



Government of India
Ministry of Communications
Department of Posts



TENDER DOCUMENT

NIT No: 141/EE/PED/ND/NIT/2020-21 dated 25-01-2022

Name of work: Supply, installation, testing, and commissioning of 8 kWp grid connected roof top solar PV system at Jhilmil HPO, Delhi..

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Department of Posts
O/o Executive Engineer (E)
Postal Electrical Division
Tenth Floor, Meghdoot Bhawan
New Delhi- 110001

NOTICE Inviting-TENDER

NIT No: 141/EE/PED/ND/NIT/2020-21/170

Date:25-01-2022

1. Percentage rate bids are invited on behalf of President of India from the contractors satisfying under mentioned eligibility conditions for the following work:

NIT No.	141/EE/PED/ND/NIT/2020-21 dated 25-01-2022
Name of work	Supply, installation, testing, and commissioning of 8 kWp grid connected roof top solar PV system at Jhilmil HPO, Delhi.
Estimated cost	₹ 3,57,120/-
Earnest money deposit	₹ 7,142/-
Period of completion	60 day
Last date and time of submission of technical and financial bid	02-02-2022 up to 15:00 hours
Date and time of opening of technical bid	02-02-2022 at 15:30 hours

- (i) The estimated cost is given merely as a rough guide.
- (ii) The intending bidder is eligible to submit the bid provided he has 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 below.
- (iii) Joint ventures are not accepted.

Criterion of eligibility for submission of bid documents:

- (a) Should have satisfactorily completed the works as mentioned below in DoP or with some Central/State Government department / Central/State Autonomous Body / PSU during last seven years ending previous day of last date of submission of bids:
- (i) Three similar works each for value not less than 40% of the estimated cost put to tender
or
- (ii) Two similar works each for value not less than 60% of the estimated cost put to tender
or
- (iii) One similar work each for value not less than 80 % of the estimated cost put to tender

The capacity of individual solar PV system completed shall not be less than 80 % of individual capacity (in case of more than one system, higher capacity shall be taken) of the grid connected solar PV system in this NIT.

NOTE:

- (i) For the purpose of this clause "similar work" means, the "SITC of grid connected or off-grid solar PV system with or without battery backup".
 - (ii) The value of all above 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 previous day of last date of submission of tenders.
 - (iii) Certificate of successful completion of work in respect of the experience should be issued by an officer not below the rank of Executive Engineer or equivalent. The work done certificate shall clearly indicate amount of work done, date of start, date of completion, time period (stipulated and actual). The works not completed in stipulated time where levy of compensation is imposed are not considered satisfactory for work experience.
- (b) Average annual financial turnover during the last three years, ending March 31 of the previous financial year, should be at least 50% of the estimated cost.
- (iv) The e-tender will be submitted on e-tendering portal of e-Wizard at <https://dopcivil.euniwizarde.com> and will be opened in the presence of intending contractors or their authorized representatives.
2. Agreement shall be drawn with the successful bidder on prescribed Form No. CPWD-7, which is available as a Government of India publication and also available on website www.cpwd.gov.in. Bidders shall quote his rates as per various terms and conditions of the said form, which will form part of the agreement.
 3. The time allowed for carrying out the work will be **60 day** 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 tender documents.
 4. The site for the work is available.
 5. The bid documents consisting of plans, specifications, the schedule of quantities of the various types of items to be executed and the set of terms and conditions of contract to be complied with and other necessary documents except Standard General Conditions of Contract Form can be seen and downloaded from website <https://dopcivil.euniwizarde.com> free of cost.
 6. After submission of the bid the contractor can re-submit revised bid any number of times but before last time and date of submission of bid as notified.
 7. While submitting the revised bid, contractor can revise the rate of one or more time(s) any number of times (he need not re-enter rate of all the items) but before last time and date of submission of bid as notified.
 8. 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.
 9. Earnest money shall be in the form of Treasury Challan or Demand Draft / Pay Order / Banker's Cheque of a Scheduled Bank (issued in favor of Accounts Officer, Postal Electrical Division, New Delhi) or Deposit at Call Receipt / Fixed Deposit Receipt of a Scheduled Bank (pledged in favor of tender inviting authority).

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

The earnest money should be deposited (on all working days up to 16:00 hours either in the office of Executive Engineer (E) inviting bids or division office of any Executive Engineer, Postal Electrical/ Civil Division within the period of bid submission. For this list of Executive Engineers along with

address where EMD can be deposited is enclosed as Annexure-II. The officer receiving EMD shall issue a receipt of deposition of earnest money to the bidder in a prescribed format as per Annexure-I. This receipt shall be scanned and uploaded on the e-tendering website within the period of bid submission.

Earnest money can also be paid at the e-tendering portal of e-Wizard through their smart payment system by using debit / credit card, internet banking, or through NEFT / RTGS before submission of bid.

Interested contractor who wish to participate in the bid has also to make following payments within the period of bid submission:

- (a) E-tender processing fee (non-refundable)(@ 0.1% of estimated cost + GST; minimum ₹ 885/-) will be paid at the e-tendering portal of e-Wizard through their e-payment system by debit / credit card, internet banking.

Copy of Enlistment Order, if required and certificate of work experience and other documents as specified shall be scanned and uploaded to the e-tendering website within the period of bid submission. **However, certified copy of all the scanned and uploaded documents as specified shall have to be submitted by the lowest bidder only within a week physically in the office of tender opening authority.**

Online bid documents submitted by intending bidders shall be opened only of those bidders, who has paid e-tender processing fee, and has paid / deposited earnest money; and other documents scanned and uploaded are found in order.

10. 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, DoP / does not pay earnest money at e-tendering portal through smart payment system.
- (iii) The bidder does not upload all the documents as stipulated in the bid document including the undertaking.
- (iv) If any discrepancy is noticed between the documents as uploaded at the time of submission of bid and hard copies as submitted physically by the lowest bidder in the office of bid opening authority, and 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 tenderer shall not be allowed to participate in the rendering process of the work.
- (v) If a bidder quotes nil rates against each item in item rate tender; or does not quote any percentage above/below on the total amount of the tender or any section / subhead, in percentage rate tender; the tender shall be treated as invalid and will not be considered as lowest bidder.

11. The contractor whose bid is accepted will be required to furnish performance guarantee of 5 % (five per cent) of the tendered amount within the period specified in Schedule 'F'. This guarantee shall be in the form of cash (in case guarantee amount is less than ₹ 10,000/-) or Deposit at Call Receipt / Banker's Cheque / Pay Order / Demand Draft of any Scheduled Bank (in case guarantee amount is less than ₹ 1,00,000/-) or Government Securities or Fixed Deposit Receipts or Guarantee Bonds of any Schedule 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 bid shall be returned after receiving the aforesaid performance guarantee.

The contractor whose bid is accepted will also be required to furnish either copy of the applicable licences/registrations or proof of applying for labour licences, registration with EPFO, ESIC and

BOCW Welfare Board including Provident Fund Code No, if applicable and also ensure the compliance of aforesaid provisions by the sub-contractors, if any engaged by the contractor for said work, and Programme Chart (Time and Progress) within the period specified in Schedule 'F'.

12. The description of the work is as follows:-

“Supply, installation, testing, and commissioning of 8 kWp grid connected roof top solar PV system at Jhilmil HPO, Delhi.”

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 charges 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. 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 bids 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. Canvassing whether directly or indirectly, in connection with bidders is strictly prohibited and the bids submitted by the contractors who resort to canvassing will be liable to rejection.
15. 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. The contractor shall not be permitted to bid for works in the DoP Circle (Division in case of Contractors of Horticulture/ Nursery category) responsible for award and execution of contracts in which his near relative is posted as Divisional Accountant or as an officer in any capacity between the grades of Superintending Engineer (E) and Junior Engineer (E) (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 Gazetted officer in the Department of Posts. 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. 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 two years 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 tender or engagement in the contractor's service.
18. The bid for the works shall remain open for acceptance for a period of 90 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 bidder shall not be allowed to participate in the re-bidding process of the work.

19. This Notice Inviting Tender shall form a part of the contract document. The successful bidders/ contractor, on acceptance of his bid by the Accepting Authority, shall, within 15 day from the stipulated date of start of the work sign the contract consisting of-
- (a) The notice inviting tender, all the documents including additional conditions, specifications and drawings, if any, forming a part of the bid as uploaded at the time of invitation of tender and the rates quoted online at the time of submission of bid and acceptance thereof together with any correspondence leading thereto.
 - (b) Standard CPWD Form as mentioned in Schedule 'F' or other Standard CPWD Form as applicable.

**Executive Engineer (E)
Postal Electrical Division
New Delhi.**

For & on behalf of the President of
India

INFORMATION AND INSTRUCTIONS FOR BIDDERS FOR e-TENDERING

1. The intending bidder must read the terms and conditions of Notice Inviting Tender (CPWD-6) carefully. He should only submit his bid if he considered himself eligible and he is in possession of all the documents required.
2. Information and instructions for bidders posted on e-tendering portal of e-Wizard shall form part of bid document.
3. 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 General Conditions of Contract Form can be seen and downloaded from website at <https://dopcivil.euniwizarde.com> free of cost.
4. But the bid can only be submitted after deposition of original EMD either in the office of Executive Engineer inviting bids or division office of any Executive Engineer, DoP/ payment of earnest money at the e-tendering portal of e-Wizard through smart payment system within the period of bid submission and uploading the mandatory documents as mentioned in NIT, receipt of deposition of original EMD to division office of any Executive Engineer (including NIT issuing EE/AE), DoP, if applicable.
5. Online bid documents submitted by intending bidders shall be opened only of those bidders, who has paid tender processing fee and has deposited / paid the earnest money; and other documents scanned and uploaded are found in order.
6. Those contractors not registered on the website mentioned above, are required to get registered beforehand.
7. The intending bidders must have valid class-III digital signature certificate (with signing and encryption uses) to submit the bid.
8. Certificate of financial turnover: At the time of submission of bid, bidder may upload affidavit/certificate from CA mentioning financial turnover of last three years or for the period as specified in the tender document and further details, if required, will be asked from the contractor after opening of technical bids. There is no need to upload entire voluminous balance sheet.
9. The e-tenders shall be submitted under two bid system on e-tendering portal before last time and date of submission of bid as notified - the first electronic bid will be named as Technical Bid and shall contain documents of bidder's satisfying the eligibility conditions and tender document; and second electronic bid shall be named as Financial Bid and shall contain Schedule/Bill of Quantities (BoQ). These bids shall contain one set of the following documents-

List of documents to be uploaded within the period of bid submission

9.1 Technical Bid shall contain the scan copies in PDF format of following documents:

- i) Tender Document in PDF format digitally signed.
- ii) Receipt of deposition of original EMD issued from division office of any Executive Engineer (including NIT issuing EE/AE), DoP; if deposited in physical form.
- iii) Certificate of work experience.
- iv) Certificate of financial turnover from CA.
- v) Any other document as specified in NIT.
- vi) Undertaking as per format enclosed at Annexure-III, duly signed and stamped.
- vii) GST registration certificate of the state in which the work is to be taken up, if already obtained by the bidder.

If the bidder has not obtained GST registration in the state in which work is to be taken up, or as required by GST authorities, then in such a case the bidder shall scan and upload following undertaking 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 within one month from the date of receipt of award letter or before release of any payment by DoP, whichever is earlier, failing which I/we shall 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 DoP or GST department in this regard".

9.2 Financial bid shall contain:

Schedule/Bill of Quantities in MS Excel format .xlsx file duly filled & digitally signed without changing the name of file.

10. The technical bid shall be opened first on due date and time. Subsequently the financial bid of contractors qualifying the technical bid shall be opened either at the due date and time specified or at such date and time communicated to them at later date.

SPECIAL INSTRUCTIONS FOR e-SUBMISSION OF BIDS ONLINE

The tender document has been published on the e-tendering portal of e-Wizard at <https://dopcivil.euniwizarde.com>. The bidders are required to submit their bids electronically on the e-tendering portal, using valid Digital Signature Certificates. The instructions given below are meant to assist the bidders in registering on this portal; prepare their bids in accordance with the requirements; and submitting their bids online on the portal. For latest and detailed instructions, please see the *Downloads* section of the e-Wizard at <https://dopcivil.euniwizarde.com>.

Registration

1. Bidders are required to enroll on the e-Wizard at <https://dopcivil.euniwizarde.com> by clicking on the link "Register". Enrolment is free of charge.
2. As part of the enrolment process, the bidders will be required to choose a unique *User Name* and assign a *Password* for their accounts.
3. Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the e-Wizard portal.
4. Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (Class III Certificates with signing and encryption) issued by any Certifying Authority recognized by CCA India (e.g. SafeScript/ TCS/ nCode/ eMudra etc.) with their profile.
5. Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSCs to others which may lead to misuse.
6. Bidder then logs in to the website through the secured log-in by entering their User Name / Password and the password of the DSC/e-Token.

Searching for Tender Documents

1. Bidders can search for any tender by clicking on "Live Tender" under search option on Home Page. Once the bidders have selected the tenders they are interested in, they may download the required tender documents and tender schedules by clicking on "Tender Document".
2. The bidders should make a note of the unique Tender ID assigned to each tender, in case they want to obtain any clarification / help from the Helpdesk.

Preparation of Bids

1. Bidder should take into account any corrigendum published in the tender before submitting their bids. Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid. Please note the number of covers in which the bid documents have to be submitted, the number of documents – including the names and content of each of the document that need to be submitted.
2. Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document and generally, they can be in PDF / MS Excel / JPG formats. Bid documents may be scanned with 100 dpi with black and white option.
3. To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g. GST registration, PAN card, auditor certificates etc.) has been provided to the bidders. Bidders can use "My Documents" area available to them to upload such documents. Those documents may be directly submitted from the "My Documents" area while submitting a bid, and need not to be uploaded again and again. This will lead to a reduction in the time required for bid submission process.

Submission of Bids

1. Bidders should log into the site well in advance for bid submission so as to upload the bid in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other issues.
2. The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document.
3. Bidder has to select the payment option as required from the dropdown to pay the earnest money and processing fee and enter the details of demand draft / other accepted instrument.
4. The tender Inviting Authority will not be held responsible for any sort of delay or the difficulties faced during the submission of bids online by the bidders. The bidder should see that the bid documents submitted should be free from virus and if the documents could not be opened, due to virus, during tender opening, the bid is liable to be rejected.
5. Bidders are required to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. The price bid has been given as a standard BoQ format with the tender document, then the same is to be downloaded and to be filled by all the bidders. Bidders are required to download the BoQ file, open it and fill the **unprotected** cells with their respective financial quotes and other details (such as name of the bidder). No other cells should be changed. Once the details have been completed, the bidder should save it and submit it online, without changing the filename. If the format of BoQ file is found to be modified by the bidder, the bid will be rejected.
6. The server time (which is displayed on the bidders' dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission. The bidders are requested to submit the bids through online e-tendering system to the TIA well before the bid submission end date & time as per server system clock.
7. All the documents being submitted by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening.
8. The uploaded tender documents become readable only after the tender opening by the authorized bid openers.
9. Upon the successful and timely submission of bids, the portal will give a successful bid submission message & a bid summary will be displayed with the bid no. and the date & time of submission of the bid with all other relevant details.
10. The bid summary has to be printed and kept as an acknowledgement of the submission of the bid. This acknowledgement may be used as an entry pass for any bid opening meetings.

Assistance to Bidders

1. Any queries relating to tender document and the terms and conditions therein should be addressed to the officer inviting tender.

Any queries related to the process of online bid submission or queries relating to e-tendering portal in general may be directed to e-Wizard Helpdesk. The contact number for Helpdesk is 011-49606060, Mr.AweshTyagi 92058-98224; Mr.Abhinav 79826-96347, Mr.Samabesh 93550-30634, Mr.Bibhesh 93550-30629.

Annexure-I**Format for Receipt of Deposition of Physical Earnest Money**

Receipt No. _____

Date: _____

1.	NIT No.	141/EE/PED/ND/NIT/2020-21 dated 25-01-2022
2.	Name of work	Supply, installation, testing, and commissioning of 8 kW connected roof top solar PV system at Jhilmil HPO, Delhi.
3.	Estimated Cost	₹ 3,57,120/-
4.	Earnest money deposit	₹ 7,142 /-
5.	Last date and time of submission of bids	02-02-2022 up to 15:00 hours

1. Name of bidder[#]:
2. Form of EMD[#]:
3. Amount of EMD[#]:
4. Date of submission of EMD[#]:

Signature, name and designation of EMD receiving officer
(EE/ AE(P)/ AE/ AAO) along with Office Stamp

Note:

[#]: To be filled by officer receiving the EMD.

1. The Executive Engineers of all Postal Civil / Electrical Divisions should receive the physical EMD of other divisions.
2. The Executive Engineer receiving the physical EMD shall examine the EMD deposition by the bidder and shall issue the receipt of deposition of Earnest Money in the above format. The receipt may be issued by AE / AAO.
3. The Executive Engineer receiving physical EMD should also intimate tender inviting Executive Engineer about deposition of EMD by bidder through e-mail / fax or over phone.
4. The tender inviting Executive Engineer will call for physical EMD of the L-1 bidder from EMD receiving Executive Engineer immediately.
5. The physical EMD receiving Executive Engineer shall release the EMD after verification from the e-tendering portal website <https://dopcivil.euniwizarde.com> [Tender Status > AOC] for the tender ID to be obtained from the tender inviting Executive Engineer) that the particular contractor is not L-1 bidder and work is awarded.
6. List of Executive Engineers (along with address), where physical EMD can be deposited is enclosed as NIT Annexure – II.

Annexure-II**List of Executive Engineers with address**

The Executive Engineer (E) Postal Electrical Division-I, Meghdoot Bhawan, New Delhi- 110001.Ph: 011-23514049	The Executive Engineer (E) Postal Electrical Division-II, Meghdoot Bhawan, New Delhi- 110001.Ph: 011-23514049	The Executive Engineer (C) Postal Civil Division, Meghdoot Bhawan, New Delhi – 110001. Ph: 011-23628366
The Executive Engineer (E) Postal Electrical Division CSO, Gandhi Nagar, Jaipur – 302015. Ph: 0141 – 2708841	The Executive Engineer (C) Postal Civil Division, 2 nd Floor, HPO Building Shastri Nagar, Jaipur – 302016. Ph: 0141-2365941	The Executive Engineer (C) Postal Civil Division, 5 th Floor, C.T.T. Nagar, PO Building Bhopal – 462003. Ph: 0755-2779149
The Executive Engineer (C) Postal Civil Division, GPO Building, Ambala – 133001. Ph: 0171- 2647521	The Executive Engineer (C) Postal Civil Division, PO Building, 1 st Floor, Summer Hill, Shimla – 171005. Ph: 0177–2832943	The Executive Engineer (C) Postal Civil Division, Postal Colony, Roop Nagar, Jammu – 180013. Ph: 0191-2592924
The Executive Engineer (C) Postal Civil Division, HPO Bldg. Civil Lines Allahabad – 211001. Ph: 0532- 2622150	The Executive Engineer (E) Postal Electrical Division, PO Building, Sector-C, Aliganj, Lucknow – 226001. Ph: 0522 – 2336053	The Executive Engineer (C) Postal Civil Division, PO Building, Sector-C, Aliganj, Lucknow – 226024. Ph: 0522-2335165
The Executive Engineer (C) Postal Civil Division, Meghdoot Bhawan, GPO Compound, Patna – 800001. Ph: 0612 – 2226070	The Executive Engineer (E) Postal Electrical Division, Yogayog Bhawan, P-36, CR-Avenue, Kolkata-700012. Ph: 033-22120646, 22120637	The Executive Engineer (C) Postal Civil Division, Yogayog Bhawan, P-36, CR-Avenue, Kolkata - 700012. Ph: 033-22121441
The Executive Engineer (C) Postal Civil Division, 3 rd floor, Postal Store Depot building, Satyanagar, Bhubaneswar – 751007. Ph: 0674 – 2570960	The Executive Engineer (C) Postal Civil Division, Meghdoot Bhawan Complex, Guwahati – 780001. Ph: 0361 – 2542679	The Executive Engineer (C) Postal Civil Division, R.N. Compound, Opp. Raj Bhawan, Shillong – 793001. Ph: 0364-2224398
The Executive Engineer (E) Postal Electrical Division, 3 rd Floor, PO Building Mumbai – 400022. Ph: 022 – 24044164	The Executive Engineer (C) Postal Civil Division, PO Building, Mumbai – 400022.Ph: 022- 24013900	The Executive Engineer (C) Postal Civil Division, Khadki PO Compound, Pune – 411003. Ph: 020-25817762
The Executive Engineer (C) Postal Civil Division, Akashwani Square, DA (P) Compound, Nagpur- 400010. Ph: 0712-2540368	The Executive Engineer (C) Postal Civil Division, 2 nd Floor, Behrampur P.O. building, Ahmedabad – 380022.	The Executive Engineer (C) Postal Civil Division, 2 nd Floor, HPO Building, Rajkot – 360001.
The Executive Engineer (E) Postal Electrical Division 2 nd Floor, HPO Bansvangudi, Bangalore – 560004. Ph: 080-26676804	The Executive Engineer (C) Postal Civil Division, GPO Building, Mysore Road, Bangalore – 560001. Ph: 080-23332025	The Executive Engineer (C) Postal Civil Division, K.C. Park, P.O. Compound, Dharwad- 580008.Ph: 0836-2445252
The Executive Engineer (C) Postal Civil Division, Gandhi Nagar, PO Building, Hyderabad – 500080. Ph: 040-23463910, 909, 908	The Executive Engineer (C) Postal Civil Division, No. 5, EthirajSalai, Chennai – 600008. Ph: 044-28203435	The Executive Engineer (C) Postal Civil Division, Manacaud, P.O. Trivandrum –695009.Ph: 0471-2466748

Annexure-III

Format for Undertaking

(To be submitted by bidders (on company letter head duly signed with stamp & seal) online on or before last time of date of bid submission)

To

The Executive Engineer (E)
Postal Electrical Division
New Delhi

Subject: Acceptance of terms & conditions of tender.

NIT No: 141/EE/PED/ND/NIT/2020-21 dated 25-01-2022

Name of work: "Supply, installation, testing, and commissioning of 8 kWp grid connected roof top solar PV system at Jhilmil HPO, Delhi.."

Dear Sir,

1. I/We have downloaded the tender document for the above mentioned work from the e-tendering portal of e-Wizard at <https://dopcivil.euniwizarde.com> as per your advertisement given in the above mentioned website.
2. I/We hereby certify that I/we have read the entire terms and conditions of the tender document (including all annexure, schedules etc.) which form part of the contract agreement and I/we shall abide hereby by the terms/ conditions/ clauses contained therein.
3. The corrigendum(s) issued from time to time by your department/ organization too has also been taken into considerations, while submitting their acceptance letter.
4. I/We hereby unconditionally accept the terms and conditions of above mentioned tender document and corrigendum(s) in its totality.
5. In case any provisions of this tender are found violated, then your department/organization shall without prejudice to any other right or remedy be at liberty to reject this tender/bid including the forfeiture of the Earnest Money absolutely.
6. 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 Department of Post 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.

Yours faithfully,

(Signature of the bidder, with Official Seal)

Annexure-IV**Format of Bank Guarantee Bond for Earnest Money**

WHEREAS, contractor (name of contractor) (hereinafter called "the contractor") has submitted his tender dated (date) for the work of (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.....(name and division of Executive Engineer) (Hereinafter called "the Engineer-in-Charge") in the sum of ₹ (Rupees 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 of20.....

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 provision of tender document and instructions to contractor.

We undertake to pay to the Engineer-in-Charge either upto the above amount or part thereof upon receipt of first written demand, without the Engineer-in-Charge having to substantiate his demand, provided that in his demand the Engineer-in-Charge will note that the amount claimed by him 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 upto 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

SEAL

WITNESS.....

(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.*

**Government of India
Department of Posts**

PERCENTAGE RATE TENDER & CONTRACT FOR WORKS

Tender or the work of **Supply, installation, testing, and commissioning of 8 kWp grid connected roof top solar PV system at Jhilmil HPO, Delhi..**

- i) To be uploaded by 02-02-2022 up to 15:00 hours on e-tendering portal of e-Wizard at <https://dopcivil.euniwizarde.com>.
- ii) To be opened through e-tendering in presence of bidders who may be present on 02-02-2022 at 15:30 hours in the office of the Executive Engineer (Electrical), Postal Electrical Division, New Delhi.

TENDER

I/We have read and examined the notice inviting tender, Schedule A, B, C, D, E, and F; specifications applicable, drawings and designs, General Rules and Directions, Conditions of Contract, Clauses of Contract, Special conditions, Schedule of Rates and 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 respects with the specifications, designs, drawings 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 respects in accordance with, such conditions so far as applicable.

I/We agree to keep the tender open for 60 day from the due date of opening of tender in case of single bid system/ 90 day from the date of opening of technical bid in case tender are invited on two bid system/ 120 day from the date of opening of technical bid, in case tenders are invited on three bid system for specialised work (strike out as the case may be) and not to make any modifications in its terms and conditions.

A sum of ₹7,142/- is paid at e-tendering portal / is hereby forwarded in Treasury Challan / Demand Draft/Pay Order/Banker's Cheque of a Scheduled Bank / Deposit at Call Receipt of a Scheduled Bank / Fixed Deposit Receipt of Scheduled Bank / / bank guarantee issued by a Scheduled Bank as earnest money. Receipt of deposition of earnest money is scanned and uploaded.

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 his 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 performance guarantee absolutely. The said performance guarantee shall be a guarantee to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to therein and to carry out such deviations as may be ordered, up to maximum of the percentage mentioned in Schedule 'F' and 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 or 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 Department of Post 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 therefrom 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 :.....

Signatures of Contractor

Postal Address:

Witness :

Address :

Occupation :

ACCEPTANCE

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

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

(a)

(b)

(c)

Signatures:.....

..

Dated :.....

Designation:.....

..

For & on behalf of the President of India

PROFORMA OF SCHEDULES

Schedule 'A'

Schedule/Bill of Quantities (MS Excel .xlsx file on the website against this work)

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
Schedule 'B' deleted				

Schedule 'C'

Tools and plants to be hired to the contractor

S.No.	Description	Hire charges per day	Place of issue
1	2	3	4
Schedule 'C' deleted			

Schedule 'D'

Extra schedule for specified requirements/ documents for the work, if any.

(i) General conditions, additional conditions, and particulars specifications as attached.

Schedule 'E'

Reference to General Conditions of contract: General Conditions of Contract for C.P.W.D. Works 2014 with amendment issued By C.P.W.D. up to date of issue of NIT.

Name of work: Supply, installation, testing, and commissioning of 8 kWp grid connected roof top solar PV system at Jhilmil HPO, Delhi..

Estimated cost of work: ₹3,57,120/-

(i) Earnest money: ₹7,142/- (to be returned after receiving performance guarantee)

(ii) Performance Guarantee: 5% of tendered value

(iii) Security Deposit: 2.5% of tendered value

Schedule 'F'

General Rules & Directions:

Officer Inviting tender: Executive Engineer (E), Postal Electrical Division, New Delhi.

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

Definitions:

2(v) Engineer-in-Charge: Executive Engineer (E), Postal Electrical Division, New Delhi

2(viii) Accepting Authority: Executive Engineer (E), Postal Electrical Division, New Delhi

2(x) Percentage on cost of materials and labour to cover all over-heads and profits: 15%

2(xi) Standard Schedule of Rates: DSR-2018

2(xii) Department: Department of Posts

9(ii) Standard CPWD Contract Form CPWD-7 as modified & corrected upto date of NIT.

Clause 1

- (i) Time allowed for submission of Performance Guarantee from the date of issue of letter of acceptance: 10 day
- (ii) Maximum allowable extension with late fee @ 0.1 % per day of Performance Guarantee amount beyond the period provided in (i) above: 10 day

Clause 2

Authority for fixing compensation under clause 2: S.E. (E), PEC, New Delhi.

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 10 day

Table of milestones

S.No.	Financial progress	Time allowed (from date of start)
1.	1/8 th (of whole work)	1/4 th (of whole work)
2.	3/8 th (of whole work)	1/2 th (of whole work)
3.	3/4 th (of whole work)	3/4 th (of whole work)
4.	Full	Full

Time allowed for execution of work 60 day

Authority to give fair and reasonable extension of time for completion of work: S.E. (E), PEC, New Delhi.

Clause 6, 6A

Clause applicable – (6 or 6A): Clause 6

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: ₹ 0.00 lakh

Clause 8B

- (i) This shall not apply for maintenance or upgradation contracts not involving any services.
- (ii) For other works, the limit shall be as below:

S.No.	Contract Value	Limit (₹)
1.	Less than or equal to ₹ 1 crore	₹ 2,000
2.	More than ₹ 1 crore but less than or equal to ₹ 5 crore	₹ 5,000
3.	More than ₹ 5 crore but less than or equal to ₹ 20 crore	₹ 25,000
4.	More than ₹ 20 crore	₹ 100,000

Clause 10A

List of testing equipment to be provided by the contractor at site lab: Earth tester, tongue tester, multi-meter, megger, vernier callipers, wire gauge

Clause 10B(ii)

Whether clause 10B(ii) shall be applicable: No

Clause 10C

Component of labour expressed as percentage of value of work: 30 %

Clause 10CC

Clause 10CC to be applicable in contracts with stipulated period of completion exceeding the period shown in next column: 18 month.

Clause 11

Specification to be followed for execution of work:

- (i) CPWD General Specifications for Electrical Works Part I (Internal) 2013.
- (ii) CPWD General Specifications for Electrical Works Part II (External) 1994.

Clause 12

Type of work:

12.2 & 12.3 Deviation limit beyond which clauses 12.2 & 12.3 shall apply for building work: 50%

12.5 Deviation limit beyond which clauses 12.2 & 12.3 shall apply for foundation work: 100%

Clause 16

Competent Authority for deciding reduced rates: S.E. (E), PEC, Delhi

Clause 18

List of mandatory machinery, tools & plants to be deployed by the contractor at site: -

Clause 36(i)

Sl No.	Minimum qualification of technical representative	Discipline	Designation (Principal technical/ technical representative)	Minimum experience	Number	Rate at which recovery shall be made from the contractor in the event of not fulfilling provision of clause 36(i)	
						Figures	Words
1.	Graduate Engineer	Elect. Engg	Principal Technical	Nil	--	₹15000/- per month	₹ fifteen thousand per month
2.	Diploma Holder	Elect. Engg	Technical representative	5 year	--	₹ 15000/- per month	₹ fifteen thousand per month

Clause 42

- (i) Schedule/ statement for determining theoretical quantity of cement & bitumen on the basis of Delhi Schedule of Rates 2013 printed by CPWD.
- (ii) Variation permissible on theoretical quantities.
 - a) Cement for works with estimated cost put to tender not more than ₹ 5 lakh 3% plus/ minus
 - For works with estimated cost put to tender more than ₹ 5 lakhs: 2% plus/ minus
 - b) Bitumen for all works: 2.5% plus only & nil on minus side
 - c) Steel Reinforcement and structural steel

sections for each diameter, section and category:	2% plus/minus
e) All other materials:	NIL

CORRECTIONS TO CPWD 7/8

Corrections to CPWD 7/8 Form for use in Department of Posts

All reference to:-

- (i) CPWD / Public Works Department;
- (ii) Administrative Head of CPWD;
- (iii) Director General of works, CPWD;
- (iv) Chief Engineer, CPWD;
- (v) CPWD Circle; and
- (vi) Ministry of Urban Development

in various clauses shall respectively be taken to mean:

- (i) Department of Posts / Civil Wing;
- (ii) Administrative Head of Department of Posts;
- (iii) Chief Engineer (C), Department of Posts;
- (iv) Chief Engineer (C), Department of Posts;
- (v) Postal Electrical Circle; and
- (vi) Ministry of Communications, Department of Posts

except in the following places and clauses where no modifications are intended:

- (i) C.P.W.D. Safety Code;
- (ii) Clause 11, 19 B(i), 19B(iii), 19C and 19 G;
- (iii) Model rules for protection of health and sanitary arrangement for workers employed by CPWD or its contractors (heading only);
- (iv) C.P.W.D. Contractor's Labour Regulations (in heading and Regulation No.1 only); and
- (v) CPWD Delhi Schedule of Rates and CPWD Specifications.

ADDITIONAL CONDITIONS AND SPECIFICATIONS

1. The work shall be done as per current CPWD General Specifications for Electrical Works as amended from time to time; and in accordance with the provisions of Electricity Act, 2003; and Central Electricity Authority (Measures Related to Safety and Electric Supply) Regulations as amended up to date.
2. The work shall be supervised by a qualified overseer/supervisor and the contractor will have to submit the credentials of the overseer/supervisor before he will be allowed to work at the site.
3. The layout of the work will be given by the Engineer-in-charge or his authorized representative at site of work.
4. The earthing sets shall be provided in the presence of the Engineer-in-charge or his authorized representative failing which the contractor will have to do that earthing in the presence of the Engineer-in-charge or his authorized representative.
5. The bidder should submit along with the tender, the make of materials to be used in the work whenever not specified in the schedule. Unapproved materials, if used on the work, shall have to be removed immediately at the cost and risk of contractor.
6. The successful contractor should recess the conduit in the walls before they are plastered and will have to take special care so that the conduit do not pass through air-conditioning grills, collar beams etc. Any damage thus done will have to be made good at cost of the contractor.
7. The runs of various circuits wiring at various places shall be kept minimum by the runs on walls where crossing of columns is not necessary. This has to be decided before the costing of slab so that unnecessary lengths of conduit are not laid there in.
8. Completion Plan and Completion Certificate: The contractor will have to submit the completion plan drawn to a suitable scale in tracing cloth with ink or computerized drawing, in triplicate along with completion certificate. In case the contractor fails to submit completion plan and completion certificate as aforesaid he shall be liable to pay a sum equivalent to 2.5% of the value of the work subject to a ceiling of ₹7,500/-.
9. Inspection of Material and Equipment: Department reserves the right to inspect the material at manufacturer's premises or at authorized dealer's godown.
10. Underground cable both of 1.1 kV and 11 kV grade should be subjected to insulation test before and after laying the same in the duct and in case of unsatisfactory test results, the cost of all repairs and replacement and all extra work for removal and relaying will have to be made by the contractor at his own cost and risk.
11. Termination of all connections on main board sub boards/sub distribution boards will be done by contractor and nothing extra will be paid on this account.

SPECIAL CONDITIONS OF CONTRACT

1. DEFINITIONS

In the deed of contract unless the context otherwise requires-

- 1.1 “DoP” shall mean The Executive Engineer (E), Postal Electrical Division, New Delhi.
- 1.2 The “contractor” shall mean the firm/ person (whose tender has been accepted by DoP) and shall include his legal representatives, successor in interest and assignees.
- 1.3 The “contract” shall mean carrying out the works as mentioned in the NIT **on turnkey basis**.

2. GENERAL

These special conditions are intended to amplify the General Conditions of Contract, and shall be read in conjunction with the same. For any discrepancy between the General Conditions and these Special Conditions, the provision of these Special Conditions will apply.

2.1 SCOPE OF WORK

The general character and the scope of work to be carried out under this contract is illustrated in Schedule of Work & Specifications. The contractor shall as a system integrator for providing an end to end solution for the above, including but not limited to design, supply, erection, testing, commissioning of the required solar photo voltaic power plant with accessories, peripherals like power conditioning units, cables, cable tray, junction boxes, conduits for wiring, all necessary wiring/cables for DC supply system (from solar array box, intermediate junction box to main junction box and main junction box to power conditioning units, cable for AC supply system from PCU to main solar panel, cable termination & connections sockets & other suitable accessories, earthing, data acquisition & storing, metering, DC system & bus etc. and installation, performance testing, commissioning, warranty, annual maintenance, etc. The bidders have to ensure the planning and smooth execution of the project.

The Contractor shall carry out and complete the said work under this contract in every respect in conformity with the contract documents and with the direction of and to the satisfaction of the engineer-in-charge. The contractor shall furnish all labour, materials and equipment as listed and specified otherwise, transportation and incidental necessary for supply, installation, testing and commissioning of the complete system through as described in the Specifications. The work shall also include interfacing the PV Plant with the grid equipment and obtaining necessary approval from Electrical Supply Company for net metering etc.

3. COMPLETION OF WORK

- 3.1 The work shall be deemed to be completed after satisfactory installation, testing and commissioning of the complete system. The work shall have to be completed within time and shall be binding on the contractor
- 3.2 In case the contractor fails to execute the said work or related obligations within stipulated time, DoP will be at liberty to get the work executed from the open market at the risk and cost of the contractor. Any additional cost incurred by DoP during such execution of the work shall be recovered from the contractor.

4. QUALITY, WARRANTY / GUARANTEE

- 4.1 The SPV panel shall carry a performance warranty of minimum 25 years.

- 4.2 The SPV panel must be warranted for their peak power output which shall not be less than 90% at the end of 10 years and 80% at the end of 25 years.
- 4.3 The PCU/solar grid tie inverter shall carry a *warranty of minimum five years*.
- 4.4 The complete system shall be under **comprehensive maintenance warranty of five years** which includes supply of all spare parts as required for reliable operation of the system for five years warranty/guarantee period from the date of satisfactory completion of work
- 4.5 The complete SPV rooftop systems installed and commissioned shall be under a warranty against any manufacturing or usage defect including mechanical structures, electrical works including power conditioners units /inverters/maximum power point tracker units /data logger & plant monitoring unit /distribution boards /digital meters /switchgear etc. and overall workmanship of the SPV rooftop systems for a minimum period of five year.
- 4.6 The warranty will be against breakages, malfunctions, non-fulfilment of guaranteed performance and breakdowns due to manufacturing defects or defects that may arise due to improper operation of electrical /electronic components of the system but do not include physical damages by the end users.
- 4.7 The above warranty shall take effect from the date on which the system is taken over by the Department of Posts after satisfactory commissioning.
- 4.8 The successful bidder shall be liable to make good the loss by replacing the defective product during the warranty period for the entire system free of cost.
- 4.9 The warranty will cover all the materials and goods involved in the installation and commissioning of SPV rooftop systems.
- 4.10 The contractor shall warrant the solar PV power plant as per applicable standards of quality. Anything to be furnished shall be new, free from all defects and faults in material and workmanship. The manufacture shall be in accordance with the specified technical parameters and should be of the highest grade and consistent with established and generally accepted standards for material. It shall be in full conformity with the drawing or samples if any and shall operate properly.
- 4.11 After installation of the solar PV power system at site, the contractor shall ensure satisfactory performance of the equipment for a period of time as specified in the scope of work. Contractor shall submit the performance report of the system on quarterly basis in addition to routine check-up of the system including cleaning of the solar panels, checking of battery and inverter etc. duly signed from user regarding functioning of the system.
- 4.12 The contractor shall rectify defects developed in the systems within warranty period promptly. In case the contractor does not rectify the defects within seven days of the receipt of complaint, DoP may restore the system in working condition on contractor's expenses.
- 4.13 Frequent and unjustified delays in rectifying defects may lead to recovery of losses and imposing of additional penalty. In such circumstance DoP shall have the full liberty to recover the losses/penalty from the contractor's pending claims, security deposit or in other lawful manner. The amount of losses/penalty shall be decided by DoP and will be binding on the contractor.
5. SERVICE CENTRES

The successful bidder shall have minimum of one service centre in Delhi. The installer or his authorised qualified representative (Engineer) shall visit the site at least once in a quarter, to attend routine maintenance, during the five years warranty period. However, in case of malfunctioning of the system, the tenderer/bidder shall attend the site for rectification of defects within 48 hours from the time of lodging complaint.

6. STANDARDS

The goods supplied and works executed under this contract shall confirm to the standards mentioned in the technical specification and where no applicable standard is mentioned, the latest version of Indian Standard or Bureau of Indian Standards shall be applicable.

7. INSPECTION AND TESTS

- 7.1 Do or its duly authorized representatives shall have the right to inspect and /or to test the goods to confirm their quality according to the contract and shall have access to the contractor's works premises and the power to inspect and examine the materials and workmanship of the solar PV power plant at all reasonable times during their period of manufacture/ before despatch of material at site.
- 7.2 The contractor shall inform DoP through a written notice regarding any material being ready for testing at least seven days in advance. All the arrangements of necessary equipment and expenses for such tests shall be on the contractor's account excluding the expenses of the inspector (fee , if any) if deputed from outside of DoP.
- 7.3 DoP's Engineer-in-charge, will inspect and attend such test within seven days from the date on which the equipment are notified as being ready for test /inspection, if required.
- 7.4 DoP shall within seven days, give written notice to the contractor, about any objection regarding the quality of the system. The contractor shall either make the necessary modifications to remove the cause of such objection or shall clarify the objections in writing if modifications are not necessary to comply with the contract.
- 7.5 After satisfactory testing of the systems during inspection, DoP's engineer-in-charge shall issue dispatch clearance for the supply.

8. FEES AND PERMITS

The contractor shall obtain all permits/ licenses approvals and pay for any and all fees required for the inspection, approval and commissioning of the installation from concerned statutory/ local bodies/ authorities. The all inputs & material as required & all necessary liaisoning with all concerned authorities/officers for obtaining them the required permits/ permission/ NOC shall be provided by the contractor & included in the scope of the work. However, all statutory fees/ amount deposited by contractor shall be reimbursed on production of proof of payment to the satisfaction of engineer-in-charge.

9. SPARE PARTS

The contractor shall make arrangement to maintain a sufficient stock of essential spares and consumable spare parts to ensure proper maintenance of the system promptly.

10. PACKING FORWARDING

10.1 Contractor, wherever applicable shall properly pack and crate all materials in such a manner as to protect them from deterioration and damage during transportation. The contractor shall be responsible for all damage due to improper packing.

10.2 The contractor shall inform the Executive Engineer (E)/engineer-in-charge, DoP regarding the probable date of each shipment of materials from his works.

11. TRANSPORTATION

The contractor is required to deliver the goods at locations as defined in the scope of work.

12. DEMURRAGE WHARFAGE, ETC

All demurrage, wharfage and other expenses incurred due to delayed clearance of the material or any other reason shall be on the account of the contractor.

13. INSURANCE

13.1 The goods supplied under the contract shall be fully insured against loss or damage incidental to manufacture or acquisition; transportation and the expenses shall be borne by the contractor.

13.2 The contractor shall arrange security & storage of their materials to avoid any theft or losses during execution of work. DoP will, in no case, shall be responsible for providing any security/storage for the materials & equipment lying at site during execution of work. Under the contract contractor shall be responsible for any loss or damage until the systems/ supplies are taken over.

14. LIABILITY FOR ACCIDENTS AND DAMAGES

14.1 During the warrantee period, the contractor shall assume all responsibilities for direct damages covering all type of accident, injury or property damage caused by manufacturing defects or faulty installation on the systems.

14.2 Any damage to the installation (s)/building due to carelessness on the part of contractor's staff shall be the responsibility of the contractor and he shall rectify the damages without any extra cost.

14.3 Any accident or damage will be the responsibility of agency and the department will not entertain any claim, compensation, penalty etc. on this account or on account of non-observance of any other requirement of law relevant to his work.

15. DUTIES AND TAXES

The rates/ prices mentioned in the price-schedule including all applicable taxes& duties and applicable taxes will be deducted at source against which necessary tax deductions certificates will be issued as and when required. No additional payments shall be made by DoP on this account.

16. PATENT RIGHT AND ROYALTIES

The contractor shall indemnify DoP against all third party claims of infringement of patent, royalties, trademark or industrial design rights arising from use of the goods supplied/ installed by the contractor or any part thereof.

17. RIGHT TO VARY QUANTITIES

DoP reserves all the rights to increase or decrease the quantity of goods mentioned in the contract, at the time of placement of orders without any change in price or other terms and conditions.

18. LOCAL CONDITIONS

18.1 It will be imperative on contractor to have full information of all local conditions and factors which may have any effect on the execution of the works. The contractor shall be deemed to have collected all the relevant information regarding the proposed place of works/ site, its local environment, approach road and connectivity etc. and be well acquainted with actual working and other prevailing conditions.

18.2 The contractor is advised to visit the site before quoting for as well as starting the work. DoP shall not entertain any request of contractor for clarifications related to such local conditions and shall bear no responsibility in this regard.

19. TOOLS & TACKLES

The contractor shall provide all necessary tools & tackles for proper execution of work and operation/ maintenance of systems after installation. DoP shall in no way, responsible for supply of any tools & tackles.

20. TERMINATION FOR DEFAULT

DoP without prejudice to any other remedy for violate of contract, by written notice of default sent to the contractor, may terminate the contract in whole or in part-

20.1 If the contractor fails to deliver the Services within the allocated time period(s).

20.2 If the contractor fails to perform any other obligation(s) under the contract. However in the event of termination of the contract in part, the contractor shall continue performance of the contract to the extent not terminated.

21. TERMINATION FOR INSOLVENCY

DoP may at any time terminate the contract by giving written notice to the contractor without compensation to the contractor if he becomes bankrupt or otherwise insolvent, provided that such termination will not prejudice or affect any right of action or remedy, which has accrued or will accrue thereafter to DoP.

22. COMPLETION DRAWINGS

Contractor shall submit five sets of completion drawings as and when work in all respects is completed in a particular area i/c photographs. These drawings shall clearly indicate following:

22.1 Location and rating of PV arrays/ PCU's

22.2 Location and details of panels, and other particulars including approved fabrication drawings of panel.

22.3 Complete wiring diagram, as installed and scheduled showing all connections in the complete electrical system.

22.4 Routing and particulars of all LT cables and trays.

22.5 Single line diagram, power schematic, control schematic with detailed bill of materials, showing makes, types and description of all components and accessories.

23. COMPLETION CERTIFICATE

On completion of the installation, a certificate shall be furnished by the contractor countersigned by the licensed electrical supervisor under whose direct supervision the installation was carried out. This certificate shall be in the prescribed form as required by the local supply authority/ electrical inspector.

24. DRAWINGS

All drawing shall be prepared on computer aided drawings and site measurement Contractor shall furnish for the approval of the Engineer in charge, detailed drawings of all equipment and material giving following information.

- i. Certified foundation details
- ii. Layout of PV arrays and associated equipment, panels.
- iii. Cable & cable tray layout.
- iv. Earthing layout/location system
- v. Single line diagram, control schematic showing make type and description of all components and accessories.
- vi. The detailed design, calculations, energy simulation for arriving as the system capacity & the energy generation capacity. The details of all losses starting from solar incident level to upto L.T. metering level shall also be provided along with detail calculations. The design shall be based on data for the location of site of work

25. BYE-LAWS AND REGULATIONS

The installation shall be in conformity with the bye-laws, regulations and standards of the local authorities/ Govt. of India/ State Govt. / any statutory body concerned, in so far as these become applicable to the installation.

26. OTHERS CONDITIONS

26.1 The contractor shall not transfer, assign or sublet the work under this contract or any substantial part thereof to any other party.

26.2 Work carried out without DoP approval shall not be accepted and DoP shall have rights to get it removed and to recover the cost so incurred from the contractor.

26.3 The contractor shall not display the photographs of the work and not take advantage through publicity of the work without written permission of DoP.

27. PAYMENT TERMS

27.1 **No advance payment shall be made.**

27.2 **60% of the tendered amount after the supply of material in good condition of the complete system at site (The contractor shall supply the necessary test certificates of the equipment /system, tax invoice, gate pass etc. in support of material supplied)**

27.3 30% of the tendered amount after installation and successful commissioning of the system.

27.4 10% payment shall be retained for comprehensive warranty period of 5 years which shall be released @2% at the end of each year for 5 years, on satisfactory performance of the complete system. However, this amount may be released against the bank guarantee for a period of 5 years of equal amount.

Note

1. No price escalation due to any reason (including any change in the applicable taxes, duties etc.) shall be considered by DoP during the validity/ extended validity of the contract agreement
2. All the bank guarantees should be made from scheduled bank for the entire warranty period of 5 year from the date of satisfactory commissioning of system.

28. APPROVAL & CLEARANCE

All associated activities required for necessary clearances / permissions /approvals / licenses from concerned Electrical authorities so their Govt. /strategy / local bodies are in the scope of supplier.

29. ACCEPTANCE TEST

- i. The user acceptance test shall be carried out as per mutually agreed
- ii. Acceptance test plan against the system requirement specified in the tender.
- iii. Type and routine test certificates of major items.

30. Operating Instruction & Maintenance Manual

Upon completion and commissioning of entire system the contractor shall submit a 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 complete bound sets of typewritten operating instructions and maintenance manuals. 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 15 year period of maintenance of each equipment. These manuals shall include:

- i. Description of the work carried out / installed.
- ii. Operating instructions.
- iii. Maintenance instructions including procedures for preventive maintenance.
- iv. Manufacturers catalogues.
- v. Spare parts list.
- vi. Trouble shooting charts.
- vii. Drawings
- viii. Type and routine test certificates of major items.

31. TRAINING OF ENGINEER IN CHARGE'S PERSONNEL FOR OPERATION AND MAINTENANCE

Upon completion of all work and all tests, the contractor will conduct on-site training of the engineer-in-charge's/user's personnel regarding the assembly, start-up, operation, adjustment, maintenance & repair of all equipment of solar PV plant installed.

TECHNICAL SPECIFICATIONS

1. DEFINITION

A grid tied solar rooftop photovoltaic (SPV) power plant consists of SPV array, module mounting structure, power conditioning unit (PCU) consisting of maximum power point tracker (MPPT), inverter, and controls & protections, interconnect cables and switches. PV array is mounted on a suitable structure. Grid tied SPV system is without battery and should be designed with necessary features to supplement the grid power during daytime. Components and parts used in the SPV power plants including the PV modules, metallic structures, cables, junction box, switches, PCU etc., should conform to the BIS or IEC or international specifications, wherever such specifications are available and applicable.

Solar PV system shall consist of following equipment/components.

- i. Solar PV modules consisting of required number of **Crystalline** PV modules.
- ii. Grid interactive power conditioning unit with remote monitoring system
- iii. Mounting structures
- iv. Junction boxes.
- v. Earthing and lightning protections.
- vi. IR/UV protected PVC Cables, pipes and accessories

2. SOLAR PHOTOVOLTAIC MODULES:

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

2.2. The PV modules used must qualify to the latest edition of IEC PV module qualification test equivalent BIS standards Crystalline Silicon Solar Cell Modules IEC 61215/IS 14286. In addition, the modules must conform to IEC 61730 Part-2-requirements for construction & Part 2-requirements for testing, for safety qualification or equivalent IS.

- a. For the PV modules to be used in a highly corrosive atmosphere throughout their lifetime, they must qualify to IEC 61701/IS 61701
- b. The total solar PV array capacity should not be less than allocated capacity and should comprise of solar crystalline modules of peak _____ power _____ of minimum **250W** and above wattage. Module capacity less than minimum 250 W will not be accepted
- c. Protective devices against surges at the PV modules shall be provided. Low voltage drop bypass diodes shall be provided.
- d. PV modules must be tested and approved by one of the IEC authorized test centres.
- e. The module frame shall be made of corrosion resistant materials, preferably having anodized aluminum.
- f. The bidders shall carefully design & accommodate requisite numbers of the modules to achieve the rated power in his bid. Departments shall allow only minor changes at the time of execution.
- g. Other general requirement for the PV modules and subsystems shall be the Following:

- i. The rated output power of any supplied module shall have tolerance of $\pm 3\%$.
- ii. The peak-power point voltage and the peak-power point current of any supplied module and /or any module string (series connected modules) shall not vary by more than 2(two) percent from the respective arithmetic means for all modules and/or for all module strings, as the case may be.
- iii. The modules shall be provided with a junction box with either provision of external screw terminal connection or sealed type and with arrangement for provision of bypass diode. The box shall have hinged, weatherproof lid with captive screws and cable gland entry points or may be of sealed type and IP-65 rated.
- iv. I-V Curves at STC should be provided by bidder.

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

- a. Name of the manufacturer of the PV module
- b. Name of the manufacturer of Solar Cells.
- c. Month & year of the manufacture (separate for solar cells and modules)
- d. Country of origin (separately for solar cells and module)
- e. I-V curve for the module Wattage, I_m , V_m and FF for the module
- f. Unique Serial No and Model No of the module
- g. Date and year of obtaining IEC PV module qualification certificate.
- h. Name of the test lab issuing IEC certificate.
- i. Other relevant information on traceability of solar cells and module as per ISO 9001 and ISO 14001

2.4. Warranties:

a. Material Warranty:

- i. Material warranty is defined as: The manufacturer should warrant the solar module(s) to be free from the defects and/or failures specified below for a period not less than five years from the date of sale to the original customer ("Customer")
- ii. Defects and/or failures due to manufacturing
- iii. Defects and/or failures due to quality of materials
- iv. Non conformity to specifications due to faulty manufacturing and/or inspection processes. If the solar Module(s) fail to conform to this warranty, the manufacturer will repair or replace the solar module(s), at the Owner's sole option

b. Performance Warranty:

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

Note: The firm should submit Necessary test certificate from the approved test lab along with supply of material.

3. ARRAY STRUCTURE

- a. Hot dip galvanized MS mounting structures may be used for mounting the modules/panels/arrays. Each structure should have angle of inclination as per the site condition to take maximum insolation. However to accommodate more capacity the angle of inclination may be reduced until the plant meets the specified performance requirements.
- b. The mounting structures shall be so designed to withstand the speed of the wind zone of the location where a PV system is proposed to be installed (like Delhi - wind speed of 150 km/hr). It may be ensured that the design has been certified by a recognized laboratory/institution in this regard and submit wind loading calculation sheet to department suitable fastening arrangements such as grouting and calming should be provided to secure the installation against the specific wind speed.
- c. The mounting structure steel shall be as per latest IS 2062:1992 and galvanization of the mounting structures shall be in compliance of latest IS 4759.
- d. Structural materials shall be corrosion resistant and electrolytically compatible with the materials used in the module frame, its fasteners, nuts and bolts. Aluminium structures also can be used which can withstand the wind speed of respective wind zone. Necessary protection towards rusting need to be provided either by coating or anodization.
- e. The fasteners used should be made up of stainless steel. The structures shall be designed to allow easy replacement of any module. The array structures shall be so designed that it will occupy minimum space without sacrificing the output from the SPV panels.
- f. Regarding civil structures the bidder need to take care of the load bearing capacity of the roof and need arrange suitable structures based on the quality of roof.
- g. The total load of the structure (when installed with PV modules) on the terrace should be less than 60 kg/m^2 .
- h. The minimum clearance of the structure from the roof level should be 300 mm.

NOTE: The structural design of the complete system should be compatible with the structural strength and load bearing capacity of the roof. Design calculations and certificate to this effect shall be provided by a qualified chartered structural engineer. Latest IS code shall be followed for structural design. Contractor shall submit the structural analysis and design (STAAD) calculations along with the structural design.

4. JUNCTION BOXES (JBs)

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

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

5. DC DISTRIBUTION BOARD:

- a. DC Distribution panel to receive the DC output from the array field.
- b. DC DPB shall have sheet from enclosure of dust & vermin proof conforming to IP65 protection. The busbars are made of copper of desired size. Suitable capacity MCBs/MCCBs shall be provided for controlling the DC power output to the PCU along with necessary surge arrestors.

6. AC DISTRIBUTION PANEL BOARD:

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

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

7. PCU/ARRAYSIZERATIO:

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

8. PCU/Inverter:

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

- Switching devices : IGBT/MOSFET
 - Control : Microprocessor/DSP
 - Nominal AC output voltage and frequency: 415V, 3Phase, 50Hz (In case single phase inverters are offered, suitable arrangement for balancing the phases must be made.)
 - Output frequency: 50Hz
 - Grid Frequency Synchronization range: +3Hz or more
 - Ambient temperature considered: -20°C to 50°C
 - Humidity: 95% Non-condensing
 - Protection of Enclosure: IP-20 (Minimum) for indoor.
: IP-65 (minimum) for outdoor.
 - Grid Frequency Tolerance range: +3% or more
 - Grid Voltage tolerance: -20% & +15%
 - No-load losses: Less than 1% of rated power
 - Inverter efficiency (minimum) : >93% (In case of 10kW or above)
 - Inverter efficiency (minimum) : >90% (In case of less than 10kW)
 - THD: <3%
 - PF: >0.9
- a. Three phase PCU/inverter shall be used with each power plant system (10kW and/or above) but in case of less than 10kW single phase inverter can be used.
 - b. PCU/inverters shall be capable of complete automatic operation including wake-up, synchronization

& shutdown.

- c. The output of power factor of PCU inverter is suitable for all voltage ranges or sink of reactive power, inverters should have internal protection arrangement against any sustainable fault in feeder line and against the lightning on feeder.
- d. Built-in meter and data logger to monitor plant performance through external computers shall be provided.
- e. The power conditioning units/inverters should comply with applicable IEC/equivalent BIS standard for efficiency measurements and environmental tests as per standard codes IEC 61683/IS 61683 and IEC 60068-2(1, 2, 14, 30)/Equivalent BIS Std.
- f. The charge controller (if any)/MPPT units environmental testing should qualify IEC 60068-2(1, 2, 14, 30)/equivalent BIS STD. The junction boxes/enclosures should be IP65 (for outdoor)/IP54 (indoor) and as per IEC 529 specifications.
9. The PCU/inverters should be tested from the MNRE approved test centres/NABL/BIS/IEC accredited testing - calibration laboratories. In case of imported power conditioning units, these should be approved by international test houses.

10. INTEGRATION OF PV POWER WITH GRID:

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

11. DATA ACQUISITION SYSTEM/PLANT MONITORING

- i. Data Acquisition System shall be provided for each of the solar PV plant.
- ii. **Data logging systems (Hardware and software): for Solar PV Plant, for plant control and monitoring shall be provided.**
- iii. The following parameters are accessible via the operating interface display in real time separately for solar power plant:
 - a. AC Voltage.
 - b. AC Output current.
 - c. Output Power
 - d. Power factor.
 - e. DC Input Voltage.
 - f. DC Input Current.
 - g. Time Active.
 - h. Time disabled.
 - i. Time Idle.
 - j. Power produced
 - k. Protective function limits (viz. AC Over voltage, AC Under voltage, Over frequency, Under frequency ground fault, PV starting voltage, PV stopping voltage).

- iv. All major parameters available on the digital bus and logging facility for energy auditing through the internal microprocessor and read on the digital front panel at any time) and logging facility (the current values, previous values for up to a month and the average values) should be made available for energy auditing through the internal microprocessor and should be read on the digital front panel.
 - v. PV array energy production: Digital Energy Meter should log the actual value of AC/DC voltage, Current & Energy generated by the PV system provided. Energy meter along with CT/PT should be of 0.5 accuracy class.
 - vi. Computerized DC String/Array monitoring and AC output monitoring shall be provided as part of the inverter and/or string/array combiner box or separately.
 - vii. String and array DC Voltage, Current and Power, Inverter AC output voltage and current (All 3 phases and lines), AC power (Active, Reactive and Apparent), Power Factor and AC Energy (All 3 phases and cumulative) and frequency shall be monitored.
 - viii. Computerized AC Energy monitoring shall be in addition to the digital AC energy meter.
 - ix. The data shall be recorded in a common worksheet chronologically date wise. The data files shall be MS Excel compatible. The data shall be represented in both tabular and graphical form.
 - x. All instantaneous data shall be shown on the computer screen.
 - xi. Software shall be provided for USB download and analysis of DC and AC parametric data for individual plant.
 - xii. Provision for Internet monitoring and download of data shall be also incorporated.
 - xiii. Remote Server and Software for centralized Internet monitoring system shall be also provided for download and analysis of cumulative data of all the plants and the data of the solar radiation and temperature monitoring system.
 - xiv. Ambient/Solar PV module back surface temperatures shall be also monitored on continuous basis.
 - xv. Simultaneous monitoring of DC and AC electrical voltage, current, power, energy and other data of the plant for correlation with solar and environment data shall be provided.
- 12. Remote Monitoring and data acquisition through Remote Monitoring System software at the project location with latest software/hardware configuration and service connectivity for online/real time data monitoring/control complete to be supplied and operation and maintenance/control to be ensured by the supplier.**

Note: Department will arrange mobile SIM for remote monitoring. The usage bill of mobile shall be paid by the department.

13. METERING:

- a. The bidirectional electronic energy meter (0.5S class) shall be installed for the measurement of import/Export of energy before commissioning of SPV plant,
- b. The bidder must take approval/NOC from the concerned DISCOM for the connectivity, technical feasibility and synchronization of SPV plant with distribution network and submit the same to the department

- c. Reverse power relay shall be provided by bidder

14. POWER CONSUMPTION:

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

15. PROTECTIONS

The system should be provided with all necessary protections like earthing, Lightning, and grid is landing as follows:

15.1. LIGHTNING PROTECTION

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

SURGE PROTECTION

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

15.2. EARTHING PROTECTION

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

15.3. GRID ISLANDING:

- i. In the event of a power failure on the electric grid, it is required that any independent power-producing inverters attached to the grid turn off in a short period of time. This prevents the DC-to-AC inverters from continuing to feed power into small sections of the grid, known as "islands." Powered islands present a risk to workers whom may expect the area to be unpowered, and they may also damage grid-tied equipment. The Rooftop PV system shall be equipped with islanding protection. In addition to disconnection from the grid (due to islanding protection) disconnection due to under and overvoltage condition shall also be provided.
- ii. A manual disconnect 4 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 by the utility personnel

16. CABLES

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

- i. Shall meet IEC 60227/IS 694, IEC 60502/IS 1554 standards
- ii. Temp. Range: -10°C to $+80^{\circ}\text{C}$.
- iii. Voltage rating 660/1000V
- iv. Excellent resistance to heat, cold, water, oil, abrasion, UV radiation
- v. Flexible
- vi. Sizes of cables between array interconnections, array to junction boxes, junction boxes to Inverter etc. shall be so selected to keep the voltage drop (power loss) of the entire solar system to the minimum. The cables (as per IS) should be insulated with a special grade PVC compound formulated for outdoor use.
- vii. Cable routing/ marking: All cable/wires are to be routed in a GI cable tray and suitably tagged and marked with proper manner by good quality ferule or by other means so that the cable easily identified.
- viii. The cable should be so selected that it should be compatible up to the life of the solar PV panels i.e. 25 years.
- ix. The ratings given are approximate. Bidder to indicate size and length as per system design requirement. All the cables required for the plant provided by the bidder. Any change in cabling sizes if desired by the bidder/approved after citing appropriate reasons. All cable schedules/layout drawings approved prior to installation.
- x. Multi strand, Annealed high conductivity copper conductor PVC type 'A' pressure extruded insulation or XLPE insulation. Overall PVC/XLPE insulation for UV protection armoured cable for underground laying. All cable trays including covers to be provided. All cables conform to latest edition of IEC/ equivalent BIS Standards as specified below:

BoS item / component	Standard description	Standard Number	Cables General Test and Measuring Methods,
PVC/XLPE insulated cables for working Voltage up to and including 1100 V, UV resistant for outdoor installation	IS / IEC 69947.		
- xi. The size of each type of DC cable selected shall be based on minimum voltage drop however; the maximum drop shall be limited to 1%.
- xii. The size of each type of AC cable selected shall be based on minimum voltage drop however; the maximum drops shall be limited to 2%.

17. CIVIL WORKS

17.1 Concreting

- a. Concrete mix shall be of M-20/M-25 grade for pedestal and earth pit chambers.
- b. Pedestal base shall be provided with tapered gola using water proofing compound of IS-2649.
- c. Curing of all concrete work shall be carried out continuously for minimum of 7 days.
- d. The solar panels are very much prone to uprooting at very high wind speed during the storms, therefore, they have to be anchored properly on the roof top by suitably designing the fixtures and its support system considering the design wind speed for the area as per relevant IS code.

- e. During fixing the solar panels on the roof top the damage to the structural slabs/ water proofing treatment should be carefully avoided.
- f. The solar panels should be fixed on the roof surface in such a way that the rain water flow to the rain water pipe should not be obstructed and maintenance of other items such as water supply pipelines should not be disturbed and there should be no hindrance for maintaining it.
- g. For the upkeep and cleaning, a lightweight folding ladder of height about 8 feet should be provided.

17.2 Array layout: Contractor shall design the array layout by incorporating following dimensions:

- a. Approx. 750 mm space around the periphery wall of rooftop.
- b. Minimum 900 mm spaces near the rain water exhaust pipe, water tank and rooftop entrance.

17.3 Structural design: Latest IS code shall be followed for structural design. Contractor shall submit the structural analysis and design (STAAD) calculations along with the structural design.

18. CONNECTIVITY

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

Plant Capacity	Connecting voltage
Up to 10 kW	240 V single phase or 415 V-three phase at the option of the consumer
Above 10 kW and Up to 100 kW	415 V – Three phase

- I. Themaximumpermissiblecapacityforrooftopshallbe100kWforasinglenetmeteringpoint.
- II. Utilities may have voltage levels other than above, DISCOMS may be consulted before finalization of the voltage level and specification be made accordingly.

19. TOOLS&TACKLESANDSPARES:

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

Danger boards should be provided as and where necessary as per IE Act./IE rules as amended upto date. Signage at three locations - one each at battery-cum-control room, solar array area and main entry from administrative block shall be provided. Text of the signage may be finalized in consultation with the department

20. FIRE EXTINGUISHERS:

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

- a. Portable fire extinguishers in the control room for fire caused by electrical short circuits
- b. Sand buckets in the control room
- c. The installation of Fire Extinguishers should confirm to TAC regulations and BIS standards. The fire extinguishers shall be provided in the control room housing PCUs as well as on the Roof for site where the PV array have been installed.

21. DRAWINGS & MANUALS:

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

22. PLANNING AND DESIGNING:

- i. The bidder should carry out Shadow Analysis at the site and accordingly design strings & array layout considering optimal usage of space, material and labor. The bidder should submit the array layout drawings along with Shadow Analysis Report to the Engineer-in-Charge for approval.
- ii. Department reserves the right to modify the landscaping design, Layout and specification of sub-systems and components at any stage as per local site conditions/requirements.
- iii. The bidder shall submit preliminary drawing for approval & based on any modification or recommendation, if any. The bidder submit three sets and soft copy in CD of final drawing for formal approval to proceed with construction work.

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

- i. The Contractor shall furnish the following drawings Award/Intent and obtain approval
- ii. General arrangement and dimensioned layout
- iii. Schematic drawing showing the requirement of SV panel, Power conditioning Unit(s)/inverter, Junction Boxes, AC and DC Distribution Boards, meters etc.
- iv. Structural drawing along with foundation details for the structure.
- v. Itemized bill of material for complete SV plant covering all the components and associated accessories.

- vi. Layout of solar Power Array
- vii. Shadow analysis of the roof

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

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

25. SAFETY MEASURES

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

26. SCOPE OF MAINTENANCE OF SPV POWER PLANT FOR A COMPREHENSIVE WARRANTY PERIOD OF 5 YEARS FROM DATE OF SATISFACTORY COMMISSIONING OF SYSTEM

- i. maintenance of the SPV Power Plant after satisfactory commissioning of system includes routine and on call maintenance of the system including supply all spare parts required for reliable operation of the system under five years comprehensive warranty period from the date of successful commissioning of the system.
- ii. The SPV power plants shall be warranted for five years comprehensive maintenance from the date of successful commissioning. The complete system including all equipment/components/accessories/mechanical structures/ electrical works such as PCU/inverter, MPPT units, distribution boards, digital meters, switchgears, cabling, earthing, lightning arrestors etc. along with supply of consumable items
- iii. Complete maintenance of the plants has to be carried out by the contractor and cannot be sublet to any third party.
- iv. The security of the power plants will rest with the contractor till such time the power plant is not handed over to the department.
- v. The Contractor shall be responsible for all required activities for maintenance of the SPV Power Plant during the five year comprehensive warranty period.
- vi. The deputed personnel during his routine visits / breakdown visits shall check and test all the equipment, so that, preventive actions, if any, could be taken well in advance to save any equipment from damage. Any abnormal behavior of any equipment shall be brought to notice of engineer-in-charge immediately for appropriate action.
- vii. Normal and preventive maintenance of the power plant and checking of all the equipment and accessories as a part of routine and breakdown maintenance on regular interval, tightening of all electrical connections, changing of tilt angle of module mounting structure, cleaning & greasing of terminals etc. shall be under the scope of the contract.
- viii. During maintenance period of five years of the power plants, if there is any loss or damage of any component of the power plants due to mismanagement/mishandling or any other reasons, what-so-ever, the contractor shall be responsible for immediate replacement/rectification. The damaged component may be repaired, if it is understood after examination that after repairing performance of the component shall not be degraded, otherwise the defective component shall have to be replaced by new one without any extra cost.

- ix. The contractor shall keep sufficient inventories to assure ready stock supply of all spares, consumables and fixtures as required. Stock should be maintained all associated equipment and materials as per manufacturer/supplier recommendations.
- x. The spares and measuring instruments which are supplied along with the systems are the property of the department and the contractor will use these spares sparingly with express permission of the department in case of emergency breakdowns, however, the contractor will have to refill the used spares within one month of drawn down.
- xi. All the spares inventory of the department has to be fully refilled with new and unused spares at the time of handing over of the plant after completion of the five years of maintenance of the plants by the contractor. In case of non-compliance, the department will refill these spares with new ones at the cost of the contractor.

27. MAINTENANCE INSTRUCTIONS

- i. Maintenance of the plants shall be carried out by the contractor during comprehensive maintenance warranty period of five years, a maintenance schedule shall be prepared in consultation with the engineer-in-charge for quarterly / half yearly /annual review check-up of plant and equipment.
- ii. The contractor shall depute qualified and experienced engineers/technician well versed in maintenance of SPV plants and having knowledge of computers. The details of the Engineer/technician i.e. name, address, mobile number etc. should be submitted to the department
- iii. Proper re-painting, re-coating of exposed surfaces to prevent rusting & replacement of worn out parts shall be carried out along with the maintenance of the PCU/inverter.
- iv. **PLANT PERFORMANCE EVALUATION**
Performance Ratio (PR) mean ratio of plant output versus installed plant capacity at any instance with respect to the radiation measured. The successful bidders shall be required to meet minimum guaranteed generation with Performance Ratio (PR) at the time of commissioning and related Capacity Utilization Factor (CUF) as per the GH level of the location during the maintenance period. PR should be shown minimum of 75% at the time of inspection of or initial commissioning acceptance to qualify for release of payment. Minimum CUF of 19% should be maintained for a period of 5 years. The bidders should send the periodic plant output details to the department for ensuring the CUF. The PR will be measured at Inverter output level during peak radiation conditions.
- v. The routine maintenance work to be carried out when plant is not in operation.
- vi. All breakdown maintenance/major break down should be attended in real time and to be completed within 24 hour (including arranging spares). Any additional time (more than 24 hour) taken for making the plant generation worthy, will invite the adequate compensation commensurate to the loss of generation due to non-availability of power.
- vii. Replacement & repair of damaged parts shall be carried out immediately during the maintenance period so as to ensure at least 95% uptime.
- viii. The contractor shall maintain a maintenance record register for proper data logs and records at the plant office to record the daily generation, efficiency, and solar radiation, regular maintenance, preventive and breakdown maintenance along with the date of maintenance,

reason for breakdown, duration of the breakdown, steps taken to attend the breakdown etc. which shall be supplied on demand to the department/engineer-in-charge.

- ix. The contractor shall ensure replacement of worn out parts and components during the operation and maintenance period for which purpose the contractor shall carry and maintain minimum inventory levels of spares at the plant and its works.
- x. In case of delay in repair & maintenance and non-observance of engineer-in-charge' operation and maintenance schedule, the department shall have the right to impose any penalties including forfeiture of security.
- xi. The Five year comprehensive maintenance warranty period covers routine, preventive, breakdown and capital maintenance of complete plant and equipment including SPV array, inverter, SCADA system with dedicated telephone lines shall be carried out by the supplier in accordance with manufacturer's instructions, manufacturer's procedures, relevant safety codes, Indian Electricity Act, 2003, Indian Electricity Rules, 1956, engineer-in-charge instructions, prudent utility practices, etc.
- xii. **ROUTINE AND PREVENTIVE MAINTENANCE**
This shall include such checks and maintenance activities as and when required to be carried out on all the components of the power plant to minimize breakdowns and to ensure smooth and trouble free running of the power plant. The contractor shall be responsible to carry out routine and preventive maintenance and replacement of each and every component/equipment of the power plant and shall provide all labour, material, consumables etc. for routine and preventive maintenance at their own cost.
- xiii. **BREAKDOWN MAINTENANCE**
This shall mean the maintenance activity including repairs and replacement of any component or equipment of the power plant which is not covered by routine and preventive maintenance and which is required to be carried out as a result of sudden failure/breakdown of that particular component or equipment while the plant is running. The contractor shall be responsible to carry out breakdown maintenance of each and every component of the power plant and he shall provide the required manpower, materials, consumables, components or equipment etc. for breakdown maintenance at his own cost irrespective of the reasons of the breakdown/failure.
- xiv. **CAPITAL MAINTENANCE**
 - (a) This shall mean the major overhaul of any component or equipment of the power plant which is not covered by routine, preventive and breakdown maintenance which may become necessary on account of excessive wear & tear, aging, which needs repair/replacement. The capital maintenance of power plant and all civil structures shall normally be planned to be carried out on an annual basis. For this purpose a joint inspection by the contractor and the engineer-in-charge or his authorized representative shall be carried out on all the major components of the power plant, about two months in advance of the annual maintenance period, in order to ascertain as to which components of the power plant require capital maintenance. In this regard the decision of the department will be final and binding.
 - (b) However, if the condition of any plant and component warrants its capital maintenance at any other time, a joint inspection of the engineer-in-charge or his authorised representative and contractor shall be carried out immediately on occurrence of such situation and capital maintenance shall be carried out by arranging the shutdown of the plant/part of the plant, if

required, in consultation with concerned authorities. The decision of the department shall be final and binding.

LIST OF APPROVED MAKE OF ITEMS

Sl. No.	Item	Make
1	Crystalline PV modules	Indigenous makes – Alpex, BE, BHEL, CEL, Emmvee, Goldi Green, HHV, Moser Baer, Saatvik, Tata Solar, Vikram, Waaree, Websol Energy
2	PCU/ inverter	ABB, ACME, BHEL, Borg, Delta, KACO, Power One, Schneider Electric, SMA, Solar Edge, Tata Solar
3	Array junction boxes	Hensel, Tyco
4	Main junction boxes	Hensel, Tyco
5	DC distribution board	ABB, Legrand, Schneider Electric, Siemens
6	AC distribution	ABB, L&T, Legrand, Schneider Electric
7	Power & control cables	Finolex, Grandley, Havells, KEI, Polycab
8	Switch gears	ABB, GE, L&T, Schneider Electric, Siemens
9	Conduits	ISI marked – AKG, Astral, Finolex, M-Kay, Press Fit, Supreme
10	Monitoring system	ABB, KACO, Schneider Electric, SMA
11	Fire extinguisher	ISI marked – Ceasefire, Latex, Minimax, Safex
12	Any other item	As approved by the engineer-in-charge

Note: Specific model and make mentioned in Schedule of work shall take precedence.