

**GOVERNMENT OF INDIA  
DELHI CENTRAL ELECTRICAL CIRCLE-V  
CENTRAL PUBLIC WORKS DEPARTMENT**

**NOTICE INVITING TENDER**

Technical sanction No.	:	
Notice Inviting Tender No.	:	18/CE/NDZ-1/DED-102/2019-20
Name of Work	:	Supplying, installation, testing and commissioning of on grid roof top Solar Photo Voltaic Power generation system at the Bungalows of Hon'ble Supreme Court Judges, New Delhi
Estimated Cost	:	Rs. 3,67,00,280/-
Earnest Money	:	Rs. 7,34,006/-
Performance Guarantee	:	5 % of Tender Value
Security Deposit	:	2.5 % of Tender Value
Time Allowed	:	06 (Six) Months

## INDEX

**Name of work : Supplying, installation, testing and commissioning of on grid roof top Solar Photo Voltaic Power generation system at the Bungalows of Hon'ble Supreme Court Judges, New Delhi.**

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**Certified that this NIT contains .... Pages i.e. 1 to 67 pages.**

## INFORMATION AND INSTRUCTIONS FOR CONTRACTORS FOR e-TENDERING

The Executive Engineer (E), DED-102, CPWD, IP Bhawan, New Delhi. (Phone 011-23370310 / Fax : 011- 23018309/ e-mail : [deleeed2.cpwd@nic.in](mailto:deleeed2.cpwd@nic.in)), invites on behalf of President of India, online percentage rate e-tender, **in three bid system** from specialized agencies / firms for the following work:-

NIT No.	18/CE/NDZ-1/DED-102/2019-20
Name of work & location	Supplying, installation, testing and commissioning of on grid roof top Solar Photo Voltaic Power generation system at the Bungalows of hon'ble Supreme Court Judges, New Delhi
Estimated cost put to tender	Rs. <b>3,67,00,280/-</b>
Earnest Money	Rs. <b>7,34,006/-</b>
Period of Completion	06 months
Last date & time of submission of bids, EMD & other documents as specified in the NIT	Upto 15:00 hrs. on 06-01-2020
Time & date of opening eligibility bid	15:30 hrs. on 06-01-2020
Time & date of opening of technical bid	To be intimated later on
Time & date of opening of price bid	To be intimated later on

\*\*To be filled up by EE(E)

1. The Intending Contractors who fulfill the following requirements shall be eligible to apply, Joint ventures are not accepted.
  - a) Should have satisfactorily completed the work as mentioned below during the last seven years ending previous day of last date of submission of bids.
    - (i) Three similar works each of value not less than 40 % of estimated cost put to tender.  
or
    - (ii) Two similar works each of value not less than Rs 60 % of estimated cost put to tender.  
or
    - (iii) One similar work of value not less than Rs. 80 % of Estimated cost put to tender,  
The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum; calculated from the date of completion to last date of receipt of bid.  
Similar work shall mean works of **"SITC of Solar PV Power Generation System"**.  
The value of executed works shall be brought to the current costing level by enhancing the actual value of work at simple rate of 7% per annum calculated from the date of completion to last date of receipt of applications for bids.
  - b) Should have had average annual financial turnover of 50% of estimated cost during the last three financial years ending 31<sup>st</sup> March, 2019. (Scanned copy of certificate from CA to be uploaded).

- c) Should have a solvency of 50% of estimated cost (Scanned copy of original solvency to be uploaded) (Solvency not required if applicant is a class I (Composite) registered contractor of CPWD and estimated cost is up to Rs. 25 Crore)
  - d) The bidder should not have incurred any loss in more than two years during the last five years ending 31st March 2019. Consecutive balance sheet duly audited by Chartered Accountant shall be submitted.
  - e) The bidder shall provide GST registration Certificate of Delhi, if already obtained by the bidder. If the bidder has not obtained GST registration in the state in which the work is to be taken up, OR as required by GST authority, then in such a case the bidder shall scan and upload following under taking along with other bid documents.  
 "If work is awarded to me, I/We shall obtain GST registration certificate of the state, in which work is to be taken up, within one month from the date of receipt of award letter or before release of any payment by CPWD, which is earlier, failing which I/We be responsible for any delay in payments which will be due towards me/us on a/c of the work executed and /or for any action taken by CPWD or GST department in this regard. The bidder shall also provide acknowledgement of upto date filed return of GST, if available.
  - f) The bidder should have a valid **Electrical Contractor License** issued from any State Government of India. Copy of Electrical Contractor License must be submitted or undertaking by bidder that he would obtain it and submit it alongwith Performance Guarantee or the contractor may associate any electrical agency those who are having valid electrical license.
  - g) Lowest tenderer shall submit, along with the performance guarantee after the acceptance of tender, an undertaking from the authorized signatory of OEM regarding:
    - (i) Authorization Certificate.
    - (ii) The OEM shall unconditionally support the lowest tenderer technically throughout the execution of contract and for 25 years of life of solar PV panels for required performance of the Solar PV System, as well as during defect liability period of 5 years, for the useful life of the system, and
    - (iii) OEM shall provide all the spares required for healthy functioning of the equipment for at least seven years from the date of supply of equipment.
2. The intending bidder must read the terms and conditions of CPWD-6 carefully. He should only submit his bid if he considers himself eligible and he is in possession of all the documents required.
  3. Information and Instructions for bidders posted on website shall form part of bid document.
  4. The bid document consisting of plans, specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents can be seen and downloaded from website [www.tenderwizard.com/cpwd](http://www.tenderwizard.com/cpwd) or [www.cpwd.gov.in](http://www.cpwd.gov.in). The Press Notice is also available on [www.eprocure.gov.in](http://www.eprocure.gov.in)
  5. But the bid can only be submitted after deposition of original EMD either in the office of Executive Engineer (E), DED-102, CPWD, New Delhi inviting bid or Division office of any Executive Engineer, CPWD within the period of bid submission and uploading the mandatory scanned document such as Demand Draft or Pay order or Banker's Cheque or Deposit at call Receipt or Fixed Deposit Receipts and Bank Guarantee of any Scheduled Bank towards EMD (drawn in favour of **Executive Engineer (E), ED-II, CPWD, New Delhi**) receipt for deposition of original EMD instrument to Division office of any Executive Engineer, CPWD and other document as specified.
  6. Those contractors not registered on the website mentioned above, are required to get registered before and. If needed they can be imparted training on online bidding process as per details available on the website.
  7. The intending bidder must have valid class- III digital signature to submit the bid.

8. On opening date, the contractor can login and see the bid opening process. After opening of bids he will receive the competitor bid sheets.
9. Contractor can upload documents in the form of JPG format and PDF format.
10. Certificate of Financial Turn Over: At the time of submission of bid contractor may upload Affidavit/ Certificate from CA mentioning Financial Turnover of last 3 years or for the period as specified in the bid document and further details if required may be asked from the contractor after opening of eligibility bids. There is no need to upload entire voluminous balance sheet.
11. Contractor must ensure to quote percentage rate of works component as given in template. The column meant for quoting percentage rate in figures appears in pink colour and the moment rate is entered, it turns sky blue.

In addition to this, while selecting any of the cells a warning appears that if any cell is left blank the same shall be treated as "0". Therefore, if any cell is left blank and no rate is quoted by the bidder, rate of such item shall be treated as "0" (ZERO). However, if tenderer does not quote any percentage above or below on the total amount of the tender or any section / sub head in percentage tender, **the tender shall be treated as invalid and shall not be considered lowest tender.**

12. The eligibility bid shall be opened first on due date and time as mentioned above. The time and date of opening of technical bid of contractors qualifying the eligibility bid shall be communicated to them at a later date.
13. The Pre- bid conference shall be held in the chamber of Chief Engineer, NDZ-I, Vidyut Bhawan, New Delhi-110001 on **31-12-2019** at 11:00 hrs. to clear the doubt of intending bidders, if any.
14. When bids are invited in three-stage system and if it is desired to submit revised financial bid then it shall be mandatory to submit revised financial bid. If not submitted, then the bid submitted earlier shall become invalid.
15. The department reserves the right to reject any prospective application without assigning any reason and to restrict the list of qualified contractors to any number deemed suitable by it, if too many bids are received satisfying the laid down criterion.

**List of Documents to be scanned and uploaded within the period of bid submission: -**

- (i) Treasury Challan / Demand Draft / Pay order or Banker`s Cheque / Deposit at Call Receipt/FDRof any scheduled Bank against EMD.
- (ii) Copy of receipt for deposition of original EMD issued from Division office of any Executive Engineer, CPWD (In Enclosed Performa)
- (iii) Certificates of Work Experience issued by officers not below the rank of Executive Engineer/ Project Manager or equivalent of the client department clearly indicating 1. Name of work 2. Scope of Work 3. Agreement No. 4. Estimated Cost 5. Tendered Cost 6. Final Value of Work Done 7. Date of Start 8. Stipulated date of Completion 9. Actual date of completion. etc. in case some of above said details are not mentioned in the Completion certificate, the firm shall attach ample proof in support of above details.(Originals shall also be produced for verification if required)
- (iv) Undertakingfrom the bidder that he/ she shall submit a certificate from OEM of Solar PV Panels and Inverters/ PCU for providing technical support for 25 years of life of solar PV panels and 10 years for Inverter/ PCU respectively, at the time of submission of PG.
- (v) Certificate of Financial Turnover from CA.
- (vi) Bank solvency certificate
- (vii) Affidavit as per provisions of clause 1.3 of CPWD-6 for e-tendering.
- (viii) Certificate of registration for GST and acknowledgement of upto date filed return as per NIT stipulation. If the bidder has not obtained GST registration in the the state in which the work is to be taken up, then in such case the bidder shall upload following undertaking with the bid document "If work is awarded to me, I/We shall obtain GST registration certificate within one month from the date of receipt of award letter or before payment of 1<sup>st</sup> R.A. bill."
- (ix) Valid Electrical Contractor License or undertaking that they will either obtain valid electrical license at the time of execution of electrical work or associate the contractor having valid electrical license of appropriate class.
- (x) Any other Documents related to eligiblitybid and technical bid.
- (xi) Any other document as specified in the NIT

**Executive Engineer(E)  
DED-102,CPWD,  
IP Bhawan,New Delhi**

**Receipt of deposition of EMD**

**(Receipt No..... Date.....) #**

1. Name of work: **Supplying, installation, testing and commissioning of on grid roof top Solar Photo Voltaic Power generation system at the Bungalows of Hon'ble Supreme Court Judges, New Delhi**
2. NIT No.: **18/CE/NDZ-1/DED-102/2019-20**
3. Estimated Cost: **Rs. 3,67,00,280/-**
4. Amount of Earnest Money Deposit: **Rs. 7,34,006/-**
5. Last date of submission of bids: **06-01-2020 upto 15:00 Hrs.**

**(\*To be filled in by NIT approving authority/ EE at the time of issue of NIT and uploaded along with NIT)**

1. Name of contractor: - -----
2. Form of EMD: - -----
2. Amount of Earnest Money Deposit: - -----
3. Date of submission of EMD: - -----

Signature, Name and Designation of EMD  
Receiving officer (EE/AE(P)/AE/AAO)  
Along with office stamp

#To be filled in by EMD receiving EE

**PROFORMA FOR EARNEST MONEY (BANK GUARANTEE)**

WHEREAS, contractor..... (Name of contractor) (Hereinafter called "the Contractor") has submitted his tender dated ..... (Date) for the ..... (Name of work) (Hereinafter called "the Tender") KNOW ALL PEOPLE by these presents that we ..... (Name of bank) having our registered office at ..... (Hereinafter called "the Bank") are bound unto DED-102, CPWD, IP Bhawan, New Delhi (Hereinafter called "the Engineer-in-Charge") in the sum of Rs. .... (Rs. in words ..... ) for which payment well and truly to be made to the said Engineer-in-Charge the Bank binds itself, his successors and assigns by these presents. SEALED with the Common Seal of the said Bank this ..... day of ..... 20... .

THE CONDITIONS of this obligation are:

- (1) If after tender opening the Contractor withdraws, his tender during the period of validity of tender (including extended validity of tender) specified in the Form of Tender;
- (2) If the contractor having been notified of the acceptance of his tender by the Engineer-in-Charge:
  - (a) Fails or refuses to execute the Form of Agreement in accordance with the Instructions to contractor, if required; OR
  - (b) Fails or refuses to furnish the Performance Guarantee, in accordance with the provisions of tender document and Instructions to contractor, OR
  - (c) Fails or refuses to start the work, in accordance with the provisions of the contract and Instructions to contractor, OR
  - (d) Fails or refuses to submit fresh Bank Guarantee of an equal amount of this Bank Guarantee, against Security Deposit after award of contract.

We undertake to pay to the Engineer-in-Charge either up to the above amount or part thereof upon receipt of his first written demand, without the Engineer-in-Charge having to substantiates his demand, provided that in his demand the Engineer-in-Charge will note that the amount claimed by his is due to him owing to the occurrence of one or any of the above conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including the date\* ..... after the deadline for submission of tender as such deadline is stated in the Instructions to contractor or as it may be extended by the Engineer-in-Charge, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank not later than the above date.

DATE .....

SIGNATURE OF THE BANK

WITNESS .....

SEAL

(SIGNATURE, NAME AND ADDRESS)

\* Date to be worked out on the basis of validity period of 6 months from last date of receipt of tender.



## FORM OF PERFORMANCE Security (GUARANTEE)

### BANK GUARANTEE BOND

In consideration of the President of India (hereinafter called "The Government") having offered to accept the terms and conditions of the proposed agreement between..... and .....(Hereinafter called "the said Contractor(s)") for the work..... (Hereinafter called "the said agreement") having agreed to production of an irrevocable Bank Guarantee for Rs. .... (Rupees .....only) as a security/guarantee from the contractor(s) for compliance of his obligations in accordance with the terms and conditions in the said agreement.

1. We, .....(Hereinafter referred to as "the Bank") hereby undertake to pay to the Government an amount not exceeding Rs. ....(Rupees.....Only) on demand by the Government.
2. We, .....(indicate the name of the Bank) do hereby undertake to pay the amounts due and payable under this guarantee without any demure, merely on a demand from the Government stating that the amount claimed as required to meet the recoveries due or likely to be due from the said contractor(s). Any such demand made on the bank shall be conclusive as regards the amount due and payable by the bank under this Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. ....(Rupees .....only).
3. We, the said bank further undertake to pay the Government any money so demanded notwithstanding any dispute or disputes raised by the contractor(s) in any suit or proceeding pending before any court or Tribunal relating thereto, our liability under this present being absolute and unequivocal. The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the Contractor(s) shall have no claim against us for making such payment.
4. We, .....(indicate the name of the Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged or till Engineering- Charge on behalf of the Government certified that the terms and conditions of the said agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this guarantee.
5. We, .....(indicate the name of the Bank) further agree with the Government that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligation hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said Contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor(s) or for any forbearance, act of omission on the part of the Government or any indulgence by the Government to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.
6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).
7. We,.....(Indicate the name of the Bank) lastly undertake not to revoke this guarantee except with the previous consent of the Government in writing.
8. This guarantee shall be valid up to .....unless extended on demand by the Government. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to Rs. ....(Rupees .....) and unless a claim in writing is lodged with us within six months of the date of expiry or the extended date of expiry of this guarantee all our liabilities under this guarantee shall stand discharged.

Dated the .....day of .....for.....(indicate the name of the Bank).

## CPWD-6 FOR e-TENDERING

- 1.0 Percentage rate bids are invited on behalf of President of India from specialized agencies / firms in the field of Grid Interactive Solar PV Power Generation System for the work of **“Supplying, installation, testing and commissioning of on grid roof top Solar Photo Voltaic Power generation system at the Bungalows of Hon’ble Supreme Court Judges, New Delhi.”**
- 1.1 The work is estimated to cost Rs. **3,67,00,280/-**-This estimate, however, is given merely as a rough guide.
- 1.2 Intending bidder is eligible contractors provided they produce definite proof from the appropriate authority, which shall be to the satisfaction of the competent authority, of having satisfactorily completed similar works of magnitude specified in **“INFORMATION AND INSTRUCTIONS FOR CONTRACTORS FOR e-TENDERING”**.
- 1.3 **To become eligible for submission of bids, the bidders shall have to furnish an affidavit as under: -**
- “I/We undertake and confirm that eligible similar works(s) has/have not been got executed through another contractor on back to back basis. Further that, if such a violation comes to the notice of Department, then I/we shall be debarred for bidding in CPWD in future forever. Also, if such a violation comes to the notice of Department before date of start of work, the Engineer-in-Charge shall be free to forfeit the entire amount of Earnest Money Deposit/Performance Guarantee. (Scanned copy to be uploaded at the time of submission of bid).
- 2.0 Agreement shall be drawn with the successful bidders on prescribed Form No. CPWD 7 (or other Standard Form as mentioned) which is available as a Govt. of India Publication and also available on website [www.cpwd.gov.in](http://www.cpwd.gov.in) (Edition 2014) Bidders shall quote his rates as per various terms and conditions of the said form which will form part of the agreement.
- 3.0 The time allowed for carrying out the work will be **6 months** from the date of start as defined in schedule ‘F’ or from the first date of handing over of the site, whichever is later, in accordance with the phasing, if any, indicated in the bid documents.
- 4.0 The site for the work is available.
- 5.0 The bid document consisting of plans, specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents except Standard General Conditions of Contract Form can be seen on website [www.tenderwizard.com/CPWD](http://www.tenderwizard.com/CPWD), [www.cpwd.gov.in](http://www.cpwd.gov.in) & [www.eprocure.gov.in](http://www.eprocure.gov.in) free of cost.
- 6.0 While submitting the revised bid, contractor can revise the percentage quoted on estimated cost any number of times but before last time and date of submission of bid as notified.
- 7.0 When bids are invited in two/ three stage system and if it is desired to submit revised financial bid then it shall be mandatory to submit revised financial bid. If not submitted then the bid submitted earlier shall become invalid.
- 8.0 Earnest Money in the form of Treasury Challan or Demand Draft or Pay order or Banker`s Cheque or Deposit at Call Receipt or Fixed Deposit Receipt (drawn in favour of **Executive Engineer (E), ED-II, CPWD, New Delhi.**) shall be scanned and uploaded to the e-tendering website within the period of bid submission.

**The original EMD should be deposited either in the office of Executive Engineer (E), DED-102, CPWD, New Delhi inviting bids or Division office of any Executive Engineer, CPWD within the period of bid submission. The EMD receiving Executive**

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Correction -Nil      Omission – Nil      Addition – Nil      AE(P)      EE(P)

**Engineer shall issue a receipt of deposition of earnest money deposit to the bidder in a prescribed format (enclosed) uploaded by tender inviting EE in the NIT.**

**This receipt shall also be uploaded to the e-tendering website by the intending bidder upto the specified bid submission date and time.**

A part of earnest money is acceptable in the form of bank guarantee also. In such case, 50% of earnest money or Rs. 20 lakh, whichever is less, shall have to be deposited in shape prescribed above, and balance may be deposited in shape of Bank Guarantee of any scheduled Bank having validity for 6 months or more from the last date of receipt of bids which is to be scanned and uploaded by the intending bidders.

Copy of certificate of work experience and other documents as specified in the press notice/ NIT shall be scanned and uploaded to the e-tendering website within the period of bid submission.

Online bid documents submitted by intending bidders shall be opened only of those bidders, **whose original EMD deposited with any Division of CPWD** and other documents scanned and uploaded are found in order.

**The bid submitted shall be opened at 03:30 PM on 06-01-2020.**

9.0 **The bid submitted shall become invalid if:**

- (i) The bidder is found ineligible.
- (ii) The bidder does not deposit original EMD with Division office of **any Executive Engineer, CPWD.**
- (iii) The Bidder does not upload all the documents (including GST Registration. If the bidder has not obtained GST registration in the state in which the work is to be taken up, then in such a case the bidder shall upload the undertaking with the bid document, that "If work is awarded to me, I/we shall obtain GST registration certificate within one month from date of receipt of award letter or before payment of 1st R.A. Bill") as stipulated in the bid document including the copy of receipt for deposition of original EMD instrument.

10.0 The time & date of opening of financial bid of contractors qualifying the technical bid shall be communicated to them at a later date.

11.0 The contractor whose bid is accepted, will be required to furnish performance guarantee of 5% (Five Percent) of the bidden amount, drawn in favour of **Executive Engineer (E), ED-II, CPWD, New Delhi**, within the period specified in Schedule F. This guarantee shall be in the form of cash (in case guarantee amount is less than Rs. 10000/-) or Deposit at Call receipt of any scheduled bank/Banker's cheque of any scheduled bank/Demand Draft of any scheduled bank/Pay order of any Scheduled Bank of any scheduled bank (in case guarantee amount is less than Rs. 1,00,000/-) or Government Securities or Fixed Deposit Receipts or Guarantee Bonds of any Scheduled Bank or the State Bank of India in accordance with the prescribed form. In case the contractor fails to deposit the said performance guarantee within the period as indicated in Schedule 'F'. including the extended period if any, the Earnest Money deposited by the contractor shall be forfeited automatically without any notice to the contractor. The Earnest Money deposited along with tender shall be returned after receiving the aforesaid performance guarantee. **The Contractor whose bid is accepted will also be required to furnish either copy of applicable licenses/registrations or proof of applying for obtaining labour licenses, registration with EPFO, ESIC and BOCW Welfare Board and Programme Chart (Time and Progress) within the period specified in Schedule F.**

12.0 Intending bidders are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their bids as to the nature of the ground and sub-soil

(so far as is practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid. A bidder shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charge consequent on any misunderstanding or otherwise shall be allowed. The bidders 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 bid by a bidder 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 and of conditions and rates at which stores, tools and plant, etc. will be issued to him by the Government and local conditions and other factors having a bearing on the execution of the work.

- 13.0 The competent authority on behalf of the President of India does not bind itself to accept the lowest or any other bid and reserves to itself the authority to reject any or all the bids received without the assignment of any reason. All bid in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the bidders shall be summarily rejected.
- 14.0 Canvassing whether directly or indirectly, in connection with bidders is strictly prohibited and the bid submitted by the contractors who resort to canvassing will be liable to rejection.
- 15.0 The competent authority on behalf of President of India reserves to himself the right of accepting the whole or any part of the bid and the bidders shall be bound to perform the same at the rate quoted.
- 16.0 The contractor shall not be permitted to bid for works in the CPWD Circle (Division in case of contractors of Horticulture/Nursery category) responsible for award and execution of contracts, in which his near relative is posted a Divisional Accountant or as an officer in any capacity between the grades of Superintending Engineer to Junior Engineer (both inclusive). He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any gazette officer in the Central Public Works Department or in the Ministry of Urban Development. Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of this Department.
- 17.0 No Engineer of Gazetted Rank or other Gazetted Officer employed in Engineering or Administrative duties in an Engineering Department of the Government of India is allowed to work as a contractor for a period of one year after his retirement from Government service, without the previous permission of the Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found any time to be such a person who had not obtained the permission of the Government of India as aforesaid before submission of the bid or engagement in the contractor's service.
- 18.0 The bid for the works shall remain open for acceptance for a period of Seventy Five(75) days from the date of opening of technical bid ,if any bidder withdraws his bid before the said period or issue of letter of acceptance, whichever is earlier, or makes any modifications in the terms and conditions of the bid which are not acceptable to the department, then the Government shall, without prejudice to any other right or remedy, be at liberty to forfeit 50% of the said earnest money as aforesaid. Further the bider shall not be allowed to participate in the rebidding process of the work.
- 19.0 This notice inviting Bid shall form a part of the contract document. The successful bidders/contractor, on acceptance of his bid by the Accepting Authority shall within 15 days from the stipulated date of start of the work, sign the contract consisting of: -

- a) The Notice Inviting Bid, all the documents including additional conditions, specifications and drawings, if any, forming the bid as issued at the time of invitation of bid and acceptance thereof together with any correspondence leading thereto.
- b) Standard C.P.W.D. Form7 of year 2014 with upto date correction slips or other Standard C.P.W.D. Form as applicable.

**Executive Engineer(E)**  
**DED-102,CPWD,**  
**IP Bhawan, New Delhi**

**INTEGRITY PACT**

To,

.....  
.....  
.....  
.....

Sub: NIT No. **18/CE/NDZ-1/DED-102/2019-20** for the work **“Supplying, installation, testing and commissioning of on grid roof top Solar Photo Voltaic Power generation system at the Bungalows of hon’ble Supreme Court Judges, New Delhi**

Dear Sir,

It is here by declared that CPWD is committed to follow the principle of transparency, equity and competitiveness in public procurement.

The subject Notice Inviting Bid (NIT) is an invitation to offer made on the condition that the Bidder will sign the integrity Agreement, which is an integral part of bid/bid documents, failing which the bider/bidder will stand disqualified from the bidding process and the bid of the bidder would be summarily rejected.

This declaration shall form part and parcel of the Integrity Agreement and signing of the same shall be deemed as acceptance and signing of the Integrity Agreement on behalf of the CPWD.

Yours faithfully

**Executive Engineer(E)  
DED-102, CPWD,  
IP Bhawan, New Delhi**

## INTEGRITY PACT

To,

**Executive Engineer(E)  
DED-102, CPWD,  
IP Bhawan, New Delhi- 110002.**

**Sub:** Submission of Bid for the work of-**Supplying, installation, testing and commissioning of on grid roof top Solar Photo Voltaic Power generation system at the Bungalows of Hon'ble Supreme Court Judges, New Delhi.**

Dear Sir,

I/We acknowledge that CPWD is committed to follow the principles thereof as enumerated in the Integrity Agreement enclosed with the bid/bid document.

I/We agree that the Notice Inviting Bid (NIT) is an invitation to offer made on the condition that I/We will sign the enclosed integrity Agreement, which is an integral part of bid documents, failing which I/We will stand disqualified from the bidding process. I/We acknowledge that THE MAKING OF THE BID SHALL BE REGARDED AS AN UNCONDITIONAL AND ABSOLUTE ACCEPTANCE of this condition of the NIT.

I/We confirm acceptance and compliance with the Integrity Agreement in letter and spirit and further agree that execution of the said Integrity Agreement shall be separate and distinct from the main contract, which will come into existence when bid/bid is finally accepted by CPWD. I/We acknowledge and accept the duration of the Integrity Agreement, which shall be in the line with Article 1 of the enclosed Integrity Agreement.

I/We acknowledge that in the event of my/our failure to sign and accept the Integrity Agreement, while submitting the bid, CPWD shall have unqualified, absolute and unfettered right to disqualify the bidder and reject the bid/bid in accordance with terms and conditions of the bid.

Yours faithfully

(Duly authorized signatory of the Bidder)

**To be signed by the bidder and same signatory competent / authorised to sign the relevant contract on behalf of CPWD.**

**INTEGRITY AGREEMENT**

This Integrity Agreement is made at ..... on this ..... day of .....20.....

**BETWEEN**

President of India represented through **Executive Engineer (E), DED-102,NDZ-1, CPWD,IP Bhawan, New Delhi**. (Hereinafter referred as the '**Principal/Owner**', which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns)

**AND**

.....  
(Name and Address of the Individual/firm/Company)

through..... (Hereinafter referred to as the Details of duly authorized signatory)

**"Bidder/Contractor"** and which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns)

**Preamble**

WHEREAS the Principal / Owner has floated the Bid (18/NDZ-1/DED-102/2019-20) (hereinafter referred to as "Bid/Bid") and intends to award, under laid down organizational procedure, contract for **"Supplying, installation, testing and commissioning of on grid roof top Solar Photo Voltaic Power generation system at the Bungalows of hon'ble Supreme Court Judges, New Delhi**.

Hereinafter referred to as the **"Contract"**.

AND WHEREAS the Principal/Owner values full compliance with all relevant laws of the land, rules, regulations, economic use of resources and of fairness/transparency in its relation with its Bidder(s) and Contractor(s).

AND WHEREAS to meet the purpose aforesaid both the parties have agreed to enter into this Integrity Agreement (hereinafter referred to as **"Integrity Pact" or "Pact"**), the terms and conditions of which shall also be read as integral part and parcel of the Bid documents and Contract between the parties.

NOW, THEREFORE, in consideration of mutual covenants contained in this Pact, the parties hereby agree as follows and this Pact witnesses as under:

**Article 1: Commitment of the Principal/Owner**

- 1) The Principal/Owner commits itself to take all measures necessary to prevent corruption and to observe the following principles:



- (a) No employee of the Principal/Owner, personally or through any of his/her family members, will in connection with the Bid, or the execution of the Contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
  - (b) The Principal/Owner will, during the Bid process, treat all Bidder(s) with equity and reason. The Principal/Owner will, in particular, before and during the Bid process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the Bid process or the Contract execution.
  - (c) The Principal/Owner shall endeavour to exclude from the Bid process any person, whose conduct in the past has been of biased nature.
- 2) If the Principal/Owner obtains information on the conduct of any of its employees which is a criminal offence under the Indian Penal code (IPC)/Prevention of Corruption Act, 1988 (PC Act) or is in violation of the principles herein mentioned or if there be a substantive suspicion in this regard, the Principal/Owner will inform the Chief Vigilance Officer and in addition can also initiate disciplinary actions as per its internal laid down policies and procedures.

**Article 2: Commitment of the Bidder(s)/Contractor(s)**

- 1) It is required that each Bidder/Contractor (including their respective officers, employees and agents) adhere to the highest ethical standards, and report to the Government / Department all suspected acts of fraud or corruption or Coercion or Collusion of which it has knowledge or becomes aware, during the bidding process and throughout the negotiation or award of a contract.
- 2) The Bidder(s)/Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the Bid process and during the Contract execution:
  - a) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal/Owner's employees involved in the Bid process or execution of the Contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the Bid process or during the execution of the Contract.
  - b) The Bidder(s)/Contractor(s) will not enter with other Bidder(s) into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to cartelize in the bidding process.
  - c) The Bidder(s)/Contractor(s) will not commit any offence under the relevant IPC/PC Act. Further the Bidder(s)/Contractor(s) will not use improperly, (for the purpose of competition or personal gain), or pass on to others, any information or documents provided by the Principal/Owner as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
  - d) The Bidder(s)/Contractor(s) of foreign origin shall disclose the names and addresses of agents/representatives in India, if any. Similarly Bidder(s)/Contractor(s) of Indian

Nationality shall disclose names and addresses of foreign agents/representatives, if any. Either the Indian agent on behalf of the foreign principal or the foreign principal directly could bid in a bid but not both. Further, in cases where an agent participate in a bid on behalf of one manufacturer, he shall not be allowed to quote on behalf of another manufacturer along with the first manufacturer in a subsequent/parallel bid for the same item.

- e) The Bidder(s)/Contractor(s) will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the Contract.
- 3) The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.
- 4) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm indulge in fraudulent practice **means a willful misrepresentation or omission of facts or submission of fake/forged documents in order to induce public official to act in reliance thereof, with the purpose of obtaining unjust advantage by or causing damage to justified interest of others and/or to influence the procurement process to the detriment of the Government interests.**
- 5) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm use Coercive Practices (means the act of obtaining something, compelling an action or influencing a decision through intimidation, threat or the use of force directly or indirectly, where potential or actual injury may befall upon a person, his/ her reputation or property to influence their participation in the bidding process).

### **Article 3: Consequences of Breach**

Without prejudice to any rights that may be available to the Principal/Owner under law or the Contract or its established policies and laid down procedures, the Principal/Owner shall have the following rights in case of breach of this Integrity Pact by the Bidder(s)/Contractor(s) and the Bidder/ Contractor accepts and undertakes to respect and uphold the Principal/Owner's absolute right:

- 1) If the Bidder(s)/Contractor(s), either before award or during execution of Contract has committed a transgression through a violation of Article 2 above or in any other form, such as to put his reliability or credibility in question, the Principal/Owner after giving 14 days notice to the contractor shall have powers to disqualify the Bidder(s)/Contractor(s) from the Bid process or terminate/determine the Contract, if already executed or exclude the Bidder/Contractor from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of transgression and determined by the Principal/Owner. **Such exclusion may be forever or for a limited period as decided by the Principal/Owner.**
- 2) **Forfeiture of EMD/Performance Guarantee/Security Deposit:** If the Principal/Owner has disqualified the Bidder(s) from the Bid process prior to the award of the Contract or terminated/determined the Contract or has accrued the right to terminate/determine the Contract according to Article 3(1), the Principal/Owner apart from exercising any legal rights that may have accrued to the Principal/Owner, may in its considered opinion forfeit the entire amount of Earnest Money Deposit, Performance Guarantee and Security Deposit of the Bidder/Contractor.

- 3) **Criminal Liability:** If the Principal/Owner obtains knowledge of conduct of a Bidder or Contractor, or of an employee or a representative or an associate of a Bidder or Contractor which constitutes corruption within the meaning of IPC Act, or if the Principal/Owner has substantive suspicion in this regard, the Principal/Owner will inform the same to law enforcing agencies for further investigation.

#### **Article 4: Previous Transgression**

- 1) The Bidder declares that no previous transgressions occurred in the last 5 years with any other Company in any country confirming to the anticorruption approach or with Central Government or State Government or any other Central/State Public Sector Enterprises in India that could justify his exclusion from the Bid process.
- 2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the Bid process or action can be taken for banning of business dealings/ holiday listing of the Bidder/Contractor as deemed fit by the Principal/ Owner.
- 3) If the Bidder/Contractor can prove that he has resorted / recouped the damage caused by him and has installed a suitable corruption prevention system, the Principal/Owner may, at its own discretion, revoke the exclusion prematurely.

#### **Article 5: Equal Treatment of all Bidders/Contractors/Subcontractors**

- 1) The Bidder(s)/Contractor(s) undertake(s) to demand from all subcontractors a commitment in conformity with this Integrity Pact. The Bidder/Contractor shall be responsible for any violation(s) of the principles laid down in this agreement/Pact by any of its Sub contractors/sub-vendors.
- 2) The Principal/Owner will enter into Pacts on identical terms as this one with all Bidders and Contractors.
- 3) The Principal/Owner will disqualify Bidders, who do not submit, the duly signed Pact between the Principal/Owner and the bidder, along with the Bid or violate its provisions at any stage of the Bid process, from the Bid process.

#### **Article 6- Duration of the Pact**

This Pact begins when both the parties have legally signed it. It expires for the Contractor/Vendor 145 Days after the completion of work under the contract or till the continuation of defect liability period, whichever is more and for all other bidders, till the Contract has been awarded.

If any claim is made/lodged during the time, the same shall be binding and continue to be valid despite the lapse of this Pacts as specified above, unless it is discharged/determined by the Competent Authority, CPWD.

#### **Article 7- Other Provisions**

- 1) This Pact is subject to Indian Law, place of performance and jurisdiction is the **Head quarters of the Division** of the Principal/Owner, who has floated the Bid.
- 2) Changes and supplements need to be made in writing. Side agreements have not been made.

- 3) If the Contractor is a partnership or a consortium, this Pact must be signed by all the partners or by one or more partner holding power of attorney signed by all partners and consortium members. In case of a Company, the Pact must be signed by a representative duly authorized by board resolution.
- 4) Should one or several provisions of this Pact turn out to be invalid; the remainder of this Pact remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
- 5) It is agreed term and condition that any dispute or difference arising between the parties with regard to the terms of this Integrity Agreement / Pact, any action taken by the Owner/Principal in accordance with **this Integrity Agreement/ Pact or interpretation thereof shall not be subject to arbitration.**

**Article 8- LEGAL AND PRIOR RIGHTS**

All rights and remedies of the parties hereto shall be in addition to all the other legal rights and remedies belonging to such parties under the Contract and/or law and the same shall be deemed to be cumulative and not alternative to such legal rights and remedies aforesaid. For the sake of brevity, both the Parties agree that this Integrity Pact will have precedence over the Bid/Contact documents with regard any of the provisions covered under this Integrity Pact.

IN WITNESS WHEREOF the parties have signed and executed this Integrity Pact at the place and date first above mentioned in the presence of following witnesses:

.....

(For and on behalf of Principal/Owner)

.....

(For and on behalf of Bidder/Contractor)

WITNESSES:

1. ....

(signature, name and address)

2. ....

(signature, name and address)

Place:

Dated :

**GOVERNMENT OF INDIA  
CENTRAL PUBLIC WORKS DEPARTMENT**

STATE	<b>Delhi</b>	ZONE	<b>NDZ –I</b>
BRANCH	<b>E&amp;M</b>	DIVISION	<b>DED-102</b>

**Percentage Rate Tender & Contract for Works**

**Tender for the work of : Supplying, installation, testing and commissioning of on grid roof top Solar Photo Voltaic Power generation system at the Bungalows of Hon'ble Supreme Court Judges, New Delhi.**

- (i) Tender to be uploaded online by 15:00 hrs. on 06-01-2020.
- (ii) Eligibility criteria documents to be opened online in presence of tenderers who may be present at 15:30 hrs. on 06-01-2020 in the office of **The Executive Engineer (Elect), DED-102,IP Bhawan, New Delhi.**
- (iii) The time and date of opening of the Technical bid & Price bid shall be intimated later on by the **The Executive Engineer (Elect), DED-102,IP Bhawan, New Delhi.**

**TENDER**

I/We have read and examined the notice inviting tender, schedule, A, B, C, D, E & F Specifications applicable, Drawings & Designs, General Rules and Directions, Conditions of Contract, clauses of contract, Special conditions, Schedule of Rate & other documents and Rules referred to in the conditions of contract and all other contents in the tender document for the work.

I/We hereby tender for the execution of the work specified for the President of India within the time specified in Schedule 'F' viz., schedule of quantities and in accordance in all respect with the specifications, designs, drawing and instructions in writing referred to in Rule-1 of General Rules and Directions and in Clause 11 of the Conditions of contract and with such materials as are provided for, by, and in respect of accordance with, such conditions so far as applicable.

We agree to keep the tender open for Seventy (75) days from the date of opening of technical bid and not to make any modification in its terms and conditions.

A sum of **Rs. 7,34,006/-** is hereby forwarded in cash/receipt treasury Challan / deposit at call receipt of a scheduled bank/fixed deposit receipt of scheduled bank/demand draft of a scheduled bank/bank guarantee issued by a scheduled bank as earnest money. If I/We, fail to furnish the prescribed performance guarantee within prescribed period. I/We agree that the said President of India or his successors, in office shall without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money absolutely. Further, if I/We fail to commence work as specified, I/We agree that President of India or the successors in office shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the said earnest money and the performance guarantee absolutely, otherwise the said earnest money shall be retained by him

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Correction -Nil	Omission – Nil	Addition – Nil	AE(P)	EE(P)
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towards security deposit to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to those in excess of that limit at the rates to be determined in accordance with the provision contained in Clause 12.2 and 12.3 of the tender form.

Further, I/We agree that in case of forfeiture of Earnest Money & Performance Guarantee as aforesaid. I/We shall be debarred for participation in the re-tendering process of the work.

I/We undertake and confirm that eligible similar work(s) has/have not been got executed through another contractor on back to back basis. Further that, if such a violation comes to the notice of Department, then I / we shall be debarred for tendering in CPWD in future forever. Also, if such a violation comes to the notice of Department before date of start of work, the Engineer-in-Charge shall be free to forfeit the entire amount of Earnest Money Deposit/Performance Guarantee.

I/We hereby declare that I/We shall treat the tender documents drawings and other records connected with the work as secret/confidential documents and shall not communicate information/derived there from to any person other than a person to whom I/We am/are authorized to communicate the same or use the information in any manner prejudicial to the safety of the State.

**Dated:**

**Signature of Contractor**

**Witness:**

**Postal Address:**

**Address:**

**Occupation:**

**ACCEPTANCE**

The above tender (as modified by you as provided in the letters mentioned hereunder) is accepted by me for an on behalf of the President of India for a sum of Rs.....(Rupees .....).

The letters referred to below shall form part of this contract agreement: -

- (a)
- (b)
- (c)

**For & on behalf of President of India**

**Signature .....**

**Dated:**

**Designation .....**

## PROFORMA OF SCHEDULES

### SCHEDULE 'A'

Schedule of quantities	:	Pages 61-67 As per schedule of work & terms & conditions attached
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### SCHEDULE 'B'

Schedule of materials to be issued to the contractor: -

S. No.	Description of item	Quantity	Rates in figures & words at which the material will be charged to the contractor	Place of issue
1	2	3	4	5
—	→	NIL	←	—

### SCHEDULE 'C'

S. No.	Description	Hire charges per day	Place of issue
1	2	3	4
—	→	NIL ←	—

### SCHEDULE 'D'

Extra schedule for specific requirements/document for the work, if any:	:	Special Conditions, Technical Specifications and Terms & Conditions Enclosed
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### SCHEDULE 'E'

Reference to General Conditions of contract	:	General conditions of contract for CPWD works-2014 with amendment issued upto date of submission of tender.
Name of Work	:	Supplying, installation, testing and commissioning of on grid roof top Solar Photo Voltaic Power generation system at the Bungalows of Hon'ble Supreme Court Judges, New Delhi
Estimated cost of work	:	Rs. <b>3,67,00,280/-</b>
(i) Earnest Money	:	Rs. <b>7,34,006/-</b>
(ii) Performance Guarantee	:	5% of tendered value
(iii) Security Deposit	:	2.5% of contract amount of work Subject to maximum of 5% of awarded cost of work

### SCHEDULE 'F'

GENERAL RULES & DIRECTIONS		
Officer inviting tender	:	Executive Engineer (E), DED-102, CPWD, New Delhi or his Successor
Maximum percentage for quantity of items of work to be executed beyond which rates are to be determined in accordance with Clauses 12.2 & 12.3.	:	See below



2(v)	Engineer -in- Charge	:	Executive Engineer (E), DED-102, CPWD, New Delhi or his Successor
2(viii)	Accepting Authority	:	Chief Engineer, NDZ-I, CPWD, New Delhi, or his successor
2(x)	Percentage on cost of materials and Labour to cover all overheads and profits	:	15%
2(xi)	Standard Schedule of Rates	:	DSR 2018 for E&M works Market Rate and minimum wages of Govt. of India.
2(xii)	Department	:	Central Public Works Department
9(ii)	Standard CPWD Contract Form	:	GCC 2014, CPWD form 7 as modified and corrected up to last date of receipt of tender

Clause 1			
(i)	Time allowed for submission of Performance Guarantee, Programme Chart (Time and Progress) and applicable labour licenses, registration with EPFO, ESIC and BOCW Welfare Board or proof of applying thereof from the date of issue of letter of acceptance, in days.	:	10 days
(ii)	Maximum allowable extension with late fee @ 0.1% per day of performance guarantee amount beyond the period provided in (i) above.	:	05 days
Clause 2			
Authority for fixing compensation under clause-2		:	Chief Engineer, NDZ-I, CPWD, New Delhi or his successor
Clause 2A			
Whether Clause 2A shall be applicable		:	No
Clause 5			
Number of days from the date of issue of letter of acceptance for reckoning date of start		:	15 days

**Table of Milestones**

S.No.	Description of milestone (Physical)	Time allowed in days (from date of start)	Amount to be with held in case of non achievement of milestone (of agreement amount)
1	Submission of drawings & design(*)	10 days	½ %
2	Placement of orders for procurement for equipments & materials	20 days	1 %
3	Laying of cables & wires	2 months	1 %
4	Completion of Procurement of equipment & materials at site	4 months	1 %
5	Erection of equipments and accessories	5 months	1 %
6	Trial run & handing over	6 months	½%

(\*) NOTE: Drawing shall be approved within 10 days of submission of drawings.

NOTE:

1. Withheld amount shall be released if and when subsequent milestone is achieved within respective time specified. However, in case milestones are not achieved by the Bidder for the work, the amount shown against milestone shall be withheld.
2. Intending bidder may submit phasing of activities/milestones based on their resources and methodology at the time of bidding corresponding to physical milestones/stages indicated in the above table. These shall be formed part of the agreement after approval of the accepting authority, otherwise it would be assumed that agency agrees with the above-mentioned physical milestones.

Time allowed for execution of work		:	6 months
Authority to decide			
(i)	Extension of time	:	Chief Engineer, NDZ-I, CPWD, New Delhi or hissuccessor
(ii)	Rescheduling of mile stones	:	Chief Engineer, NDZ-I, CPWD, New Delhi or hissuccessor
(iii)	Shifting of date of start in case of start in case of delay in handing over of site	:	Chief Engineer, NDZ-I, CPWD, New Delhi or hissuccessor
Clause 5.1			
The Contractor shall submit a programme chart (Time and Progress) for each mile stone within 10 days of award of works along with performance guarantee and get it approved by the Department. The work program shall include all details of balance drawings and decision requires completing the contract with specific dates by which these details are required by contractor without causing any delay in execution of work.			

Clause 5.4			
The form of application by the contractor for seeking rescheduling of milestones or seeking extension of time		:	Annexure-C1 & C2 (P – 29&30 )
Schedule of rate of recovery for delay in submission of modified programme		:	Rs.2500/- per day
Clause 6, 6A			
Clause applicable - (6 or 6A)		:	6A
Clause 7			
Gross work to be done together with net payment /adjustment of advances for material collected, if any, since the last such payment for being eligible to interim payment		:	Rs. 50 Lakh
Clause 7A			
Whether Clause 7A shall be applicable		:	Yes
Clause 10A			
List of testing equipment to be provided by the contractor at site lab.		:	NA
Clause 10B (ii)			
Whether Clause 10 B (ii) shall be applicable		:	No
Clause 10C			
Component of labour expressed as percent of value of work		:	25%

Clause 10CA		: Not applicable	
<b>Clause 10 CC</b>			
Clause 10 CC to be applicable in contracts with stipulated period of completion exceeding the period shown in next column		:	<b>12 months</b>
Schedule of component of other Materials, Labour, POL etc. for price escalation. Component of civil (except materials covered under clause 10CA) /Electrical construction Materials expressed as percentage of total value of work.		:	X m NIL %
Component of Labour			
Expressed as percentage of total value of work.		:	Y NIL%
Component of P.O.L.			
Expressed as percentage of total value of work.		:	Z NIL %
<b>Clause 11</b>			
Specifications to be followed for execution of work		:	a. CPWD General Specifications for Electrical work Part I Internal - 2013, amended upto date. b. CPWD General Specifications for Electrical work Part II External -1994, amended upto date.
<b>Clause 12</b>			
Type of work		:	Original work
<b>Clause 12.2. &amp; 12.3</b> Deviation Limit beyond which clauses 12.2 & 12.3 shall apply for building work		:	30%
<b>Clause 12.5</b>			
(i)	Deviation limit beyond which clause 12.2 & 12.3 shall apply for all items other than earth work items as mentioned in clause 12.5	:	30%
(ii)	Deviation limit beyond which clause 12.2 & 12.3 shall apply for earth work	:	100%
<b>Clause 13</b>			
Competent Authority for deciding reduced rates		:	Chief Engineer, NDZ-I, CPWD, New Delhi or his successor
<b>Clause 18</b>			
List of mandatory machinery, tools & plants to be deployed by the contractor at site		:	<b>Electrical works:</b> 1. Earth Tester 2. Megger 500 V 3. Line Tester 4. Test Lamp 5. Die & Vice 6. Chase Cutting Machine 7. Crimping Tools 8. Tong Tester and /or as per requirement at site / as per the contract provisions and as per direction of Engineer-in-charge.
<b>Clause 25</b>			
Constitution of Dispute Redressal Committee			Competent Authority to appoint DRC

<p><b>(For all claims in dispute)</b>  Chairman: CE, NDZ-II, New Delhi  Member Secretary: CE, NDZ-I, New Delhi  Member-I : SE (Works &amp; TLQA) RD  Member-II : SE, Delhi Circle-1,  EE (E), DED-102 shall present the case before DRC but shall not have any part in decision making.</p>	<p>ADR(RD), CPWD, New Delhi</p>
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**Clause 36 (i)**

Requirement of Technical Representative(s) and recovery Rate: -

S.No.	Designation (Principal Technical/ Technical Representative)	Requirement of Technical Staff		Minimum Experience	Rate at which recovery shall be made from the Contractor in the event of not fulfilling provision of Clause 36(i)
		Qualification	No.		
1	Project Manager cum Planning/Quality / Site/ Billing Engineer	Graduate/ Diploma Engineer (E&M)	1+1	2 or 5 years for Graduate & Diploma Respectively	Rs. 15,000/- (Rupees Fifteen thousand only) per month

Assistant Engineers retired from Government services that are holding Diploma will be treated at par with Graduate Engineers.

Diploma holder with minimum 10 year relevant experience with a reputed construction co. can be treated at par with Graduate Engineer for the purpose of such deployment subject to the condition that such diploma holder should not exceed 50% of requirement of degree engineers.

**Executive Engineer(E)**  
**DED-102, CPWD,**  
**IP Bhawan, New Delhi.**

**ANNEXURE-C 1**

**Form of Application by the Contractor for seeking Extension of Time**

1. Name of Contractor:
2. Name of work as given in the agreement:
3. Agreement No. :
4. Estimated amount put tender:
5. Date of commencement of works as per agreement:
6. Period allowed for completion of work as per agreement:
7. Date of completion stipulated in agreement:
8. Period for which extension of time if has been given by authority in Schedule "F" Previously :

	EE's Letter No. and date	Extension granted	
		Months	Days
(a) 1 <sup>st</sup> Extension			
(b) 2 <sup>nd</sup> Extension			
I 3 <sup>rd</sup> Extension			
(d) Total extension previously given			

9. Reasons for which extension have been previously given (Copies of the previous applications should be attached) :
10. Period for which extension if applied:
11. Hindrances on account of which extension is applied for which dates on which hindrances occurred and the period for which these are likely to last (for causes under clause 5.2/ and 5.3):  
Submitted to the authority indicated in Schedule "F" with copy to the Engineer –in –Charge

**ANNEXURE-C 2**

**Form of Application by the Contractor for seeking Rescheduling of Milestones**

1. Name of Contractor:
2. Name of work as given in the agreement:
3. Agreement No. :
4. Estimated amount put tender:
5. Date of commencement of works as per agreement:
6. Period allowed for completion of work as per agreement:
7. Date of completion stipulated in agreement:
8. Rescheduling of milestones done previously:

	EE's Letter No. and date	Rescheduling of Milestones Done	
		Original date	Rescheduled date
(A) 1 <sup>st</sup> Milestone			
(B) 2 <sup>nd</sup> Milestone			

Milestone No. for which Rescheduling is applied	Original/Rescheduled Date	Details and Period of Hindrances	Comments of Executive Engineer	Proposed Rescheduled Date of
(A) 1 <sup>st</sup> Milestone				
(B) 2 <sup>nd</sup> Milestone				

Submitted to the Sub Divisional Officer

**Signature of Contractor Dated.**

## General, Commercial and Additional Conditions

### 1.0 General

1.1 This specification covers manufacture, testing as may be necessary before dispatch, delivery at site, all preparatory work, assembly and installation, commissioning putting into operation of Electrical installations.

### 1.2 Location:

**Work shall be carried out at the bungalows in LBZ Area, New Delhi.**

1.3 The work shall be executed as per CPWD General Specifications for Electrical Works Part-I (internal) 2013, Part-II (external) 1994, and Part-IV (sub-station) 2013 as amended upto date, relevant I.E. Rules, BIS/IES and as per directions of Engineer-in-charge. These additional specifications/conditions are to be read in conjunction with above and in case of variations; specifications given in these additional conditions shall apply. However, nothing extra shall be paid on account of these additional specifications and conditions, as the same are to be read along with schedule of quantities for the work.

1.4 The tenderer should in his own interest visit the site and get familiarize with the site conditions before tendering.

1.5 No T&P shall be issued by the Department and nothing extra shall be paid on account of this.

1.6 The firms shall be responsible for providing the system fulfilling the specifications capacity and all other related requirement of system ensuring compatibility between different items of work.

1.7 The firm shall be required to supply all the items of same make (among the list of approved makes) wherever available to ensure compatibility, proper matching and ease of maintenance.

1.8 Department reserves the right to accept the upgraded version of various items, if there is technological advancement with reference to these makes/models. The decision of department in this reference shall be final and binding on the firms.

1.9 The contractor shall discuss with EE(E) or his authorized representative / visit the site before placing the supply order / delivery of materials at site as per actual requirement **as the actual Quantity of materials required may deviate (+/-) from the quantity taken in the schedule of Work/inventory of the agreement.**

### 2.0 Commercial conditions

#### 2.1 Type of contract

The work to be awarded by this tender shall be treated as indivisible works contract.

#### 2.2 Submission of Tenders: -

2.2.1 Percentage rate tender in three-bid system.

##### 2.2.1 Stage-I : Opening of Eligibility bid.

Eligibility criteria documents as per NIT shall be opened first on the due date and time, as specified in form CPWD-6 and "INFORMATION AND INSTRUCTIONS FOR BIDDERS FOR e-TENDERING" in the presence of tenderers or their authorized representatives who wish to remain present.

##### 2.2.3 Stage-II : Opening of Technical Bid

The technical bid of only those firm(s), who have been found to be eligible for this tender and approved by competent authority, shall be opened. The date of opening of technical bid shall

be communicated to only eligible bidders, who have been declared eligible by competent authority. Issue of clarifications, if any, shall be done by the department.

#### 2.2.4 **Stage –III: Opening of Price Bid**

“Price Bid” of only those agencies shall be opened whose technical bid papers are found in order. The date and time of downloading of the “Financial Bid” shall be communicated at a later date to bidder. The EMD of those firms who do not fulfill the eligibility criteria and are also not approved by the competent authority, will be returned back to the firm without any interest & their “Financial Bid” shall not be opened.

2.3 Part - II Technical–cum-Commercial Bid should be complete with the following document: -

2.3.1 Complete tender document Part- II Technical-cum-commercial bid

2.3.2 Deviation, if any from NIT specifications should be clearly brought out.

2.3.3 Complete technical particulars of all equipments & materials as per proforma

2.3.4 Technical Literature and catalogues of all equipments etc.

2.4 Scrutiny / evaluation of the Technical-cum-commercial bid shall be done by the department in consultation with any agency as deemed necessary. After scrutiny/evaluation of the technical particulars received from the firms, technical details shall be finalized by the department, which will be final and binding on the all the participating firm(s). Firm(s) will have to quote their rates in price bid accordingly.

2.5 Necessary clarifications required by the department shall have to be furnished by the tenderer within the time given by the department for the same. The tenderer will have to depute his representative to discuss with the officer(s) of the department as when so desired. In case, in the opinion of the department the tenderer is taking undue long time in furnishing the desired clarifications, the technical & commercial conditions/ specifications shall be finalised ex-parte by the department which will be binding on all firms.

2.6 After obtaining clarifications from all the tenderer, the department may modify the Technical & Commercial Conditions/Specifications, if required, and will intimate the same to all the participating firms, which shall be binding on all the firms.

2.7 A tenderer will not be allowed to withdraw or modify any condition at a time after the technical bids have been accepted and the decision to open the price bid has been taken by the department.

2.8 The Part-III of the bid i.e. Price bid or revised price bid if any (if desired & allowed by the Department) will be opened by the Executive Engineer (E) in the presence of the representatives of the tenderers who wish to be present on the due date and time of opening of price bid.

2.9 In the price bid, there shall be no conditions whatsoever. In case any bidder mentions any condition including conditional rebates in their price part, tender shall be rejected forthwith.

2.10 The Bidders are advised not to deviate from the technical specifications/items, commercial terms and conditions of NIT like terms of payment, guarantee, arbitration, clause, and escalation.

2.11 The department reserves the right to reject any or all the price bids and call for fresh price bid as the case may be without assigning any reason.

### 3.0 **Terms of payment**

3.1 Payment shall be made on the basis of running account bill as per progress of execution of work. **Stage of payment shall be as per following: -**

i) Against supply of material received at site in good condition- 70% On pro-rata basis

ii) On completion of pro-rata installation-15%

iii) On commissioning and completion of work-15%

### 4.0 **Security Deposit**

(i) Security Deposit @2.5% of total cost of work done shall be deducted from the payments.

### 5.0 **Condition for release of Security Deposit after the warranty**

i) 50% of the performance Guarantee shall be refunded to the contractor soon after the completion of the work and recording of the completion certificate.



- ii) 50% of the Performance Guarantee shall be retained as Security Deposit.
- iii) 50% of the Performance Guarantee retained as security deposit plus 2.5% security deposit already deducted from running bills (total 2.5 + 2.5 =5%) shall be refunded year wise proportionately, till the defect liability period of 5 years is over.

## **6.0 Performance Guarantee**

**6.1** The tender shall guarantee among other things, the following: -

- a) Quality, strength and performance of the materials used.
- b) Safe mechanical and electrical stress on all parts under all specified conditions of operation.
- c) Satisfactory operation during the defect liability period.

**6.2** The contractor whose bid is accepted, will be required to furnish performance guarantee of 5% (Five Percent) of the bid amount within the period specified in Schedule F. This guarantee shall be in the form of cash (in case guarantee amount is less than Rs. 10000/- ) or Deposit at Call receipt of any scheduled bank/Banker's cheque of any scheduled bank/Demand Draft of any scheduled bank/Pay order of any Scheduled Bank of any scheduled bank (in case guarantee amount is less than Rs. 1,00,000/-) or Government Securities or Fixed Deposit Receipts or Guarantee Bonds of any Scheduled Bank or the State Bank of India in accordance with the prescribed form. In case the contractor fails to deposit the said performance guarantee within the period as indicated in Schedule 'F'. including the extended period if any, the Earnest Money deposited by the contractor shall be forfeited automatically without any notice to the contractor. The earnest money deposited alongwith bid shall be returned after receiving the aforesaid performance guarantee.

**6.3** Income Tax, GST, labourcess& other statutory deductions etc shall be made at source as per the prevalent laws. The deductions of Security Deposit, Income-Tax, GST etc shall be done after calculation of the above due payments as per clauses 3.1 to 3.3 and net payment shall be reduced accordingly.

## **7.0 Rates**

**7.1** The rates quoted by the tenderer, shall be firm and inclusive of all taxes including, GST, labourcess, duties, levies, octroi etc and all charges for packing forwarding, insurance, freight and delivery, installation, testing, commissioning etc at site including temporary construction of storage, risks, over head charges, general liabilities/obligations and clearance from Local Body. However, the fee for the Local Body inspections shall be borne by the department.

**7.2** The department will not issue Octroi exemption certificate.

**7.3** The contractor has to carry out Servicing, Cleaning& Routine maintenance of above Solar Photovoltaic power generation system approx. 600 kwp by deputing man power as per BOQ for cleaning of solar PV module, checking & routine maintenance of all the systems, for satisfactorily operation as per manufacturer's standards, recording the various electrical parameters in log book for a period of 60 months from the date of handing over i/c monthly visit by Engineer for checking the healthiness of each system i/c repair/replacement of the defective part or to attend the major complaint whenever informed by the Department as per terms & condition attached. (Supply of parts are lying in the scope of the work under guarantee period) from the date of handing over.

## **8.0 Completeness of Tender**

All sundry equipment, fittings, unit assemblies, accessories, hardware items, foundation bolts, termination lugs for electrical connections and all other items which are useful and necessary for efficient assembly and installation of the system shall be deemed to have been included in the tender irrespective of such items are specifically mentioned in the tender documents or not.

## **9.0 Storage and Custody of Materials**

For storage of sundry materials and erection of equipments, the agency has to make his own arrangements. No separate storage accommodation shall be provided by the department. Watch and ward of the stores and their safe custody shall be the responsibility of the contractor till the final taking over of the installation by the department.

## **10.0 Care of the Building**

Care shall be taken by the contractor while handling and installing the various equipments and components of the work to avoid damage to the building. He shall be responsible for repairing all damages and restoring the same to their original finish at his cost. He shall also remove at his cost all unwanted and waste materials arising out of the installation from the site of work.

## **11.0 Cleanliness of site**

- i) The Contractor shall not stack building material/malba/muck on the land or road of the local development authority or on the land owned by the others, as the case may be. So the muck, rubbish etc. shall be removed periodically as directed by the Engineer-in-Charge, from the site of work to the approved dumping grounds as per the local byelaws and regulations of the concerned authorities and all necessary permissions in this regard from the local bodies shall be obtained by the Contractor. Nothing extra shall be payable on this account. In case, the Contractor is found stacking the building material/malba as stated above, the Contractor shall be liable to pay the stacking charges/penalty as may be levied by the local body or any other authority and also to face penal action as per the rules, regulations and bye-laws of such body or authority. The Engineer –in-Charge shall be at liberty to recover, such sums due but not paid to the concerned authorities on the above counts, from any sums due to the Contractor including amount of the Security Deposit and performance guarantee in respect of this contract agreement.
- ii) The contractor shall take instructions from the Engineer-In-Charge regarding collection and stacking of materials at any place. No excavated earth or building rubbish shall be stacked on areas where other buildings, roads, services and compound walls are to be constructed.
- iii) The site of work shall be always kept clean due to constraints of space and to avoid any nuisance to the users of buildings in the adjacent area. The Contractor shall take all care to prevent any water- logging at site. The waste water, slush etc. shall not be allowed to be collected at site. It may be directly pumped into the creek with prior approval of the concerned authorities. For discharge into public drainage system, necessary permission shall be obtained from relevant authorities after paying the necessary charges, if any, directly to the authorities. The work shall be carried out in such a way that the area is kept clean and tidy. All the fees/charges in this regard shall be borne by the Contractor. Nothing extra shall be payable on this account.

## **12.0 Completion Period**

- 12.1** The completion period of **6months** indicated in the tender documents is for the entire work of planning, designing, approval of drawings etc i/c arrangement of materials & equipments, delivery at site including transportation, installation, testing, commissioning and handing over the entire system to the satisfaction of the Engineer-in-charge.

**12.2** The Contractor shall be responsible for handing over the Inventory of entire system in operational to the Client/Department to the satisfaction of the Engineer-in-Charge before recording of completion Certificate & making the final payment.

**13.0 Guarantee**

**13.1 Plant Performance Evaluation:** -The successful bidder shall be required to meet minimum guaranteed generation with minimum Performance Ratio (PR) 75% at the time of commissioning and related Capacity Utilization Factor (CUF) as per the GHI levels of the location during the defect liability period of **5 years**. Minimum CUF 16% should be maintained for a period of **5 years** for fulfilling the conditions for release of Performance Guarantee money. The bidder should send the periodic plant output details to SECI for ensuring the CUF. The PR will be measured at Inverter output level during peak radiation conditions.

**13.2** All equipments shall be guaranteed for a period of 60 months, from the date of taking over the installation by the department, against unsatisfactory performance and /or break down due to defective design, workmanship or material. The contractor will stand performance guarantee of solar PV system supplied and installed by them for a period of 60 months from the date of the handing over of the installation. The equipments or components, or any part thereof, so found defective during guarantee period shall be forthwith repaired or replaced free of cost, to the satisfaction of the Engineer-in-charge. In case it is felt by the department that undue delay is being caused by the contractor in doing this, the same will be got done by the department at the risk and cost of the contractor. If the performance of Solar PV system found unsatisfactory during the guarantee period or contractor repeatedly fails to replace/repair the defective solar PV system within 15 days time after written complaint in this regard, the amount of performance guarantee shall be forfeited absolutely. The decision of the Engineer-in-charge in this regard shall be final & binding on the contractor.

**13.3** The tenderer shall guarantee among other things, the following: -

- a) Quality, strength and performance of the materials used as per manufacturers standards.
- b) Safe mechanical and electrical stress on all parts under all specified conditions of operation.

**14.0 Power Supply**

Arrangement of electric power supply (Three Phase/Single Phase) at a single point as required to carry out the work for successful commissioning of the system will be provided by the department. However, distribution of electric supply to carry out the work at different locations shall lie in the scope of the contractor.

**15.0 Preferred Makes of Various Equipments**

**15.1** The Preferred makes of various equipments/components/accessories have been indicated in "Preferred Makes". The tenderer shall work out the cost of the offer on this basis. Alternate makes are not acceptable.

**15.2** The firm will be required to procure material directly from the manufacturer /authorized dealers to ensure genuineness & quality and as per the approved makes only. Proof in this regard shall be submitted by the contractor if required by the department.

**16.0** The successful tenderer should furnish well in advance three copies of detailed instructions and manuals of manufacturers for all items of equipments regarding installation, adjustments operation and maintenance including preventive maintenance trouble

shooting together with all the relevant data sheets, spare parts catalogue etc all in triplicate.

**17.0 Mobilization Advance:**

No mobilization advance shall be paid for this work

**18.0 Extent of work**

**18.1** The work shall comprise of entire labour including supervision and all materials necessary to make a complete installation and such tests and adjustments and commissioning, as may be required by the department. The term complete installation shall not only mean major items of the plant and equipments covered by specifications but all incidental sundry components necessary for complete execution and satisfactory performance of installation with all layout charts whether or not those have been mentioned in details in the tender documents in connection with this contract as this is a turnkey job.

**18.2** In addition to supply, installation, testing and commissioning of complete installation, following works shall be deemed to be included within the scope of work to be executed by the tenderer as this is a turnkey job.

- a) Minor building works necessary for installation of equipments, foundation, making of opening in walls or in floors and restoring them to their original condition / finish and necessary grouting etc as required.
- b) All supports for cables and MS channels for erection of panels etc as are necessary.
- c) Getting Local Body inspection done & obtaining approval for energizing the installation if required. However, necessary fees for inspection shall be borne by the Department.
- d) Small wiring, inter-connection etc inclusive of all materials and accessories, necessary to comply with the regulations as well as proper and trouble free operation of the equipment.
- e) Closing of the cable entry points in sub-station/D.G Set room to arrest seepage of water, rodents etc.
- f) Tools and tackles required for handling and installation.
- g) Necessary testing equipments for commissioning.
- h) Watch and Ward of materials and/or installation and equipments till their handling over to the department.
- i) Provision of supports/clamps for equipments, cables etc wherever required.
- j) Arrangement of networking on requirement.

**19.0 Inspection and Testing**

**19.1** All the tests certificate of the equipments are required to submit along with delivery of material.

**19.2** Copies of all documents of routine and type test certificates of the equipment, / cable carried out at the manufacturers premises shall be furnished to the Engineer-in-charge and consignee.

**19.3** After completion of the work in all respects the contractor shall offer the installation for testing and operation.

**20.0 Validity**

Tenders shall be valid for acceptance for a period of 75 days from the date of opening of technical bid.

## **21.0 Compliance with Regulations and Indian Standards**

**21.1** All works shall be carried out in accordance with relevant regulation, both statutory and those specified by the Indian standards related to the works covered by this specification. In particular, the equipment and installation will comply with the following:

- i) Factories Act
- ii) Indian Electricity Rules
- iii) BIS & other standards as applicable
- iv) Workmen's compensation Act
- v) Statutory norms prescribed by local bodies, Power supply co., etc

**21.2** Nothing in this specification shall be construed to relieve the successful tenderer of his responsibility for the design, manufacture and installation of the equipment with all accessories in accordance with currently applicable statutory regulations and safety codes.

**21.3** Successful tenderer shall arrange for compliance with statutory provisions of safety regulations and departmental requirements of safety codes in respect of labour employed on the work by the tenderer. Failure to provide such safety requirement would make the tenderer liable for penalty of Rs. 500/- for each default. In addition, the department will be at liberty to make arrangement for the safety requirements at the cost of tenderer and recover the cost thereof from him.

## **22.0 Indemnity**

The successful tenderer shall at all times indemnify the department, consequent on this works contract. The successful tenderer shall be liable, in accordance with the Indian Law and Regulations for any accident occurring due to any cause and the contractor shall be responsible for any accident or damage incurred or claims arising there from during the period of erection, construction and putting into operation the equipments and ancillary equipment under the supervision of the successful tenderer in so far as the latter is responsible. The successful tenderer shall also provide all insurance including their party insurance as may be necessary to cover the risk. No extra payment would be made to the successful tenderer on account of the above.

## **23.0 Erection Tools**

No tools and tackles either for unloading or for shifting the equipments for erection purposes would be made available by the department. The successful tenderer shall make his own arrangement for all these facilities.

## **24.0 Cooperation with Client/Occupants**

**24.1** The successful tenderer shall coordinate with occupants and client to carry out the work with least disturbance and shut down shall be taken after consultation with client department.

## **24.0 Painting**

This work includes cost of painting of the entire installation and nothing extra shall be paid on this account.

## **25.0 Documents to be Furnished on completion of Installation**

Upon completion and commissioning of entire system the contractor shall submit a draft copy of comprehensive operating instructions, maintenance schedule and log sheets for all systems and

equipment included in this contract. This shall be supplementary to manufacturer's operating and maintenance manuals. Upon approval of the draft, the contractor shall submit four (4) complete bound sets of typewritten operating instructions and maintenance manuals; one each for retention by Engineer in charge's site representative or two set for Operating Personnel. These manuals shall also include basis of design, detailed technical data for each piece of equipment as installed, spare parts manual and recommended spares for 07 years period of maintenance of each equipment. These manuals shall include:

- i. completion drawings showing all equipments installed
- ii. Description of the work carried out/installed.
- iii. Operating instructions.
- iv. Maintenance instructions including procedures for preventive maintenance.
- v. Three sets Manufacturers technical catalogues of all equipments and accessories.
- vi. Spare parts list.
- vii. Trouble shooting charts.
- viii. Type and routine test certificates of major items.
- ix. Operation and maintenance manual of all major equipments, detailing all adjustments, operation and maintenance procedure.

#### **26.0 After Sales Services**

The contractor shall ensure adequate and prompt after sales service free of cost during guarantee period, and against payment after guarantee period is over, in the form of maintenance, spares and personal as and when required during normal life span of the equipments and shall minimize the breakdown period. In case of equipment supplied by other manufacturers, the firm shall submit the guarantee from manufacturer for the same before the entire installation is taken over.

The lowest tenderer shall submit, along with performance guarantee after the acceptance of tender, an undertaking from the OEM regarding: -

- (i) Authorization Certificate from OEM of all the major Equipments.
- (ii) A **Corporate Performance Guarantee** from OEM of all the major equipments that :-
  - (a) The OEM shall unconditionally support the lowest tenderer technically throughout the execution of contract as well as for Maintenance/Comprehensive Maintenance Contract for the useful life of system,
  - (b) The OEM shall give 10 year warranty for the PCU/ Inverter and 25 Years Performance Warranty for SPV modules, and
  - (c) OEM shall provide all the spares required for healthy functioning of the equipment for at least ten years from the date of supply of equipment.

The items supplied by the contractor should have specifications compatible with each other required for satisfactory operation of the system.

#### **27.0 Interpreting specifications**

In interpreting the specifications, the following order of decreasing importance shall be followed in case of contradictions:

- a) Schedule of quantities
- b) Technical specifications
- c) General, Commercial and Additional Conditions
- d) Drawing (if any)
- e) CPWD General specifications
- f) Relevant BIS codes or other international code in case BIS code is not available.

#### **28.0 Performance Warranty:**

25 Years Performance Warranty shall be provided by manufacturer on SPV modules with degradation in performance maximum 10% after 10 years and 20% after 25 years as per industrial standard warranty conditions on complete system from the date of

commissioning of the system. If SPV modules do not perform satisfactorily, as above, then the manufacturer of the solar PV modules shall make proper check of the quality of material and should replace the unsatisfactorily solar PV modules, free of cost. Otherwise department may take action to debar the manufacturer for CPWD works and may intimate to MNRE to take suitable action against such defaulting manufacturer.

- 29.0** The scope of work for the bidder includes obtaining No Objective Certificate (NOC) from Distribution Company (DISTCOM) for grid connectivity, complete design, engineering, manufacture, supply, storage, civil work, erection, testing and commissioning of the grid connected rooftop Solar PV project
- 30.0** The support mounting structure & foundation of solar PV modules shall be so designed to withstand speed 185 km/hr for wind zone of the location as given in relevant Indian wind load codes/ standards. The contractor shall arrange vetting/approval of the submitted drawing of mounting Structure for solar PV modules by any approved and enlisted structural Engineer or CDO, CPWD, Nirman Bhawan, New Delhi/IIT Delhi. He will also arrange the visit of structural Engineer to ascertain that existing R.C.C slab is strong enough to take this additional load of mounting structure along with solar PV modules. Nothing extra shall be paid on account of this.
- 31.0** A supplementary agreement shall be made with the successful tenderer for sub-head-II of schedule of work i.e. Servicing& routine maintenance of Solar PV System for 5 years after handing over/taking over the system. The payment for servicing& routine maintenance shall be made quarterly after the end of each quarter.

**Executive Engineer (E)**  
**DED-102, CPWD,**  
**IP Bhawan, New Delhi**



## SPECIAL CONDITIONS

1. Contractor shall guarantee minimum generation of 1200 KWh per annum per KWp of installed and commissioned generation capacity of Solar Power Plant, during the defect liability period of 5 years.
2. For any shortfall in the generation of solargeneration, the recovery at the prevailing rates at which Power Purchase Agreement shall be signed by Engineer-in-charge with DISTCOM shall be affected from performance guarantee / security deposited of the firm and it shall not be released.
3. The trial run of electrical work / equipments shall be carried out by the firm in presence of Engineer-in-charge or his representative at the site at least once as per requirement of department. A certificate shall be issued by Engineer-in-charge for having witness the satisfactory trial run before release of security deposit which is due after guarantee period.
4. Before installation work is started, the mechanical design of module mounted structure against 185 Km/hr wind velocity at 2.2 meter above the terrace level of building shall be submitted to Engineer-in-charge, who shall forward these design drawings to CDO, CPWD/IIT/NIT/DTU for approval. All co-ordination and necessary fees for approval of drawings shall be paid by the Firm.
5. Before handing over of each system, the OEM shall ensure that all design parameters are conformed to, as per the prevelant standards and shall give a certificate to this affect.
6. The Power Purchase Agreement shall be taken up by Engineer-in-charge or his representative separately with DISCOM. The draft Power Purchase Agreement shall be submitted to competent authority of CPWD for approval before signing with DISCOM. All necessary fees shall be paid by the department. However, all co-ordination shall be done by the Firm.
7. The application for Net Metering and necessary fees shall be paid by the Department However all co-ordination shall be done by the Firm.
8. SIM card for online monitoring system, if required, shall be provided by the department.

**Executive Engineer(E)**  
**DED-102, CPWD,**  
**IP Bhawan, New Delhi**



## TECHNICAL SPECIFICATIONS

The equipment and material for **10/ 15/ 20/ 30kWp** Solar PhotoVoltaic Power Plant with associated system (typical) shall include following but not be limited to the following: (Only The technical features of major equipments are described here under).

### **1.0 SPV Modules:**

- 1.1. Mono PERC/Poly crystalline cells are acceptable. SPV Mono PERC/Poly crystalline modules to be supplied should have output of 370Wp or above per module, to be supplied and shall work out accordingly.
- 1.2. Stabilized output of the Solar Power Plant should not be less than **370 Wp for each solar PV module** under Standard Test Condition from date of Commissioning of solar plant.
- 1.3. Each module shall have low iron tempered glass front for strength & superior light transmission. It shall also have tough multi-layered polymer back sheet for environmental protection against moisture & provide high voltage electrical insulation.
- 1.4. The module frame shall be made of aluminum or corrosion resistant material, which shall be electrically compatible with the structural material used for mounting the modules.
- 1.5. SPV module shall contain mono/poly crystalline high power silicon solar cells. The solar cell shall have surface anti-reflective coating to help to absorb more light in all weather conditions.
- 1.6. The solar modules shall have suitable encapsulation and sealing arrangements to protect the silicon cells from the environment. The arrangement and the material of encapsulation shall be compatible with the thermal expansion properties of the Silicon cells and the module framing arrangement/material. The encapsulation arrangement shall ensure complete moisture proofing during entire life of the solar modules.
- 1.7. Photo conversion efficiency of SPV Module should **not be less than 18.5 %**. Module shall be made of high transmittance glass front surface giving high encapsulation gain.
- 1.8. Cell used in offered module should be of reputed make. The bidder should specify the make of PV cell in Bid itself and it should be got approved from the Engineer-in-charge before installation
- 1.9. Module rating is considered under standard test conditions, however Solar Modules shall be designed to operate and perform under site condition including high temperature & dust (sometimes).
- 1.10. All materials used shall be having a proven history of reliable, light weight and stable operation in external outdoor applications.
- 1.11. Solar PV Module design shall conform to following requirement:
  - a. Weather proof DC rated connector and a lead/cable coming out as a part of the module, making connections easier and secure, not allowing for any loose connections.
  - b. Resistant of water, abrasion, hail impact, humidity & other environment factor for the worst situation at site.
- 1.12. Each PV module used in any solar power project 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.

- Name of the manufacturer of PV module
- Name of the manufacturer of Solar cells
- Month and year of the manufacturer (Separately for Solar cell and module)
- Country of origin (Separately for Solar cell and module)
- I-V curve for the module
- Wattage,  $I_m$ ,  $V_m$  and FF for the module
- Unique Serial No and Model No of the module
- Date and year of obtaining IEC PV module qualification certificate
- Name of the test lab issuing IEC certificate
- Other relevant information for traceability of Solar cell and module as per ISO 9001 & ISO 14001.

## 2.0 **MODULE MOUNTING STRUCTURE (FIXED):**

- 2.1 The structure design shall be appropriate and innovative and must follow the existing structure and profile. The bidder may choose to offer module mounting structure as per their design fulfilling the details in NIT.
- 2.2 The module alignment & tilt angle shall be calculated to provide the maximum annual energy output to take maximum insolation. This shall be decided based on the location of array installation.
- 2.3 The structure shall be designed to allow easy replacement of any module and shall be in line with site requirement considering cleaning of PV modules and maintenance.
- 2.4 **The Terrace mounted structure shall be designed so that upper edge of the mounted structure should be at maximum height of 2.2 mtr from the terrace level for getting maximum output.** It shall support SPV modules at a given orientation, absorb and transfer the mechanical loads to the base properly. It should be less than 60 kg/m<sup>2</sup>.
- 2.5 The mounting steel structure shall be as per latest BIS 2062 (amended up to date) and galvanization of mounting structure shall be in compliance of BIS 4759 (amended up to date).
- 2.6 The array structure shall be so designed that it will occupy minimum space without sacrificing the output from SPV panels at the same.
- 2.7 Nut & bolts, supporting structures including Module Mounting Structures shall have to be adequately protected from atmosphere and weather prevailing in the area.
- 2.8 All fasteners shall be of stainless steel of grade SS 304.
- 2.9 The mounting structure shall be fixed at terrace by fastener/ grouted method as per the recommendation of CDO, CPWD/IIT /NIT/DTU.
- 2.10 The support structure & foundation shall be so designed to withstand speed of 185 km/hr for wind zone of the location as given in relevant Indian wind load codes/ standards.
- 2.11 Design drawings with material selected shall be submitted for prior approval of Engineer-in-charge. The bidder/manufacturer shall specify installation details of the PV modules and the support structures with appropriate diagram and general arrangement drawings (GAD). The drawings along with detailed structure design and material selected and their standards shall be submitted in four sets for approval by the CDO, CPWD / IIT / NIT/ DTU

before starting the execution work. The work will be carried out as per design approved and Engineer-in-charge for the work.

### **3.0 ARRAY JUNCTION BOXES:**

- 3.1** If DC isolation switch, surge protection and fuse protection is not inbuilt to the inverter then array junction boxes is required to be used. The junction box shall be dust, vermin, and waterproof for outdoor application IP 65 and made of 2mm thick CRCA sheet.
- 3.2** The terminal will be connected to copper bus-bar arrangement of proper size to be provided. The junction boxes shall have suitable cable entry points fitted with cable glands of appropriate sizes for both incoming and outgoing cables.
- 3.3** Suitable markings shall be provided on the bus-bars for easy identification and cable ferrules will be fitted at the cable termination points for identification.
- 3.4** Each Array Junction Box will have suitable Reverse Blocking Diodes of maximum DC blocking voltage of minimum 600 V with suitable arrangement for its connecting.
- 3.5** The Array Junction Box will also have suitable surge protection device.
- 3.6** The junction Boxes shall have suitable arrangement for the followings (typical): -
- Combine groups of modules into independent charging sub-arrays.
  - Provide arrangement for disconnection for each of the groups.
  - Provide a test point for each sub-group for quick fault location.
  - To provide group array isolation.
- 3.7** The current carrying ratings of the junction Boxes shall be suitable with adequate safety factor, to interconnect the Solar PV system.

### **4.0 POWER CONDITIONING UNIT (PCU)**

- 4.1** Power Conditioning Unit (PCU) shall be **grid interactive in nature and mainly consist of MPPT controller, inverter of suitable rating**. Associated control and protection devices etc., all integrated into PCU. It shall provide necessary protections for Grid Synchronization and Data Logging/Monitoring. The PCU should convert DC power produced by SPV modules in to AC power and must synchronize automatically its AC output to the compatible AC Voltage and frequency of Grid.
- 4.2** The DC energy produced has to be utilized to maximum and supplied to the bus for inverting to AC voltage to extract maximum energy from solar array and provides 3-ph, 415V AC (+15% to – 10%), 50+/- 3% Hz. to synchronize with the grid.
- 4.3** The PCU shall be of very high quality having efficiency not less than 97% and shall be capable of running in integrated mode.
- 4.4** Degree of protection of the PCU shall be at least IP-65 for outdoor or better protection.
- 4.5** Provision for built in port with data logging to remotely monitor plant performance through external PC shall be provided (only provision).
- 4.6** The PCU shall be designed for continuous, reliable power supply as per specification.
- 4.7** The PCU shall be capable of complete automatic operation, including wake-up, synchronization & shut down independently & automatically.
- 4.8** Both AC & DC lines shall have suitable fuses/MCB/MCCBs, Metal Oxide Arrestors/surge arrestors and contactors to allow safe start up and shut down of the system. Fuses/MCB/MCCBs used in the DC circuit should be DC rated.

- 4.9** PCU shall operate in sleeping mode when there will be no power connected to it.
- 4.10** Protections:
- Over voltage both at input & output.
  - Over current both at input & output.
  - Over/under grid frequency.
  - Heat sink over temperature.
  - Short circuit.
  - Protection against lightening.
  - Surge arrestors to protect against Surge voltage induced at output due to external source.
  - Any other protection in view of grid supply.
  - Anti- Islanding Protection
- 4.11** It should have user friendly, LED/LCD display for programming and view on line parameters such as:
- Inverter per phase Voltage, current, KW, KVA and frequency,
  - Grid Voltage and frequency,
  - Inverter (Grid) on Line status,
  - PV panel voltage,
  - Solar charge current and ambient temperature,
  - Individual power stage heat sink and cabinet temperature,
  - Solar Radiation (with external pyranometer with in scope)
  - Inverter on
  - Grid on
  - Inverter under voltage/over voltage
  - Inverter over load
  - Inverter over temperature.
  - Ambient Temperature
- 4.12** The PCU shall have arrangement for adjusting DC input current and should trip against sustainable fault downstream and shall not start till the fault is rectified.
- 4.13** The PCU shall be able to withstand an unbalanced load conforming to relevant IEC standard and Indian electricity condition. The PCU shall include appropriate self-protective and self-diagnostic features to protect itself and the PV array from damage in the event of PCU component failure or from parameters – beyond the PCU’s safe operating range due to internal or external causes. The self-protective features shall not allow signals from the PCU front panel to cause the PCU to be operated in a manner which may be unsafe or damaging. Faults due to malfunctioning within the PCU, including commutation feature, shall be cleared by the PCU protective devices and not by the existing site utility grid service circuit breaker.
- 4.14** The PCU shall go to shutdown/standby mode, with its contacts open, under the following conditions before attempting an automatic restart after an appropriate time delay.

- When the power available from the PV array is insufficient to supply the losses of the PCU, the PCU shall go to standby/shutdown mode.
- The PCU control shall prevent excessive cycling of shut down during insufficient solar radiance.

**4.15** Operation outside the limits of power quality should cause the power conditioner to disconnect the grid. Additional parameters requiring automatic disconnection are

- Neutral voltage displacement
- Over current
- Earth fault
- Reverse power

In each of the above cases, tripping time should be very less.

**4.16** The Bidder shall provide data sheet for Power Conditioning Unit along with their offer as per Guaranteed Technical Particular.

**4.17** PCU / Inverter should have IEC Certification as per Indian Standards.

## **5.0 DC DISTRIBUTION BOARD (DCDB)**

DC distribution board shall be provided in between solar array and inverter it shall have MCB/MCCB of suitable rating for connection and disconnection of array section it shall have meters for measuring the array voltage and array current (this can be inbuilt with inverter instead the separate.)

## **6.0 AC DISTRIBUTION BOARD (ACDB)**

**6.1** The AC power output of the inverter shall be fed to the ACDB (metering panel & isolation panel) which also houses energy meter. The 415V AC output of the isolation panel shall be fed to the grid. AC energy is then synchronized with the grid and power is consumed by the grid.

**6.2** ACDB shall be floor / wall mounted type but drawing is to be got approved before installation and shall have all the measuring instruments such as voltmeter, ammeter, frequency meter, Energy Meter {For measuring the deliverable units kWh}, selector switches etc as per specification mentioned in BOQ.

**6.3** All the power cables shall be taken through top/ Bottom of the panel as per site requirement.

**6.4** The ACDB shall fitted with suitable rating & size aluminium bus, MCCB, indicators for all incomer and outgoing terminals, LED, voltmeter & Ammeter with suitable selector switches to monitor & measure the power to be evacuated.

**6.5** Nut & bolts including metallic shall have to be adequately protected against atmosphere and weather prevailing in the area.

**6.6** Modifications/ addition if any, in existing L T panel shall be done at site for connection the supply from ACDB and covered in scope of Bidder.

## **7.0 WIRING**

**7.1** All instruments and Panel wiring shall be of heat resisting and self extinguishing type in compliance with IS. Heat resisting UPVC or porcelain cleats of the limited compression type shall be used for holding wiring runs. All wires shall be suitable for bending to meet the terminal studs at right angles. Metal cases of all apparatus mounted on panels shall be separately earthed.

- 7.2 The following color scheme of the wiring shall be used as per IS: 375. AC three phase circuits:
- No.1 Phase: Red.
  - No.2 Phase: Yellow.
  - No.3 Phase: Blue
  - ii) Neutral Conductor: Black iii) Connection to Earth: Green b) D.C. circuits: Grey

## 8.0 CABLE ACCESSORIES

- 8.1 Only terminal cable joints shall be accepted. No cable joints to join two cable ends shall be accepted.
- 8.2 Cable terminations shall be made with suitable cable lugs & sockets etc., crimped properly and passed through brass compression type cable glands at the entry and exit point of the cubicles. The panels' bottoms should be properly sealed to prevent entry of snakes/lizard etc. inside the panel.
- 8.3 The terminal end of cables and wires are to be fitted with good quality numbered ferrules of proper sizes so that the cables can be identified easily.

## 9.0 EARTHING

- 9.1 Each array structure of the SPV shall be grounded properly. The array structures are to be connected to earth pits as per CPWD General Specifications. Junction boxes shall be connected to the main earthing conductor/ electrode.
- 9.2 Earthing system installation shall be in strict accordance with CPWD General Specifications Part-I internal 2013 as amended upto date.
- 9.3 Necessary Test Point provision shall be made for bolted isolating joints of each earthing pit for periodic checking of earth resistance.
- 9.4 In compliance to Rule 33 and 61 of Indian Electricity Rules, 1956 (as amended up to date) all non-current carrying metal parts shall be earthed with two separate and distinct earth continuity conductors to an efficient earth electrode.
- 9.5 Earth resistance of the earth pits shall be tested in presence of the representative of Engineer-in-charge.

## 10. LIGHTNING & OVER VOLTAGE PROTECTION

### (A)

- a. The SPV Power Plant should be provided with Lightning and over voltage protection connected to proper earth system. The main aim of over voltage protection is to reduce the over voltage to a tolerable level before it reaches the PV or other sub-system components. The source of over voltage can be lightning or other atmospheric disturbance.
- b. The lightning system / Conductors shall be made as per applicable CPWD General Specifications.
- c. COMMUNICATION INTERFACE AND DATA MONITORING: -  
The project envisages a communication interface which shall be able to support.
- Real time data logging
  - Event logging
  - Supervisory control

- Operational modes
  - Set point editing
  - Software and communication compatibility:
- d. Port with RS 485/RJ 45/RS 232 compatible to transfer the data remotely via GSM/Wifi network to main global access portal with user name and password restriction. It should be possible to provide to stage monitoring/general monitoring/ admin monitoring.
  - e. The supplier shall supply necessary software and hardware required. The supplier shall also provide training for the use of software. The software should be compatible to Microsoft windows systems (Windows VISTA OR Higher version system.)
  - f. Copy of operation manual shall be supplied.
  - g. The supplier shall provide facility to print the reports regularly on daily, monthly and yearly basis.

**(B)** The following parameters shall also be measured and displayed continuously.

- (a) DC current and voltages
- (b) DC injection into the grid (one time measurement at the time of installation)
- (c) Efficiency of the inverter.
- (d) Any other parameter considered necessary by supplier of the solar PV system based on current practices.
- (e) KWh reading DC/AC i.e. input/output (instaneous power)

**(C)** Data logger /PC based monitoring system must record these parameters for study of effect of various environmental & grid parameter on energy generated by the solar system and various analysis would be required to be provided through bar charts, curves, tables, which shall be finalized during approval of drawings.

**(D)** The communication interface shall be an integral part of inverter and shall be suitable to be connected to local computer and also remotely via the Web using either a standard modem or a GSM/WIFI modem.

#### **11.0 SPARES:**

A minimum set of spares, comprising of **1 No. PCU/Inverter of each capacity and 2% of total quantity of PV Modules**, shall be provided, at no extra cost, for the entire period of warranty and operation & maintenance, which, upon its use shall be replenished.

#### **12.0 DANGER BOARDS AND SIGNAGES**

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

#### **13.0 INTEGRATION OF PV POWER WITH GRID:**

- i. In case of Power plant without battery bank (i.e. with string inverter), the existing uni-directional meter of the user shall be installed for gross metering of solar generation while a Bi-directional meter shall be installed for net-metering purpose or conditions pertaining to Net Metering Policy and get the same done by DISCOM.
- ii. CEA guideline 2013 or amended upto date guidelines for interconnecting solar power with Grid shall be followed.

- iii. Certification of Islanding protection in the inverter/PCU from the manufacturer of the equipment shall be mandatory. This shall be arranged by the supplier from the manufacturer.
- iv. Verification report/test report shall be issued by the DISTCOM or their authorized agency and the same shall be taken by the contractor within scope of work.

**Grid Islanding:**

- In the event of a power failure on the electric grid, it is required that any independent power producing inverters attached to the grid turn off in a short period of time. This prevents the DC-to- AC inverters from continuing to feed power into small sections of the grid, known as "Islands."
- Powered islands present a risk to workers who may expect the area to be unpowered, and they may also damage grid-tied equipment. The Roof top PV system shall be equipped with islanding protection. In addition to disconnection from the grid (due to islanding protection) disconnection due to under and over voltage conditions shall also be provided.
- A manual disconnect pole isolation switch beside automatic disconnection to grid would have to be provided at utility end to isolate the grid connection by the utility personnel to carry out any maintenance. This switch shall be locked, if required, by the utility personnel.



## STANDARDS FOR SOLAR PHOTOVOLTAIC (PV) POWER PLANTS/SYSTEMS

### A. PV MODULES:

The PV 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/ISI 14286
Thin film silicon terrestrial PV modules	IEC 61646
Concentrator PV modules & assemblies	IEC 62108

In addition, the modules must conform to IEC 61730 Part1-requirements for construction & Part2 – requirements for testing, for safety qualification. PV modules to be used in a highly corrosive atmosphere (coastal areas, etc.) must quality. Salt Mist Corrosion Testing as per IEC 61701.

### B. BALANCE OF SYSTEM (BoS) ITEMS/COMPONENTS:

The BoS items/components of the SPV power plants/systems deployed under the mission must conform to the latest edition of IEC/equivalent BIS standards as specified below:

BoS	Applicable IEC/equivalent BIS standard	
Item/component	Standard Description	Standard Number
Power conditioner/	Efficiency Measurements	EN61000-6-3
Inverters*	Environmental Testing	EN 50178
MPPT units*	Design Qualification	EN 50178
	Environmental Testing	UL 1741
		CSA 107.1
Cables	General test and measuring methods PVC insulated cables for working voltage upto and including 1100 V-Do-UV resistant for outdoor installation	IEC 60189 IS 694 / IS 1554 IS/IEC 69947
Switches/Circuit	General Requirements	IS/IEC 60947 part I,II & III
Breakers/Connectors	Connectors - Safety	EN 50521
Junction Boxes/ Enclosures	General Requirements	IP 65 (for outdoor)/IP 21 (for indoor) IEC 62208
SPV System Design	PV Stand-alone Systems Design verification	IEC 61215 IEC 61730 IEC 61701
Installation Practices	Electrical installation of buildings requirements for SPV power supply systems	IEC 61730

\*Must additionally confirm to the relevant national/international electrical safety standards.

**TERMS AND CONDITIONS FOR SERVICING & ROUTINE MAINTENANCE OF  
SOLAR PHOTO VOLTAIC SYSTEM)  
(SUB HEAD- II: ITEM NO. 1)**

1. The scope of work includes Servicing& Routine maintenance of all roof top Solar Photovoltaic power generation systems of approx. 600 KWp capacity, by deputing minimum staff, as below, on all days of the month including Sundays& Holidays for cleaning of solar PV module, checking & routine maintenance the system for satisfactorily operation as per manufacturer's standards, recording the various electrical parameters in log booketc i/c visit by Engineer for checking the healthiness of each system i/c repair/replacement of the defective part or to attend the major complaint when informed by the Department.
2. It is the responsibility of contractor to ensure proper functioning of Solar PV System.
3. Penalty for not attending complaints **within CPWD E-Sewa Benchmark (GREEN)**, will be @ Rs. 700/- per complaint per day.
4. The contractor has to depute following minimum staff with proper uniform, for cleaning, servicing and checking of system, on all days including Sundays and holidays:-

Shift	Skilled (Technician)	Unskilled
09:00AM to 05:00PM	1	1
Total	1 No.	1 No.

5. Besides this the contractor has to provide an Engineer for checking the healthiness of each system and each PV system is to be checked at least once a month.
6. Each roof top solar PV system is to be serviced and cleaned every fort night & checked by Engineer at least once a month.
7. Supply of all parts, required for replacement due to normal wear & tear, are inclusive in the scope of the work under guarntee period and nothing extra shall be paid on this account.
8. The contractor has to arrange T & Ps required for the work atsite.
9. The contractor has to arrange PVC tape, nut-bolts etc. and nothing extra shall be paid on this account.
10. Safety of the staff employed will be the responsibility of the contractor who must insure the staff adequately. This office will not be responsible for any mishap, injury/death of the staff.
11. All the equipments and installations shall be maintained in neat and clean condition.
12. In case of absence of any staff prescribed at S.No. 4 above from duty, the following recoveries shall be made from thecontractor
  - a) Skilled @ Rs. 1900/- per person per shift
  - b) Unskilled @ Rs. 1400/- per person per shift
13. Preventive Maintenance, servicing& cleaning of every solar PV system is to be carried out at least once a fortnight, besidescomprehensive maintenance work and record is to be kept in log book. Failing which recovery @Rs.2000/- per system per fortnight shall be deducted from the bill payment. If servicing & cleaning of any system is to be carried out more than once a fortnight, the contractor has to carry it out, at no extra cost.
14. Healthiness of each system is to be checked by Engineer, at least once a month and report submitted to Engineer-in-charge. Failing which recovery @Rs.2000/- per system per month shall be deducted from the bill payment.

## Technical Specifications

### SPECIFICATION FOR SPV PANEL

<b>Sl. No</b>	<b>Description</b>	<b>Specification Requirement</b>
1	Rated power range output at STC	370 Wp or above
2	No. of solar cells in each solar PV module	72 (minimum)
3	Voc/Isc	48.2-49.3 V/ 9.25-9.87 A
4	MPP Voltage (Vmpp) V	39.5-40.1
5	MPP current (imp) A	9.1-9.35
6	Normal operating cell temperature	44 to 46+ - 2° C
7	Operating Temperature range	-40° c to 85° c
8	Module dimensions (LxWxH) Appx.	As per manufacturer standard
9	PV Module type	Mono PERC /Poly Crystalline
10	Min. efficiency of Solar PV Modules	18.5 % or better
11	Solar module frame material	Aluminium
12	Weather resistant junction	IP65 or better
13	Front Glass	Toughened not less than 3.2 mm thick.
14	Glass iron content	Low Iron
15	glass transmissivity	High transmissivity
16	Frame	Minimum 40 mm wide Anodized aluminium
17	Encapsulation	Ethyl Vinyl Acetate (EVA)
18	Trilaminate back surface	Tedlar / Polyester
19	By-pass diode	To be provided
20	Standard	IEC 61215 / IS 14286 & IEC 61730 Part 1 & Part 2
21	Performance warranty	10 years of 90% power output
		25 years of 80% power output

**TECHNICAL SPECIFICATION OF SOLAR INVERTER (GRID TIED)**

Sl. No.	Description	Specification Requirement
1	Type	Grid tied
2	Max. DC Array Input Voltage	1000V
3	DC voltage tolerance	$\pm 20\%$ +15% of the DC array input voltage in Sr. No. 1 above
4	Type of solar charge controller	MPPT based solar charge controller
5	Switching Device	MOSFET / IGBT BASED
6	Continuous inverter output rating	10/15/20/30KWp
7	Output wave form	Pure Sine wave output
8	total harmonic distortion	< 3% with resistive load
9	Nominal AC output voltage and frequency	415V, 3 phase, 50Hz
10	Output frequency	50 Hz + 0.5 Hz
11	Grid frequency tolerance	$\pm 3\%$
12	Grid frequency synchronization range	$\pm 3\text{Hz}$
13	No-Load losses	<1%
14	Power factor	> 0.9
15	PCU efficiency	>97 % at nominal voltage & power
16	Noise level	< 57 db
17	Certifications	IEC 61727, CE, IEC 62109-1, IEC 62109-2
18	Idle current	< 4 % of rated capacity
19	Regulation	Line regulation and load regulation -2%
20	Over load features	150% for one minute'
21	Cooling	Forced air cooling with temperature controlled cooling
22	Operating Temperature	-10°C to 60 °C
23	Relative Humidity	95% Maximum
24	LED/LCD display	Indications display shall indicate system functional parameters and protection functional indicators
25	Data Monitor and display controls	RS 485, Ethernet or RS 232 connectivity
26	Protections	1) Input over Voltage

SI. No.	Description	Specification Requirement
		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
27	Enclosure Protection Safety	Minimum IP 65 (for outdoor)
28	Warranty	10 years warranty shall be provided by the OEM

**SPECIFICATIONS FOR ARRAY JUNCTION BOX (DCDB)**

<b>S. No.</b>	<b>Description</b>	<b>Specification Requirement</b>
1	No. of module in series	As per manufacturer standard
2	No. of module in parallel	As per manufacturer standard
3	Switch gears	MCB / MCCB
4	Connectors	1.1 KV grade 100 Amps capacity
5	Wiring	FRLS copper conductor single core cable 1.1 KV grade
6	Enclosure Protection	IP 65 (outdoor) dust & vermin proof weather resistance
7	Enclosure	2mm thick powder coated CRCA sheet/ Polycarbonate
8	Size	As per manufacturer standard
9	Capacity of each SPV panel and nos.	To be intimated by Firm

## **SPECIFICATIONS FOR PV PANEL SUPPORT/MODULE MOUNTING STRUCTURE**

<b>Sl. No</b>	<b>Description</b>	<b>Specification Requirement</b>
1	Material	Hot dip galvanized steel with min. 80 micron galvanizing Or as per manufacturer Standard Capable of with stand wind
2	Thickness of member	As per OEM design, approved by authorised institute.
3	Over all dimensions	As per manufacturer standard
4	Wind rating	185Km / hour As per manufacturer standard.
5	Tilt angle and adjustment	Tilt angle shall be calculated to provide the maximum annual energy output to take maximum insulation. This shall be decided based on the location of array installation.
6	Pitch of structure	Max. 7 Mtr or as per manufacturer standard
7	Hardwares& fastener	SS 304
8	Foundation	CC 1:2:4

**SCHEDULE - A**

**TECHNICAL PARTICULARS**  
**(TO BE FILLED BY THE BIDDER)**

**Name of work:-**       **Supplying, installation, testing and commissioning of on grid roof top Solar Photo Voltaic Power generation system at the Bungalows of hon'ble Supreme Court Judges, New Delhi**

**NIT No.:-**               **18/CE/NDZ-1/DED-102/2019-20**

**Name of Contractor:-**

S.No.	Details of Particulars	To be filled by tenderer
<b>(A) Solar PV Module</b>		
1.	Rated power range output at STC	
2.	No. of solar cells in each solar PV module	
3.	Voc/Isc	
4.	MPP Voltage (Vmpp) V	
5.	MPP current (imp) A	
6.	Normal operating cell temperature	
7.	Operating Temperature range	
8.	Module dimensions (LxWxH) Appx.	
9.	PV Module type	
10.	Min. efficiency of solar cell	
11.	Solar module frame material	
12.	Weather resistant junction	
13.	Front Glass	
14.	Glass iron content	
15.	glass transmissivity	
16.	Frame	
17.	Encapsulation	
18.	Trilaminate back surface	
19.	By-pass diode	
20.	Standard	
21.	Performance warranty	
<b>(B) Solar Inverter</b>		
1.	Type	
2.	Max. DC Array Input Voltage	
3.	DC voltage tolerance	
4.	Type of solar charge controller	
5.	Switching Device	
6.	Continuous inverter output rating	
7.	Output wave form	
8.	total harmonic distortion	
9.	Nominal AC output voltage and frequency	
10.	Output frequency	

Correction -Nil      Omission – Nil      Addition – Nil      AE(P)      EE(P)



S.No.	Details of Particulars	To be filled by tenderer
11.	Grid frequency tolerance	
12.	Grid frequency synchronization range	
13.	No-Load losses	
14.	Power factor	
15.	PCU efficiency	
16.	Noise level	
17.	Certifications	
18.	Idle current	
19.	Regulation	
20.	Over load features	
21.	Cooling	
22.	Operating Temperature	
23.	Relative Humidity	
24.	LED/LCD display	
25.	Data Monitor and display controls	
26.	Protections	
27.	Enclosure Protection Safety	
28.	Warranty	
<b>(C) Array Junction Box (DCDB)</b>		
1.	No. of module in series	
2.	No. of module in parallel	
3.	Switch gears	
4.	Connectors	
5.	Wiring	
6.	Enclosure Protection	
7.	Enclosure	
8.	Size	
9.	Capacity of each SPV panel and nos.	
<b><u>(D) PANEL SUPPORT/MODULE MOUNTING STRUCTURE</u></b>		
1.	Material	
2.	Thickness of member	
3.	Over all dimensions	
4.	Wind rating	
5.	Tilt angle and adjustment	
6.	Peach of structure	
7.	Hard wears & fastener	
8.	Foundation	

(Signature of the contractor)

**SCHEDULE - B**

**DEPARTURE FROM SPECIFICATIONS**  
**(TO BE FILLED BY THE BIDDER)**

Name of work:-       **Supplying, installation, testing and commissioning of on grid roof top Solar Photo Voltaic Power generation system at the Bungalows of hon'ble Supreme Court Judges, New Delhi**

NIT No.:-               **18/NDZ-1/DED-102/2019-20**

Name of Contractor: \_

S.No.	Ref to NIT Para	Description of Deviation / Departure	Reason for Departure
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

- (i) Certified that except for departure mentioned above, tender is in accordance with site conditions for support to GRID connected SOLAR PV applications as amended upto date, CPWD General Specifications for Electrical works Part - I Internal - 2013 as amended upto date, CPWD General Specifications for Electrical works Part - II external and CPWD General Specification for Civil works as amended upto date and in accordance with detailed requirements specified in tender specifications /BOQ.
- (ii) Certified that the items of the work as described in the Schedule of Quantities in Price Bid have been read in conjunction with the Technical Specifications and the Scope of Work has been fully understood by us. Further, we also certify that there are no departures from the nomenclature of items specified in the Schedule of Quantities except those specifically brought out in the "Schedule ***of departure from Specifications***".

(Signature of the contractor)

**SCHEDULE – C**

**LIST OF TECHNICAL LITERATURE & CATALOGUE  
AND ANY OTHER INFORMATION  
(TO BE FILLED BY THE BIDDER)**

Name of work:-       **Supplying, installation, testing and commissioning of on grid roof top Solar Photo Voltaic Power generation system at the Bungalows of hon'ble Supreme Court Judges, New Delhi**

NIT No.:-               **18/NDZ-1/ DED-102/2019-20**

Name of Contractor: \_

**The tenderer should furnish the list of technical literature & catalogues of the equipments offered: -**

S.No.	Data/Information	Remarks
1.		
2.		
3.		
4.		

(Signature of the contractor)

**List of Preferred makes of Equipments and Materials**

<b>Sl.No.</b>	<b>Item</b>	<b>Make</b>
1	Mono PERC/ Poly-Crystalline solar Panel	Tata Solar Power / Vikram Solar / EMVEE / BHEL / CEL / Anchor-Panasonic / Ritika / Adani / Havells / Bosch / Sun Power / Schnieder
2	String Inverter/PCU	Polycab / Delta / SMA / Solis / Havells / Tata Solar Power / Schnieder / Fronius / Sun Power
3	Junction box Enclosure	Hensel / Grasp / Sintex/ Havells
4	Module mounting structure	As per MNRE / Manufacture standard (Design to be got approved fromCDO, CPWD / IIT / NIT/ DTU)
5	MCB	Schneider / Legrand / Siemens / L&T / Hager / ABB / Havells
6	MCCB	Schneider / Legrand / Siemens / L&T / Hager / ABB / Havells
7	Multifunction meter	L&T / Schneider / AE / Trinity
8	CTs	AE / Kappa / Siemens / ABB /L&T
9	Indicating lights	Schneider / L&T / Siemens / C&S
10	XLPE insulated aluminium conductor cable	Polycab / LAPP / RR Kabel / Finolex / Havells
11	DC tinned copper conductor cable	Polycab/ LAPP / RR Kabel / Finolex / Havells
12	LT Panel	CPRI Approved Manufacturer
13	Earthing Enhancement Compound as per IEC 62561-7	JMV / Erico / OBO / Furse

**Executive Engineer (E)**  
**DED-102, CPWD,**  
**IP Bhawan, New Delhi**

### Schedule Of Work

**Name of Work : Supplying, installation, testing and commissioning of on grid roof top Solar Photo Voltaic Power generation system at the Bungalows of hon'ble Supreme Court Judges, New Delhi**

S.No.	Description of Item	Qty.	Rate	Unit	Amount
	<b>SH : I (SITC of PV System)</b>				
1	<p>Supplying, installation, testing and commissioning of grid interactive roof top solar photovoltaic power generation system comprising of :-                      Mono PERC/ Poly-Crystalline photo voltaic modules as per IEC 61215/IS 14286 and IEC 61730 Part-I &amp; II. The minimum power rating of individual solar PV module shall be not less than 370 Wp as per detailed technical specifications attached. The work shall include series-parallel connection of different solar photovoltaic panels &amp; arrays mounted at different locations at different heights at interconnected terrace of the same block on the existing module mounting structure at a approx. height of 2.2 mtr from the terrace level to generate suitable volt and power to comply with solar grid inverter including connections and interconnection from SPV module to module in a solar array by 4 sq. mm size DC solar cable which is the integral part of the SPV module (which is supplied along with SPV module) and as per terms &amp; conditions attached etc complete as required at site.(Different solar PV modules under one array or different array connecting to a single power conditioning unit shall be installed at different locations at the existing terrace of a continuous block. interconnection between module to module or solar array to array is included in the scope of work however, the interconnection cable between one solar array to another solar array shall be paid extra.)</p>	1620 Jobs	12626	Job	20454120.00

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Correction -Nil      Omission – Nil      Addition – Nil      AE(P)      EE(P)

S.No.	Description of Item	Qty.	Rate	Unit	Amount
2	Supplying, installation, testing & commissioning of following capacity On Grid Solar PV Inverter suitable for Item No 1, MPPT based solar charge controller with MOSFET/ IGBT based switching devices 415Volt , 3 phase 50 Hz AC regulated output supply conforming to IEC61683 and IEC 60068. It should have max. DC array input voltage of 1000 Volt, THDi<3%, Efficiency>97%, LED/LCD display with multiple monitoring and communication Graphical UI and with RS 485/432 port, protection against over/under voltage, short circuit, low/ high frequency, Operating temperature range -10°C to 60°C, over temperature, grid input under voltage/over voltage with auto recovery, reverse polarity etc. complete with galvanic isolation at input and output through transformer synchronization system, hourly digital metering arrangement for energy and display for V, A, frequency, PF, etc. as reqd. housed in powder coated weather proof IP 65 enclosure fabricated with 2mm thick CRCA sheet for outdoor application complete with control cables, wiring, connections, inter connections, base foundation etc. as reqd and as per detailed technical specifications and terms & conditions attached				
a)	10 KWp	8 Jobs	93000	Job	744000.00
b)	15 KWp	8 Jobs	121515	Job	972120.00
c)	20 KWp	8 Jobs	124335	Job	994680.00
d)	30 KWp	8 Jobs	154508	Job	1236064.00
3	Supplying & Installation of PV Module Mounting Structure suitable for installation(mounting) of roof top SPV made of cold rolled hot dip galvanized steel with > 85 microns galvanizing with SS hardware and holding bracketes at different locations at different heights at terrace roof top with combination of I, C, L sections as per structure using minmum size of C(75X40X5 mm), I (60X 40 X4 mm) & L(55 X 55 X 5mm) sections or higher side dimensions for respective sections required to withstand wind speed of upto 185 Km/Hour at sitelocations suitable fastening arrangement such as grouting and clamping shall be provided to secure the installation against the specified wind speed. Approx height of				

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S.No.	Description of Item	Qty.	Rate	Unit	Amount
	the upper edge of the mounting structure for solar PV module should be 2.2 Mtrs from the terrace to get suitable DC output and adjustable tilt angle to encapsulate max solar irradiance with all mounting accessories and as per detailed technical specifications and terms & conditions attached etc. complete as required. This item includes providing of suitable CC Padestals, on roof, for bolting the mounting structures. (The contractor shall arrange vetting/approval of the submitted drawing of mounting structure for solar PV modules by CDO, CPWD / IIT / NIT / DTU Delhi. He will also arrange the visit of structural Engineer to ascertain that existing Roof slab is strong enough to take this additional load of mounting structure along with solar PV modules.)	30000 Kgs	103	Kg	3090000.00
4	Supply, Installation, Testing and Commissioning array junction boxes (DCDB), compatible with item no. 2, above, of solar grid inverter. DC distribution box shall be mounted close to the solar grid inverter. The DC distribution box should be weather & heat resistant and shall be of the thermo-plastic/ Polycarbonate having minimum IP65 protection, UV/IR protected, ozone resistant with connectors of IP 65/67 standard with integrated locking and sealing for ultimate safety with MC4 compatible design DIN-rail mounting type transparent box and shall comprise the following components and cable terminations: (i) String Combiner Box - (Breaker, SPD and Fuses) (ii) DCDB - (Breaker, SPD)				
	(iii) Combiner / Busbar Box - (Breaker, SPD) (iv) Incoming positive and negative DC cables from the solar module (v) DC fuse of suitable rating installed at incoming of each string (vi) DC surge protection device (SPD), class 2 as per IEC 60364-5-53; (vii) Outgoing positive and negative DC cables to the solar grid inverter. The terminals shall be connected to copper busbar arrangement of required size and junction box shall be fitted with cable glands as per required cable size for both incoming and outgoing cable complete as reqd. The DC distribution boxes shall be of following ratings:				

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a)	Upto 15kW (with 2 Input and 2 output)	16 Jobs	10125	Job	162000.00
S.No.	Description of Item	Qty.	Rate	Unit	Amount
b)	16kW – 20kW (with 4 Input and 4 output)	8 Jobs	20250	Job	162000.00
c)	21kW – 30kW (with 6 Input and 6 output)	8 Jobs	30375	Job	243000.00
5	Supplying & laying 4 sqmm size DC solar cable, flexible tinned copper conductor single core multistrand cross linked, zero halogen low smoke insulation and cross linked low smoke sheathing heat resistant upto 120° C and UV resistant solar cables to withstand high DC current, from solar PV module array (from end/last PV module of solar PV array to array junction box) to array junction box and from array junction board to solar inverter on surface of wall/ roof with 1mm thick MS saddles etc complete as required. (Interconnection cable between solar PV module to nearby solar PV module in an array shall not be paid as it is the part of Item No. 1)	10000 Mtrs	82	Mtr	820000.00
6	Supplying & laying of one number XLPE insulated, armoured cable with aluminium conductor of 1100 V grade confirming to IS: 7098 (part1) 1988 of following size in the existing masonry open duct as required.				
(a)	4 x 25 sqmm	300 Mtrs	183	Mtr	54900.00
(b)	3.5x 50 sqmm	300 Mtrs	267	Mtr	80100.00
7	Supplying & laying and fixing of one number XLPE insulated, armoured cable with aluminium conductor of 1100 V grade confirming to IS: 7098 (part1) 1988 of following size in the on wall / ceiling surface as required.				
(a)	4 x 25 sqmm	450 Mtrs	199	Mtr	89550.00
(b)	3.5x 50 sqmm	450 Mtrs	333	Mtr	149850.00
8	Supplying & laying of one number XLPE insulated, armoured cable with aluminium conductor 650 /1100 V grade confirming to IS: 7098 (part1) 1988 of following size in the existing HUME/METAL pipe as required				
(a)	4 X 25 Sqmm	800 Mtrs	191	Mtr	152800.00
(b)	3.5 x 50 sqmm	800 Mtrs	276	Mtr	220800.00
9	Supplying and making end termination with brass compression gland and aluminium lugs for following size of PVC insulated and PVC sheathed/ XLPE aluminium conductor cable of 1.1 KV grade as required.				
(a)	4 X 25 Sqmm	30 Nos	250	Each	7500.00
(b)	3.5 x 50 Sqmm	40 Nos	329	Each	13160.00

Correction -Nil Omission – Nil Addition – Nil AE(P) EE(P)



S.No.	Description of Item	Qty.	Rate	Unit	Amount
10	Supplying and laying of following size DWC HDPE pipe ISI marked along with all accessories like socket, bend, couplers etc. conforming to IS 14930, Part II complete with fitting and cutting, jointing etc. direct in ground (75 cm below ground level) including excavation and refilling the trench but excluding sand cushioning and protective covering etc., complete as required.				
a)	63 mm dia (OD-63 mm & ID-51 mm nominal)	800 Mtrs	209	Mtr	167200.00
b)	90 mm dia (OD-90 mm & ID-76 mm nominal)	800 Mtrs	249	Mtr	199200.00
11	Supplying installation, testing and commissioning of 3 phase 4 wire, 50 Hz 415 volts AC distribution box of following ratings, suitable for receiving 1 no of inverter supply and out going to grid supply; dust and vermin proof, min. IP 65 protection Polycarbonate/ thermoplastic box with transparent door to transfer power from inverter to load/DB busbar, including providing and fixing, testing and commissioning of following accessories, interconnections and connection from inverter with appropriate size copper conductor cable, earthing etc:				
(a)	Upto 15 kW rating				
i)	63A FP MCCB 415V, 50 Hz (Ics = Icu at 433 V) – 1 no.				
ii)	Bidirectional & Unidirectional CT operated Multifunction Meter having provision for recording of all parameters such as Volt, Amp, Freq, PF, kW, kVA, kVAR, kWh, kVAh, kVARh, Runhours, On hours, Interrupts, Phase angle, THD, Neutral current, Maximum Demand (kW & kVA), MD reset, Bidirectional (Import-Export) Class Accuracy 0.5 complete with CTs of suitable rating with accessories for making suitable arrangements of Netmetering with existing power supply company– 1 set				
iii)	RS 485/432 port				
iv)	AC SPD Class 2 at 415V				
v)	LED indicators – RYB- 1 set	16 Jobs	15947	Job	255152.00
(b)	16kW - 30kW rating				
i)	125A FP MCCB 415V, 50 Hz (Ics = Icu at 433 V) – 1 no.				

Correction -Nil Omission – Nil Addition – Nil AE(P) EE(P)

S.No.	Description of Item	Qty.	Rate	Unit	Amount
ii)	Bidirectional & Unidirectional CT operated Multifunction Meter having provision for recording of all parameters such as Volt, Amp, Freq, PF, kW, kVA, kVAR, kWh, kVAh, kVARh, Runhours, On hours, Interrupts, Phase angle, THD, Neutral current, Maximum Demand (kW & kVA), MD reset, Bidirectional (Import-Export) Class Accuracy 0.5 complete with CTs of suitable rating with accessories for making suitable arrangements of Netmetering with existing power supply company– 1 set RS 485/432 port AC SPD Class 2 at 415V LED indicators – RYB- 1 set	16 Jobs	24469	Job	391504.00
iii)					
iv)					
v)					
	<b>Earthing</b>				
12	Providing maintenance free earthing system consisting of copper bonded steel rod having 17.2mm dia (NS) and minimum 3 Mtr length as per UL467 (UL listed). The material of rod shall be low carbon high tensile steel molecularly bonded with 99.9% pure electrolytic grade copper having thickness of minimum 250 microns alongwith an exothermically welded copper busbar of 50x6x200mm (NS) size and both having CPR1 test report tested at 25 KA fault current carrying capacity. The earthing rod shall be placed vertically in suitable pit of minimum dia 150mm and depth of atleast 3.2 Mtr. The earthing pit shall be filled with atleast 30Kg earth enhancement compound having resistivity of less than 0.12 Ohm meter as per IEC 62561-7. The earthing system shall be covered with suitable size poly plastic pit cover of size 300x250x200mm (NS) complete as required.	64 Sets	11800	Set	755200.00
13	Supplying and laying 25 mm X 5 mm copper strip at 0.50 meter below ground as strip earth electrode, including connection/terminating with nut, bolt, spring, washer etc. as required. (Jointing shall be done by overlapping and with 2 sets of brass nut bolt & spring washer spaced at 50 mm)	500 Mtrs	853	Mtr	426500.00
14	Providing and fixing 25 mm X 5 mm copper strip in 40 mm dia G.I. pipe from earth electrode including connection with brass nut, bolt, spring, washer excavation and re-filling etc. as required.	300 Mtrs	1224	Mtr	367200.00

Correction -Nil Omission – Nil Addition – Nil AE(P) EE(P)

S.No.	Description of Item	Qty.	Rate	Unit	Amount
15	Providing and fixing 25 mm X 5 mm copper strip on surface or in recess for connections etc. as required.	500 Mtrs	1009	Mtr	504500.00
16	Providing and fixing earth bus of 50 mm X 5 mm copper strip on surface for connections etc. as required.	50 Mtrs	1844	Mtr	92200.00
17	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing along with existing surface/ recessed conduit/submain wiring/ cable as required.	6200 Mtrs	37	Mtr	229400.00
<b>TOTAL SUB-HEAD I</b>					<b>33034700.00</b>
	<b>SH: II (Servicing &amp; Routine maintenance)</b>				
1	Servicing & Routine maintenance of above roof top Solar Photovoltaic power generation systems of approx. 600 kwp capacity, by deputing minimum staff, as per terms & conditions, on all days of the month including Sundays & Holidays for cleaning of solar PV module, checking & routine maintenance of the system for satisfactorily operation as per manufacturer's standards, recording the various electrical parameters in log book i/c visit by Engineer for checking the healthiness of each system i/c repair/replacement of the defective part or to attend the major complaint when informed by the Department as per terms & condition attached. Each roof top solar PV system is to be serviced & cleaned at least once a fortnight and checked at least once a month (Supply of parts, required for replacement due to normal wear & tear or manufacturing defect, are inclusive in the scope of the work under guarantee period)	60 Month	61093	Month	3665580.00
<b>TOTAL SUB-HEAD II</b>					<b>3665580.00</b>
<b>TOTAL SUB-HEAD I &amp; II</b>					<b>36700280.00</b>

**Executive Engineer (E)**  
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