

**NOTICE INVITING TENDER  
FOR**

**SOLAR PHOTO VOLTAIC LIGHTING  
SYSTEM**

**For  
IDSA,  
AT**

**No1, DEVELOPMENT ENCLAVE ,**

**RAO TULA RAM MARG,**

**NEW DELHI-110010**

**General Information**

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## NOTICE

1. Tenders are invited on behalf of the Director General, IDSA from Authorised channel partners of MNRE for the SOLAR PHOTO VOLTAIC LIGHTING SYSTEM for IDSA ,1 Development Enclave , Rao Tula Ram Marg, -New Delhi-10

### 1.a Scope of Work.

The scope of work includes, supplying, installing testing & commissioning of materials as defined in the Tender document.

There are 2 heads in which the submission is to be made

- 1 Technical Bid
- 2 Financial Bid

### 1.b Technical Bid:

Bidder must provide the details of company, work done etc. in the form of documents in prescribed format. This should be in an separate envelope labeled as "Technical Bid- Solar Photo Voltaic Lighting system for IDSA, New Delhi – Name of Bidder"

### 1.c Financial Bid:

This should be in an separate envelope labeled as "Financial Bid- Solar Photo Voltaic Lighting system for IDSA, New Delhi – Name of Bidder". Bidder must provide financial costs which is all inclusive.

The Technical bids shall be opened and evaluated first. The financial bid of only companies who qualify the technical bid (as assessed by the tender committee ) shall be opened.

2. Time:

The time allowed for carrying out the work will be 2 MONTHS from the day after the date of issue of Letter of Intent. The site for the work shall be made available on award of work. Rs 1000/- per day penalty will be imposed on firm after closing date of completion without any valid reason . Decision of Estate Manager in this regard will be final and binding .

4. Tender document is free of cost

5. Tenders, which should always be placed in main sealed envelope, with the name of work – "SOLAR Photo Voltaic LIGHTING SYSTEM FOR IDSA "written on the envelopes, will be received by the IDSA upto 3.00P.M. On or before 31.03.2014 .The technical bid will be opened by Tender committee on the same day at 4:00 P.M. The main envelop shall have two sealed envelopes inside with labels –"TECHNICAL BID – NAME OF BIDDER" and "FINANCIAL BID – NAME OF BIDDER".

6. The tender shall be accompanied by earnest money, of Rs 15000/- ( Rupees fifteen thousand only) in the shape of Demand draft D.D. from any Nationalized Bank issued in favour of IDSA, New Delhi. The Earnest money

deposit of the successful tenderer to be converted into the Security deposit. In respect of the unsuccessful tenderers, the same shall be refunded/ returned after completion of process of award of work or as decided by IDSA

The Earnest Money deposit shall be in a separate envelope with the title "Earnest Money Deposit for SOLAR PHOTO VOLTAIC LIGHTING SYSTEM at IDSA – Name of Bidder". Tenders without Earnest Money Deposit shall be summarily rejected.

7. All the Rates/Amount in Rupees to be mentioned in words and figures.
8. The IDSA does not bind it self to accept the lowest or any other tender, and reserves its right to reject any or cancel all of the tenders received without the assignment of any reason.
9. All tenders in whom any of the prescribed conditions are not fulfilled or are incomplete in any respect are liable to be rejected.
10. Canvassing whether directly or indirectly, in connection with tender is strictly prohibited and the tender submitted by the contractors who resort to canvassing will be liable to rejection.
11. The IDSA reserves the right of accepting the whole or any part of the tender and the tenderer shall be bound to perform the same at the rate quoted.
12. The tender for the works shall remain open for acceptance for a period of one hundred and eighty days from the date of opening of tenders. If any tenderer withdraws his tender before the said period or makes any modifications in the terms and conditions of the tender which are not acceptable to the IDSA then the IDSA shall, without prejudice to any other right or remedy, be at liberty to forfeit 100% of the said earnest money as aforesaid.
13. This Notice Inviting Tender shall form a part of the contract document. The successful tenderer/ contractor, on acceptance of his tender by the IDSA , shall start the work within 10 days from the date of award of work. . The notice inviting tender, all the documents including additional conditions, specifications and drawings, if any, forming the tender as issued at the time of invitation of tender and acceptance thereof together with any correspondence leading thereto etc.
14. Tender schedule shall not be transferable.
15. The contractors may submit the tender during working hours on any working day from the date of publishing the tender notice up to the last date and time for receipt of tenders indicated. Tenders may be submitted by the contractor either in person or through any agent in the drop box.
16. At the time of collecting the tender from IDSA, the contractor or his authorized representative must bring proof of their identity or letter of authorization that they are a part of the tenderer firm.
17. The tenderers or their agents are expected to be present at the time of opening of financial bid of the tenders. The tenders receiving officer/designated person of I D S A will on opening each tender prepare a statement of the attested and unattested submissions in the presence of tenderers. If any of the tenderer or their agents find it inconvenient to be present at the time then in such case the tender receiving officer will, on opening the tender of the absentee tenderer, make out statement of the unattested corrections and communicate it to him. The absentee tenderer shall then accept

the statement of the corrections without any question whatsoever.

18. The contractor has to make his own arrangement for procurement, supply and use of all constituent materials.
19. Tender not submitted in proper form or in due time will be liable to be rejected, alterations which are made by the tenderer in the tender schedule, the conditions of the contract, the drawings, specifications accompanying the same will not be entertained and if any such alterations are made the tenders will be liable to be rejected.
20. Tenderer are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their tenders, the accommodation they may require and in general shall themselves obtain all items which influence or affect their tender. A tenderer shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charges consequent on any misunderstanding or otherwise shall be allowed. The tenderer shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a tender by tenderer implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done , local conditions and other factors having a bearing on the execution of the work.
21. Additions and alterations in schedules or conditions will make the tender liable for disqualifications. The contractors should procure required materials from the choice if available as per the specifications mentioned in the tender schedules.
22. In case of ambiguity in regard to conditions and qualification criteria and other related matters if any with the Tenders the decision taken by the IDSA Committee shall be final.
23. **RIGHT TO OMIT OR ADD ONE OR MORE ITEMS.**  
The IDSA shall have the right to omit or add one or more items put in the tender either before or after issuing work order. In order to comply with the latest requirements of the w o r k
24. If due to any reason the office happens to remain closed on the last date for receipt of tenders, as specified the tenders will be received on the next working day at the same time and venue and the tenders will be opened on the next working day to the day specified or as instructed by IDSA .
25. Payment : Payment will be made after successfully completion of work in all respect . No part payment will be made during the work
26. Security Deposit /Retention Money: 10% of the contract value will be deposited with IDSA by the contractor as retention money in form of bank guarantee. The retention period would be one year from the date of depositing such amount. Earnest money deposited by the successful bidder will be adjusted in security money.
27. Taxes : Shall be on contractor's account. Rates quoted should be inclusive of all taxes. No escalation will be allowed.
  - a. Suitable deductions/recoveries like Work Contracts Tax will be made as per Government of India regulations.

Signature of Asst. Director  
For and on behalf of IDSA

**TENDER UNDERTAKING TO BE GIVEN ON COMPANY LETTER HEAD ALONG  
WITH TECHNICAL BID**

**TENDER UNDERTAKING**

To

Institute for Defence Studies and Analyses

No 1, Development Enclave ,

Rao Tula Ram Marg

New Delhi.-110010.

1. I/we do hereby tender and if this tender be accepted undertake to execute the following work viz, Solar Photo Voltaic Lighting system with the tender documents attached therein.
- 2 I/we agree to keep the offer in this tender valid for period of 180 days mentioned in the tender notice and not to modify the whole or any rt of it for any reason within in the above period. If the tender is withdrawn by me/us for any reason whatsoever the earnest money deposited by me/us will be forfeited to IDSA
- 3 I/We hereby distinctly and expressly declare and acknowledge that before the submission of my/our tender. I/We have carefully understood the instruction in the tender notice and have read the contract documents and of the plan, specification and quantities, etc. and rates and of the location and alignment where the said work is to be done and such investigation of work required to be done & materials required for the works as to enable me/us to thoroughly understand the intention of the same and the requirement, covenants , agreements, stipulations and restrictions contained in the contract and in the contract and in the said plans and specifications and distinctly agree that I/We will not hereafter make any claim or demand upon the IDSA based upon or a raising out of any alleged misunderstanding or misconception or mistake or my/ our part of the said requirement, covenants, agreements, stipulations, restrictions and conditions.
- 4 If my/our tender is not accepted the EMD paid by me /us shall be retuned to me / us with out interest on our application soon after the tender is decided or expiration of six months after the last date

prescribed for the receipt of tenders whichever is earlier. If my/our tender is accepted the earnest money shall be retained by the IDSA as security for the due fulfillment of the contract. If upon to written to me/us by the IDSA, I/We fail to attend the said office on the date herein fixes or if upon intimation being given to me/us by the IDSA of accepted of my/our tender. I/We fail to make the additional security deposit or enter into the required agreement as defined in tender notice, then I/we agree to the forfeiture of the earnest money. Any notice required to be served on me/us there under shall be deemed to have been served on me/us. If delivered to me/us personally or forwarded to me/us by post (Registered or Ordinary) or left at my / our address given herein. Such notice shall, if sent by post be deemed to have been served on me/us at the time when in due course of post if it would be delivered at the address to which it is sent.

- 5 I/We shall not assign the contract or sublet any portion of the same. In case, it becomes necessary such subletting with the permission of the IDSA , shall be limited to:
  - i) Labor Contract
  - ii) Transport Contract
  - iii) Material Contract
  - iv) Engaging specialists for special items of work.
  
6. I/We will employ the following technical staff supervising the work. I/We shall see that they are always at site during working hours personally checking all items of works and paying extra attention to such works which require special attention.
  
7. Keeping in view the national importance of this building I/We shall comply with all security measures laid down by the IDSA.

#### **DECLARATION**

I/We hereby declare that I/we have inspected and satisfied / ourselves thoroughly and I/We are conversant with the local conditions, the technical and materials specification, plans design and conditions of contract on which the offer have been based completely studied by me before submitting the tender.

**GENERAL CONDITIONS**

**SOLAR PHOTO VOLTAIC LIGHTING  
SYSTEM**

**FOR  
INSTITUTE FOR DEFENCE STUDIES  
AND ANALYSES**

**AT**

**NO1, DEVELOPMENT ENCLAVE**

**RAO TULA RAM MARG,**

**NEW DELHI-110010**

## **1. SCOPE AND INTENT**

### **1.1 SCOPE:**

The general character and the scope of the work is illustrated and defined by but not limited to the signed Contract Documents herewith attached.

### **1.2 EXTENT:**

The contractor shall carry out and complete the said work in every respect in accordance with the contract, and with the directions of and to the satisfaction of the IDSA.

### **1.3 INTENT**

The contract documents are complimentary, and what is called for by any one shall be binding as if called for by all. The intention of the documents is to include all labour and materials, equipment and transportation necessary for the proper execution of the work. Materials of Work described in words which so applied have a well known technical or trade meaning shall be held to refer to such recognized standards as applicable.

Wherever it is mentioned in the Documents that the Contractor shall perform certain work or provide certain facilities, it is understood that the Contractor shall do so at his cost.

### **1.4 SCHEDULE OF QUANTITIES:**

The quantities given in the Schedule of Quantities are provisional and are meant to indicate the intent of the work and provide a uniform basis for tendering. The contractor shall be paid for the actual quantity of work executed by him in accordance with the tender documents at the contract rates. IDSA reserves the right to increase or decrease any of the quantities or to totally omit any items of work either before or after Issuing the work order and the contractor shall not claim any extra or damages on these grounds. Any error in description or in quantity or omission of item in the Schedule of Quantities shall not vitiate this contract but shall be deemed to be a variation required by IDSA .

## **2. LICENSES AND PERMITS**

License and permits for all materials under Government control shall be obtained by the contractor directly. IDSA may assist the contractor in this respect to the extent possible. The contractor shall include in his tender all transport charges and other expenses that may be incurred in this connection. The contractor shall comply with all Government Acts including any bye-laws or regulations of local authorities relating to the works, and shall give all notices and pay all fees and charges demanded by law there under and indemnify the IDSA against the same. At no point of time shall any payment be due from the IDSA in this regard.

## **3. WATER AND POWER FOR INSTALLATION**

### **3.1 WATER**

Water shall be supplied to the contractor by IDSA free of cost Limiting to work only

### 3.2 POWER

Power shall be supplied to the contractor by IDSA free of cost limiting to the work.

**The water and power shall be used for bonafide IDSA works only.**

### 4. COMPENSATION FOR DELAY:

The contractor 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 modification to the work entrusted to him or in any sub-contracts connected therewith or delays in awarding contracts for other trades of the project or in commencement or completion of such work. IDSA shall not be liable for any claim in respect thereof. IDSA does not accept liability for any sum besides the tender amount subject to such variations as are provided herein.

### 5. SAFETY CODE

In respect of all labour, directly or indirectly employed in the work for the performance of contractor's part of this agreement, the contractor shall at his own expense arrange for all the safety provisions as specified by Bureau of Indian Standards and Regulations, Rules and orders made thereunder and such other acts as applicable.

Precautions as stated in the Safety Clause are the minimum necessary and shall not preclude the contractor taking additional safety precautions as may be warranted for the particular type of work or situation. Also mere observance of these precautions shall not absolve the contractor of his liability in case of loss or damage to property or injury to any person including contractor's labour, Owner's and or any member of the public or resulting into death of any of these.

In case the contractor fails to make arrangements and provide necessary facilities as aforesaid, IDSA shall be entitled to do so and recover the costs thereof from the contractor. The decision of the IDSA in this regard shall be final and binding.

#### 5.1 CHILD LABOUR

The contractor shall not employ any labour less than 18 years of age on the job. If female labour is engaged, the contractor shall make necessary provision at his own expense, for safeguarding and care of small children and keeping them clear of the site of operations.

#### 5.2 SITE ENGINEER

The contractor shall ensure continued effective supervision with the help of a qualified, experienced and competent Engineer assisted by adequate staff as ascertained by the IDSA, for the entire duration of the works. The Site Engineer will be responsible for carrying out the work to the true meaning of the drawings, conditions of contract, specifications, schedule of quantities and IDSA's instructions and directions or instructions given to him in writing shall be held to have been given to the contractor officially. Attention is called to the importance of requesting written instruction from the IDSA before undertaking any work where IDSA's directions or instructions are required. Any such work done in advance of such instructions will be liable to be removed at the contractor's cost. No staff including the Engineer and technical supervisory staff shall be transferred from the work without the written prior permission from the Estate Manager.

### **5.3 EQUIPMENT**

The contractor shall provide and install all necessary hoists, ladders, scaffolding, tools, plants and all transport for labour, materials and plant necessary for the proper execution and completion of the work to the satisfaction of the Estate Manager.

### **5.4 SCAFFOLDING, STAGING, GUARD RAILS**

The contractor shall provide scaffolding, staging, guard rails, temporary stairs and other temporary measures required during project . The supports for the scaffolding, staging, guard rails and temporary stairs shall be strong, adequate for the particular situations, tied together with horizontal pieces and braced properly. The temporary access to the various parts of the building under construction shall be rigid and strong enough to avoid any chance of mishaps. The entire scaffolding arrangement proposed shall be subject to the approval of the Architect.

### **6. ASSIGNMENT AND SUBLETTING**

The contractor shall not, without the written consent of the Estate Manager assign this contract or sublet any portion of the work. Any permission to sublet parts of the work shall not absolve the contractor from any liability under this contract.

### **7. PRICE ESCALATION**

The rates quoted by the contractor and accepted by the Owner shall hold good till the completion of the work and no additional claim will be admissible on account of statutory increase in prices, fluctuation in market rates, increase in duties, taxes/any other levies/fees etc.

### **8. MATERIALS & WORKMANSHIP**

#### **8.1 MATERIALS TO BE NEW**

All materials and equipment to be incorporated in the works shall be new. Materials, equipment and workmanship are to be of the best quality of the specified type and to the entire satisfaction of the IDSA. The contractor shall immediately remove from the premises any materials, equipment and/or workmanship which, in the opinion of the IDSA, are defective or unsuitable and shall substitute proper materials equipment and/or workmanship at his own cost. The term approval used in connection with this contract shall mean the approval of the Estate Manager.

The contractor shall, if required, submit satisfactory evidence as to the kind and quality of materials and equipment.

#### **8.2 SPECIAL MAKES OR BRANDS**

Where special makes or brands are called for, they are mentioned as a standard. Others of equivalent quality may be used, provided that the IDSA considers the substituted materials as equivalent to the brand specified and approval is first obtained in writing from the Estate Manager. Unless substitutions are approved by the Estate Manager no deviation from the specifications will be permitted. The contractor shall indicate and submit written evidence of those materials or equipment called for in the specifications that are not obtainable for installation in the building within the time limit as per the tender document

#### **8.3 PROPER SCHEDULING OF MATERIALS**

All materials and equipment shall be delivered so as to ensure a speedy and uninterrupted progress

of the work. The same shall be stored so as to prevent overloading of any portion of the structure, and the contractor shall be entirely responsible for damage or loss to the materials, by weather or other causes.

#### **8.4 RIGHT KIND OF JIGS, TOOLS, EQUIPMENT ETC.**

The contractor shall employ the right kind of workmen, jigs, tools and equipment to fabricate and install all materials and equipment, whether locally purchased or imported and whether provided by the IDSA or Contractor himself. They shall be fabricated and installed without any damage and in accordance with the manufacturer's instructions and manuals.

#### **8.5 INSPECTION**

All materials, equipment and workmanship shall be subject to inspection, examination and test by the IDSA at any and all items during manufacture and/or construction. IDSA shall have the right to reject defective material, equipment and workmanship or require its correction. Rejected workmanship shall be satisfactorily corrected and rejected materials and equipment shall be satisfactorily replaced with proper material and equipment without charge therefore, and the Contractor shall promptly segregate and remove the rejected materials and equipment from the premises. If the contractor fails to proceed at once with the replacement of rejected materials and/or the correction of defective workmanship, IDSA may replace such materials and equipment and/or correct such workmanship and charge the cost thereof to the contractor or may terminate the right of the contractor to proceed further with the work. The contractor shall furnish promptly, without additional charge all reasonable facilities, labour, materials and equipment necessary for the safe and convenient inspection and test that may be required by the IDSA.

#### **9. DEDUCTIONS FOR UNCORRECTED WORK**

If the Estate Manager deems it inexpedient to correct work damaged or not done in accordance with the contract, an equitable deduction from the contract price shall be made therefore and the Estate Manager decision in this respect shall be final.

#### **10. CORRECTION OF WORK BEFORE VIRTUAL COMPLETION OF WORK**

The Estate Manager shall conduct a final inspection just before the virtual completion of the work and prepare a list of materials, equipment and items of work which fail to conform to the Contract Specifications. The contractor shall promptly replace and re-execute such items in accordance with the contract and shall bear all expenses of making good all work.

If the contractor fails to remove and replace above rejected materials, equipment and/or workmanship within a reasonable time, fixed by written notice, IDSA may employ and pay other persons to amend and make good such defects at the expense of the contractor. All expenses incurred by the IDSA in rectifying the defects including all damages, loss and expenses consequent on the defects shall be recoverable from any amount due or that may become due to the contractor.

#### **11. VIRTUAL COMPLETION**

The work shall be considered as virtually completed only upon fulfillment of the procedure laid down in clause above and when the Estate Manager has certified in writing that the work has been

virtually completed. The defects liability period shall commence from the date of such certificate.

**11.1 MAINTENANCE DURING DEFECTS LIABILITY PERIOD**

Any defects noticed and brought to the attention of the Contractor shall be promptly attended to by the Contractor expeditiously.

**12. GUARANTEE**

- a) Besides guarantees required elsewhere, the contractor shall guarantee the work as specified in Tender Document .
- b) All required guarantees shall be submitted to the Estate Manager by the contractor when requesting certification of accounts for payment IDSA .
- c) All required guarantees shall be submitted to the Estate Manager as a pre-requisite to acceptance and payment.

**13. BUREAU OF INDIAN STANDARDS**

A reference made to any Indian Standard specifications in these documents, shall imply reference to the latest version of that standard, including such revisions/ amendments as may be issued by the Bureau of Indian Standards during the currency of the contract and the corresponding clause/s therein shall hold valid in place of those referred to.

**14. FORCE MAJEURE**

The right of the contractor to proceed with the work shall not be terminated because of any delay in the completion of the work due to unforeseen causes beyond the control and without the fault or negligence of the contractor, including but not limited to **Acts of God**, or of the public enemy, restraints of Governing State, Fires, floods unusually severe weather, earthquake, etc.

# **Technical Details**

## **1. System Configuration:**

Solar Panel system is to be prepared for a 10 kWp Rooftop Grid Tied Solar PV System at the premises of ISDA at New Delhi.

The availability of shadow free and suitable rooftop area has been considered in this proposal. Since system is grid tied, batteries are not a part of the system .

Contractor to use 250 Wp high efficiency Multi crystalline Solar modules certified and approved by MNRE and suitable Inverters and other Balance of System (BOS) components will be as per the standards specified by MNRE.

## **I. Technical Specifications of Major Components of Solar PV Power Plant**

1. Solar PV modules and array
2. Module mounting structure
3. Junction Boxes
4. Power Conditioning Unit
5. DC & AC Switches
6. Cables and installation accessories
7. Earthing and lightning protection

### **1. SOLAR PV MODULES AND ARRAY**

(i) Only indigenous modules shall be used in the project. Solar module shall be high efficiency Crystalline Silicone Terrestrial PV modules type. The peak power output of the PV Module shall be min

(ii) The mechanical structure shall withstand gusts of wind / cyclonic wind up to 150km/hr from back side of the panel.

(iii) The offered modules must conform to the latest edition of any of the following IEC/ equivalent BIS Standards for PV module design qualification and type approval:

Crystalline Silicon Terrestrial PV Modules : IEC 61215/IS14286

(iv) PV modules must also qualify Salt Mist Corrosion Testing as per IEC 61701/IS61701.

(vi) SPV modules shall be certified by NABL/IECQ accredited test centre. The bidder shall submit appropriate certificates.

(vii) Protective devices against surges at the PV module shall be provided. Low voltage drop bypass diodes shall be provided.

(viii) Module Junction box (weather proof), where the module terminals shall be interconnected and output taken, shall be designed for long life out door operation in harsh environment as per the relevant BIS specifications and protected against surges. It should have a provision for "Opening" for replacing the cable, if required.

(ix) PV modules used in solar power plants must be warranted for output wattage, which should not be

less than 90% at the end of 10 years and 80% at the end of 25 years. (x) Each PV module must use a RF identification tag (RFID), which must contain the following information:

- a. Name of the manufacturer of PV Module
- b. Name of the manufacturer of Solar cells
- c. Unique Serial Number & Model No. of the module
- d. Month and year of the manufacture (separately for Solar cells and module)
- e. Country of origin ( separately for solar cells and module)
- f. I-V curve for the module
- g. Peak Wattage of the module ,Im, Vm and FF for the module
- h. Date and year of obtaining IEC PV module qualification certificate
- i. Name of the test lab issuing IEC certificate
- j. Other relevant information on traceability of solar cells and module as per ISO 9000 series

RFID shall be mandatorily placed inside the module laminate.

A distinctive serial number starting with NSM will be engraved on the frame of the module or screen printed on the tedlar sheet of the module.

### 1.1 ORIENTATION AND TILT OF PV MODULES

Modules shall be North –South oriented at the Tilt Angle of 11o -13o

## 2. MOUNTING STRUCTURES

The PV modules will be mounted on fixed metallic structures of adequate strength and appropriate design, which can withstand load of modules and high wind velocities up to 150 km per hour. The support structure used in the power plants will be hot dip Galvanized Iron (G.I).

The “Mounting Structure” should have the following features:

- The modules support structure shall be Mild Steel /hot dipped Galvanized (atleast 120 micron) Iron for holding the PV modules. The size of angle iron should not be less than 50x50x5 mm.
- Each panel frame structure shall be so fabricated as to be grouted on roof on its legs. The legs of the structure shall be fixed and grouted in the PCC foundation column made with 1:2:4 cement concrete. The foundation shall support SPV modules at a given orientation, absorb and transfer the mechanical loads to the ground properly and shall withstand maximum wind speed of 150 km/hr.
- All nuts and bolts should be made of good quality Stainless Steel.
- The structure should 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.
- The minimum clearance of the lowest part of the module structure and the developed ground level shall not be less than 500 mm.
- The minimum clearance required from the parapet wall of the roof & in between row of panels is min 1 metre for cleaning the panels & servicing.
- The bidder shall specify installation details of the PV modules and the support structures with appropriate diagrams and drawings. The work shall be carried out as per the designs approved by the procuring entity.

#### 4. JUNCTION BOXES

The junction boxes shall be dust proof, vermin and waterproof and made of FRP / Thermo Plastic. The terminals shall be connected to copper bus bar arrangement of proper sizes. The junction boxes shall have suitable cable entry points fitted with cable glands of appropriate sizes for both incoming and outgoing cables. Suitable markings shall be provided on the bus bar for easy identification and cable ferrules shall be fitted at the cable termination points for identification. Each main junction box shall be fitted with appropriate rating blocking diode. The junction boxes shall be of reputed make.

#### 4. POWER CONDITIONING UNIT (PCU)

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 maximize Solar PV array energy input into the System. PCU including

MPPT & protection conform to IEC 61683/IS 61683, IEC 60068-2(1,2,14,30)/Equivalent BIS Std.,

#### DETAILED SPECIFICATIONS

1	Nominal DC Array Input voltage	1000 V
2.	<u>DC</u> array input operating voltage	-20%+15% of the DC array input voltage in Sr No 1 Above
3.	Type of solar charge controller	MPPT based solar charge controller (3)
4	Switching Device	MOSFET /IGBT BASED
5	Continuous inverter output rating	10 KVA
6.	Output wave form	Pure Sine wave output
7.	Total harmonic distortion	< 3 % with resistive load
8	Output Voltage	400 +3% in case of 3 phase PCU
9	Output frequency	50 HZ +0.5 Hz
10	Power factor	>0.9
11	PCU efficiency	>90 % at nominal voltage & power
12	Idle current	< 4 % of rated capacity
13	Regulation	Line regulation and load regulation-2%
14	Over Load features	150% for one minute
15	Cooling	Forced air cooling with temperature controlled cooling

		fan
16	Operating Temperature	0-50 0C
17	Relative Humidity	95% Maximum
18	LED/ LCD display : Indications	Display shall indicate system functional parameters and protection functional indicators
19	Data Monitor and display controls	RS 485, Ethernet or RS 232 connectivity
20	Protections	1) Input over voltage      2) Low / High Frequency 3) Short circuit            4) Under / over output voltage 5) Over Temperature      6) Grid Input under voltage / over voltage with auto recovery 7) DC disconnect device    8) DC reverse polarity 9) Anti Islanding protection as per the standard
21	Enclosure Protection	IP 21 (for indoor) as per IEC 529
22	Safety	1. IEC 62103 2. IEC 62109 Part 1 & 2 3. Galvanic isolation at input & output through transformer
23	System Details	10 Kw Grid – Tie Solar PV System
24	Proposed PV Module Type	Make/Model – PV-Powertech / Vikram Solar / Waree – 250 Wp Quantity – 40 Wattage – 250 Wp No of Cells – 60 Voc/Isc – 37.5 V / 8.72 A Vmp / Imp – 30 V / 8.42A Dimensions – 1639*989*35 (mm) Weight – 20 Kg Operating conditions – 40 to +85 C Maximum System Voltage – 1000 DC
25	Mounting Type	Galvanized Steel with fixed tilted direct mounting on rooftop of parking shed and security cabin
26	Inverter Type	Grid tied inverters with monitoring system of reputed make Quantity – 10 Kw – 1 Nos AC maximum output – 15 Kw Output voltage – 415 V, 50 Hz AC Efficiency - >98 % Power Connections – 3 Phase
27	Electrical Accessories	Cables will confirm to IS694 and shall be of 650 V/1.1 Kv grade. Inter connections – array to junction boxes, junction boxes to inverter etc will be selected to keep voltage drop & losses to the minimum. The bright annealed 99.97 % pure bare copper conductors result in lower heating thereby increasing cable fire & efficiency. These wires are insulated with a special grade PVC compound formulated manufactured in house. Temperature Range – 15 deg C to +70 deg C Sizes & colours – Suitable Red, Yellow, Blue, Black
28	String Design	4 Strings of 20 panels each, however a detailed engineering might change the string design. In case inverter configuration needs any modifications, the string layout may be modified accordingly.

#### 5. DC & AC switches :

##### a. DC SIDE

(i) MCB of suitable rating shall be provided for connection and disconnection of array & PCU for maintenance purpose .

(ii) Switches and circuit breakers on DC side shall be DC rated or they shall be sufficiently de-rated , if AC rated switches are used .

##### a. AC side

MCB of suitable rating shall be provided for connection disconnection of PCU and Load.

6. Cables and accessories : All the cables shall be supplied confirming to IEC 60227/IS694 & IEC 60502/IS 1554 shall be of 1.1KV grade as per requirement . Only PVC copper cables shall be used . the size of the cables between the array interconnections , array to junction boxes, junction box to PCU , PCU to AC distribution box etc shall be so selected to keep the voltage drop and losses to minimum . permissible wire drop and losses to the minimum . Permissible wire in DC side shall be  $\leq 1\%$

The bidder shall supply Installation accessories , which are required to install and successfully commission the power plant..

#### 15. Earthing and lightening protection

Earthing : the array structure of PV yard shall be grounded properly , using adequate number of earthing kits . All metal casing or shielding of power plant shall be thoroughly grounded to ensure safety of the power plant

Lightning : The SPV power plant shall be provided with lightning & power voltage protection . The main aim in this protection shall be reduced to over voltage to a tolerable value before it reaches the PV or other sub system components . the source of overvoltage can be lightning , atmosphere disturbance etc.

#### 8. Operation and maintenance manual

An operation and maintenance manual , in English should be provided with the solar PV power plant .

The following minimum details must be provided in the manual :

- (a) About photo voltaic and PV Module .
- (b) Clear instruction about mounting of PV modules
- (c) About electronics used in
- (d) DO's and DON'Ts
- (e) Clear instruction on regular maintenance and trouble shooting of the power plants .
- (f) Name & address of the person of centre to be contacted in case of failure or Complaint .

#### 9. **WARRANTY**

(i) System Components : The mechanical Structures, electrical works including power conditioners/ inverters/ charge controllers / maximum power point tracker units/ distribution boards / digital meters / switchgear , etc. and overall workmanship of the SPV power plants/ systems must be warranted against any manufacturing / design/ installation defects for a minimum period of 5 years.

(ii) Power output Warranty for PV modules : 25 Years

(iii) inverter : 5 Years.

(iv) Balance of system : 1 Year

### **DETAILED SCOPE OF WORK**

Contractor Shall be responsible for the execution of proposed project, on a lump sum turnkey basis inclusive of all execution work set out here and after.

Engineering – Contractor shall be responsible for design and development of 10 Kwp solar PV system in compliance with technical specification as per MNRE, applicable laws and industry practices Contractor shall also be responsible for:

- Electrical Schemes.
- Lists of specifications of modules, inverters, materials, spare part and accessories.
- Operation and Maintenance manuals.
- Onsite Training and offline support.
- Any other certificates necessary to comply with rules and requirements of Law.

**Electrical and Mechanical Equipment** – Contractor shall be responsible for Procurement , Supply, transportation, and unloading at the site following equipment:

- Solar Modules and Mounting structures
- Inverters
- Complete electrical cabling (for DC & AC Applications)
- Evacuation and Earthling kit on LT side
- Suitable Lightning Arresters for solar system.
- Remote monitoring solution (if applicable).

**Setting –up, Assembly, Installation & Commissioning** – Contractor shall supply equipment and materials, machinery accessories and components including necessary civil work for full, correct and safe operation of PV system and install & commission for the targeted performance. Contractor shall give commissioning report and shall

regularly monitor the as per terms terms and conditions.

### **TENDER ELIGIBILITY CRITERIA**

Tender Eligibility Criteria are as follows:

S. No.	Minimum Eligibility Criteria	Proof to be submitted for fulfilling <i>The Eligibility Criteria</i>
1.	a) Bidder shall be a registered Company/ Firms in existence for at least past two audited year.	Certificate of Incorporation or Registration shall be submitted.
	b) Consortium not exceeding three partners. Each partner of the consortium shall be a Registered Company / Firms in existence for at least part one audited year.	i) Certificate of Incorporation or Registration of all the partners shall be submitted. ii) Copy of consortium agreement shall be submitted ( <b>OR</b> ) A letter of intent to execute a consortium agreement in the event of a successful bid shall be signed by all the partners and submitted with the bid along with the copy of proposed consortium Agreement. iii) In case of Consortium, all partners of the consortium shall be liable jointly and severally for the execution of the contract in accordance to the contract terms and a statement to this effect shall be included in the letter of intent.
2.	The Bidder shall use only SPV modules manufactured in India.	Necessary Self undertaking letter shall be submitted.
3.	Bidder should have experience in installation of SPV power plants of 15 KWp & above and shall have installed at least one of the tendered quantity (Power plants installed minimum 6 months prior to the date of bid submission will only be considered) & these systems should be working satisfactorily.	Copy of work orders and performance certificate for satisfactory function of power plants obtained from the agency issuing work order.
4.	PV Modules & PCU of the SPV system shall conform to the MNRE standards as per tender document	Copy of test certificates along with reports shall be submitted.
5.	Bidder should not be blacklisted by any of the state of central Government or organization of the state or Central Government as on date of submission of tender.	Necessary undertaking letter should be furnished.

### Financial Bid

Sr No	Description	Amount in Rs (in figure and words )
1	Grid-tied 10 KWP Solar PV system Complete in all respect including procurement , supply , Installation ,commissioning and testing (Inclusive of All taxes, excise ,customs and transportation without subsidy .  ( turnkey basis project)	
2	Subsidy (% age)	
3	Net Amount after subsidy	

Signature of contractor with seal of company