arising from any personal injury or illness (including death) of any nature whatsoever and any penalty, loss, damage or destruction to any property whether real or personal where such liability arises out of or in connection with the conduct of the Services whether under common law, under statute or otherwise.

9. SCHEDULE OF QUANTITIES:

The quantities of respective items mentioned in BOQ are indicative; the payment will be made as per actual quantities executed for respective items.

10. DISPATCH & TRANSIT INSURANCE:

All the materials required for the above mentioned scope of work are to be dispatched and delivered at above mentioned site with own arrangement of transportation including loading, unloading and transit insurance by the Contractor. No extra cost will be paid in this regard.

11. MATERIALS:

All material shall be as per the specifications mentioned in the tender documents and manufacturer’s test certificates for the same shall be provided whenever required. A record of all tests should be duly entered in appropriate registers and shall be available at all times for inspection by Owner.

12. SCHEDULE OF PAYMENT(A)

The payment will be in accordance with the actual quantities executed, based on the measurements as certified by the Engineer-in-Charge/ representative of owner and will be released as running bills as under and minimum value of each Running Bill should not be less than of Rs. 2,00,000/-). Payment will be made as under:

- a) 60% of the total contract price after delivery of materials such as Solar Panels, Array structure Etc. at site on pro-rata basis on submission of purchase invoices supplied items supplied along with the Bill raised to the Institute.

- b) 30% of the total contract price after complete Supply, installation, testing, commissioning and handing over of the system and submission of documents like warranty/ Guarantee certificates of solar modular's, Inverter, structure stability certificates, SLD diagram, products manuals etc.
- c) Balance 10% of the total cost of equipment is to be retained till expiry of warranty/ defect liability period or same may be released against equivalent amount of bank guarantee valid up to one year from the date of commissioning and handing over.

13. SECURITY OF MATERIALS:

Contractor shall be solely responsible for the physical security of materials at site including the materials procured by Owner directly (if any) and issued to Contractor. Any loss or damage to materials lying at site caused by theft, and riots, weather, accident, fire, rain, flood etc. will be entirely to Contractor's account and Contractor shall make good, the value of such loss to the Owner. Contractor at their own cost shall take all necessary steps to ensure protection of material lying at site, provision of security guards, and appropriate storage space etc.

14. NON-TENDER ITEMS:

Owner shall have the right to add / change / delete any item at their absolute discretion. Payment for Non-Tender Items shall be made on the basis of Rate Analysis to be submitted by the Contractor along with original proof of purchase.

The Contractor shall be paid actual cost for labour and material plus 15% (towards incidental charges, overheads & profits) for Non-tendered Items based on approval of Rate Analysis by the Owner. WCT/GST on work contract is to be paid on these items, as per prevailing statutory rates.

15. QUALITY ASSURANCE:

Contractor is expected to perform work of high standard and quality. Contractor shall perform quality checks as per standard engineering practice. Periodic reports shall be generated and / or as advised by Owner required in adherence to good engineering practice.

All works shall be carried out as per specifications, B.O.Q & drawings. In case of any ambiguity, decision will be given by Owner base as relevant IS codes.

In case the works carried out by Contractor are found to be of unacceptable quality, Owner shall order dismantling of such defective works and advise contractor to carry out quality work to the entire satisfaction of the Owner without affecting the contract value or contract time. No payment will be made over and above the rates in the Bill of Quantities for such re- work. Owner reserves the right to get defective work removed or rectified through other agencies & recover the cost thereof from the Contractor's dues.

16. SAFETY:

Contractor shall have to provide all required safety accessories i.e. safety helmet, safety belt etc. to his workers while working at height with his own cost and follow all safety rules regulation and all statutory provisions etc. in force. He shall be liable for accident, injury,

negligence, losses due to any act or omission causing accident of his workers and he shall be liable to incur all the expenses in consequence thereof and Owner is in no way responsible for any damages/ compensation arising out of this work contractor.

Contractor shall indemnify and hold Owner harmless from and against any liability, penalty, cost or expense suffered or incurred as a result of Contractor failing to comply with any law, or regulation, or such permit or license relating to any part of the Work and Services.

17. RECTIFICATION OF DEFECTS

If, it shall appear to the Owner or his representative in-charge of the works that any work has been executed with unsound, imperfect or un-skillful workmanship or material or any inferior description, the contractor shall, on demand, in writing from the Owner, specifying the work material or articles complained of shall rectify or remove the defect so specified in part, as the case may require.

18. DEFACEMENT

If the contractor or his staff, or labors shall break, deface, injure, or destroy any part of a building, or interiors, then the contract or has to rectify the same part at his own expenses to the satisfaction of the Owner.

19. EMERGENCIES:

In any emergency affecting the safety of persons or property, Contractor shall act, at their discretion to prevent threatened damage, injury or loss but at the same time safeguarding the interest of the Owner and the project.

20. SUB-LETTING/ASSIGNMENT:

The contract or shall not sub let or assign the whole or part of the works except where otherwise provided, by the contract and even then only with the prior written consent of the Owner and such consent if given shall not relieve the contractor from any liability or obligation under the contract and he shall be responsible for the acts, defaults or neglects of any sub-contractor, his agents, workman as full as if they were the acts, defaults or neglects of the contractor, his agent, workman provided always that the provision of labour on piece work basis shall not be deemed to be a subletting under this clause. However, nothing in the foregoing shall be affected in the event of there being a merger, amalgamation or takeover of the business/ management of a party. In such an eventuality all the rights and obligations shall automatically be vested with the entity with which such party has been merged or is taken over.

21. INSPECTION AND TESTING:

The Institute may at its discretion carry out the inspection of ongoing work by the Contractor, to check whether the services are in conformity with the terms mentioned in the Agreement or not and the contractor agrees to provide all needful assistance to the staff/officers/ representatives of the Institute for the said inspection and testing.

22. WATER SUPPLY & ELECTRICITY:

Water & Electricity required for the Installation will be provided at single point by Owner free of cost. The Contractor shall make his own arrangements for required distribution for work meeting the safety regulation as per statutory requirement.

23. SECURITY DEPOSIT:

a. Earnest Money Deposit and Retention Money

The Earnest Money deposited and total retention money retained will be treated as Security Deposit and the same will be retained till completion of defect liability period of 12 months. 50% of the total security deposit shall be released after completion of 6 months from the date of commissioning and handing over the system and balance 50% after completion of balance 6 months of defect liability period. The same may be refunded against equivalent amount of bank guarantee valid for a period of sixty days beyond the date of completion of all Contractual obligations.

Whenever under the agreement, any sum of money is recoverable from and payable by the Contractor, the Owner shall have right to recover such sum by appropriating in part or in whole from the security deposits. In the event of the security deposit being insufficient, the balance or the total sum recoverable, as may be, shall be deducted from any sum due to the Contractor or which at any time thereafter may become due to the Contractor under this or any other agreement with the Owner. If this sum is not sufficient to cover the full amount recoverable, the Contractor shall pay the Owner on demand the remaining amount.

b. Forfeiture of Security Deposit

The above said security deposit shall be liable to forfeiture wholly or in part at the sole discretion of the Owner if the Contractor fails to carry out the work or perform or discharge its obligation or observe any of the terms/conditions/clauses of the contract or tender document.

c. Interest on the Security Deposit

No interest would be payable by the Owner to the Contractor on the security held in deposit.

24. FORCE MAJEURE:

Except to the payment obligations of the Institute, neither Party shall be liable for any failure to perform, any of its obligations under this Agreement and any work / purchase order, if the performance is prevented, hindered or delayed by a Force Majeure event (defined below) and in such case its obligations shall be suspended for so long as the Force Majeure Event continues. Each party shall promptly inform the other of the existence of a Force Majeure Event within a period of three (3) days from date of happening of such an event requiring invocation of this force majeure event article. Unless otherwise directed by Institute in writing, the Service Provider will continue to perform its obligations under this order so far as is reasonably practical and seek all reasonable alternative means for performance of this order and shall consult together to find a mutually acceptable solution.

25. BLACKLISTING:

Notwithstanding any other remedy available in this Agreement, the Institute by notice in writing and after providing an opportunity of being heard, may blacklist the Service Provider for suitable period in case Service Provider (a) fails to discharge its obligation including providing Services not as per specifications within the time schedule ordered under this Agreement or respective Statement of Work, without sufficient grounds; or (b) Adoption of any unethical or illegal practices in delivery of its Services; (c) Any indiscipline behavior or hooliganism by the Service Provider or any of its employee(s) during the provision of Services to the Institute. The EMD/ Security Deposit/ Bank Guarantee provided by the Service Provider shall be forfeited after providing an opportunity of being heard and the reasons thereof.

26. COMPLIANCE OF LABOURREGULATIONS:

Contractor shall comply with all laws applicable to workmen employed by them and the rules framed there under. The Owner shall in no event and under no circumstances, be liable or responsible for any default by way of non-observance/compliance of the said law/rules on the Contractor's part and Contractor shall further indemnify Owner against any liabilities and costs/expenses from all proceedings in respect thereof. Contractor shall obtain at his cost all permissions and licenses under various statutes for carrying on their activities and any default in the same would render this Contract void apart from making Contractor liable to Owner towards all costs.

27. COMPLIANCE WITH STATUTORY REGULATIONS &WORK RULES:

Contractor shall be responsible for complying with the applicable laws/bye laws/Regulations in force from time to time. Contractor shall have to bear all statutory liabilities (including safety of its workers / personnel) as applicable to workers/personnel engaged for the job. Nothing will be paid extra in this regard. If any amount is paid by Owner in this regard, the same amount will be deducted from Contractor's bill. Contractor shall have to arrange insurance cover for the workers/personnel engaged for the job. Contractor shall be responsible for all the dues of the workers/personnel engaged including the liabilities, if any, towards workmen compensation or under any other law.

28. DISPUTERESOLUTION:

Any dispute, difference, controversy or claim ('Dispute') arising between the Parties out of or in relation to or in connection with this Contract / Agreement, or the breach, termination, effect, validity, interpretation or application of this Contract / Agreement or as to their rights, duties or liabilities hereunder, shall be addressed for mutual resolution by the authorized official of the parties. If, for any reason, such Dispute cannot be resolved amicably by the Parties, the same shall be referred to the Sole Arbitrator appointed by the Secretary of the Institute of Company Secretaries of India. The provisions of the Arbitration and Conciliation Act, 1996 or any statutory modifications on re-enactment thereof as in force will be applicable to the arbitration proceedings. The venue of the arbitration shall be at New Delhi. The cost of the Arbitration proceedings

shall be shared equally by both the parties. The language of the arbitration and the award shall be English. The decision / award of the arbitrator shall be final and binding.

29. TERMINATION:

The Institute without prejudice to any other remedy, reserves the right to terminate the agreement immediately by giving notice in writing in case contractor fails to perform its obligation under this Agreement or found guilty for breach of any condition(s) of the agreement, from date of receipt of notice of such breach, negligence, carelessness, inefficiency, fraud, mischief and misappropriation or any other type of misconduct by Service Provider or by its staff or agent.

SECTION - VI
SPECIAL CONDITIONS OF CONTRACT

1. Notice of Operation

The work is to be executed in the fully Operational building, thus the work shall be executed in the co-ordination of the Administrative department of the Building in order to ensure trouble free Functioning of the Office. The Contractor shall not carry out any important operation without the consent in writing of the Owner. Contractor shall ensure that no hindrance to be created in normal functioning of the Institute while execution of its work.

2. Safety of adjacent Structures

The Contractor shall protect efficiently all work done in the building structures and provide protective guards and all required measures

3. Office Accommodation for Contractor

The Contractor shall provide & maintain all necessary site office space, stores, for themselves and their staff at Project site with the approval of the Owner.

4. Facilities for Contractor's Employees

The Contractor shall make his own arrangement for the housing and welfare of his staff and workmen including adequate drinking water and sanitary facilities. The Contractor shall also make his own arrangements at his own cost for transport where necessary for his staff and workmen to and from the Sites of the works. The necessary drinking water and sanitary facilities for Owner's & Owner's representative, contractor's staff & labour & visitors at site shall be provided and maintained by the contractor at no extra cost.

5. Lighting for Works

The Contractor shall at all times provide adequate and approved lighting as required for the proper execution and supervision & inspection of the works.

6. Disposal of Refuse etc.

The Contractor shall cart away from site all refuse/malba/ waste material, etc. arising from the Works both as it accumulates, at completion of the Works or at the direction of the Owner.

7. Contractor to verify site Measurements

The Contractor shall check and verify all site measurements whenever requested by other specialists, Contractors or by nominated or other sub-contractors to enable them to prepare their own shop drawings and pass on the information with sufficient promptness, as will not in any way delay the works. A copy of all such information passed on shall be given to the Owner.

8. Approved Makes / Agencies

The Contractor shall provide all materials from the list of approved makes and also appoin the specialist agency from the approved list as provided in the Tender. Owner will approve make / agency as selected by the contractors within the approved list after inspection of their samples / and there compliance to Technical Specifications / B.O.Q. items and after ascertaining their spare capacities and recent past performances. In case the materials are not in conformity with BOQ & Technical Specification though it is in approved list or for Aesthetic reason, Owner may select the other approved makes

9. As Built Drawings / Documents / Shop Drawing

(a) Shop drawings prepared by the Contractor:

The contractor shall prepare the shop-drawings based on the design prepared on the feasibility study of the site and obtain approval from the Owner for implementation of the same. After the completion of work, the Contractor is required to submit As Built Drawings for the will modify the drawing prepared by him wherever any changes are made consequent to site decisions etc. as approved by the Owner.

(b) Documents:

Contractor shall submit documents like As Built Drawings, Maintenance and Operation Manuals, Literatures of various equipments, Guarantee etc. in bounded form in triplicate to Owner on completion of work, which will be construed as a condition for certify Final Bill.

10. Warranty Certificates

The Original Manufacturer's Warranty Certificates shall be on the name of Institute of all the supplied & installed items for which Warranty is applicable such as Solar Panels etc.

11. Procurement of Materials

The contractor shall make his own arrangement to procure all materials required for the work.

12. Taxes

The Contractor shall pay and be responsible for payment of all taxes, duties, levies, royalties, fees or charges in respect of the works including but not limited to GST, Excise duties and octroi, payable in respect of materials, equipment, plant and other things required for the Contract. All of the aforesaid taxes, duties, levies fees and charges shall be to the Contractor's account and Owner shall not be required to pay any additional or extra amount on this account.

13. Non-Assignability

This Contract & Benefits and Obligations thereof shall be strictly personal to the bidder bidding the bid and shall not on any account be assignable or transferable by the Bidder. Also, the Bidder will not be allowed to get the work executed on back to back basis through any other agency except for specialized works.

14. Scope of Work during Defect Liability Period & Comprehensive Annual Maintenance Contract

- I. Scheduled/ Preventive maintenance
- II. The contractor shall ensure trouble free operation of the solar PV plant system by undertaking scheduled maintenance of the plant as per the recommendations of the respective OEMs/vendors of component items. The components of the solar PV plant shall be checked for loose connection/heating and the same shall be rectified. Troubleshooting and repair of the solar PV plant shall be done by the contractor. The contractor shall submit a detailed PM schedule of the plant within 15 days of placement of PO. The schedule shall be approved by Institute before signing the contract.
- III. During the inspection/maintenance schedule, the equipment in the solar PV plant will be thoroughly checked for proper operation, cleaned and serviced.
- IV. Scope of regular maintenance work:

Periodicity of maintenance: Every month Maintenance work to be carried out

- a. The vendor will depute his Service team at least twice a month for cleaning and testing/ checking of the solar system.
- b. Cleaning of solar PV modules/arrays monthly with water*
- c. Checking and tightening all wiring connections in PV arrays and electrical cables in PCU, earthing and lightning protection system
- d. Checking of proper functioning of PCU and recording all parameters, including any Fault/incipient fault.
- e. Measurement of solar irradiation
- f. Troubleshoot faults, if any, and rectify the same- if the fault cannot be rectified, the maintenance team will inform Institute and contractor. Contractor will arrange for rectification of the fault with the help of OEM/expert. Spares for regular/breakdown maintenance will be in contractor's scope.

*** Note:**

- A) If the weather is dusty, cleaning of PV arrays more than twice every month is to be carried out as per instruction of engineer-in-charge of Institute. No extra charge can be claimed for this.
 - B) Water will be available free of cost from the installation. Any equipment viz. hose pipe, mops, pressure washer etc. will be in contractor's scope.
- V. In case of any faults/ other problems not directly connected to the solar PV plant, (for example, non-functioning of a light fitting in a room supplied with solar power), the same shall be reported to concerned electrical engineer/Junior Engineer/supervisor.
 - VI. The contractor shall check the solar PV plant for any damage and ingress of water.

- VII. Following reports shall be submitted by the contractor in hard copy during the periodic visits:
- a. Healthiness/problems of solar PV plant (as per solar PV plant OEM(s)' guidelines)
 - b. Operation checked status (of all components of the solar PV plant, changeover system etc.)
 - c. Report attended and action taken (in details) for malfunctioning solar PV plant.
 - d. Any other relevant point
- VIII. The starting date for annual maintenance service shall be the date on which the plant shall be handed over to Institute to their full satisfaction.
- IX. Any other points specifically not mentioned in the supply, installation and commissioning and annual maintenance services, but required for successful operation shall be in the scope of the contractor.

Any spares/serviceable parts/replacement parts required to put the defective plant back into service shall have to be supplied by the contractor without any cost to Institute.

15. Contractor to co-ordinate with other Contractors

Contractor shall have to co-ordinate with other Contractors (if any) employed by Owner for other works and for any dispute the same to be brought to the notice of Owner.

16. Suppliers /sub-contractors

Contractor shall provide the details of suppliers and sub-Contractors to the PMC / Owner as requested for any queries regarding quality aspects.

17. Mode of Measurements

Contractor will be entitled for the work as per actual measurement with mm accuracy only. If any discrepancy observed in the Bill of quantities shall be highlighted in the offer. Bills are admitted only by Joint Measurement Sheets only.

18. Housekeeping

Workmen are not allowed to take-up the work or leave the work without housekeeping and contractor should ensure that they doesn't spoil with gutka / khaini marks in the premises.

SECTION - VII
TECHNICAL SPECIFICATIONS

It has been proposed to setup a 8 KWp (estimated) grid interactive solar photovoltaic power plant (without battery back-up) at the Rooftop of Institute's Building Mysuru Chapter 125, National Housing Co-operative Society Limited Layout Opp. J.K. Tyres Ltd., off. KRS Road Mysuru-570016, the proposed project shall be commissioned as per the technical specifications given below.

A Grid Tied Solar Rooftop Photo Voltaic (SPV) power plant consists of SPV array, Module Mounting Structure, Power Conditioning Unit (PCU) consisting of Maximum Power Point Tracker (MPPT), Inverter, and Controls & Protections, interconnect cables and switches. PV Array is mounted on a suitable structure. Grid tied SPV system is without battery and should be designed with necessary features to supplement the grid power during day time. Components and parts used in the SPV power plants including the PV modules, metallic structures, cables, junction box, switches, PCUs etc., should conform to the BIS or IEC or international specifications, wherever such specifications are available and applicable.

Solar PV system shall consist of following equipment/components.

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

1. SOLAR PHOTOVOLTAICMODULES:

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

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

- a) The total solar PV array capacity should not be less than allocated capacity (kWp) and should comprise of solar crystalline modules of minimum **380** Wp and above wattage. Module capacity less than minimum **380** Watts should not be accepted.
- b) Protective devices against surges at the PV module shall be provided. Low voltage drop bypass diodes shall be provided.
- c) PV modules must be tested and approved by one of the IEC authorized test centers.
- d) The module frame shall be made of corrosion resistant materials, preferably having anodized aluminum.

- e) The bidder shall carefully design & accommodate requisite numbers of the modules to achieve the rated power in his bid. Owners shall allow only minor changes at the time of execution.
 - f) Other general requirement for the PV modules and subsystems shall be the Following:
 - I. The rated output power of any supplied module shall have tolerance of +/- 3%.
 - II. The peak-power point voltage and the peak-power point current of any supplied module and/or any module string (series connected modules) shall not vary by more than 2 (two) per cent from the respective arithmetic means for all modules and/or for all module strings, as the case may be.
 - III. The module shall be provided with a junction box with either provision of external screw terminal connection or sealed type and with arrangement for provision of by-pass diode. The box shall have hinged, weather proof lid with captive screws and cable gland entry points or may be of sealed type and IP-65 rated.
- IV. I-V curves at STC should be provided by bidder.

13. Modules deployed must use a RF identification tag. The following information must be mentioned in the RFID used on each module (This can be inside or outside the laminate, but must be able to withstand harsh environmental conditions).

- a) Name of the manufacturer of the PV module.
- b) Name of the manufacturer of Solar Cells.
- c) Month & year of the manufacture (separate for solar cells and modules)
- d) Country of origin (separately for solar cells and module)
- e) I-V curve for the module Wattage, I_m , V_m and FF for the module
- f) Unique Serial No and Model No of the module
- g) Date and year of obtaining IEC PV module qualification certificate.
- h) Name of the test lab issuing IEC certificate.
- i) Other relevant information on traceability of solar cells and module as per ISO 9001 and ISO14001

14. Warranties:

- i. Each solar PV module shall be warranted by the manufacturer with free replacement if the output under standard light condition falls more than 10% in first 10 (ten) years and 10% in next 15 (fifteen) years.
- ii. 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")
- iii. Defects and/or failures due to manufacturing
- iv. Defects and/or failures due to quality of materials
- v. Non conformity to specifications due to faulty manufacturing and/or inspection processes. If the solar Module(s) fails to conform to this warranty, the manufacturer will repair or replace the solar module(s), at the Owners sole

option

15. Performance Warranty:

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

2. ARRAYSTRUCTURE:

- a) Hot dip galvanized MS mounting structures to be used for mounting the modules/ panels/arrays. Each structure should have angle of inclination as per the site conditions to take maximum insolation. However to accommodate more capacity the angle inclination may be reduced until the plant meets the specified performance ratio requirements.
- b) The Mounting structure shall be so designed to withstand the speed for the wind zone of the location where a PV system is proposed to be installed. It may be ensured that the design has been certified by a recognized Lab/ Institution in this regard and submit wind loading calculation sheet to the Owner. Suitable fastening arrangement such as grouting and calming should be provided to secure the installation against the specific wind speed.
- c) The mounting structure steel shall be as per latest IS 2062: 1992 and galvanization of the mounting structure shall be in compliance of latest IS4759.
- 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 coating or anodization.
- e) The fasteners used should be made up of stainless steel. The structures shall be designed to allow easy replacement of any module. The array structure shall be so designed that it will occupy minimum space without sacrificing the output from the SPV panels
- f) Regarding civil structures the bidder need to take care of the load bearing capacity of the roof and need arrange suitable structures based on the quality of roof.
- g) The total load of the structure (when installed with PV modules) on the terrace should be less than 60kg/m².
- h) The minimum clearance of the structure from the roof level should be 300mm.

3. JUNCTION BOXES (JBs):

- a) The junction boxes are to be provided in the PV array for termination of connecting cables. The J. Boxes (JBs) shall be made of GRP/FRP/Powder Coated Aluminum /cast aluminum alloy with full dust, water & vermin proof arrangement. All wires/cables must be terminated through cable lugs. The JB's shall be such that input & output termination can be made through suitable cable glands.

- b) Copper bus bars/terminal blocks housed in the junction box with suitable termination threads Conforming to IP65 standard and IEC 62208 Hinged door with EPDM rubber gasket to prevent water entry. Single / double compression cable glands. Provision of earthings. It should be placed at 5 feet height or above for ease of accessibility.
- c) Each Junction Box shall have High quality Suitable capacity Metal Oxide Varistors (MOVs) / SPDs, suitable Reverse Blocking Diodes. The Junction Boxes shall have suitable arrangement monitoring and disconnection for each of the groups.
- d) Suitable markings shall be provided on the bus bar for easy identification and the cable ferrules must be fitted at the cable termination points for identification

4. DC DISTRIBUTIONBOARD:

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

5. AC DISTRIBUTION PANELBOARD:

- a) AC Distribution Panel Board (DPB) shall control the AC power from PCU/ inverter, and should have necessary surge arrestors. Interconnection from ACDB to mains at LT Bus bar while in grid tied mode.
- b) All switches and the circuit breakers, connectors should conform to IEC 60947, part I, II and III/ IS60947 part I, II and III.
- c) The changeover switches, cabling work should be undertaken by the bidder as part of the project.
- d) All the Panel's shall be metal clad, totally enclosed, rigid, floor mounted, air - insulated, cubical type suitable for operation on three phase / single phase, 415 or 230 volts, 50Hz.
- e) The panels shall be designed for minimum expected ambient temperature of 45 degree Celsius, 80 percent humidity and dusty weather.
- f) All indoor panels will have protection of IP54 or better. All outdoor panels will have protection of IP65 or better.
- g) Should conform to Indian Electricity Act and rules (till last amendment).

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

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

6. PCU/ARRAY SIZERATIO:

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

7. PCU/Inverter:

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

- Switching devices :IGBT/MOSFET
- Control : Microprocessor/DSP
- Nominal AC output voltage and frequency: 415V, 3 Phase, 50 Hz (In case single phase inverters are offered, suitable arrangement for balancing the phases must be made.)
- Output frequency : 50 Hz
- Grid Frequency Synchronization range : + 3 Hz or more
- Ambient temperature considered : -20⁰ C to 50⁰C
- Humidity : 95 %Non-condensing
- Protection of Enclosure indoor. : IP-20(Minimum) for

- Grid Frequency Tolerance range : + 3 or more
 - Grid Voltage tolerance : - 20% & + 15%
 - No-load losses : Less than 1% of rated power
 - Inverter efficiency(minimum) : >93% (In case of 10kW or above)
 - Inverter efficiency(minimum) : > 90% (In case of less than 10kW)
 - THD : <3%
 - PF : >0.9
- a) Three phase PCU/ inverter shall be used with each power plant system (10 kW and/or above) but In case of less than 10 kW single phase inverter can be used.
- b) PCU/inverter shall be capable of complete automatic operation including wake- up, synchronization & shutdown.
- c) 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.
- d) Built-in meter and data logger to monitor plant performance through external computer shall be provided.
- e) 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.
- f) 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.
- g) 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 test houses.

8. INTEGRATION OF PV POWER WITH GRID:

The output power from SPV would be fed to the inverters which converts DC produced by SPV array to AC and feeds it into the main electricity grid after synchronization. In case of grid failure, or low or high voltage, solar PV

system shall be out of synchronization and shall be disconnected from the grid. Once the 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.

9. DATA ACQUISITION SYSTEM/PLANT MONITORING:

- i. Data Acquisition System shall be provided for each of the solar PV plant.
- ii. Data Logging Provision for plant control and monitoring, time and date stamped system data logs for analysis with the high quality, suitable PC. Metering and Instrumentation for display of systems parameters and status indication to be provided.
- iii. Solar Irradiance: An integrating Pyranometer / Solar cell based irradiation sensor (along with calibration certificate) provided, with the sensor mounted in the plane of the array. Readout integrated with data logging system.
- iv. Temperature: Temperature probes for recording the Solar panel temperature and/or ambient temperature to be provided complete with readouts integrated with the data logging system
- v. The following parameters are accessible via the operating interface display in real time separately for solar power plant:
 - a. AC Voltage.
 - b. AC Output current.
 - c. Output Power
 - d. Power factor.
 - e. DC Input Voltage.
 - f. DC Input Current.
 - g. Time Active.
 - h. Time disabled.
 - i. Time Idle.
 - j. Power produced
 - k. Protective function limits (Viz-AC Over voltage, AC Under voltage, over frequency, under frequency ground fault, PV starting voltage, PV stopping voltage.
- vi. 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.
- vii. 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.

- viii. 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.
- ix. 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.
- x. Computerized AC energy monitoring shall be in addition to the digital AC energy meter.
- xi. 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.
- xii. All instantaneous data shall be shown on the computer screen.
- xiii. Software shall be provided for USB download and analysis of DC and AC parametric data for individual plant.
- xiv. Provision for Internet monitoring and download of data shall be also incorporated.
- xv. 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.
- xvi. Ambient / Solar PV module back surface temperature shall be also monitored on continuous basis.
- xvii. 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.
- xviii. 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.

10. METERING:

- a) The bidirectional electronic energy meter (0.5 S Class) shall be installed for the measurement of import/Export of energy.
- b) The bidder must take approval/NOC from the Concerned DISCOM for the connectivity, technical feasibility, and synchronization of SPV plant with distribution network and submit the same to the Owner before commissioning of SPV plant.
- c) Reverse power relay shall be provided by bidder (if necessary), as per the local DISCOM requirement.

11. POWER CONSUMPTION:

- a) Regarding the generated power consumption, priority need to give for internal consumption first and thereafter any excess power can be exported to grid.

b) SOLAR METER

As per specification and approval of State DISCOM. Approval from State DISCOM and payment of fees, if any, shall be the responsibility of the Bidder. No payment shall be paid by Institute in this regard.

12. PROTECTIONS

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

12.1. LIGHTNINGPROTECTION

The SPV power plants shall be provided with lightning & overvoltage protection. The main aim in this protection shall be to reduce the over voltage to a tolerable value before it reaches the PV or other sub system components. The source of over voltage can be lightning, atmosphere disturbances etc. The entire space occupying the SPV array shall be suitably protected against Lightning by deploying required number of Lightning Arrestors. Lightning protection should be provided as per IEC 62305 standard. The protection against induced high- voltages shall be provided by the use of metal oxide varistors (MOVs) and suitable earthing such that induced transients find an alternate route to earth.

12.2. SURGEPROTECTION

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

12.3. EARTHINGPROTECTION

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

12.4. GRIDISLANDING:

- i. 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 is landing protection) disconnection due to under and over voltage conditions shall also be provided.

- i. A manual disconnect 4pole isolation switch beside automatic disconnection to grid would have to be provided at utility end to isolate the grid connection by the utility personnel to carry out any maintenance. This switch shall be locked by the utility personnel

13. CABLES

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

- i. Shall meet IEC 60227/IS 694, IEC 60502/IS1554standards
- ii. Temp. Range: -10°C to $+80^{\circ}\text{C}$.
- iii. Voltage rating 660/1000V
- iv. Excellent resistance to heat, cold, water, oil, abrasion, UV radiation
- v. Flexible
- vi. Sizes of cables between array interconnections, array to junction boxes, junction boxes to Inverter etc. shall be so selected to keep the voltage drop (power loss) of the entire solar system to the minimum. The cables (as per IS) should be insulated with a special grade PVC compound formulated for outdoor use.
- vii. Cable Routing/ Marking: All cable/wires are to be routed in a GI cable tray and suitably tagged and marked with proper manner by good quality ferule or by other means so that the cable easily identified.
- viii. The Cable should be so selected that it should be compatible up to the life of the solar PV panels i.e. 25years.
- ix. The ratings given are approximate. Bidder to indicate size and length as per system design requirement. All the cables required for the plant provided by the bidder. Any change in cabling sizes if desired by the bidder/approved after citing appropriate reasons. All cable schedules/layout drawings approved prior to installation.
- x. Multi Strand, Annealed high conductivity copper conductor PVC type 'A' pressure extruded insulation or XLPE insulation. Overall PVC/XLPE insulation for UV protection Armoured cable for underground laying. All cable trays including covers to be provided. All cables conform to latest edition of IEC/ equivalent BIS Standards as specified below: BoS item/component Standard.
- xi. Description Standard Number Cables General Test and Measuring Methods, PVC/XLPE insulated cables for working Voltage up to and including 1100 V UV resistant for outdoor installation IS /IEC 69947.
- xii. The size of each type of DC cable selected shall be based on minimum voltage drop however; the maximum drop shall be limited to 1%.
- xiii. The size of each type of AC cables elected shall be based on minimum voltage drop however; the maximum drop shall be limited to 2 %.

14. TOOLS & TACKLES AND SPARES:

- i. After completion of installation & commissioning of the power plant, necessary tools & tackles are to be provided free of cost by the bidder for maintenance purpose. List of tools and tackles to be supplied by the bidder for approval of specifications and make from/owner.
- ii. A list of requisite spares in case of PCU/inverter comprising of a set of control logic cards, IGBT driver cards etc. Junction Boxes. Fuses, MOVs / arrestors, MCCBs etc along with spare set of PV modules be indicated, which shall be supplied along with the equipment. A minimum set of spares shall be maintained in the plant itself for the entire period of warranty and Operation & Maintenance which upon its use shall be replenished

15. DANGER BOARDS AND SIGNAGES:

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. Text of the signage may be finalized in consultation with the Institute.

16. FIRE EXTINGUISHERS:

The firefighting system for the proposed power plant for fire protection shall be consisting of:

- a) Two nos. 4 KG ABC type Portable fire extinguishers in the nearby control room, and junction box/DB of DC/AC power supply for fire caused by electrical short circuits
- b) Sand buckets in the control room.
- c) The installation of Fire Extinguishers should confirm to TAC regulations and BIS standards. The fire extinguishers shall be provided in the control room housing PCUs as well as on the Roof or site where the PV arrays have been installed.

17. DRAWINGS & MANUALS:

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

18. PLANNING AND DESIGNING:

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

19. DOCUMENTS TO BE SUBMITTED ALONG WITH THE BID:

- a) Type test certificates for all the tests specified for the factory built Solar PV modules: Approved by MNRE Authorized test centre or equivalent International Labs (certificate to be submitted along with the offer).
- b) Module mounting structure- Certificate from MNRE approved test centre.
- c) Inverter: Certificate from MNRE approved test centre.
- d) DC Cable- TUV Certification.
- e) Schedule of materials for approximate 8 KWp Roof Top Solar PV System in following format (use Separate Sheet):

Sl. No.	Item Description	Unit	Approx. Qty.	Make

- f) Bidder's declaration.
- g) Documents as specified in BEC/BRC criteria.

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

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

- i. General arrangement and dimensioned layout
- ii. Schematic drawing showing the requirement of SV panel, Power conditioning Unit(s)/inverter, Junction Boxes, AC and DC Distribution Boards, meters etc.
- iii. Structural drawing along with foundation details for the structure.
- iv. Itemized bill of material for complete SV plant covering all the components and associated accessories.
- v. Layout of solar Power Array
- vi. Shadow analysis of thereof

21. SOLAR PV SYSTEM ON THE ROOFTOP FOR MEETING THE ANNUAL ENERGY REQUIREMENT

The Solar PV system on the rooftop of the selected buildings will be installed for meeting upto 90% of the annual energy requirements depending upon the area of rooftop available and the remaining energy requirement of the office buildings will be met by drawing power from grid at commercial tariff of DISCOMs.

22. SAFETY MEASURES:

The bidder shall take entire responsibility for electrical safety of the installation(s) including connectivity with the grid and follow all the safety rules & regulations applicable as per Electricity Act, 2003 and CEA guidelines etc.

23. NOTE:

Bidders must visit the installation site and carry out all required assessments prior to submission of bid.

General arrangement drawing of the plant to be approved by OIL prior to supply and installation.

SECTION VIII
LIST OF MAKES

Only indigenous brands of components will be used in the solar cell/panel system. Makes of various items will be as under:

- a) Mono-crystalline solar panel: Vikram Solar/Adani/Waaree Solar/Tata Power
- b) Mono-crystalline solar cell: Vikram Solar/ Adani/Waaree Solar/Tata Power
- c) Inverter/filter on-grid: ABB/ Fronius/Delta/Solis/SMA
- d) Modular mounting structure: Reputed Indian Make as approved by Institute.
- e) MCCB,MCBs: ABB/ Siemens/ Schneider Electric/L&T
- f) ACCable: Polycab/ Havells/ Finolex
- g) DC Cable: TUV certified. Polycab/ Havells/Finolex/

SECTION IX

BIDDER'S DECLARATION

The following check list must be completed and submitted with the offer. Please ensure that all these points are covered in your offer. These will ensure proper evaluation at our end.

Please mark Yes or No to the following question, in the right hand column

Sl. No.	ITEM	YES / NO
1	Whether all items to be provided as per technical specifications?	
2	The SPV modules / SPV systems must be tested and approved from MNRE's Solar Energy Centre/ MNRE authorized testing laboratories/centers, for assessing this manufacturer shall furnish latest type test reports. Copies of approval and test reports be attached. Have	
3	The bidder should have installed at least one Grid connected Solar PV Power Plant having capacity of not less than 8kWp which should have been commissioned during the last five (05) years {2015-16,2016-17, 2017-18, 2018-19 and 2019-20}. Proof of certificates to be attached. Have you attached?	
4	The details of projects executed in past five (05) years shall be submitted along with tender documents. A certificate issued by the Govt. Organisation/MNRE Authorised Agency/Project owner towards the satisfactory installation and functioning of the power plants to be furnished by the bidder. Documentary evidence is to be submitted. Have you submitted?	
5	Bidder must agree to carry out comprehensive annual maintenance contract for a period of 5 years, which can extended upto 25 years from the date of commissioning with required revision in AMC cost. Undertaking must be submitted along with the bid. Have you submitted the undertaking?	
6	Inverter: Certificate from MNRE approved test centre. Have you submitted?	
7	DC Cable- TUV Certification. Have you submitted?	
8	Bill/Schedule of materials/items (without rate as per prescribed format in Section VII, Clause no. 19.e. of entire PV system. Have you submitted?	