Name of work:- C/o East Delhi Campus of Guru Gobind Singh Indrasprastha University at Surajmal Vihar, Shahdara, Delhi. (SH: Supplying, Installation, Testing and Commissioning of Grid Interactive roof top solar photo voltaic power generation system).

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NOTICE INVITING TENDER

Name of work: - **C/o East Delhi Campus of Guru Gobind Singh Indrasprastha University at Surajmal Vihar, Shahdara, Delhi. (SH: Supplying, Installation, Testing and Commissioning of Grid Interactive roof top solar photo voltaic power generation system).**

ESTIMATED COST	:	Rs. 8,48,98,538/-
EARNEST MONEY	:	Rs. 16,97,971/-
SECURITY DEPOSIT	:	2.5% of Tendered Cost
PERFORMANCE GUARANTEE	:	5% of Tendered Cost
TIME ALLOWED	:	180 Days

CERTIFIED THAT THIS NIT CONTAINS 74 PAGES

Asstt. Executive Engineer (E)
HEESD-4, PWD

Assistant Engineer (P)
HEED (B-141), PWD

Executive Engineer (E)
HEED (B-141), PWD

Assistant Engineer (P)
O/o PM (Hr. Edu. Proj.)

Project Mnager (Hr. Edu. Proj.)
PWD, Delhi

Assistant Engineer (P)
O/o CE(OP), PWD

Chief Engineer (Other Project)
PWD, Delhi

NIT amounting to Rs. **8,48,98,538/-** (Rupees Eight Crore Forty Eight Lakh Ninety Eight Thousand Five Hundred Thirty Eight Only).

PWD

PRESS NOTICE (E-TENDER)

The Executive Engineer (E), Higher Education Electrical Division (B-141), IIT Compex, Sector-9, Dwarka, New Delhi-110077 **(E-mail: eepwddelhib141@gmail.com) (Ph 011-25086035)** on behalf of the President of India invites online Percentage rate tender in two bid system from specialized agencies/firms having requisite experience in the field of **Solar Photovoltaic Power Generation System** for following work:

NIT No: 16/CE(OP)/PWD/2019-20

Name of Work: - C/o East Delhi Campus of Guru Gobind Singh Indrasprastha University at Surajmal Vihar, Shahdara, Delhi. (SH: Supplying, Installation, Testing and Commissioning of Grid Interactive roof top solar photo voltaic power generation system).

Estimated Cost: **Rs. 8,48,98,538/-**

Earnest Money: **Rs. 16,97,971/-**

Period of Completion: **180 Days.**

The Pre-Bid Conference shall be held on **12.03.2020 at 3:00 PM** in the Office of Chief Engineer (Other Project), PWD, 13th Floor (Conference Hall), MSO Building, IP Estate, New Delhi. Last time & date of submission of bid: **23.03.2020 at 3:00 PM.** The bid forms and other details can be obtained from the website **https://govtprocurement.delhi.gov.in ID No** _____**.**

Not to be published below this line (For News Papers)

Asstt. Executive Engineer (E)
HEESD-4, PWD

Assistant Engineer (P)
O/o HEED (B-141), PWD

Executive Engineer (E)
HEED (B-141), PWD

Assistant Engineer (P)
O/o PM (Hr. Edu. Proj.)

Project Mnager (Hr. Edu. Proj.)
PWD, Delhi

Assistant Engineer (P)
O/o CE(OP), PWD

Chief Engineer (Other Project)
PWD, Delhi

CPWD-6 FOR e-Tendering

1. **The Executive Engineer (E),** Higher Education Electrical Division (B-141), IIT Compex, Sector-9, Dwarka, New Delhi-110077 (Ph 011-25086035) on behalf of the President of India invites online percentage rate tender in two bid system from specialized agencies/ firms having experience in the field of **Solar Photovoltaic Power Generation System** for following work: **C/o East Delhi Campus of Guru Gobind Singh Indrasprastha University at Surajmal Vihar, Shahdara, Delhi. (SH: Supplying, Installation, Testing and Commissioning of Grid Interactive roof top solar photo voltaic power generation system).**

1.1 The work is estimated to cost **Rs. 8,48,98,538/-.**

1.2 Details of criteria for eligibility As Indicated in "INFORMATION AND INSTRUCTIONS FOR BIDDERS FOR e-TENDERING FORMING PART OF NIT AND TO BE POSTED ON WEBSITE"

1.2.1 To become eligible, the tenderer shall have to furnish an affidavit on non-judicial e-stamp paper as under-

I/We undertake and confirm that eligible similar work(s) has /have not been got executed through another bidder on back basis. Further that, if such a violation comes to the notice of department, than I/we shall be debarred for tendering in CPWD and PWD 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 to Earnest Money Deposit/Performance Guarantee (Scanned copy to be uploaded at the time of submission of bid).

2. Agreement shall be drawn with the successful bidders on prescribed Form No. **CPWD 7** (or other Standard Form as mentioned) which is available as a Govt. of India Publication and also available on website **https://govtprocurement.delhi.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 **180 Days** from the date of start as defined in schedule 'F' or from the first date of handing over of the site, whichever is later, in accordance with the phasing, if any, indicated in the bid documents.

4. The site for the work is available.

5 The bid document consisting of plans, specifications, the schedule of quantities of various type of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents except Standard General Conditions of Contract Form can be seen and downloaded from website **https://govtprocurement.delhi.gov.in free of cost.**

6. After submission of the bid, the bidder 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, bidder can revise the rate of one or more item(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 tender submitted earlier shall become invalid.

9. Earnest Money in the form of Treasury Challan or Demand Draft or Pay order or Banker`s Cheque or Deposit at Call Receipt or Fixed Deposit Receipt (drawn in favour **Executive Engineer (E), B-141,PWD, New Delhi shall be scanned and uploaded to the e-Tendering website within the** period of bid submission. **The original EMD should be deposited either in the office of Executive Engineer inviting bids or the EE/Engineer-in-charge/DDH of any division / projects of PWD Delhi or CPWD or any other officer designated by CPWD Directorate from time to time, are authorized to receive the EMDs within the period of bid submission. (The EMD document shall only be issued from the place in which the office of receiving division from the place in which the office of receiving division office is situated). The EMD receiving Executive Engineer shall issue a receipt of deposition of earnest money deposit to the bidder in a prescribed format (enclosed) uploaded by tender inviting EE in the NIT. The receipt shall be also be uploaded to the e-tendering website by the intending bidder up to the specified bid submission date & time.**

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

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

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

The bid submitted shall be opened at 03:30 PM on as mention in **Instruction to bidder**

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, PWD Delhi/CPWD. **(The EMD document shall only be issued from the place in which the office of receiving division office is situated).**

(iii) The bidder does not upload all the documents (including GST registration & up to date GST return) **as stipulated in the bid documents including the copy of receipt for deposition of original EMD**.

(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 tenderer in the office of tender opening authority.

11. The bidder whose bid is accepted will be required to furnish performance guarantee of 5% (Five Percent) 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 Rs. 10000/-) or Deposit at Call receipt of any scheduled bank/Banker's cheque of any scheduled bank/Demand Draft of any scheduled bank/Pay order of any Scheduled Bank (in case guarantee amount is less than Rs.1,00,000/-) or Government Securities or Fixed Deposit Receipts or Guarantee Bonds of any Scheduled Bank or the State Bank of India in accordance with the prescribed form. In case the bidder 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 bidder shall be forfeited automatically without any notice to the bidder. **The earnest money deposited along with bid shall be returned after submission of the aforesaid performance guarantee.**

12. Intending bidders are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their bids as to the nature of the ground and sub-soil (so far as is practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid. A bidder shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charge consequent on any misunderstanding or otherwise shall be allowed. The bidders shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a bid by a bidders 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 Copies of other drawing and documents pertaining to the works will be open for inspection by the tenderers at the office of above mentioned officer. Tenderers are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their tenders 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 tender. A tenderer shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charge consequent on any misunderstanding or otherwise shall be allowed. The tenderer shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a tender by a tenderer implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done 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.

14. 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.

15. Canvassing whether directly or indirectly, in connection with tenderer sis strictly prohibited and the tenders submitted by the bidders who resort to canvassing will be liable to rejection.

16 The bidder shall not be permitted to bid for works in the CPWD Circle (Division in case of bidders of Horticulture/Nursery category) responsible for award and execution of contracts, in which his near relative is posted a Divisional Accountant or as an officer in any capacity between the grades of Superintending Engineer and Junior Engineer (both inclusive). He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any gazetted officer in the Central Public Works Department or in the Ministry of Urban Development. Any breach of this condition by the bidder would render him liable to be removed from the approved list of bidders 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 bidder for a period of one year after his retirement from Government service, without the prior permission of the Government of India in writing. This contract is liable to be cancelled if either the bidder or any of his employees is found any time to be such a person who had not obtained the permission of the Government of India as aforesaid before submission of the bid or engagement in the bidder's service.

18. The bid for the works shall remain open for acceptance for a period of Ninety (90) days from the date of opening of financial bid. If any bidder(s) 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 bidders shall not be allowed to participate in the rebidding process of the work.

19. This notice inviting Bid shall form a part of the contract document. The successful bidders/bidder, acceptance of his bid by the Accepting Authority shall within 15 days from the stipulated date of start of the work, sign the contract consisting of:-

(a) The Notice Inviting Bid, all the documents including additional conditions, specifications and drawings, if any, forming part of the bid as uploaded at the time of invitation of bid and the rates quoted online at the time of submission of bid and acceptance thereof together with any correspondence leading there.

(b) Standard P.W.D. Form 7 is applicable.

Executive Engineer (E)
Higher Education Electrical Division,
PWD, IIT Complex, Sector-9, Dwarka, New Delhi.

SECTION 1

GOVERNMENT OF NCT, DELHI
PUBLIC WORKS DEPARTMENT

INFORMATION AND INSTRUCTIONS FOR BIDDERS FOR e-TENDERING

The Executive Engineer (E), Higher Education Electrical Division IIT Complex, Sector-9, Dwarka New Delhi (Ph 011-25086035) on behalf of the President of India invites online Percentage Rate tender in two bid system from specialized agencies/firms having requisite experience in the field of **Solar Photovoltaic Power Generation System** for following work:

S. No.	NIT No.	Name of work & Location	Estimated cost put to bid	Earnest Money	Period of Completion	Last date and time of submission of bid, Original EMD, Copy of receipt for deposition of original EMD & other documents as specified in the press notice.	Time and date of opening bid
1	2	3	4	5	6	7	8
1	**16/CE(OP)/PWD/2019-20**	**C/o East Delhi Campus of Guru Gobind Singh Indrasprastha University at Surajmal Vihar, Shahdara, Delhi. (SH: Supplying, Installation, Testing and Commissioning of Solar Photovoltaic Power Generation System).**	**Rs. 8,48,98,538/-**	**Rs. 16,97,971/-**	**180 Days**	Upto 3.00 PM On 23.03.2020	Upto 3.30 PM On 23.03.2020

….. *……To be filled by Executive Engineer (E)

The eligibility criteria mentioned as below:

1. The agencies who fulfill the following requirements shall be eligible to apply. Joint ventures are not accepted.

   a) Should have satisfactorily completed the works as mentioned below during the last seven years up to previous day of the last date of submission of tenders.

   One similar work costing not less 80% of the Estimated cost put to tender.

   Or

Two similar works costing not less 60% of the Estimated cost put to tender.

Or

Three similar works costing not less 40% of the Estimated cost put to tender.

The agencies should submit clear visible attested copies of Completion Certificate issued by the Officer of the Client Department of the rank of Executive Engineer or equivalent rank along with the application.

2. The similar works means **"Supply, Installation, Testing and Commissioning of Solar Photovoltaic Power Generation System".**

3. The intending bidder must read the terms and conditions of CPWD-6 carefully. He should only submit his bid if he consider himself eligible and he is in possession of all the documents required.
4. Information and Instructions for bidders posted on website shall form part of bid document.
5. The bid document consisting of plans, specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents can be seen and downloaded from website http://govtproucurement.delhi.gov.in free of cost.
6. But the bid can only be submitted after deposition of original EMD either in the office of Executive Engineer inviting bids or in the office of Executive Engineer inviting bids or the EE/Engineer-in-charge/DDH of any division / projects of PWD Delhi or CPWD or any other officer designated by CPWD Directorate from time to time, are authorized to receive the EMDs within the period of bid submission and uploading the mandatory scanned documents such as Demand Draft or Pay order or Banker's Cheque or Deposit at call Receipt or Fixed Deposit Receipt and Bank Guarantee of any Scheduled Bank towards EMD in favour of **Executive Engineer (E) B-141 PWD, New Delhi** as mentioned in NIT, receipt for deposition of original EMD to division office of any Executive Engineer **(including NIT Issuing EE),** PWD and other documents as specified.
7. Those bidders not registered on the website mentioned above, are required to get registered beforehand. If needed they can be imparted training on online bidding process as per details available on the website.
8. The intending bidder must have valid class-III digital signature to submit the bid.
9. On opening date, the bidder can login and see the bid opening process.
   Technical bid shall be opened first. Eligibility related documents shall be evaluated and parties qualified/disqualified by the competent authority.
   Financial bid of qualified tenders shall then be opened at notified time, date and place in the presence of tenderers or their representatives. The time, date and place in the financial bid shall be communicated to the qualified bidder at a later date.
10. Bidder can upload documents in the form of **PDF** format.
11. Pre Bid conference shall be held in the office of Chief Engineer (Other Project), 13th Floor (Conference Hall), MSO Building, IP Estate, New Delhi on 12.03.2020 at 3:00 PM to clear the doubt of intending bidder(s), if any.

Executive Engineer (E)
Higher Education Electrical Division,
PWD, IIT Complex, Sector-9, Dwarka, New Delhi.

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

1. Scanned copy of Treasury Challan/Demand Draft/Pay order or Banker`s Cheque/FDR /Deposit at Call Receipt/Bank Guarantee of any Scheduled Bank against EMD.
2. Scanned copy of receipt deposition of Original EMD **in favour of Executive Engineer(E), B -141, PWD, New Delhi,** to deposition of original EMD either in the office of Executive Engineer inviting bids or in the office of Executive Engineer inviting bids or the EE/Engineer-in-charge/DDH of any division / projects of PWD Delhi or CPWD or any other officer designated by CPWD Directorate from time to time, are authorized to receive the EMDs.
3. Scanned copy of certificate of registration in GST and up to date GST return.
4. Scanned copy of PAN Card issued by Income Tax Department.
5. Statement of Similar work experience as per Annexure-3 along with copies of work order, completion certificates. etc.
6. Certificate of Company Incorporation/Firm Registration
7. Self-declaration-Blacklisting as per Annexure-5
8. Financial Information as per Annexure 4 along with Company's Balance Sheet and Profit and Loss Account for the preceding three financial years duly certified by CA.
9. Bank solvency as per annexure-6.
10. Documentary proof of OEM service center in India for Solar PV Modules and accessories.
11. Affidavit as per CPWD 6 clause 1.2.1 of NIT (affidavit on non-judicial e-stamp paper)
12. Any other Document as specified in the press notice.

Executive Engineer (E)
Higher Education Electrical Division,
PWD, IIT Complex, Sector-9, Dwarka, New Delhi.

Salient details of the work

S. No	Name of work	Estimated cost	Period
1.	**C/o East Delhi Campus of Guru Gobind Singh Indrasprastha University at Surajmal Vihar, Shahdara, Delhi. (SH: Supplying, Installation, Testing and Commissioning of Solar Photovoltaic Power Generation System).**	**Rs. 8,48,98,538/-**	**180 Days**

The work is to executed at East Delhi Campus of Guru Gobind Singh Indrasprastha University at Surajmal Vihar, Shahdara, Delhi It involves

a) Supply, Installation, Commissioning and Testing of Solar Photovoltaic Power Generation System of total 1200 kW capacity. The size of Solar PV Plant for various buildings in campus are as follows:
   1. 625 kW for Academic building.
   2. 180 kW for Admin Block.
   3. 170 kW for Sports Hall.
   4. 45 kW Teachers Hostel.
   5. 70 kW Girl's Hostel.
   6. 110 kW Boy's Hostel.

b) SCADA, Monitoring and Control System including data logger, weather monitoring system, automatic DG-PV Controller.

c) Other details of items given in schedule of quantities.

2. Work shall be executed according to CPWD Specifications and General Conditions of Contract - 2019 with up to date correction slip issued by CPWD which is available separately at printer's outlets. The bidder may obtain the address of the outlets from the Executive Engineer, Higher Education Electrical Division, PWD, Delhi.
3. The bidder should quote his rates inclusive all taxes including GST. No reimbursement on account of any tax including GST shall be made.
4. The clause 2A, 10B (i), 10B(ii), Clause 10CA & Clause 10CC are not applicable.
5. **Market rate:** The rate quoted by the bidder is market rate. The extra item, substitute item shall be paid accordingly as under:
   i. In case of **extra item** being the Non-Scheduled Item(non-DSR item), the payment of such non-scheduled extra items shall be made at the prevailing market rate plus/minus percentage by which the contract amount is above/below the justified amount of the tender respectively at the time of calling of tender. The bidder may within fifteen days of receipt of order or occurrence of the item(s) claim rates, supported by proper analysis which shall include invoices, vouchers etc. and manufacturer's specification for the work failing which the rate approved later by Engineer-in-Chief shall be binding and the engineer-in-charge shall within prescribed time limit of the receipt of the claims supported by analysis, after giving consideration to the analysis of the rates submitted by the bidder, determine the rates as mentioned above and the bidder shall be paid in accordance with the rates so determined.
   ii. In case of **substituted item** being the non-scheduled Item(non-DSR item), the payment of such non-scheduled substituted items shall be made at the prevailing market rate plus/minus percentage by which the contract amount is above/below the justified amount of the tender respectively at the time of calling of tender.
   iii. The **deviated quantity** beyond the deviation limit shall be paid at market rate.

INTEGRITY PACT

To

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

Sub: NIT No. **16/CE(OP)/PWD/2019-20** for the work of **C/o East Delhi Campus of Guru Gobind Singh Indrasprastha University at Surajmal Vihar, Shahdara, Delhi. (SH: Supplying, Installation, Testing and Commissioning of Grid Interactive roof top solar photo voltaic power generation system).**

Dear Sir,

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

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

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

Yours faithfully

Executive Engineer

**** To be filled by EE**

INTEGRITY PACT

To

Executive Engineer
Higher Education Electrical Division
PWD (GNCTD)
IIT Complex, Sector-9,
Dwarka, New Delhi-110077

Sub: Submission of Tender for the work of **C/o East Delhi Campus of Guru Gobind Singh Indrasprastha University at Surajmal Vihar, Shahdara, Delhi. (SH: Supplying, Installation, Testing and Commissioning of Grid Interactive roof top solar photo voltaic power generation system).**

Dear Sir,

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

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

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

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

Yours faithfully

(Duly authorized signatory of the Bidder)

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

INTEGRITY AGREEMENT

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

BETWEEN

President of India represented through **The Executive Engineer (E) Higher Education Electrical Division, IIT Complex, Sector-9, Dwarka, New Delhi-110077** (Hereinafter referred as the '**Principal/Owner**', which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns)

AND

.....**.....

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

Through .....**..... (Hereinafter referred to as the

(Details of duly authorized signatory)

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

Preamble

WHEREAS the Principal / Owner has floated the Tender (NIT No. **16/CE(OP)/PWD/2019-20**) (hereinafter referred to as "**Tender/Bid**") and intends to award, under laid down organizational procedure, contract for **C/o East Delhi Campus of Guru Gobind Singh Indrasprastha University at Surajmal Vihar, Shahdara, Delhi. (SH: Supplying, Installation, Testing and Commissioning of Grid Interactive roof top solar photo voltaic power generation system).**

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

AND WHEREAS the Principal/Owner values full compliance with all relevant laws of the land, rules, regulations, economic use of resources and of fairness/transparency in its relation with its Bidder(s) and Bidder(s). AND WHEREAS to meet the purpose aforesaid both the parties have agreed to enter into this Integrity Agreement (hereinafter referred to as "**Integrity Pact**" or "**Pact**"), the terms and conditions of which shall also be read as integral part and parcel of the Tender/Bid documents and Contract between the parties.

**** To be filled by EE**

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

Article 1: Commitment of the Principal/Owner

1) The Principal/Owner commits itself to take all measures necessary to prevent corruption and to observe the following principles:
   (a) No employee of the Principal/Owner, personally or through any of his/her family members, will in connection with the Tender, or the execution of the Contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
   (b) The Principal/Owner will, during the Tender process, treat all Bidder(s) with equity and reason. The Principal/Owner will, in particular, before and during the Tender process, provide to all Bidder(s) the same information and will not provide

to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the Tender process or the Contract execution.

(c) The Principal/Owner shall endeavour to exclude from the Tender process any person, whose conduct in the past has been of biased nature.

2) If the Principal/Owner obtains information on the conduct of any of its employees which is a criminal offence under the Indian Penal code (IPC)/Prevention of Corruption Act, 1988 (PC Act) or is in violation of the principles herein mentioned or if there be a substantive suspicion in this regard, the Principal/Owner will inform the Chief Vigilance Officer and in addition can also initiate disciplinary actions as per its internal laid down policies and procedures.

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

1) It is required that each Bidder/Bidder (including their respective officers, employees and agents) adhere to the highest ethical standards, and report to the Government / Department all suspected acts of fraud or corruption or Coercion or Collusion of which it has knowledge or becomes aware, during the tendering process and throughout the negotiation or award of a contract.

2) The Bidder(s)/Bidder(s) commit himself to take all measures necessary prevent corruption. He commits himself to observe the following principles during his participation in the Tender process and during the Contract execution:

a) The Bidder(s) /Bidder(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal/Owner's employees involved in the Tender process or execution of the Contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the Tender process or during the execution of the Contract.

b) The Bidder(s)/Bidder(s) will not enter with other Bidder(s) into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to cartelize in the bidding process.

c) The Bidder(s)/Bidder(s) will not commit any offence under the relevant IPC/PC Act. Further the Bidder(s)/Contract(s) will not use improperly, (for the purpose of competition or personal gain), or pass on to others, any information or documents provided by the Principal/Owner as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

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

e) The Bidder(s)/Bidder(s) will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the Contract.

3) The Bidder(s)/Bidder(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

4) The Bidder(s)/Bidder(s) will not, directly or through any other person or firm indulge in fraudulent practice means a wilful misrepresentation or omission of facts or submission of fake/forged documents in order to induce public official to act in reliance thereof, with the purpose of obtaining unjust advantage by or causing damage to justified interest of others and/or to influence the procurement process to the detriment of the Government interests.

5) The Bidder(s)/Bidder(s) will not, directly or through any other person or firm use Coercive Practices (means the act of obtaining something, compelling an action or influencing a decision through intimidation, threat or the use of force directly or indirectly, where potential or actual injury may befall upon a person, his/ her reputation
or property to influence their participation in the tendering process).

Article 3: Consequences of Breach

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

1) If the Bidder(s)/Bidder(s), either before award or during execution of Contract has committed a transgression through a violation of Article 2 above or in any other form, such as to put his reliability or credibility in question, the Principal/Owner after giving 14 days notice to the bidder shall have powers to disqualify the Bidder(s)/Bidder(s) from the Tender process or terminate/determine the Contract, if already executed or exclude the Bidder/Bidder from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of transgression and determined by the Principal/Owner. Such exclusion may be forever or for a limited period as decided by the Principal/Owner.

2) **Forfeiture of EMD/Performance Guarantee/Security Deposit**: If the Principal/Owner has disqualified the Bidder(s) from the Tender process prior to the award of the Contract or terminated/determined the Contract or has accrued the right to terminate/determine the Contract according to Article 3(1), the Principal/Owner apart from exercising any legal rights that may have accrued to the Principal/Owner, may in its considered opinion forfeit the entire amount of Earnest Money Deposit, Performance Guarantee and Security Deposit of the Bidder/Bidder.

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

Article 4: Previous Transgression

1) The Bidder declares that no previous transgressions occurred in the last 5 years with any other Company in any country confirming to the anticorruption approach or with Central Government or State Government or any other Central/State Public Sector Enterprises in India that could justify his exclusion from the Tender process.

2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the Tender process or action can be taken for banning of business dealings/ holiday listing of the Bidder/Bidder as deemed fit by the Principal/ Owner.

3) If the Bidder/Bidder can prove that he has resorted / recouped the damage caused by him and has installed a suitable corruption prevention system, the Principal/Owner may, at its own discretion, revoke the exclusion prematurely.

Article 5: Equal Treatment of all Bidders/Bidders/Sub bidders

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

Article 6- Duration of the Pact

This Pact begins when both the parties have legally signed it. It expires for the Bidder/Bidder 12 months after the completion of work under the contract or till the continuation of defect liability period, whichever is more and for all other bidders, till the Contract has been awarded. If any claim is made/lodged during the time, the same shall be binding and continue to be valid despite the lapse of this Pacts as specified above, unless it is discharged/determined by the Competent Authority, CPWD.

Article 7- Other Provisions

1) This Pact is subject to Indian Law, place of performance and jurisdiction is the Head quarters of the Division of the Principal/Owner, who has floated the Tender.
2) Changes and supplements need to be made in writing. Side agreements have not been made.
3) If the Bidder is a partnership or a consortium, this Pact must be signed by all the partners or by one or more partner holding power of attorney signed by all partners and consortium members. In case of a Company, the Pact must be signed by a representative duly authorized by board resolution.
4) Should one or several provisions of this Pact turn out to be invalid; the remainder of this Pact remains valid. In this case, the parties will strive to come to an agreement to their original intensions.
5) It is agreed term and condition that any dispute or difference arising between the parties with regard to the terms of this Integrity Agreement / Pact, any action taken by the Owner/Principal in accordance with this Integrity Agreement/ Pact.

Article 8- LEGAL AND PRIOR RIGHTS

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

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

…….**…….
(For and on behalf of Principal/Owner)

…….**…….
(For and on behalf of Bidder/Bidder)

WITNESSES:

1. ……**……
(signature, name and address)

2. ……**……
(signature, name and address)

Place:

Dated:

**** To be filled by EE**

SECTION 2
ELIGIBILITY AND EVALUATION CRITERIA

1 ELIGIBILITY CRITERIA:-

1.1.1 Eligibility criterion for the bidder:-

1.1.2 The Applicant must be a Proprietorship Firm/Company registered under Indian Company Act, 1956/ Firm registered under The Partnership Act 1932/ Society registered under Societies Act, 1860/Autonomous bodies or any other venture not covered above and in similar business for the last Seven years as on 31st January 2020. **Consortium and joint venture of companies/firms** are not allowed (Copy of valid Certificate of Incorporation or firms' registration attested by Company Secretary/ Authorized Signatory is to be uploaded)

1.1.3 The applicant should have valid GST Registration (copy of registration & up to date GST return is to be uploaded)

1.1.4 The applicant should have PAN number(copy of PAN No. is to be uploaded)

1.1.5 A self-certificate that the Company has not been black listed by any department/ autonomous body/PSU of the Central/State Government in the past five years as on last date of submission of the bid (submit as per Annexure 5)

1.1.6 Average Annual Turnover of the bidder should be at least 50% of the Estimated cost put to tender for the last three consecutive financial years ending March 2019 duly certified by CA. (Attach Financial Information as per Annexure 3).

1.1.7 Should have a bank solvency of 40% of the Estimated cost put to tender (Attach Financial Information as per Annexure 6) certified by banker.

1.1.8 Bidder should not have incurred any loss (Profit after tax should be positive) in more than two years during the last five years ending 31 March 2019. (Attach Financial Information as per Annexure 3).

1.1.9 The successful bidder within 10 days of the issue of acceptance of bid from department shall have to submit valid Authorization letter from the OEMs of different equipments as under:-

i) Authorization letter from OEMs of Solar Photovoltaic Power Generation System.

ii) All the OEMs shall unconditionally support the bidder technically throughout the execution of contract as well as for Comprehensive Maintenance Contract for the useful life (at least seven years) of the system.

iii) All the OEMs shall provide all the spares required for the healthy functioning of the equipment for at least five years from the date of supply of equipment.

1.1.10 The Bidder should have successfully completed following work of **Supplying, Installation, Testing & Commissioning of Solar Photovoltaic Power Generation System** during last Seven years ending previous day of last date of submission of bid of value (completion certificate to be uploaded as per Annexure-4): -

1. Three similar works each of value not less than 40% of the Estimated cost put to tender.

Or

2. Two similar works each of value not less than 60% of the Estimated cost put to tender.

Or

3. One similar work each of value not less than 80% of the Estimated cost put to tender.

The Similar work shall mean works of **"Supply, Installation, Testing and Commissioning of Solar Photovoltaic Power Generation System".**

The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple rate of 7 % per annum calculated from date of completion to last date of receipt of bids.

1.1.11 The Bidder have to furnish an affidavit as "I/We undertake and confirm that eligible similar work (S) has/ have not been got executed through another bidder on back to back basis. Further that, if such a violation comer to the notice of Department, then I/We shall be debarred for tendering in CPWD contracts in future forever. Also, if such a violation comes to the notice of Department before date start of work, the Engineer-In-Charge shall be free to forfeit the entire amount of Earnest Money Deposit/ Performance Guarantee."

1.1.12 Bidder should have their own support & service Centre in India or have back to back support & service centres of OEMs in India preferably in Delhi.

1.1.13 **Eligibility criterion for the OEMs :-**

i) OEMs should have **their own** registered office in India since last seven years for which documentary evidence such as copy of ROC.

ii) OEMs should have service centre in India. This is to be supported with documentary evidence.

iii) Each OEM shall enter into agreement/MOU with bidder to support the project for the contract period including warranty period.

1.1.14 The Bidder himself should ensure that proposed OEMs fulfil the eligibility criteria before bidding. For approval of OEMs, Engineer-in-Charge, PWD shall be competent authority.

1.2 Evaluation Criteria

1.2.1 First Step -On line opening of eligibility bid document.

1.2.2 Second Step – Evaluation of eligibility bid

The eligibility bid of the prospective bidders will be evaluated as per para no. 2.5. The bidders who qualify the eligibility criteria will be declared as eligible bidders for next step.

1.2.3 Third Step – Opening of financial bid of eligible bidders. Financial bids of only those bidders shall be opened, whose eligibility bid was found satisfactory and approved by the department. Such Financial bids will be opened by the Executive Engineer (E), HEED in presence of the Bidder's representatives, who choose to attend can do so, at the given time, date and venue. The bidder's representatives, who participate in the opening process, shall sign a document evidencing their attendance.

1.3 AWARD CRITERIA

1.3.1 The successful bidder within 15 days of the issue of Letter of Intent from department, shall deposit an amount equal to 5% of the tendered amount as performance guarantee in one of the following forms:

(i) Cash (in case guarantee amount is less than Rs, 10,000/-)

(ii) Deposit at Call Receipt/ Banker's Cheque/ Demand draft/ Pay Order of a Scheduled Bank. (In case guarantee amount is less than Rs. 1,00,000/-)

(iii) Government securities.

(iv) Fixed Deposit Receipt (FDR) of a scheduled Bank.

(v) An irrevocable bank guarantee bond of any scheduled bank or the State Bank of India in the prescribed from given in Annexure.

1.3.2 It will be obligatory upon the lowest bidder to make the supply of all the items as per terms and conditions of contract. On refusal of the supply and execution to the satisfaction of department, the agreement of the company will be cancelled, up to date Security Deposited and Performance Guarantee (PG) will be forfeited and other appropriate action as deemed fit will be initiated.

1.4 VALIDITY OF PROPOSAL

The proposal is valid for a period of three months i.e. Ninety (90 days) from the date of submission of bid.

1.5 Evaluation Criteria for Eligibility (Technical Bid)

1.5.1 The Eligibility details submitted by the bidders will be evaluated in the following manner.

1.5.2 The initial criteria for eligibility in respect of experience of eligible similar class of works completed, profit/loss, solvency and financial turn over etc. will be first scrutinized and the bidder's eligibility for the work be determined.

Annexure -1
FORM FOR EARNEST MONEY DEPOSIT (BANK GUARANTEE)

WHEREAS, bidder.....**..... (Name of bidder) (hereinafter called "the bidder") has submitted his tender dated .....**..... (date) for the construction 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 **Executive Engineer (E), B-141, PWD, New Delhi** in the sum of Rs. .....**..... (Rs. In words .....**.....) for which payment well and truly to be made to the said Engineer-in-Charge the Bank binds itself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this .....**..... day of .....**..... 2020

THE CONDITIONS of this obligation are:

(1) If after tender opening the Bidder withdraws, his tender during the period of validity of tender (including extended validity of tender) specified in the Form of Tender;
(2) If the bidder 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 bidder, if required; OR
(b) Fails or refuses to furnish the Performance Guarantee, in accordance with the provisions of tender document and Instructions to bidder, OR
(c) fails or refuses to start the work, in accordance with the provisions of the contract and Instructions to bidder, OR
(d) fails or refuses to submit fresh Bank Guarantee of an equal amount of this Bank Guarantee, against Security Deposit after award of contract.

We undertake to pay to the Engineer-in-Charge up to the above amount upon receipt of his first written demand, without the Engineer-in-Charge having to substantiates his demand, provided that in his demand the Engineer-in-Charge will note that the amount claimed by his is due to him owing to the occurrence of one or any of the above conditions, specifying the occurred condition or conditions.
This Guarantee will remain in force up to and including the date .....**..... after the deadline for submission of tender as such deadline is stated in the Instructions to bidder or as it may be extended by the Engineer-in-Charge, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank not later than the above date.

DATE .....**..... SIGNATURE OF THE BANK
WITNESS .....**..... SEAL

(SIGNATURE, NAME AND ADDRESS)

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

**** to be filled by EE.**

Annexure-2
FORM OF PERFORMANCE SECURITY/
BANK GUARANTEE BOND

In consideration of the President of India (hereinafter called "the Government") having agreed under the terms and conditions of agreement No._____dated_____made between_____and_____{hereinafter called "the said bidder(s)"} for the work _____ _____ _____(hereinafter called "the said agreement") having agreed to production of an irrevocable Bank Guarantee for Rs._____ (Rupees _____ only) as a security/guarantee from the bidder(s) for compliance of his obligations in accordance with the terms and conditions in the said agreement,

We _____
(indicate the name of the Bank)

(hereinafter referred to as "the Bank") hereby undertake to pay to the Government an amount not exceeding Rs._____/- (Rupees_____only) on demand by the Government.

2. We _____ do hereby undertake to
(indicate the name of the Bank)

pay the amounts due and payable under this Guarantee without any demure, merely on a demand from the Government stating that the amount claimed is required to meet the recoveries due or likely to be due from the said bidder (s). Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the bank under this Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs._____/-(Rupees_____only).

3. We, the said bank further undertake to pay to the Government any money so demanded notwithstanding any dispute or disputes raised by the bidder(s) in any suit or proceeding pending before any court or Tribunal relating thereto, our liability under this present being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the bidder(s) shall have no claim against us for making such payment.

4. We_____further agree that the guarantee
(indicate the name of the Bank)

herein contained shall remain in full force and effect during the period that would be taken for the performance of the said agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged or till Engineer-in-Charge, on behalf of the Government, certifies that the terms and conditions of the said agreement have been fully and properly carried out by the said bidder(s) accordingly discharges this guarantee.

5. We_____ further agree with the Government that
(indicate the name of the Bank)

the Government shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said bidder(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said bidder(s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said bidder(s) or for any forbearance, act of omission on the part of the Government or any indulgence by the Government to the said

bidder(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the bidder(s).

7. We_____ lastly undertake not to (indicate the name of bank) revoke this guarantee except with the previous consent of the Government in writing.

8.This guarantee shall be valid upto_____ unless extended on demand by Government. Notwithstanding anything mentioned above, our liability against this Guarantee is restricted to Rs._____/-(Rupees_____only) and unless a claim in writing is lodged with us within six months of the date of expiry or the extended date of expiry of this guarantee, all our liabilities under this guarantee shall stand discharged.

Dated the _____ day of_____

for_____

(Indicate the name of the

Annexure 3
Financial Information

Please provide Chartered Accountant certified financial information of three last declared financial years.

Year	**2019-20**	**2018-19**	**2017-18**
Annual Turnover			
(i)Turnover			

(ii) Profit /Loss (Profit after tax should be positive).

Year	**Profit / Loss**
2015-16	
2016-17	
2017-18	
2018-19	
2019-20	

Note: -Please attach copies of relevant financial statements and audited accounts for the three last declared financial years

Annexure 4
STATEMENT OF SIMILAR WORK EXPERIENCE

Work completion certificate (issued by officer not below the rank of Executive Engineer from client department) of the eligible works of "**Supply, Installation, Testing and Commissioning of Solar Photovoltaic Power Generation System"** during last seven years in the following format:-

Certified that the work mentioned below ..... has carried out the "**Supply, Installation, Testing and Commissioning of Solar Photovoltaic Power Generation System**" as below mentioned :-

1. Name of Work :
2. Agreement No. :
3. Estimated Cost :
4. Tendered Amount :
5. Total Value of Work Done :
6. Date of Start :
7. Date of Completion as per agreement :
8. Actual Date of Completion :
9. Nature of Work Done :
10. Performance Report
    - (1) Quality of work — Very Good/Good/Fair/Poor
    - (2) Financial soundness — Very Good/Good/Fair/Poor
    - (3) Technical Proficiency — Very Good/Good/Fair/Poor
    - (4) Resourcefulness — Very Good/Good/Fair/Poor
    - (5) General Behaviour — Very Good/Good/Fair/Poor

Dated: Executive Engineer or Equivalent

To be signed by competent authority in-charge of work of Executive Engineer level or equivalent.

(**Furnish copies of Satisfactory Job Completion Certificates along with duly signed copies of corresponding Work Order/Award letter/Agreement/Job Orders along with Schedule of work/BOQ)**

Note: The Department shall be at liberty to verify the details submitted by the applicant

Annexure 5
SELF-DECLARATION – NO BLACKLISTING

To

The Executive Engineer (E),
HEED (B-141), PWD, Delhi.
IIT Complex, Sector-9,
Dwarka, Delhi-110077.

In response to this bid document pertaining to the work - **C/o East Delhi Campus of Guru Gobind Singh Indrasprastha University at Surajmal Vihar, Shahdara, Delhi. (SH: Supplying, Installation, Testing and Commissioning of Grid Interactive roof top solar photo voltaic power generation system)**, I/ We hereby declare that presently our Company/firm _____is having unblemished record and is not declared ineligible for corrupt & fraudulent practices either indefinitely or for a particular period of time by any State/ Central Government/ PSU/Autonomous Body.

We further declare that presently our Company/ firm _____is not blacklisted and not declared ineligible for reasons other than corrupt & fraudulent practices by any State/ Central Government/ PSU/ Autonomous Body on the date of Bid Submission.

If this declaration is found to be incorrect then without prejudice to any other action that may be taken, my/ our security may be forfeited in full and the empanelment if any to the extent accepted may be cancelled.

Thanking you,

Name of the Bidder: -
Authorized Signatory: -
Seal of the Organization: -
Date:
Place

Annexure-6

FORM OF BANKERS CERTIFICATE FORM A SCHEDULED BANK

This is to certify that to the best of knowledge and information that Mrs. / Sh..... Having marginally noted address a customer of our bank are/ is respectable and can be treated as good for any engagement upto a limit of Rs..... (Rupees.....).

This certificate is issued without any guarantee of responsibility on the bank or any of the officers.

(Signature)
For the Bank
Date: ----------

NOTE (1) Bankers certificate should be on letter head of the Bank sealed in over addressed to tendering authority.
(2) In case of partnership firm, certificate should include names of all partners as recorded with the Bank.

Annexure-7

Receipt of deposition of original EMD

(i) The EE/Engineer in Charge/DDH of any divisions/projects of CPWD or any other officer designated by CPWD Directorate from time to time, are authorized to receive the EMDs. These authorities should receive the original EMD for their tenders or tenders of any other division/projects.

(ii) The NIT approving authority/ Tender inviting authority at the time of issue of NIT also fills and upload the following prescribed format of receipt of deposition of original EMD along with NIT:

Receipt of deposition of original EMD

(Receipt No……/ Date……)

1.	**Name of work:- C/o East Delhi Campus of Guru Gobind Singh Indrasprastha University at Surajmal Vihar, Shahdara, Delhi. (SH: Supplying, Installation, Testing and Commissioning of Grid Interactive roof top solar photo voltaic power generation system).**		
2.	NIT No.	:	16/CE(OP)/PWD/2019-20
3.	Estimated Cost	:	Rs. 8,48,98,538/-
4.	Earnest Money deposit	:	Rs. 16,97,971/-
5.	Late date of submission of bid	:	23.03.2020 Upto 03:00 p.m.

1. Name of bidder: _____
2. Form of EMD: _____
3 Amount of Earnest Money Deposit: _____
4 Date of submission of EMD: _____

Signature,
Name and Designation of EMD
receiving officer (EE/DDH)
along with office stamp.

(#To be filled by EMD receiving EE)

(iii) The Authority receiving EMD in original form examines the EMD deposited by the bidder and issues receipt of deposition of earnest money to the agency in a given format uploaded by tender inviting authority. The receipt can also be issued by any subordinate gazetted authority as authorized by the EE/Engineer in Charge/DDH.

(iv) The authority receiving original EMD also intimates tender inviting authority about deposition of EMD by the agency by email/fax/telephonically.

(v) The original EMD receiving authority releases the EMD to unsuccessful bidders after the expiry of stipulated bid validity period or immediately after acceptance of the successful bidder, whichever is earlier, after verification from the e-tendering portal website (https://www.govtprocurement.delhi.gov.in/nicgep/app > tender status>awarded tenders) that the particular contractor is not L-1 tenderer and work is awarded

(vi) The tender inviting authority calls for original EMD of the L1 tenderer from EMD receiving authority immediately.

Annexure 8

STATEMENT OF CHECKLIST

The bidder is required to include scanned copies of following documents in their e-bids that are mandatorily to be uploaded by them on e-procurement website http://govtprocurement.delhi.gov.in on or before due date /time.

Sr. No	Documents Required	Submitted (Yes/No)
A	Scanned Copy of EMD and receipt of deposit of EMD as per Annexure-7	
B	Eligibility Documents	
(i)	Certificate of Company Incorporation/Firm Registration as per para 2.1.1	
(ii)	Copy of registration in GST & upto date GST return as per para 2.1.2	
(iii)	PAN/ TAN number of the company as per para 2.1.3	
(iv)	Self-declaration-Blacklisting as per Annexure-5 (as per para 2.1.4)	
(v)	Financial Information as per Annexure 3 along with Company's Balance Sheet and P/L Account for the preceding five financial years duly certified by CA	
(vi)	Statement of Similar work experience as per Annexure-4 along with copies of work order, completion certificates. etc.	
(vii)	Documentary proof of service centre in India for Solar Photovoltaic Power Generation System as per para 2.1.13	
(viii)	Bank solvency as per annexure-6 as per para 2.1.6	
C	Technical Bid Documents	
(i)	Signed copy of Technical Bid Documents	
D	Price Bid	

Signature, name and designation of authorized signatory

SECTION 3
ADDITIONAL INSTRUCTIONS TO BIDDER

1 The bidder shall bear all costs associated with the preparation and submission of the bid document. The department in any case will not be responsible or liable for these costs

2 The bidders advised to study the Bid Document carefully. Submission of the Bid shall be deemed to have been done after carefully studying and examination of all instructions, eligibility criterion, terms and requirement specifications contained in the Bid document with full understanding of its implications. Failure to furnish all information required in the Bid Document in all respects will be at the company's risk and may result in the rejection of the Bid.

3 BID DOCUMENTS

3.1 Bid Documents includes:-
Section 1 Notice inviting tender, CPWD-6, 7, Proforma of schedule & Integrity Pact
Section 2 Eligibility and Evaluation Criteria Annexure-1 to 8
Section 3 Instructions to bidder,
Section 4 Commercial Conditions of the Contract
Section 5 Technical specifications
Section 6 Price Bid

4 **AMENDMENT TO BID DOCUMENTS**

4.1 At any time the Department may for any reason, whether at its own initiative or in response to a clarification requested by a prospective company, modify the Bid documents by amendments.

4.2 The amendments/Corrigendum will be notified on PWD Website and these amendments will be binding on them. Applicants are advised to visit Delhi Govt. site https://govtprocurement.delhi. gov.in regularly for updates on Bid Documents.

5 **EXTENSION OF TIME**

In order to give bidder required time in which to take the amendments into action in preparing their Bid, the Department may at its discretion extend the deadline for submission of bid suitably.

6 **ELIGIBILITY AND QUALIFICATIONS**

Bidder shall furnish as a part of Bid documents establishing the bidder's eligibility to supply the material. The bidder shall also submit documentary evidence in the form of literature, drawing, data on the goods offered.

7 **EARNEST MONEY DEPOSIT**

7.1 The bidder shall submit EMD of Rs. 16,97,971/- (Rupees Sixteen Lakh Ninety Seven Thousand Nine Hundred Seventy One only) by Demand Draft or Pay Order or FDR from a Scheduled Bank in **favour of Executive Engineer (E), B-141, PWD, payable at New Delhi.** But the bid can only be submitted after deposition of original EMD either in the office of Executive Engineer inviting bids or deposition of original EMD either in the office of Executive Engineer inviting bids or in the office of Executive Engineer inviting bids or the EE/Engineer-in-charge/DDH of any division / projects of PWD Delhi or CPWD or any other officer designated by CPWD Directorate from time to time, are authorized to receive the EMDs within period of bid submission. **(The EMD document shall only be issued from the place in which the office of receiving division office is situated)** and uploading the mandatory scanned documents such as mentioned above.

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

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

7.2 The EMD of the unsuccessful bidder shall be discharged/ returned as promptly as possible.

7.3 The successful bidder's EMD shall be discharged upon the submission of the Performance Guarantee by the bidder. If the bidder fails to submit the performance guarantee then the EMD shall be forfeited

7.4 No interest is payable on EMD.

7.5 In case of inadequacy or non-submission of prescribed EMD as per bid document, the bidder shall be deemed to be disqualified and shall be summarily rejected in the evaluation.

7.6 If the successful bidder fails or neglects to observe or perform any of his obligations under the contract it shall be lawful for the PWD to forfeit either in whole or in part, the Performance Guarantee /Security deposit furnished by the bidder.

8 Upon verification, evaluation / assessment, if in case any information furnished by the bidder is found to be false/ incorrect, their total Bid can be summarily rejected and no correspondence on the same, shall be entertained.

9 The Department will not be responsible for any misinterpretation or wrong assumption by the bidder, while responding to this Bid.

10 The bidder shall be governed by the laws and procedures established by Govt. of India, within the framework of applicable legislation and enactment made from time to time concerning such commercial dealings/processing.

11 All disputes in this connection shall be settled in Delhi jurisdiction only.

12 The Department reserves the right to cancel this Bid or modify the requirement without assigning any reasons. The Department will not be under obligation to give clarifications for doing the aforementioned.

13 **Enquiries, Clarification and Pre-Bid Meeting: -**

a. Enquiries, if any, shall be addressed to Executive Engineer (E), HEED, PWD, Delhi and sent to the email id eepwddelhib141@gmail.com. All clarifications that are received by email on or before the date mentioned in the schedule will be addressed in a Pre-bid Meeting. The Department shall aggregate and respond to all such clarifications as per the schedule of bidding. This response to clarifications will be issued as a Corrigendum to the original Bid Document, if any.

b. During the course of Pre-Bid conferences, the bidder will be free to seek clarifications and make suggestions for consideration. The Department shall endeavour to provide clarifications and such further information as it may, in its sole discretion, consider appropriate for facilitating a fair and transparent Process.

c. In respect of suggestions/clarifications received, the following shall apply:

(i) The Department reserves the right not to consider any condition that is the sole discretion of the Department, if found unacceptable.

(ii) If in Department opinion, certain conditions are acceptable, in whole or in part, the same shall be finalized by Committee and the accepted conditions will be made available to all Bidder.

(iii) In respect of suggestion/ alterations proposed Department may consider them and the result will be circulated to all bidders through its website.

d. If Department deems it appropriate to revise any part of this Bid Document or to issue additional date to clarify an interpretation of the provisions of this Bid Document, it may issue supplements to this Bid Document. Such supplemental information, including but not limited to, any additional conditions, clarifications, minutes of

meeting, and official communication over email/post will be posted on the Delhi Govt. site https://govtprocurement.delhi.gov.in any such supplement shall be deemed to be incorporated by this reference into this Bid Document.

e. In order to allow bidders a reasonable time to take the amendment(s) into account in preparing their bids, Department, at its discretion, may extend the deadline for the submission of bids.

14 **Authentication of Bid:**

The Bid along with all annexure /document shall be signed by a person duly authorized to bind the organization to the Contract. A duly stamped Power-of-Attorney accompanying the Bid Document shall support the letter of authorization. The person or persons signing the Bid Document shall sign all pages of the Bid Document, including pages where entries or amendments have been made.

15 Instructions regarding online submission of Bid

Participation in this Bid shall be through online submission only. The following instructions are to be read carefully. These instructions are supplemented with more detailed guidelines on the relevant screens of the E-procurement portal of Govt. of NCT of Delhi.

15.1 Preparation & Submission of Bids:

Detailed tender documents may be downloaded from e-tender portal of Govt. Of Delhi http://www.govtprocurement.delhi.gov.in as per Tender Notification and tender is to be submitted online following the instruction appearing on the screen. A buyer manual containing the detailed guidelines for e- tendering system is also available on e- tender portal of http://www.govtprocurement.delhi.gov.in.

15.2.1 On-Line Submission

The On Line Submission will have the following activities:

i) Submission of particulars of EMD.
ii) Submission of signed and scanned copy of Bid

Bid must contain the signed & scanned copy which is required to be uploaded as per requirement of Bid and the list of documents is as under: -

1. Scanned Copy of EMD and receipt of deposit of EMD as per Annexure-7
2. Copy of Certificate of Incorporation of Company/ Firms Registration.
3. Copy of registration in GST & upto date return.
4. Copy of Income Tax PAN/ TAN number.
5. Financial Information as per Annexure 3 duly certified by CA.
6. Statement of Experience as per Annexure 4, along with copies of work order, completion certificates. etc.
7. Self-certificate regarding blacklisting of the company as per Format on Annexure 5
8. Bank solvency as per annexure-6
9. Signed copy of bid in token of acceptance of Terms and Conditions of Bid.

15.2.2 Completeness of Offer

Financial Bid accompanied by vague and conditional expressions such as "subject to immediate acceptance", "subject to confirmation before sales", etc. will be treated as being at variance and shall be liable for rejection.

15.2.3 Modification/ Substitution/ Withdrawal of Bids:

15.2.3.1 The Company may modify, substitute or withdraw its Bid after submission prior to the Bid due date. No Bid shall be modified, substituted or withdrawn by the Company on or after the Bid due date.

15.2.3.2 Any alteration/ modification in the Bid or additional information supplied subsequently to the Bid Due Date, unless the same has been expressly sought for by the Authority, shall be disregarded.

15.2.3.3 For modification of bid, Company has to detach its old bid document from e-tendering portal and upload/ resubmit digitally signed Bid.

15.2.3.4 For withdrawal of Bid, Company has to click on withdrawal icon at e-tendering portal and can withdraw its bid.

15.2.3.5 Before withdrawal of a Bid, it may specifically be noted that after withdrawal of a Bid for any reason, Company cannot re-submit Bid again.

15.3 DELIVERY AND INSTALLATION SCHEDULE

The bidder has to complete the supplying, installation, testing and commissioning of BMS within a period specified in the NIT, effective from the date of issue of award of this particular work.

15.4 Warranty

The bid of the bidders will include comprehensive on-site warranty, covering replacement of all unserviceable parts, for first year starting from the date of installation and acceptance of the system by the Department. The bidder shall be fully responsible for the manufacturer's warranty in respect of proper design, quality and workmanship of all installed equipments covered by the Bid Document. The bidder must warranty all equipments, against any manufacturing defects during the warranty period.

15.5 Support

The bidder is required to provide sound-service after-installation and commissioning of the system by arranging timely attending of calls during defect liability period.

15.6 Hardware Failure

If, during the warranty period any equipment fails to function properly four or more times during a quarter due to any reason except Force Majeure event, the bidder shall arrange replacement of the same by new equipment of same or higher configuration, at no extra cost to the department's Client.

15.7 LIQUIDATED DAMAGES FOR DELAY IN INSTALLATION

The firm has to complete the supplying, installation, testing and commissioning of BMS System within a period as per agreement, effective from the date of issue of award letter by the department. However, if the firm delays the work beyond the stipulated time period as per agreement, the firm will be levied a compensation under the contract subject to a maximum limit of 10 percent of the agreement value.

15.8 The bidder can use different brands of products as mentioned in the nomenclature of the item provided they meet the tender specifications and compatible with all hardware components for optimum system performance.

15.9 The bidder shall comply with all the provisions of the Minimum Wages Act, 1948, and Contract Labour (Regulation and Abolition) Act, 1970, amended from time to time and rules framed there under and other labour laws affecting contract labour that may be brought into force from time to time.

15.10 (i) All tendered rates shall be inclusive of all taxes and levies payable under respective statutes. However, if any further tax or levy or cess is imposed by Statute, after the last stipulated date for the receipt of tender including extensions if any and the bidder thereupon necessarily and properly pays such taxes/levies/cess, the bidder shall be reimbursed the amount so paid, provided such payments, if any, is not, in the opinion of the CE(OP),PWD (whose decision shall be final and binding on the bidder) attributable to delay in execution of work within the control of the bidder.

(ii) The bidder shall keep necessary books of accounts and other documents for the purpose of this condition as may be necessary and shall allow inspection of the same by a duly authorized representative of the Government and/or the Engineer-in-Charge and shall also furnish such other information/document as the Engineer-in-Charge may require from time to time.

(iii) The bidder shall, within a period of 30 days of the imposition of any such further tax or levy or cess, give a written notice thereof to the Engineer-in-charge that the same is given pursuant to this condition, together with all necessary information relating thereto.

15.11 The bidder shall not be permitted to tender for works in the PWD circle (Division in case of bidders of Horticulture/Nursery categories) 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 the Superintending Engineer and Junior Engineer (both inclusive). He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any Gazetted Officer in the PWD or in the Ministry of Housing and Urban

Affairs. Any breach of this condition by the bidder would render him liable to be removed from the approved list of bidders of this Department. If however the bidder is registered in any other department, he shall be debarred from tendering in PWD for any breach of this condition.

NOTE: By the term "near relatives" is meant wife, husband, parents and grand parents, children and grand children, brothers and sisters, uncles, aunts and cousins and their corresponding in-laws.

15.12 No engineer of gazetted rank or other gazetted officer employed in engineering or administrative duties in an engineering department of the Government of India shall work as a bidder or employee of a bidder for a period of one year after his retirement from government service without the previous permission of Government of India in writing. This contract is liable to be cancelled if either the bidder or any of his employees is found at any time to be such a person who had not obtained the permission of Government of India as aforesaid, before submission of the tender or engagement in the bidder's service, as the case may be.

15.13 If the bidder fails to maintain the required progress and clear the site on or before the contract or extended date of completion, he shall, without prejudice to any other right or remedy available under the law to the Government on account of such breach, pay as agreed compensation the amount calculated at the rates stipulated by the Superintending Engineer (whose decision in writing shall be final and binding) may decide on the amount of tendered value of the work for every completed day/month (as applicable) that the progress remains below or that the work remains incomplete.

(i) Compensation for delay of work @ 1.5 % per month of delay to be computed on per day basis.

Provided always that the total amount of compensation for delay to be paid under this Condition shall not exceed 10% of the agreement value of work.

The amount of compensation may be adjusted or set-off against any sum payable to the Bidder under this or any other contract with the Government.

15.14 The time allowed for execution of the Works as specified in the agreement or the extended time in accordance with these conditions shall be the essence of the Contract. The execution of the works shall commence from such time period as mentioned in agreement. If the Bidder commits default in commencing the execution of the work as aforesaid, Government shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the performance guarantee absolutely.

As soon as possible after the award of work, the firm shall submit a Time and Progress Chart and get it approved by the Department. The Chart shall be prepared in direct relation to the time stated in the agreement for completion of items of the works.

Executive Engineer (E)
Higher Education Electrical Division,
PWD, IIT Complex, Sector-9, Dwarka, New Delhi.

GOVERNMENT OF DELHI
PUBLIC WORKS DEPARTMENT

STATE DELHI **Division: HEED**

BRANCH E&M **CIRCLE : PM (Hr. Edu. Proj.)**

Percentage Rate Tender & Contract for works

Tender for the work of **"C/o East Delhi Campus of Guru Gobind Singh Indrasprastha University at Surajmal Vihar, Shahdara, Delhi. (SH: Supplying, Installation, Testing and Commissioning of Solar Photovoltaic Power Generation System)".**

To be uploaded on website upto 3:00 PM on 23.03.2020 to The **Executive Engineer(E), PWD, HEED, PWD, IIT Complex, Sector-9, Dwarka, New Delhi-77** through e-procurement solution and to be opened online in the office of Executive Engineer (E), PWD, Higher Education Electrical Division, IIT Complex, Sector-9, Dwarka, New Delhi-77 as under:-

(a) Technical Bid at 3:30 PM on 23.03.2020
(b) Financial Bid at 3:30 PM on 23.03.2020 will be intimated later to eligible bidders.

TENDER

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

I/We hereby tender for the execution of the work specified for the President of India within the times 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 the 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.

We agree to keep the tender open for Ninety (90) days from the date of opening of financial bid thereof and not to make any modification in its terms and conditions.

A sum of **Rs. 16,97,971/-** is hereby forwarded in form of Deposit at Call Receipt/Treasury Challan/ Bankers Cheque/ Demand Draft/Fix Deposit Receipt of a Scheduled Bank as earnest money. If I/We fail to furnish the prescribed performance guarantee within prescribed period, I/We agree that the said President of India or his successors in office shall without prejudice to any other right or remedy be at liberty to forfeit the said earnest money absolutely. Further, If I/We fail to commence work as specified, I/WE agree that the said 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 the performance guarantee absolutely, otherwise the said earnest money shall be retained by him towards security deposit 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, upto maximum of 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 bidder on back to back basis. Further that, if such a violation comes to the notice of Department, then I/We shall be debarred for tendering in CPWD in future forever. Also, if such a violation comes to the notice of Department before date of start of work, the

Engineer-in-Charge shall be free to forfeit the entire amount of Earnest Money Deposit/Performance Guarantee.

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

Dated…….

Signature of Bidder

Postal Address....*.....

Witness:

Address:

Occupation:

Dated …….

Signature of Bidder

Postal Address

Witness :

Telephone No.:

Address :

Fax.

Occupation :

Email

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 Rs. ……*…….

(Rupees…….*…….

)

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

(a)
(b) ….*….
(c)

For & on behalf of the President of India

Signature…….

Dated …….
Designation……

****To be filled by the EE before uploading the NIT**

PROFORMA OF SCHEDULES

SCHEDULE 'A' **Page No. 68 to 74**

Schedule of quantities (Enclosed)

SCHEDULE 'B'

Schedule of materials to be issued to the bidder.

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

SCHEDULE 'C'

Tools and plants to be hired to the bidder

Sl. No.	Description	Hire charges per day	Place of issue
1	2	3	4
NIL			

SCHEDULE 'D'

Extra schedule for specific requirements/ documents for the work, if any. ----- Nil

SCHEDULE 'E'

Reference to upto date General Conditions of Contract: Upto date General Conditions of Contract for CPWD works having amendments issued up to date of submission of tender and further read with correction slips issued up to the last date of uploading the tender.

1.1 Name of Work:- **C/o East Delhi Campus of Guru Gobind Singh Indrasprastha University at Surajmal Vihar, Shahdara, Delhi. (SH: Supplying, Installation, Testing and Commissioning of Grid Interactive roof top solar photo voltaic power generation system).**

1.2 Estimated Cost of work: - **Rs. 8,48,98,538/-**

1.3 Earnest Money: - **Rs. 16,97,971/-**

1.4 Performance Guarantee **5% of tendered value**

1.5 Security Deposit **2.5% of tendered value**

1.6 Time Allowed: **180 Days**

SCHEDULE 'F':-

General Rules & Directions:-

Officer Inviting Tender: - **Executive Engineer (E), HEED, PWD IIT Complex, Sector-9, Dwarka, 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 5 **Refer clause 12**

Definitions:-

2(v) Engineer-In-Charge	**Executive Engineer (E), HEED, PWD, Delhi**
2(viii) Accepting Authority	**CE (Other Proj.), PWD, (GNCTD).**
2(x) Percentage on cost of materials and labour to cover all overheads and profits	**15%**
2(xi) Standard Schedule of Rates	**MR/DSR(E&M)2016 with up to date correction slips**
2(xii) Department	**Public Works Department, New Delhi**

9(ii) Standard CPWD contract form (Form GCC upto date): CPWD form 7 as modified and corrected upto last date of uploading the bid.

Clause-1:-

(i) Time allowed for submission of performance guarantee after date of issue of letter of acceptance **15days**

(i) Maximum allowable extension with late fee @ 0.1% per day of performance Guarantee Amount beyond the period in (1) above. **3 days**

Clause-2:- I. Authority for fixing compensation under clause-2. **CE (OP),PWD 13th Floor, MSO Building, Delhi.**

Clause 2A II. Whether clause-2A shall be applicable. **Not applicable**

Clause-5:-Number of days from the date of issue of letter of acceptance for reckoning date of start **10 days**

TABLE OF MILE STONE

Sr. No	Description of Milestone (Physical)	Time Allowed in **Days** (from date of start)	Amount to be with-held in case of non-achievement of mile stone.
1	Approval of drawings, schematic, Technical specifications, make of Solar PV Modules and other components.	25 Days	1%
2	Supply of material(Solar PV Modules, Inverters etc.) & Installation of Cabling work	90 Days	2%
3	Installation of Solar Photovoltaic Power Generation System, inverter, ACDB, DCDB, DG-PV Controller, SCADA system etc.	150 Days	1%
4	Commissioning and Handing Over	180 Days	1%

Time allowed for execution of work : **180 Days**

Authority to decide:

(i) Authority to give fair & reasonable extension of time for completion of time	:	**PM (Hr. Edu. Proj.), PWD**
(ii) Reschedule of Mile Stones	:	**PM (Hr. Edu. Proj.), PWD.**

Clause-6,6A:-

Clause Applicable-(6)	:	**6 Applicable**

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	:	**Not Applicable**
Clause-10-A List of Testing Equipment to be provided by the bidder at site Lab	:	**All equipments as per requirement for successful completion of work at site.**
Clause-10-B (ii). Whether clause 10-B (ii) shall be applicable	:	**Not Applicable**
Clause 10 C Component of Labour expressed as percent of value of work	:	**Not Applicable**
"**Clause 10 CA** Materials covered under this clause	:	**N.A.**
Clause-10-CC:- Clause 10CC to be applicable in . 12 months contracts with stipulated period of completion exceeding the period.	:	**N.A.**
Clause-11:- Specifications to be followed for Execution of work	:	**C.P.W.D. General Specifications for Electrical works (Elect Part I, 2013 Internal, Part-II -1994) and amended up to date**.

Clause-12:-

Type of work ***_		**Original work.**
12.2 & 12.3 Deviation limit beyond which clause 12.2 & 12.3 shall apply for electrical work	:	**30%**
12.5 (i) Deviation limit beyond which clause 12.2 & 12.3 shall apply for foundation works (except earth work).	:	**NA**

(ii) Deviation limit for items in earthwork sub-head of DSR-2016 or related items. : **NA**

Clause-16:- Competent Authority for deciding reduced rates. **Project Manager /Superintending Engineer**

Clause-18 List of mandatory M/c, tools, T&P as required for completion of work.

Clause-25
Constitution of dispute redressal committee :

a) For total claims more than 25 lakh.

Chairman : i. CE, PWD, New Delhi.
Member : ii. Director (Works), in O/o E-in-C, PWD, New Delhi.
Member : iii. SE, PWD, New Delhi.
iv. SE-in-Charge of the work shall present case before DRC but shall not have any part in decision making.

(b) For total claims upto Rs. 25 Lakh.

Chairman : i. Director (Works), in O/o E-in-C, PWD, New Delhi.
Member : ii. EE, O/o E-in-C, PWD, New Delhi.
Member : iii. EE, O/o E-in-C, PWD, New Delhi.
iv. The EE-in-charge of the work shall present the case before DRC but will not have any part in decision making.

Note: The above constitution of dispute redressal committee is subject to change, for which necessary notification shall be issued by the competent authority of the department, if required.

Clause-36 : "Requirement of Technical Representative (s) and Recovery Rates"

Requirement of Technical		**Minimum experience (Years)**	**Designation Technical Staff**	**Rate of which recovery shall be made from the contractor in the event of not fulfilling.**
Qualification	**Number (of Major component)**			
Graduate Engineer	1	5 (and having experience of one similar nature of work)	Project Manager	Rs. 25000/- per month
Graduate Engineer or Diploma Engineer	1+1	2 or 5 respectively	Project planning/quality /billing Engineer	Rs. 15000/- per month per person.

SECTION - 4
General Commercial & Technical Conditions:

1 PRICE APPLICABILITY

Prices in the Bid shall remain valid for the period of as specified in Bid.

2 PAYMENT TERMS

The following percentage of contract rates for the various items included in the contract shall be payable against the stage of work shown herein

A. Solar Photovoltaic Power Generation System:

a) 60% against supply, as per items of the schedule of work, after delivery at site in good condition against guarantee bond.
b) 20% after completion of installations, as per items of the schedule of work at specified locations in all respect.
c) Balance 20% will be paid only after testing, commissioning trial run & handing over of the head to the client department for their beneficial use.

3 INDEMNITY:

The bidder shall indemnify the department/User departments against all third party claims of infringement of patent, trademark/copyright or industrial design rights arising from the use of the supplied items and related services or any part thereof. Department/User department stand indemnified from any claims that the bidder's manpower may opt to have towards the discharge of their duties in the fulfilment of the bid orders. Department/User department also stand indemnified from any compensation arising out of accidental loss of life or injury sustained by the bidder's manpower while discharging their duty towards fulfilment of the bid orders.

4 PERFORMANCE GUARANTEE

4.1 The successful bidder within 15 days of the issue of letter from department, shall deposit an amount equal to 5% of the calculated amount of the proposed work order (Without limit) as performance guarantee in one of the following forms:

i) Cash (in case guarantee amount is less than Rs, 10,000/-)
ii) Deposit at Call Receipt/ Banker's Cheque/ Demand draft/ Pay Order of a Scheduled Bank. (In case guarantee amount is less than Rs. 1,00,000/-)
iii) Government securities.
iv) Fixed Deposit Receipt (FDR) of a scheduled Bank.
v) An irrevocable bank guarantee bond of any scheduled bank or the State Bank of India in the prescribed from given in Annexure-3

4.2 The proceeds of the Performance Guarantee shall be payable to the department as compensation for any loss resulting from the bidder's failure to complete its obligations under the contract.

5 SECURITY DEPOSIT

The security deposit @ 2.5% shall be deducted from the bill of the bidder.

6 CHANGE ORDERS

6.1 The Department may at any time by written order given to the Bidder make changes within the general scope of the contract in any one or more of the following:-

a) Drawings, designs or specifications where goods to be furnished under the contract are to be specifically manufactured for the Department.
b) Method of transportation or packing.
c) Place of delivery.
d) Services to be provided by the bidder.

6.2 If any such change causes an increase or decrease in the time required for the execution of the bidder, an equitable adjustment shall be made in the contract for delivery schedule.

7 SUB-LETTING

The Company cannot assign or transfer and sub-contract its interest/ obligations under the contract without prior written permission of the Purchaser.

8 ARBITRATION

As per clause 25 of CPWD GCC with up to date correction slips

9 The bidder/OEMs shall comply applicable e-waste rules/guidelines of Government of India.

10 Interpreting specifications

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

a) Nomenclature of item as per Schedule of Quantities
b) Additional/Special Conditions.
c) Particular Specifications and List of Makes.
d) CPWD Specifications.
e) Architectural Drawings.
f) National Building code 2016, ECBC 2017, Relevant BIS standards all as modified up to date. (Note: The specification mentioned in relevant code or CPWD specification or NBC 2016 or ECBC 2017 whichever is more stringent will be followed).
g) OEM specification.
h) Sound Engineering Practice

11 The work shall be generally carried out in accordance with tender specifications and the following speciation rules, unless otherwise specified the latest amended edition of all such codes/specification/manuals on the last date of submission of the tender would be applicable.

a) CPWD General Specifications for Electrical Works Part I Internal – 2013 as amended up to date.
b) CPWD general specification for electrical work part II External 1994 as amended up to date.
c) General Specifications for Electrical Works (Part-III-LITS & Escalators) – 2003 as amended up to date.
d) CPWD general specification for electrical work part IV Sub-Station 2013 as amended up to date.
e) CPWD General Specifications for Electrical Works Part VII D.G. Sets - 2013 as amended up to date.
f) General Specifications for Heating, Ventilation & Air-Conditioning (HVAC) – 2017 as amended up to date.
g) Indian Electricity Act 2003 amended up to date.
h) National Electrical Code 2008 and NFPA (National Fire Protection Association) 70.
i) Indian Electricity Rule 1956 amended up to date.
j) National Building Code 2016
k) BIS codes as applicable.
l) Other standards and codes as applicable in the electrical and mechanical works.

Executive Engineer (E)
Higher Education Electrical Division,
PWD, IIT Complex, Sector-9, Dwarka, New Delhi.

Additional Conditions

1. Bidder shall have to provide typical scaled site plan and equipment layout plan for the systems. The layout shall show interconnecting cable routings between various equipments of the systems. The complete specifications along with exact locations of the installation of each and every equipment should be made available to the department before final acceptance of the system. The plan must be submitted in hard copy and also made available in soft copy to the concerned Engineer-in-.
2. The technical team staff should be as per requisite technical qualifications and standards of the trade and designation of the team members.
3. Department reserves the right to conduct the test, as may be deemed fit to adjudge the suitability and capability of the staff provided by the contract.

Executive Engineer (E)
Higher Education Electrical Division,
PWD, IIT Complex, Sector-9, Dwarka, New Delhi.

SPECIAL CONDITIONS

1. The work is to be carried out as per CPWD specifications Electrical (Internal) -2013 External -1993 and as per technical specification of the NIT and conditions attached.
2. The work is to be carried out in already constructed building. Contractor has to co-ordinate with other agencies for timely completion of work.
3. All items are for supply, installation, testing & commissioning of complete equipments and nothing extra shall be paid for anything.
4. All equipment shall be guaranteed for 12 months from the date of handing over of the work to the client department.
5. Arrangement of Electric supply (Three Phase/Single Phase) as required to carry out the work for successful commissioning of the system. Department will not pay anything extra on this account. This shall be in the scope of successful firm.
6. Watch & Ward of the installation shall be the responsibility of contractor till completion of work and handing over to the Client Department & nothing shall be paid extra for that.
7. The contractor has to get the sample of item approved from the Engineer – in – charge before bringing the material at site.
8. The rates quoted by the contractor shall be inclusive of GST / Work contract Tax / duties & levies / road tax (if any) & nothing shall be paid extra for the same.
9. Any damage done to the building during execution of work is to be made good as per original finish & nothing extra shall be paid for the same
10. Any opening made in the wall / ceiling for cable / channel / conduit crossing shall be repaired as per original finish & nothing shall be paid extra for the same.
11. The security Deposit for this work shall be released after expiry of guarantee period of 12 months from the date of handing over of the work to the client department.
12. On field training of PWD Personal and Client Department personal on operation, supervision, management function shall be provided as per requirement. Four set of Solar Photo voltaic power generation system documentation i/c system architecture, contents, component list, GA diagram, controller wiring diagram, part diagram etc complete as required shall be supplied.

Executive Engineer (E)
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Section-5

TECHNICAL SPECIFICATIONS

1. **DEFINITION**

A Grid Tied Solar Rooftop Photo Voltaic (SPV) power plant consists of SPV array, Module Mounting Structure, Power Conditioning Unit (PCU) consisting of Maximum Power Point Tracker (MPPT), Inverter, and Controls & Protections, interconnect cables, Junction boxes, Distribution boxes and switches.

PV Array is mounted on a suitable structure. Grid tied SPV system is without battery and should be designed with necessary features to supplement the grid power during day time. Components and parts used in the SPV power plants including the PV modules, metallic structures, cables, junction box, switches, PCUs etc., should conform to the BIS or IEC or international specifications, wherever such specifications are available and applicable.

2. **Solar PV system shall consist of following equipment's/components.**

2.1. Solar PV modules consisting of required number of Crystalline PV cells.
2.2. Grid interactive Power Conditioning Unit with Remote Monitoring System
2.3. Mounting structures
2.4. Junction Boxes.
2.5. Earthing and lightening protections.
2.6. IR/UV protected PVC Cables, pipes and accessories.

3. SOLAR PHOTOVOLTAIC MODULES:

3.1. The PV modules used should be made in India.
3.2. The PV modules used must qualify to the latest edition of MNRE Specification /IEC PV module qualification test or equivalent BIS standards Crystalline Silicon Solar Cell Modules IEC 61215/IS14286. In addition, the modules must conform to IEC 61730 Part 1 - requirements for construction & Part 2 - requirements for testing, for safety qualification or equivalent IS. Any other test applicable in addition to the above, if introduced by MNRE or any statutory authority shall also be complied with.
3.3. For the PV modules to be used in a highly corrosive atmosphere throughout their lifetime, they must qualify to IEC 61701/IS 61701.
3.4. The total solar PV array capacity should not be less than allocated capacity (KWp) and should comprise of solar crystalline modules of minimum 330 Wp and above wattage.
3.5. Protective devices against surges at the PV module shall be provided. Low voltage drop bypass diodes shall be provided.
3.6. PV modules must be tested and approved by one of the IEC authorized test Centers.
3.7. The module frame shall be made of corrosion resistant materials, preferably having anodized Aluminium.
3.8. The bidder shall carefully design & accommodate requisite numbers of the modules to achieve the rated power in his bid. Tendering authority/Engineer-in-charge shall allow only minor changes at the time of execution, if necessary.
3.9. Other general requirement for the PV modules and subsystems shall be the Following:
3.10. The rated output power of any supplied module shall have tolerance within +5 / - 0% (Zero negative Tolerance).
3.11. The peak-power point voltage and the peak-power point current of any supplied module and/or any module string (series connected modules) shall not vary by more than 2 (two) per cent from the respective arithmetic means for all modules and/or for all module strings, as the case may be.
3.12. The module shall be provided with a junction box with either provision of external screw terminal connection or sealed type and with arrangement for provision of by-pass diode. The box shall have hinged, weather proof lid with captive screws and cable gland entry points or may be of sealed type and IP-65 rated.
3.13. I-V curves at STC should be provided by bidder.
3.14. Modules deployed must use a RF identification tag. The following information must be mentioned in the RFID used on each modules. This should be inside the laminate only.
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, Im, Vm 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

3.15. **Warranties:**

a. Material Warranty:

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 Ten (10) years from the date of sale to the original customer ("Customer")

☑ Defects and/or failures due to manufacturing
☑ Defects and/or failures due to quality of materials
☑ Non conformity to specifications due to faulty manufacturing and/or inspection processes. If the solar Module(s) fails to conform to this warranty, the manufacturer will repair or replace the solar module(s), at the Owners sole option

b. Performance Warranty:

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.

3.16. **Data-Sheet / Specification of Solar PV Modules (Typical)**

Solar PV modules shall be of the crystalline silicon type, manufactured in India. Detailed specifications are given below.

Description	Details
Type of SPV module	Poly Crystalline Silicon
Origin	Manufactured in India
Module efficiency	Photo-electric conversion efficiency of SPV module shall not be less than 16.5%.
Fill factor	Fill factor of the module shall not be less than 70%.
Degradation warranty	Panel output (Wp) capacity to be >=90% of design nominal power after 10 years and >=80% of design nominal power after 25 years
Module frame	Non-corrosive and electrolytically compatible with the mounting structure material
Termination box	Thermo-plastic, IP 65, UV resistant
Blocking diodes	Schottky type
Module minimum rated power	The nominal power of a single PV module shall not be less than **330Wp.**
Power output rating	To be given for standard test conditions (STC). I-V curve of the sample module shall be submitted.
Codes and Standards	SPV modules should comply to relevant Codes and Standards
Compliance with standards and codes	IEC 61215 I IS 14286 IEC 61730 Part 1 and 2 or equivalent BIS standards
Salt Mist Corrosion Testing	As per IEC 61701 or equivalent BIS standards
PID	Compliance to the PID free nature of PV modules shall be established
Environment (Humidity, Temp. range)	SPV module shall perform satisfactorily in relative humidity up to 90% with operating temperatures between -10°C & +85°C and shall withstand wind speed on the surface of the panel as per site specific requirement.

Glass Transitivity	Transitivity of glass shall not be less than 91%.
Bypass diode	The PV modules shall be equipped with bypass diode to minimize power drop caused by shade. Minimum one bypass diode between two circuits.
Module frame	The module frame shall be made of anodized Aluminum or corrosion resistant material frame, which shall be electrolytically compatible with the structural material used for mounting the modules with sufficient number of grounding installation. The anodizing thickness shall be 15 micron or more.
Power capacity tolerance	The actual module power capacity shall not vary by more than +5% from its minimum certified module power capacity. No negative tolerance shall be accepted.
Temperature co-efficient for power output	The temperature co-efficient for power output of the Solar PV module shall not be more than - 0.40% /°C.
Degradation	All photovoltaic modules shall have linear performance warranty from second year. The solar PV modules offered shall not degrade more than 2.5% in first year and not more than 0.7% from second year of its rated power.
Performance warranty	Each Solar PV modules used in solar power plants/ systems must be warranted for their output peak watt capacity, which shall not be less than 90% at the end of 10 years and 80% at the end of 25 years from the completion of the trial run.
Module mismatch losses	The module mismatch losses for modules connected to an inverter shall be less than 2%.
Anti-reflection coating	The modules shall be provided with anti-reflection coating and back surface field (BSF) structure to increase conversion efficiency.
Toughened glass	The SPV module shall be made up of impact resistant, low iron and high transmissivity toughened glass. The front surface shall give high encapsulation gain.
Encapsulation	The SPV modules shall have suitable encapsulation and sealing arrangements to protect the silicon cells from environment. The encapsulation arrangement shall ensure complete moisture proofing for the entire life of solar modules.
Designed to give efficient and reliable performance	The equipment shall be designed to give efficient and reliable performance and shall be such that the risks of accidental short-circuit due to animals, birds or vermin are obviated.
Data sheets	The data sheets of all modules shall be provided. The exact power of the module shall be indicated if the data sheet consists of a range of modules with varying output power.
Module Junction box	Module Junction box and Terminal Block shall be of high quality fitted at the back side and shall be weather proof (IP 65 or better rated) and designed to be used with standard wiring or conduit connection. Each Junction Box shall contain Bypass Diode. They shall have a provision for opening /replacing the cables, if required. The module junction box shall be certified as per IEC 61215.
DC solar cables	Each module shall have minimum two 4 sq.mm. stranded UV resistant output DC solar cables each terminated with connectors adaptive to MC4 type connector directly.
MC4 type connector	MC4 type connector should have typical certification from

	testing agency TUV, competent for the purpose
Routine test results	The typical solar PV module electrical characteristics including current- voltage (I-V) performance curves and temperature coefficients of power, voltage and current shall be provided for all the modules supplied. However, the tabulated document with all the relevant data like voltage, current, power output for each module is also required to be provided along with the supply
Traceability - RF Identification tag data (RFID)	RF Identification tag Shall be provided inside the module and must be able to withstand environmental conditions and last the lifetime of the solar module. Each solar module Modules deployed must use a Radio Frequency Identification (RFID) tag for traceability. It shall be well protected within the module laminate and contain the following information: ☑ Name of the manufacturer of PV Module ☑ Name of the Manufacturer of Solar cells ☑ Month and year of manufacture (separately for solar cells and module) ☑ Country of origin (separately for solar cells and module) ☑ I-V curve for the module ☑ Wattage, Imp, Vmp (Wm, Im, Vm) and FF for the module ☑ Unique Serial No and Model No of the module ☑ Date and year of obtaining IEC PV module qualification certificate ☑ Name of the test lab issuing IEC certificate ☑ Other relevant information on traceability of solar cells and module as per ISO 9000 standard
Name Plate label	All individual modules shall be provided with Name Plate label at the back of module which shall provide the information given below for identification. They shall be clearly visible and shall not be hidden by equipment wiring. Type of labels and fixing of labels shall be such that they are not likely to peel off/ fall off during the life of the panel. ☑ Name of the Project ☑ Manufacturer's Name ☑ Model Number, Serial Number ☑ Overall dimensions and effective Dimensions (WxLxD) ☑ Weight (kg) ☑ Maximum Power (Pmax), Voltage (Vmp), Current (Imp) ☑ Short Circuit Current (Isc), Open Circuit Voltage (Voc) ☑ Main System Voltage ☑ Relevant standards, Certification lab. name ☑ Warnings, if any
Datasheet	Unless otherwise stipulated, the properties mentioned above should be demonstrated through datasheet of the manufacturer.
Testing of Solar PV Modules	PV modules must qualify test from IEC/NABL accredited laboratory as per relevant IEC standard and report/certification of the same must be attached. The performance of PV modules at STC conditions must be tested and approved by one of the IEC / NABL Accredited Testing Laboratories / Solar Energy Centre of MNRE/ any other MNRE authorized test laboratories/centers. The test certificates shall be submitted for acceptability of modules.

TESTS:	The manufacturer shall carry out routine tests at his works and shall maintain records for the same. Acceptance testing shall be carried out by "USER" representative or by third party inspector.
	* Copy of the latest conformance certificates should be asked ** Standard Type test report will be relied upon
Quality Testing of PV-Module	Modules used in solar panels shall have IEC 61215 Ed 2 or latest compliance certificate. The qualification testing procedure is defined in IEC 61215 Ed 2 or latest to examine the impact of mechanical, thermal and electrical stress on power output. The bidder shall submit appropriate type approval certificate for the offered solar modules from accredited test laboratory.
METHOD OF TESTING	
Visual Inspection	Each module shall be carefully inspected under an illumination of not less than 1,000 lux for the following conditions: ☑ Racked, bent, misaligned or torn external surfaces. ☑ Broken / cracked cells ☑ Faulty interconnections or joints ☑ Cells touching one another or the frame ☑ Failure of adhesive bonds; bubbles or delamination forming a continuous path between a cell and edge of the module ☑ Faulty terminations and exposed live electrical parts ☑ Junction box should have common terminals with suitable blocking diode to prevent reverse current flow. Blocking diode in solar module junction box is required in case of using DC Junction box.
Performance at Standard Test Conditions: (Clause 10.1 of IEC 61215 Ed 2 or latest)	All PV modules supplied shall be accompanied with I-V curves (tested in the manufacturing unit, clearly indicating the serial number, batch number, date and country of origin). The current-voltage characteristics of the module shall be determined in accordance with IEC 60904-1 at a specific set of irradiance and temperature conditions. Performance of PV-Module shall be generally evaluated at Standard-Test-Conditions (STC) as defined in IEC 60904 standards: ☑ Cell temp. of 25° C, ☑ Incident solar irradiance of 1000W/m2, ☑ Spectral distribution of light spectrum with an air mass AM=1.5
Acceptance Criteria	The module is deemed to have passed the tests if the sample meets the following criteria; ☑ There is no evidence of a major visual defect such as a cracked or broken window, bubbles or de-lamination in the encapsulate etc. ☑ There is no cell breakage and no water infiltration into terminal boxes. ☑ No sample exhibits any open circuit or ground fault. ☑ No visible evidence of major defects that may affect performance of the module. ☑ Insulation Resistance not less than 50M-ohm at 500 VDC. ☑ Degradation of performance may not exceed 5% after

	each single test or 8% after the whole sequence.

3.17. **QUALITY TESTING OF PV-MODULE : METHOD OF TESTING**

Name of Test	Test Procedure	Acceptance Test
Modules used in solar panels shall have IEC 61215 Ed 2 or latest compliance certificate.	The qualification testing procedure is defined in IEC 61215 Ed 2 or latest to examine the impact of mechanical, thermal and electrical stress on power output. The bidder shall submit appropriate type approval certificate for the offered solar modules from accredited test laboratory.	Yes
Visual Inspection	Each module shall be carefully inspected under an illumination of not less than 1,000 lux for the following conditions: ☑ Racked, bent, misaligned or torn external surfaces. ☑ Broken / cracked cells ☑ Faulty interconnections or joints ☑ Cells touching one another or the frame ☑ Failure of adhesive bonds; bubbles or de-lamination forming a continuous path between a cell and edge of the module ☑ Faulty terminations and exposed live electrical parts ☑ Junction box should have common terminals with suitable blocking diode to prevent reverse current flow. Blocking diode in solar module junction box is required in case of using DC Junction box.	
Performance at STC: (Clause 10.1 of IEC 61215 Ed 2 or latest)	All PV modules supplied shall be accompanied with I-V curves (tested in the manufacturing unit, clearly indicating the serial number, batch number, date and country of origin). The current-voltage characteristics of the module shall be determined in accordance with IEC 60904-1 at a specific set of irradiance and temperature conditions. Performance of PV-Module shall be generally evaluated at Standard-Test-Conditions (STC) as defined in IEC 60904 standards: ☑ Cell temp. of 25°C, ☑ Incident solar irradiance of1000W/m2, ☑ Spectral distribution of light spectrum with an air mass AM=1.5	
Acceptance Criteria	The module is deemed to have passed the tests if the sample meets the following criteria; ☑ There is no evidence of a major visual defect such as a cracked or broken window, bubbles or de-lamination in the encapsulate etc. ☑ There is no cell breakage and no water infiltration into terminal boxes. ☑ No sample exhibits any open circuit or ground fault. ☑ No visible evidence of major defects that may affect performance of the module. ☑ Insulation Resistance not less than 50M-ohm at 500 VDC.	

	☑ Degradation of performance may not exceed 5% after each single test or 8% after the whole sequence.	

3.18. **TESTS ON SPV MODULE**

Name of Test	Type Test	Routine Test	Acceptance Test
Visual Examination	Yes	Yes	Yes
Design Qualification	Yes	Yes	Yes*
Safety Qualification	Yes	Yes	Yes*
Photo Electrical Conversion Efficiency	Yes	Yes	Yes
Fill Factor	Yes	Yes	Yes
Transmittivity of Glass	Yes		
Rated output of module	Yes	Yes	
Module mismatch test			Yes
Array mismatch test			Yes
Encapsulation and sealing	Yes	Yes	
Terminal block	Yes	Yes	
Provision of Bird Spike (only if not provided in structure)	Yes		Yes
Provision of RFID tag with requisite details	Yes	Yes	Yes
Environmental tests	Yes	Yes	Yes
(IEC 61215 damp test)	Yes	Yes	Yes
Provision of Earthing	Yes	Yes	Yes
Marking	Yes	Yes	Yes
* Copy of the latest conformance certificates should be asked ** Standard Type test report will be relied upon			

3.19. **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 conditions to take maximum insulation. However to accommodate more capacity the angle inclination may be reduced until the plant meets the specified performance ratio requirements.
b. The Mounting structure shall be so designed to withstand the speed for the wind zone of the location where a PV system is proposed to be installed (like Delhi-wind speed of 150 kM/ hour). It may be ensured that the design has been certified by a recognized Lab/ Institution in this regard and submit wind loading calculation sheet to OWNER. Suitable fastening arrangement such as grouting and calming should be provided to secure the installation against the specific wind speed
c. The mounting structure steel shall be as per latest IS 2062: 1992 and galvanization of the mounting structure shall be in compliance of latest IS 4759.
d. Structural material shall be corrosion resistant and electrolytically compatible with the materials used in the module frame, its fasteners, nuts and bolts. Aluminum structures also can be used which can withstand the wind speed of respective wind zone. Protection towards rusting need to be provided either by coating or anodization.
e. The fasteners used should be made up of stainless steel. The structures shall be designed to allow easy replacement of any module. The array structure shall be so

designed that it will occupy minimum space without sacrificing the output from the SPV panels

f. Regarding civil structures the bidder need to take care of the load bearing capacity of the roof and need arrange suitable structures based on the quality of roof.
g. The total load of the structure (when installed with PV modules) on the terrace should be less than 60 kg/m2.
h. Provision for safe and secure access to roof top shall be in the scope of vendor, if required.

3.20. **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 JBs shall be such that input & output termination can be made through suitable cable glands.
b. Copper bus bars/terminal blocks housed in the junction box with suitable termination threads Conforming to IP65 standard and IEC 62208 Hinged door with EPDM rubber gasket to prevent water entry. Single / double compression cable glands. Provision of earthings. It should be placed at 5 feet height or above for ease of accessibility.
c. Each Junction Box shall have High quality Suitable capacity Metal Oxide Varistors (MOVs) / SPDs, suitable Reverse Blocking Diodes. The Junction Boxes shall have suitable arrangement monitoring and disconnection for each of the groups.
d. Suitable markings shall be provided on the bus bar for easy identification and the cable ferrules must be fitted at the cable termination points for identification.
e. All fuses shall have DIN rail mountable fuse holders and shall be housed in thermoplastic IP 65 enclosures with transparent covers.

3.21. **DC DISTRIBUTION BOARD:**

a. DC Distribution panel to receive the DC output from the array field.
b. DC DPBs shall have sheet from enclosure of dust & vermin proof conform to IP 65 protection. The bus bars are made of copper of desired size. Suitable capacity MCBs/MCCB shall be provided for controlling the DC power output to the PCU along with necessary surge arrestors.
c. DCDB not required, if PCU/ inverter having inbuilt DC fuses and SPD protection.

3.22. **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 ACDB to mains at LT Bus bar while in grid tied mode.
b. All switches and the circuit breakers, connectors should conform to IEC 60947, part I, II and III/ IS60947 part I, II and III. Should conform to Indian Electricity Act and rules (till last amendment).
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 panels shall be designed for minimum expected ambient temperature of 45 degree Celsius, 80 percent humidity and dusty weather.
f. All indoor panels will have protection of IP54 or better. All outdoor panels will have protection of IP65 or better.
g. All the 415 AC or 230 volts devices / equipment like bus support insulators, circuit breakers, SPDs, VTs etc., mounted inside the switchgear shall be suitable for continuous operation and satisfactory performance under the following supply conditions.

Variation in supply voltage	**+ / - 10 %**

Variation in supply frequency	**+ / - 2.5 Hz**

3.23. **PCU/ARRAY SIZE RATIO:**

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

3.24. **PCU/ Inverter:**

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

Switching devices	IGBT/MOSFET
Control	Microprocessor /DSP
Nominal AC output voltage and Frequency	415V,3Phase,50Hz(In case single phase inverters are offered, suitable arrangement for balancing the phases must be made.)
Output frequency	50 Hz
Grid Frequency Synchronization range	+/- 5 Hz
Ambient temperature considered	-20^{o} C to 50^{o} C
Humidity	95 % Non-condensing
Protection of Enclosure	IP-20(Minimum) for indoor. IP-65(Minimum) for outdoor.
Grid Frequency Tolerance range	+/- 5 Hz
Grid Voltage tolerance	-0.20.15
No-load losses	Less than 1% of rated power
Inverter efficiency(minimum)	>93% (In case of 10 kW or above with in-built galvanic isolation)
	>97% (In case of 10 KW or above without in- built galvanic isolation)
Inverter efficiency (minimum)	> 90% (In case of less than 10 kW)
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/inverter shall be capable of complete automatic operation including wake-up, synchronization & shutdown.
c. The output of power factor of PCU inverter is suitable for all voltage ranges or sink of reactive power, inverter should have internal protection arrangement against any sustainable fault in feeder line and against the lightning on feeder.
d. Built-in meter and data logger to monitor plant performance through external computer shall be provided.
e. Anti-islanding (Protection against Islanding of grid): The PCU shall have anti islanding protection in conformity to IEEE 1547/UL 1741/ IEC 62116 or equivalent BIS standard.
f. Successful Bidders shall be responsible for galvanic isolation of solar roof top power plant (>100kW) with electrical grid or LT panel.
g. In PCU/Inverter, there shall be a direct current isolation provided at the output by means of a suitable isolating transformer. If Isolation Transformer is not

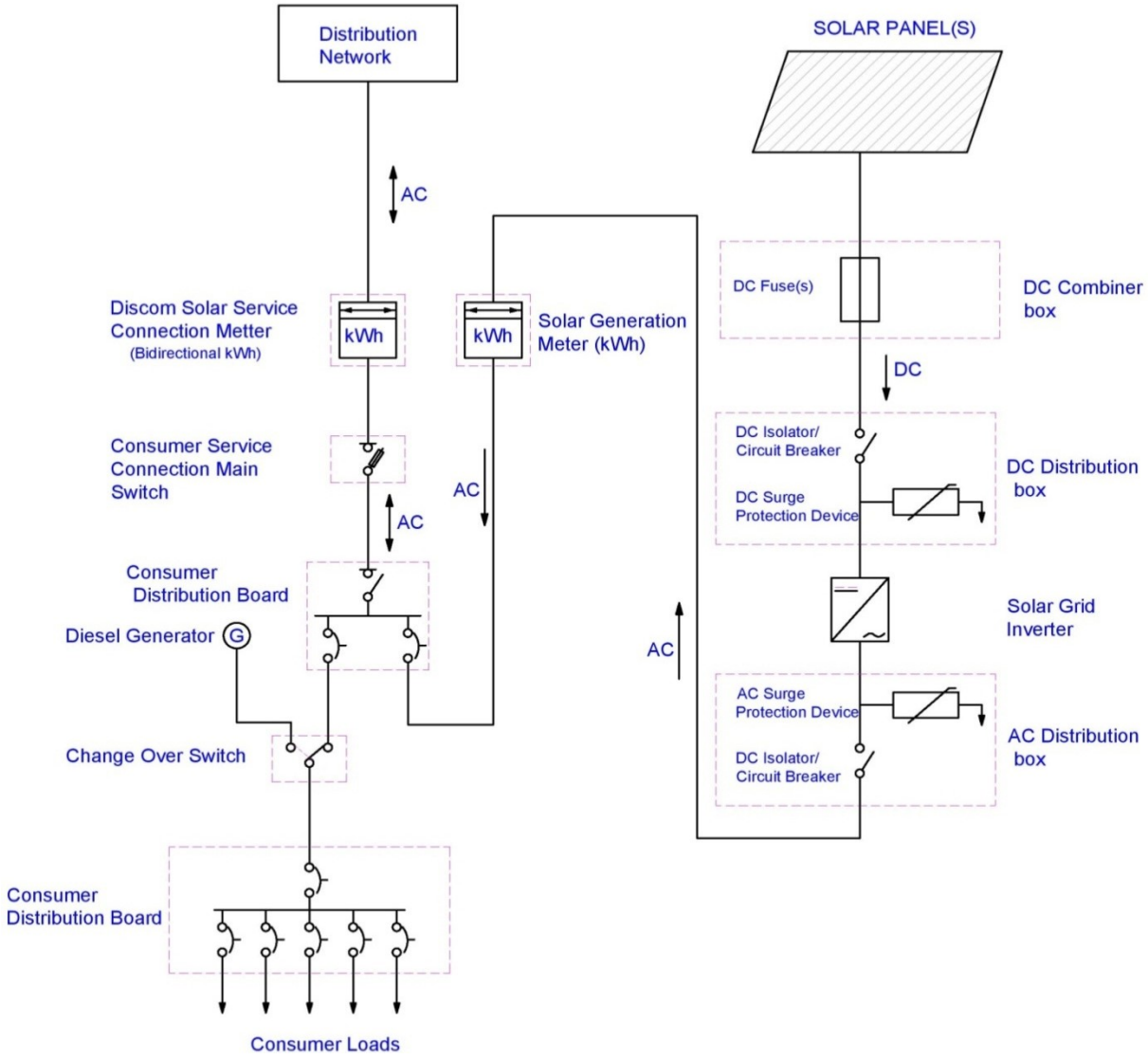
incorporated with PCU/Inverter, there shall be a separate Isolation Transformer of suitable rating provided at the output side of PCU/PCU units for capacity more than 100 kW.

h. The PCU/ inverter generated harmonics, flicker, DC injection limits, Voltage Range, Frequency Range and Anti-Islanding measures at the point of connection to the utility services should follow the latest CEA (Technical Standards for Connectivity Distribution Generation Resources) Guidelines.
i. 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.
j. The MPPT units environmental testing should qualify IEC 60068-2 (1, 2, 14, 30)/ Equivalent BIS std. The junction boxes/ enclosures should be IP 65 (for outdoor)/ IP 54 (indoor) and as per IEC 529 specifications.
k. The PCU/ inverters should be tested from the MNRE approved test centers/ NABL/ BIS/ IEC accredited testing- calibration laboratories. In case of imported power conditioning units, these should be approved by international test houses.

3.25. INTEGRATION OF PV POWER WITH GRID:

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

Typical Wiring Diagram (shared next) for Grid-Connected Solar PV System with Diesel Generator shall be applicable because Solar plants needs to run with back-up system as well.



3.26. DATA ACQUISITION SYSTEM / PLANT MONITORING

Scope of Work for SCADA (EMS / RMS) system for Solar power plant shall be as per below mentioned details.

S.No.	Item Description	Quantity	Unit of Measurement
1	**EMS / RMS system (refer the detailed specifications) :** Supply, Installation, Testing & Commissioning of SCADA, Monitoring & Control System, Data Logger, Automatic DG-PV Controller, Automatic reverse power relay, Weather monitoring system for 1200kWp Solar power system spread on various roofs of the university campus in New Delhi as per following technical specifications:		
1.1	**SCADA, Monitoring & Control System :** To monitor and control Solar power from various inverters, power management with Grid or DG & integration with Building management system (IBMS for monitoring).	1	Set
1.2	**Data Logger:** For remote monitoring of plant, Fetching data from each inverters and uploading it to cloud with GSM / Ethernet / Modbus / Wi-Fi / Optical Fiber Communication	3	Nos.

	feasibility		
1.3	**Automatic DG-PV Controller:** For regulating working with DG. DG-PV controller system complete with 1 master controller and slaves on each power transformer (5 nos.) + DG (4 nos 750kVA) + Solar Incomers from different roofs or Inverters or ACDB'S at different roofs (minimum 25 nos or as per actual design) + Spare (3 nos) and communications through Modbus (RS485) or Optical Fiber cables (approx. 8000 mts.), interconnected with SCADA for dynamic control and blocking reverse power flow to DG & Grid in case gird power supply is not available.	1	set
1.4	**Weather Monitoring System:** 1 no. mono-crystalline Si based Reference Cell, Wind sensor, 1no. of Module temperature sensor & ambient temperature sensor each. Integrated input to SCADA	1	set
1.5	**Balance of System:** For the complete SCADA system as mentioned above and for its full functionality all required equipment's even if not specifically mentioned above such as hardware's, PLC's and controllers, cables (Control, communication, Power), interconnections / JB's, power supply (aux / dc), computers, display units, UPS / SMPS, fixing and mounting arrangements, Racks & switching devices, Optical Fiber & converters etc. and installation & commissioning of the same. The O&M cost for next 5 years including any data charges/ portal charges or any other AMC cost.		

3.27. GENERAL TECHNICAL SPECIFICATIONS - MONITORING

a. SPV PROJECT MONITORING SYSTEM - DATA ACQUISITION SYSTEM / REMOTE MONITORING
b. Data Acquisition System shall be provided for each of the solar PV plant.
c. Data Logging Provision for plant control and monitoring, time and date stamped system data logs for analysis with the high quality, suitable PC. Metering and Instrumentation for display of systems parameters and status indication to be provided.
d. Solar Irradiance: An integrating Pyranometer / Solar cell based irradiation sensor (along with calibration certificate) provided, with the sensor mounted in the plane of the array. Readout integrated with data logging system.
e. Temperature: Temperature probes for recording the Solar panel temperature and/or ambient
temperature to be provided complete with readouts integrated with the data logging sys tem
f. The following parameters are accessible via the operating interface display in real time separately for solar power plant:
   - ☑ AC Voltage.
   - ☑ AC Output current.
   - ☑ Output Power
   - ☑ Power factor.
   - ☑ DC Input Voltage.
   - ☑ DC Input Current.
   - ☑ Time Active.
   - ☑ Time disabled.
   - ☑ Time Idle.

- ☑ Power produced
- ☑ Protective function limits (Viz-AC Over voltage, AC Under voltage, Over frequency, Under frequency ground fault, PV starting voltage, PV stopping voltage.

a. 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.
b. PV array energy production: Digital Energy Meters to log the actual value of AC/ DC voltage, Current & Energy generated by the PV system provided. Energy meter along with CT/PT should be of 0.5 accuracy class.
c. 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.
d. 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.
e. Computerized AC energy monitoring shall be in addition to the digital AC energy meter.
f. The data shall be recorded in a common work sheet chronologically date wise. The data file shall be MS Excel compatible. The data shall be represented in both tabular and graphical form.
g. All instantaneous data shall be shown on the computer screen.
h. Software shall be provided for USB download and analysis of DC and AC parametric data for individual plant.
i. Provision for Internet monitoring and download of data shall be also incorporated.
j. 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.
k. Ambient / Solar PV module back surface temperature shall be also monitored on continuous basis.
l. 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.
m. Remote Monitoring and data acquisition through Remote Monitoring System software at the owner /" GGSIPU " location with latest software/hardware configuration and service connectivity for online / real time data monitoring/control complete to be supplied and operation and maintenance/control to be ensured by the supplier. Provision for interfacing these data on " GGSIPU " server and portal in future shall be kept.
n. Only two set of weather sensing equipment's shall be installed per SCADA system, one as master and other as slave (redundancy purpose).
o. Data Logger and hardware is required for systems size above 50kWp capacity and for smaller systems data can be pooled from inverter manufacturers cloud server or any other suitable alternate option.
p.
q. **Connection to the Building Electrical System**
r. The AC output of the solar grid inverter shall be connected to the building's electrical system after the DISCOMs service connection meter and main switch on the load side. The solar grid inverter output shall be connected to a dedicated module in the Main Distribution Board (MDB) of the building. It shall not be connected to a nearby load or socket point of the building.
s. The connection to the electrical system of the building shall be done as shown in typical wiring diagram 1 in next section.
t. For buildings or loads with diesel generator backup, the wiring of the solar grid inverter shall be such that the solar grid inverter cannot run in parallel with the diesel generator. This implies that the solar grid inverter must be connected to a

distribution board on the grid side of the automatic or manual change-over switch as shown in typical wiring diagram 2 in the last of this section.

3.28. **INSTALLATION OF "WEB BASED ENERGY MONITORING SOLUTION (EMS)"**

EMS SCOPE:

a. It is required to deploy a web based Energy Monitoring Solution so as to have the continuous monitoring of all energy distribution points including renewable energy generation. "The Online Energy Monitoring Solution" should be an automated on-line data acquisition support and reporting system which should gathers data from meters on MODBUS RTU and MODBUS TCP/IP protocol. The data should be available over web as well as Mobile App.

b. The system should be user friendly, flexible and easy to understand. The system should be capable to access the data simultaneously from networked chains of various meters, installed at different locations within the entity/building/commercial establishment.

c. The Online Energy Monitoring Solution should help to perform / measure / monitor following functions:

- ☑ Renewable energy generation measurement
- ☑ Import and export/forwarded energy to building/office/establishment
- ☑ Mobile App for instant monitoring from anywhere
- ☑ Dashboards (configurable)
- ☑ Reports over e-mail
- ☑ Instantaneous Alerts in case of exceptions
- ☑ Trend reports of energy utilization, demand, renewable energy generation, power supply reliability
- ☑ Distribution Management of the building /office/ establishment
- ☑ Data Logging of electrical parameters
- ☑ Reporting and analysis of different parameters
- ☑ Energy conservation

d. EMS SYSTEM/SOLUTION TOPOLOGY:

e. The meters should be connected through a multi-drop system using RS485 MODBUS Protocol or Modbus over TCP/IP direct, to a GPRS / Internet Wired Broadband Gateway.

f. This gateway will poll the data to central server system over GPRS / Internet Wired Broadband connectivity.

g. Application should have provision to select the different categories of Service packages (Differentiation of features and applications for different category of consumers).

h. Gateway should have provision of SIM as well as wired broadband connectivity along with inbuilt memory to save the data in case of communication failure.

i. EMS SYSTEM/SOLUTION FEATURES:

j. The data which should be required to be viewed / logged can be configured by the USER, as per his need

k. The ON-LINE data should be viewed from web and mobile app in Tabular & Graphical format

l. The solution application should be supported over Android as well as IOS platform.

m. EMS should have 24*7 helpdesk to support the application

n. EMS should have capability of minimum meter data polling frequency of 1 minute

o. EMS should have a facility to view the historical trend and current values of multiple parameters on single screen

p. EMS should have provision to show harmonics parameters (THD) of voltage, current and power

q. EMS should have Virtual metering location support to calculate consolidated consumption. It should also have provision for virtual metering reports

r. EMS should have Configurable dashboard view to provide overall consolidated data to enable for energy conservation

s. A set of pre-defined report formats should be available for the USER to choose from, while reporting so as to meet the function requirements of the various hierarchical levels of its management. EMS should have provision for electrical data reports on e-mail

t. It should be possible to see Main online parameters i.e. (Voltages, Currents, Power factors, Frequency) in graphical view with indicators and all main energies should be available in Text mode on single screen.

u. Separate indication for alerts; which should indicate when limits defined by user deviate. Also have provision for real time alerts over mobile app.

3.29. **REMOTE MONITORING SYSTEM (RMS)/ MICROPROCESSOR BASED DATA LOGGER SYSTEM**

S. No.	Description	Details
1	Data Logger System	☑ The plant parameters shall be measured using Microprocessor based Data Logger System or an equivalent system deployed to monitor the plant centrally and also to study the plant performance. ☑ All the parameters from different array/systems at various locations, individually and combined together, must come to the central system (at the existing SCADA monitoring at each site) to provide a live and comprehensive view of the entire solar plant with continuous alert system. ☑ The remote monitoring system shall be capable to monitor and record at least 3 months data within the system and compatible to be viewed from anywhere through internet cloud network. ☑ The system shall be in accordance with IEC 61724. ☑ The Microprocessor based Data Logger system shall have spare capacity with provision of at least 25% expansion without any software or hardware upgradation at Microprocessor based Data Logger system end and further licensing so that any future solar project can be integrated with the same system.
2	Plant monitoring Parameters	The plant monitoring parameters shall include: o PV array energy production: Communicable multi-function energy meters logging the actual value of DC and AC Voltage and Current & Energy generated by the PV system and subsequently by PCU shall have to be provided. o Solar PV Plant Energy production: Total energy generation (DC) from Solar PV Power Plant as measured at energy meter installed in Solar PV Plant Inverter/PCU input. This reading shall be treated as final energy generation from Solar PV Power Plant for evaluation of Performance Guarantee. o Solar Irradiance: One no. of mono crystalline Si-based Solar Reference Cell shall be provided, with its sensor mounted in the plane of the array. o Ambient and Solar PV cell temperature
3	Remote Monitoring System	Readout shall be integrated with Remote Monitoring System. The reference cell must have an accuracy > 98%. Test certificate for the same shall be submitted. Reference Cell shall be capable to provide instantaneous irradiation (in W/m2) at an interval of every 1-minute. Reference Cell shall have communicable RS485 port/ Ethernet port. Electrical performance parameters: All the electrical parameters have to be provided in Microprocessor based Data Logger system. The performance logs from individual electrical equipment/devices have to be made available in Microprocessor based Data Logger system with a sampling time as given in the standards.
4	Data Log	Microprocessor based Data Logger system should be programmed

	Report	to generate data log report on a daily, weekly, monthly and annual basis. All the key parameters necessary to evaluate the plant performance shall be integrated in this report after finalization of the same. All the values shall correspond to system clock time at the time of recording and in all the reports generated.
		All the values corresponding to above mentioned parameters shall be recorded with respect to independent system clock of Remote Monitoring System.
5	Remote Monitoring System	Monitoring System shall generate GHI value (from reference cell), Ambient and Cell temperature, Generation value (from the DC energy meter installed at Inverter/PCU Input), and percentage controller regulation value (derived from Solar-Grid Energy Management System) on instantaneous/ average/ integrated basis as required in the assessment procedure for Performance Guarantee Test and Yearly Performance Evaluation Test. The same shall be used to assess the system performance and to establish Performance Guarantee Test (PGT) of the system as described in the SCC.
6	Technical Requirements:	Microprocessor based Data Logger system shall have the provision to perform the following functions: • Acquisition and display of data, status, and trends • Monitoring of all the parameters from Switchgears (especially numerical relays/ meters) and Inverters • Display and storage of measured values at remote monitoring systems through intranet/internet cloud network • Display and storage of derived/ calculated/ integrated values • Display and Storage of events and trends • Generate, store and retrieve Event Reports from Inverters/PCUs and Numerical Relays/ meters • Generate, store and retrieve user configurable Periodic Reports • System self-supervision • Backup facility for data backup at every three months on CDROM/tapes/portable storage devices through cloud network
		A graphical daily and monthly generation report as well as generation w.r.t. radiation shall be made available at cloud network. All the data shall be made available on internet cloud network provided along with the Data Logging System.
		The following data to be monitored: • Grid summary • AC output voltage • kVA • Frequency • Inverter summary • DC Energy Input (key parameter to be used for Plant Performance evaluation) • AC output voltage • kVA • Frequency • Power Factor • Current • DC summary • DC voltage • Current • DC power input • Site Summary (Field data) and other data • Solar Insulation Data • Ambient and Cell temperature

		• Solar Power Plant generation • DC Energy Meter at Inverter/PCU Input • AC Energy Meter reading at Captive Load Bus
		Data logging system/software shall allow visualization, monitoring and service of the installation. The data logger shall be web enabled. It should be possible to access the data logger with any standard web browser like Internet Explorer, Google Chrome, Mozilla, Safari etc. and for this purpose, relevant software/ hardware will be suppli ed by the successful bidder. In addition to the web portal, it should also be possible to retrieve the data directly from the data logger. The software for access/ visualization of data from data logger should also be provided. Necessary executable files, if any, will be required to be given on a CD/any other storage device along with lifetime license (if applicable).
7	Communicati on interface	The system should offer minimum no. of communicable ports (RS 485/Ethernet ports for each Inverter) interface to facilitate monitoring of the system at local monitoring system for the proposed system and to cater any future expansion for 25% of the proposed capacity.
		A internet /dongle/Router service shall be ensured to communicate this Data Logger system through internet cloud network provided along with the Data Logging System. The data storage shall also be ensured in the system's internal memory space (as defined above, for minimum 3 months) which shall be able to capacitate access of data later due to any intermittent failure of internet access or any other technical constraint.
		A complete and comprehensive "RMS monitoring solution" report shall be made available to – • Know what is produced in real time • Have detailed analytics to understand if the power generated is 'as expected/designed', and • Know any issues with field equipment and correct, through effective maintenance. • UPS supply will be provided by vendor to Microprocessor based Data Logger system and its auxiliaries. The power backup for the entire system should be at least for 30 minutes.
		Data Acquisition system installed will be integrated with the existing SCADA system of "USER" at each of the sites.

3.30. **TRANSFORMER "IF REQUIRED" & METERING:**

a. Dry/oil type relevant kVA, 11kV/415V, 50 Hz Step up along with all protections, switchgears, Vacuum circuit breakers, cables etc. along with required civil work.
b. The bidirectional electronic energy meter (0.5 S class) shall be installed for the measurement of import/Export of energy.
c. 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 OWNER before commissioning of SPV plant.
d. Reverse power relay shall be provided by bidder (if necessary), as per the local DISCOM requirement.

3.31. **POWER CONSUMPTION:**

Regarding the generated power consumption, priority need to give for internal consumption first and thereafter any excess power can be exported to grid. Finalization of tariff is not under the purview of OWNER or MNRE. Decisions of appropriate authority like DISCOM, state regulator may be followed.

3.32. **PROTECTIONS**

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

3.32.1. LIGHTNING PROTECTION

a. The SPV power plants shall be provided with lightning & overvoltage protection. The main aim in this protection shall be to reduce the over voltage to a tolerable value before it reaches the PV or other sub system components. The source of over voltage can be lightning, atmosphere disturbances etc. The entire space occupying the SPV array shall be suitably protected against Lightning by deploying required number of Lightning Arrestors. Lightning protection should be provided as per NFC 17-102:2011 standard. The protection against induced high-voltages shall be provided by the use of metal oxide varistors (MOVs) and suitable and separate earthing such that induced transients find an alternate route to earth.

b. Conventional copper Lightning Arrester can be provided for LA for plants below 25 KW. The earthling conductor made up of dip galvanized steel, should be installed with GI strip insulator.

c. E.S.E. Lightning Arrester shall be provided for LA for plants above 25 KW. The earthling conductor made up of dip galvanized steel, should be installed with GI strip insulator

3.32.2. SURGE PROTECTION

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

3.32.3. EARTHING PROTECTION

a. The PV module structure components shall be electrically interconnected and shall be grounded.

b. Earthing shall be done in accordance with IS 3043-1986, provided that earthing conductors shall have a minimum size of 6.0 mm2 copper, 10 mm2 Aluminum or 70 mm2 hot dip galvanized steel. Unprotected aluminum or copper-clad aluminum conductors shall not be used for final underground connections to earth electrodes.

c. A minimum of two separate dedicated and interconnected earth electrodes must be used for the earthing of the solar PV system support structure with a total earth resistance not exceeding 5 Ohm.

d. The earth electrodes shall have a precast concrete enclosure with a removable lid for inspection and maintenance. The entire earthing system shall comprise non-corrosive components.

e. In case LA earthing conductors made up of dip galvanized steel, the conductor should having GI Strip Insulator.

f. Total Nos. of Earth pits for Solar PV plant:

☑ For Solar PV plant upto 50 KW: 03 Nos. Earth pits: AC-01, DC-02 LA-01

☑ For Solar PV plant above 50 KW: 05 Nos. Earth Pits: AC-02, DC-02, LA-01 (double run of earthing conductors for AC & DC).

3.32.4. GRID ISLANDING:

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

b. 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.

3.33. **CABLES**

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

a. Shall meet IEC 60227/ IS 694, IEC 60502/ IS1554 standards.
b. Temp. Range: –10oC to +80oC
c. Voltage rating 660/1000V
d. Excellent resistance to heat, cold, water, oil, abrasion, UV radiation
e. Flexible
f. 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 (2%)
g. For the DC cabling, XLPE or, XLPO insulated and sheathed, UV-stabilized single core multi-stranded flexible copper cables shall be used; Multi-core cables shall not be used.
h. Multi Strand, Annealed high conductivity Cable (As per MNRE Guideline issued) conductor PVC type 'A' pressure extruded insulation or XLPE insulation. Overall PVC/ XLPE insulation for UV protection Armored cable for underground laying.
i. The cables (as per IS) should be insulated with a special grade PVC compound formulated for outdoor use. Outer sheath of cables shall be electron beam cross-linked XLPO type and black in colour.
j. The DC cables from the SPV module array shall run through a UV-stabilized PVC conduit pipe of adequate diameter with a minimum wall thickness of 1.5mm.
k. Cables and wires used for the interconnection of solar PV modules shall be provided with solar PV connectors (MC4) and couplers
l. All cables and conduit pipes shall be clamped to the rooftop, walls and ceilings with thermo-plastic clamps at intervals not exceeding 50 cm; the minimum DC cable size shall be 4.0 mm2 copper; the minimum AC cable size shall be 4.0 mm2 copper. In three phase systems, the size of the neutral wire size shall be equal to the size of the phase wires. Aluminum cables of required size can be used from ACDB to LT panel only.
m. 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. In addition, cable drum no. / Batch no. to be embossed/ printed at every one meter.
n. Cable Jacket should also be electron beam cross-linked XLPO, flame retardant, UV resistant and black in colour.
o. All cables and connectors for use for installation of solar field must be of solar grade which can withstand harsh environment conditions including High temperatures, UV radiation, rain, humidity, dirt, salt, burial and attack by moss and microbes for 25 years and voltages as per latest IEC standards. DC cables used from solar modules to array junction box shall be solar grade copper (Cu) with XLPO insulation and rated for 1.1kV as per relevant standards only.
p. The ratings given are approximate. Bidder to indicate size and length as per system design requirement. All the cables required for the plant shall be provided by the bidder. Any change in cabling sizes if desired by the bidder shall be approved after citing appropriate reasons. All cable schedules/ layout drawings shall be approved prior to installation.
q. 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.

r. The total voltage drop on the cable segments from the solar PV modules to the solar grid inverter shall not exceed 2.0%.
s. The total voltage drop on the cable segments from the solar grid inverter to the building distribution board shall not exceed 2.0%.

3.34. **CONNECTIVITY**

a. 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	240V-single phase or 415V-threephase at the option of the consumer.
Above 10kW and up to 100 kW	415V – three phase
Above 100kW	At HT/EHT level (11kV/33kV/66kV) as per DISCOM rules

b. The maximum permissible capacity for rooftop shall be 1 MW for a single net metering point.
c. Utilities may have voltage levels other than above, DISCOMS may be consulted before finalization of the voltage level and specification be made accordingly.
d. Evacuation of Solar power to LT/ HT panel of Consumer at Ground floor level or as per requirement of DISCOM.

3.35. **TOOLS & TACKLES AND SPARES:**

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

3.36. **DANGER BOARDS AND SIGNAGES:**

a. Danger boards should be provided as and where necessary as per IE Act. /IE rules as amended up to date.
b. Three signage shall be provided one each at control room, solar array area and main entry from administrative block. Text of the signage may be finalized in consultation with owner.

3.37. **FIRE EXTINGUISHERS:**

a. The fire fighting system for the proposed power plant for fire protection shall be consisting of:
b. Portable fire extinguishers for fire caused by electrical short circuits.
c. Sand buckets.
d. The installation of Fire Extinguishers should confirm to TAC regulations and BIS standards. The fire extinguishers shall be provided on the Roof or site where the PV arrays have been installed.

3.38. **DRAWINGS & MANUALS:**

a. Two sets of Engineering, electrical drawings and Installation and O&M manuals are to be supplied. Bidders shall provide complete technical data sheets for each equipment giving details of the specifications along with make/makes in their bid

along with basic design of the power plant and power evacuation, synchronization along with protection equipment.

b. Approved ISI and reputed makes for equipment be used.
c. For complete electro-mechanical works, bidders shall supply complete design, details and drawings for approval to OWNER/owners before progressing with the installation work.

3.39. **PLANNING AND DESIGNING:**

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

3.40. **DRAWINGS TO BE FURNISHED BY BIDDER AFTER AWARD OF CONTRACT**

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

3.41. **SAFETY MEASURES**

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

3.42. **DISPLAY BOARD**

a. The bidder has to display a board at the project site (above 25 KWp) mentioning the following:
b. Plant Name, Capacity, Location, Date of commissioning, estimated Power generation.
c. Financial Assistance details from OWNER/ EEREM /Any other financial institution apart from loan. This information shall not be limited to project site but also be displayed at site offices/head quarter offices of the successful bidder
d. The size and type of board and display shall be approved by Engineer-in-charge before site inspection.
e. All the IEC standards to be mandatorily adhered as specified.

3.43. **TECHNICAL SPECIFICATIONS FOR SMALL ROOFTOP SOLAR PV SYSTEMS ON SLOPING ROOFS.**

a. Module can be directly mounted on the roof sheet in such a way that the clearance for air flow between them should be approximately 200mm.
b. All cables are to be routed in the conduit/raceways/concealed in the structure till the control box, mounted at the Site.
c. The Control box shall be able to house properly DCDB, ACDB, Inverter, LDB/PDB as may be required. It should be designed for outdoor duty of IP 65 with proper louvers for air ventilation. It should be lockable to avoid any un-authorized access.

d. In similar way a metering box should be provided adjacent to this control box such a way that the meter reading is possible through the transparent window by DISCOM.
e. The service connection cable to this meter shall be routed through surface conduit/concealed in the bus shelter structure in a safe way.
f. The separate earthing for the equipment and the structure should be provided properly.
g. These are the broad guidelines and the design of the solar system should be approved by the tendering authority before execution.

Asstt. Executive Engineer (E)
HEESD-4, PWD

Assistant Engineer (P)
HEED (B-141), PWD

Executive Engineer (E)
HEED (B-141), PWD

Assistant Engineer (P)
O/o PM (Hr. Edu. Proj.)

Project Mnager (Hr. Edu. Proj.)
PWD, Delhi

Assistant Engineer (P)
O/o CE(OP), PWD

Chief Engineer (Other Project)
PWD

LIST OF APPROVED MAKES

S. No.	Description of Items	Approved Make(s)
1	Solar photovoltaic System	TATA Power / Adani Solar / Vikram Solar / Greentek India/Waaree/Havells
2	String Inverter for Solar System/PCU	Delta/Fronious/ABB/K-Solar /Siemens/Havells
3	1.1 KV Grade PVC insulated FRLS cable/wire (ISI Marked)	RRKabel/Polycab/Finolex/BCH/ L&T/Batra Henlay
4	DC Cable (1.5 kV grade)	RRKabel/Polycab/Finolex/BCH/ L&T/Batra Henlay
5	PVC conduit with accessories(ISI marked)	Precision/AKG/BEC/Batra Henlay
6	MCCBs	ABB(T-Max)/Siemens (Sentron-VL)/Merlin Gerin (Compact)/L&T (DNX Series)/Legrand (DPX)
7	MCB	Legrand (Lexic)L&T (Hager)/Seimens (Betagard)/ Schneider (Multi9)/ABB (S 270)
8	Ammeter/Voltmeter (Digital Type)	AE/L&T/Crompton Greaves/Siemens/Conserve/Neptune
9	LED indicating Lamp/Push Button	Siemens/GE power/ABB/L&T/Schneider Electric
10	Selector Switch	AE/L&T/Kaycee
11	Relay/Timer/Contractor/Starter/ Push Button	Siemens/L&T/Schneider Electric/ABB/BIL
12	ACB	Schneider-MVS/Siemens-3WL/L&T-U-Power/Omega/Abb-Emax
13	SCADA i/c DG-PV Controller, Data Logger, Reverse Power Relay, Monitoring and Control System, Weather Monitoring System etc.	Iplon/Innova/DEF/Trackso/Comamp/Logic AMR (Sensors-Jamvekar/Aron/Oriana Power/Meatech Solutions)
14	Lighting Conductor/Protection & Earthing System	Dehn/APS/Tercel/South Asian/JMV/ABB /Nimbus
15	Cable Tray (Factory Fabricated)	Indiana/Venus/Slotco/Pilco/Recco/Legrand/OBO/ KME
16	GI/Aluminium Pipe	TATA Steel/Jindal (Hissar)/Sail
17	End Termination/ Brass compression gland	Dowell's/Comet/Raychem/Gripwell/Jainson /ABB
18	Birds Spike	Custom
19	Current Transformer (Cast resin)	AE/L&T/Kappa
20	Switch/Fuse Unit/HRC Fuse	L&T/Siemens/ABB
21	Fiber Cable	Schneider/Siemens/Systimax/Legrand
22	Electrical Floor Panel	Tricolite/Adlec/Neptune/SPC Electrotech
23	Junction Box (IP 65)	Hensel /ABB/Schneider Electric
24	DWC HDPE Pipe (ISI Marked)	Rex/ Duraline/Tirupati/GF
25	Jointing Kit /Cable Gland /Lugs /Thimbles /Compression Glands (HT/LT)	Comet /Dowells/Raychem /Gripwell / ABB / Jainson/Denson
26	'C' Class Heavy Duty M.S. Pipe	TATA /Jindal (Hissar) /SAIL
27	Pipe coat material (Pipe Protection)	Pypkote/ Coalteck/IWL
28	Desktop PC	HP/Panasonic/Dell/Lenovo

In case any of makes for any of the material is missed out in the above list for using at site then the contractor shall inform the Engineer-in-charge about the same and obtain the approval. Thereafter, he can proceed with the supply of the material.

Asstt. Executive Engineer (E)
HEESD-4, PWD

Assistant Engineer (P)
HEED (B-141), PWD

Executive Engineer (E)
HEED (B-141), PWD

Assistant Engineer (P)
O/o PM (Hr. Edu. Proj.)

Project Mnager (Hr. Edu. Proj.)
PWD, Delhi

Assistant Engineer (P)
O/o CE(OP), PWD

Chief Engineer (Other Project)
PWD, Delhi

Section-6
Schedule of Quantities

Name of work:- C/o East Delhi Campus of Guru Gobind Singh Indrasprastha University at Surajmal Vihar, Shahdara, Delhi. (SH: Supplying, Installation, Testing and Commissioning of Solar Photovoltaic Power Generation System)

S. No.	Description	Qty.	Unit	Rate	Amount
1	**SITC of on-grid Solar Photovoltaic Power Plant complete work as per below items.**				
	Supply, Installation, Testing and Commissioning of **on-grid Solar Photovoltaic Power Plant** conforming to MNRE specifications as amended, consisting of Solar Panels (Poly Crystalline silicon solar cells) mounted on Aluminium/GI structure of suitable strength including wiring with suitable size copper annealed conductor cables connection, interconnection complete with all accessories etc. as required as per detailed specifications attached, net metering facility, necessary protections, earthing, with following components complete as required:-				
a	**Solar Photovoltaic Module :** Solar Photovoltaic Module of capacity 330 Wp or above, conforming to IS 14286/IEC 61215, IS/IEC 61730-Part-1, IS/IEC 61730-Part-2, IEC 61701 for testing, BIS approved, Solar Photovoltaic Module conversion efficiency shall not be less than 16.5%. The module shall be weather resisteance IP65 with anodized aluminium framework, toughened high transitivity low iron glass, sedlar/polyeste wax surface, bypass diode etc. PV modules used in solar power plants/ systems must be warranted for their output peak watt capacity, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years. Product warranty 10 years and performance warranty.				
b	**Power Conditioning Unit (PCU) / Solar PV String inverter:** Solar PV string inverter with MPPT, 1000 V DC Input voltage and suitable to generate 415 V regulated output voltage AC, three phase, 4 wire, 50Hz +/- 2.5 Hz AC Power, Having efficiency more than 98%, total harmonic distortion less than 3%				

	with overloading capacity for 1 minute, MPPT based solar charge controller with MOSFET/IGBT based switching devices, LED/LCD Display with RS 485/432 port, protection against over/under voltage, short circuit, low/high frequency, temperature, grid input under voltage/over voltage with auto recovery, reverse polarity etc. complete with galvanic isolation at input and output through transformer synchronization system, hourly digital metering arrangement for energy and display for V, A, frequency, PF, data logging & monitoring system and suitable for ambient temperature from 0 to 50 degree C. etc., housed in powder coated weather proof IP 65 enclosure fabricated with 2mm thick CRCA sheet for out door application complete with control cables, wiring, connections, inter connections, base foundation etc. as reqd. The PCU shall adjust the voltage and frequency level to suit the Grid Voltage Frequency.				
c	**Module Mounting Structure** : Suitable for installation of roof top solar Modules, made of minimum 4mm thick mild steel section with horizontal, vertical and cross members duly cold rolled hot dip galvanized > 85 microns i/c fasting arrangement and foundation made of 1:2:4: ratio cement concrete columns having 300 mm to 450 mm minimum clearance of the structure from the roof level to secure the installation against minimum wind speed 150 Km/Hour etc. complete as per specifications attached. Alumunium MMS meeting above specifications and relavant standards can also be accepted where GI not feasible (non RCC roof i.e. struss, Slant roof, shed etc.)				
d	Data Monitoring System with complete accessories.				
e	**DCDB /String combiner box/ Array junction box & ACDB / Main junction box :** DCDB / ACDB box with IP 65 protection suitable for roof top solar photovoltaic module complete with termination arrangement for incoming and outgoing cable with appropriate no. of input and output along with glands, lugs and				

	other accessories etc. as required. DC Cable :- Flexible solar DC Cable with class-V annealed multi strand tinned copper conductor with 1.5 KV rated DC Voltage, Flame retardant, 4/6 Sq. mm single core cable as per actual requirement at site. (Module to Inverter) AC Cable (Inverter to AC DB):- Size as per actual design, armoured/unarmoured copper XLPE 1.1 KV grade Cable. DC DB:- With DC SPD (1000volts) Type-II and 16A 2 pole 3 C-curve MCB in IP65 box. AC DB:- With SPD Type-II, suitable size MCCB, phase indicator and MFM in IP65 box.				
f	Lightning and surge voltage protection with ESE Type LA with appropriate radius to cover entire installation area including 1Cx70 Sq mm. Cu cable, 25x3 mm HDG GI strip and 1Cx6 Sq mm copper earthing cable.				
1.1	Complete work as referred above for Academic Block	625	kWp	61,060	38162500
1.2	Complete work as referred above for Admin Block	180	kWp	61,060	10990800
1.3	Complete work as referred above for Sports Hall	170	kWp	61,060	10380200
1.4	Complete work as referred above for Teachers Hostel	45	kWp	61,060	2747700
1.5	Complete work as referred above for Girls Hostel	70	kWp	61,060	4274200
1.6	Complete work as referred above for Boys Hostel	110	kWp	61,060	6716600
2	Supply, Installation, Testing & Commissioning of SCADA, Monitoring ND Control system, data logger, Automatic DG-PV Controller, Automatic reverse power relay, Weather monitoring system as per following technical specifications:	1	Set	2204285	2204285
2.1	SCADA, Monitoring & Control System : To monitor and control Solar power from various inverters, power management with Grid or DG & integration with Building management system (IBMS)-1 Set.				
2.2	**Data Logger:** For remote monitoring of plant, Fetching data from each inverters and uploading it to cloud with GSM / Ethernet / Modbus / Wi-Fi Communication feasibility- 3 Nos.				
2.3	**Automatic DG-PV Controller:** For regulating working with DG. DG-PV controller syetem complete with 1 master controller and slaves on each power transformer (5 nos.) +				

	DG (4 nos 750kVA) + Solar Incomers from different roofs or Inverters or ACDB'S at different roofs (minimum 25 nos or as per actual design) + Spare (3 nos) and commuinications through Modbus (RS485) or Optical Fiber cables, interconnected with SCADA for dynamic control and blocking reverse power flow to DG & Grid in case gird power supply is not availlable with 5 inch Colour display on master controller for enhance local Monitoring, master controller must have RRCR function for RRCR enabled Invertor. Master Solar Controller must have full Plant Overview or all Genset, GRID & Solar ACDB. Master Solar Controller have minimum 1000 event & alarm Logging for ease of trouble shooting-1 Set				
2.4	**Weather Monitoring System:** 1 no. mono-crystalline Si based Reference Cell, Wind sensor, 1no. of Module temperature sensor & ambient temperature sensor each. Integrated input to SCADA-1 Set				
3	Supply, Installation, Testing and Commissioning of galvanized single sheet steel Bird Spikes having minimum 30 cm length complete etc. as per site requirement.	3,500	Nos	93	325500
4	Supply, Installation, Testing & Commissioning of Armoured Shielded 6 core single mode Optical Fiber Cable in existing conduit/HDPE Pipe/Surface C14 for Communication through Modbus (RS485) for interconnecting SCADA, IBMS and DG-PV Controller complete as per technical specification attached.	8,000	mts.	46	368000
5	Supplying of following sizes of one number XLPE insulated and PVC sheated aluminium conductor armoured power cable of 1.1 KV grade of following sizes in the surface etc. complete as required.				
5.1	3.5Cx185 Sq.mm	3,200	mtr	514	1644800
5.2	3.5Cx300 Sq.mm	2,700	mtr	793	2141100
6	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 kV grade of following size in the existing RCC/ HUME/ METAL pipe as required.				
6.1	Above 95 sq. mm and upto 185 sq. mm	1,100	mtr	37	40700
7	Laying and fixing of one number PVC insulated and PVC sheathed /				

	XLPE power cable of 1.1 kV grade of following size on wall surface as required.				
7.1	Above 95 sq. mm and upto 185 sq. mm (clamped with 25/ 40x3mm MS flat clamp)	500	mtr	84	42000
8	Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 kV grade of following size on cable tray as required.				
8.1	Above 95 sq. mm and upto 185 sq. mm (clamped with 25x40x3mm MS flat clamp)	4,300	mtr	61	262300
9	Supplying and installing following size of perforated painted with powder coating M.S. cable trays with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with M.S. suspenders including				
9.1	150 mm width X 50 mm depth X 1.6 mm thickness	1,500	mtr	393	589500
9.2	300 mm width X 50 mm depth X 1.6 mm thickness	1,800	mtr	526	946800
9.3	450 mm width X 50 mm depth X 2.0 mm thickness	1,000	mtr	782	782000
10	Supplying and laying of following size DWC HDPE pipe ISI marked along with all accessories like socket, bend, couplers etc. conforming to IS 14930, Part II complete with fitting and cutting, jointing etc. in the existing trench, complete as required.				
10.1	63 mm dia (OD-63 mm & ID-51 mm nominal)	2,000	mtr	79	158000
10.2	120 mm dia (OD-120 mm & ID-103 mm nominal)	500	mtr	173	86500
11	Supplying and laying of following size DWC HDPE pipe ISI marked along with all accessories like socket, bend, couplers etc. conforming to IS 14930, Part II complete with fitting and cutting, jointing etc..direct in ground (75 cm below ground level) including excavation and refilling the trench but excluding sand cushioning and protective covering etc., complete as required.				
11.1	63 mm dia (OD-63 mm & ID-51 mm nominal)	2,000	mtr	135	270000
11.2	120 mm dia (OD-120 mm & ID-103 mm nominal)	500	mtr	229	114500
12	Providing and fixing 25 mm X 5 mm G.I. strip on surface or in recess for connections etc. as required.	500	mtr	129	64500
13	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing as required.	11,800	mtr	37	436600

14	Fabrication, Supplying, Installation, Testing & Commissioinig of cubical type fully enclosed compartmentalized MV switch board of suitable size having 1800 Amps capacity four strip AL. bur bars, Auxiliary bus vars, provision for incoming cpnnections with cables at the top, cable alleys and provision for the future extension, duly fabricated with 2mm thick CRCA sheet steel strenghened with MS channels, duly powder coated i/c providing and installation of following switch gears, connections, interconnections with solid ALstrip/flexible copper tinned copper thimbles etc. as required. Bottom base channel of MS section not less than 100 mmx50mmx5mm thick, fabrication shall be done in transportable section, entire panel shall have a common GI earth bar of size 50mmx6mm at the rear with 2 nos. earth stud, solid connections form main bus bat to switch gears with required size of Aluminium bus bars, and control wiring with 2.5 sq. mm Cu wiring. The panel should be IBMS compatible.				
A	INCOMING WITH METERING				
	1 No.- 1600Amp 50 KA TPN EDO ACB, Air Circuit Breaker, Horizontal drawout type of fault breaking capacity 50 KA, 433V (cs=Icu-Icw for 1 second) Electrical Draw Out operated, fiteed with interlocked door, automatic safety shutters, mechanical ON/OFF and service/test/solated position indicators and frame earthing contact, confirming to IS-13947-2 1993 as amended up-to-date. Microprocessor based release with O/C, S/C & E/F protector release.				
i)	1 Set Calibrated interligent multi function digital panel meter of class 1.0 accuracy with communication interface port RS 485 for giving output on MOD BUS protocol of IBMS for recording V,A,KVA, KVAh,KW,KWh,F,KVAR & PF etc individual harminic distortion upto 15th order as a K percentage of current with suitable rating CTs etc complete with wiring connections etc. Cts shall be "CAST RESIN" type, 15VA class & accuracy class 1.0.				
ii)	1 Sets Digital (96 sq. mm flush				

	pattern type) Ammenter of range 0-1600 Amps 1 Set of 3 Nos. cast resin type CTs of ratio 1600/5A Class I accuracy and 15VA burden, 1 Sets Digital (96 sq. mm flush pattern type) Voltmeter of range 0-500 Volts, 1 Sets of R/Y/V phase indication LED lapms, 1 sets of ON?OFF/TRIP indication LED lamps and 1 sets of 2A protection.				
iii)	1 Set Micrpprocessor Based Undervoltage relay with suitable rating of CTs & interconnection of control wiring.				
iv)	1 Set Mocroprocessor Baswed over voltage relay with suitable rating CTs & interconnection of control wiring.				
B)	OUTGOING:				
i)	630 Amp TP MCCB minimum 36 KA (ics=Icu) breaking capacity with thermal magnetic release- 2 Nos.				
ii)	400 Amp TP MCCB minimum 36 KA (Ics=Icu) breaking capacity with thermal magnetic release- 5 Nos.				
	Complete Main Solar Panel as above	2	Sets	485592	971184
	Total of Market Rate Items				**80,926,869**
	Total of DSR Items (B)				**3,793,400**
	Add cost index @15.69% (100/102X118) at (B) = (C)				**595184.46**
	Total Amount Rs. (C+B) = (D)				**4388584.46**
	Substraction factor @ 9.5% of D (As per F.8(2)/2007-AC/Finance/01295543 /S.fina./1376-1499 Dt. 14/05/2018) = (E)				**416915.52**
	Total Amount Rs. (D-E)= (F)				**3971668.94**
	Total (A+F)				**84898537.94**
	Say				**84898538**

Asstt. Executive Engineer (E)
HEESD-4, PWD

Assistant Engineer (P)
O/o HEED (B-141), PWD

Executive Engineer (E)
HEED (B-141), PWD

Assistant Engineer (P)
O/o PM (Hr. Edu. Proj.)

Project Mnager (Hr. Edu. Proj.)
PWD, Delhi

Assistant Engineer (P)
O/o CE (OP), PWD

Chief Engineer (Other Project)
PWD, Delhi

Signature Not Verified
Digitally signed by RAJEEV KUMAR SAXENA
Date: 2020.03.07 16:25:15 IST
Location: NCD of Delhi-DL