



GOVERNMENT OF INDIA
CENTRAL PUBLIC WORKS DEPARTMENT



BID DOCUMENT

PART A

Name of work: SITC of Grid Connected Rooftop Solar PV Panels in the Office Complex of Central Administrative Tribunal, Sector 17, Chandigarh.

CPWD-6 FOR e-TENDERING

 सत्यमेव जयते	GOVERNMENT OF INDIA CENTRAL PUBLIC WORKS DEPARTMENT	 CPWD
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The Executive Engineer(Elect.)-Chandigarh, CPWD, Sector 9 A, Chandigarh (Tel.No. **0172-2743366** & E-mail ID: **eecced.chd@cpwd.gov.in**) on behalf of the President of India invites online Percentage Rate Bids from Manufacturers/ OEMs Approved by Ministry of New & Renewable Energy OR Specialized firms OR Approved & eligible CPWD Buildings & Roads category contractors in two bid system (PQ-cum-Eligibility Bid & Price Bid) for the following work:

SITC of Grid Connected Rooftop Solar PV Panels in the Office Complex of Central Administrative Tribunal, Sector 17, Chandigarh.

The enlistment of the contractors should be valid on the last date of submission of bids.

In case the last date of submission of bid is extended, the enlistment of contractor should be valid on the original date of submission of bids.

1.1 The work is estimated to cost **Rs. 24,96,880/-**. This estimate, however, is given merely as a rough guide.

1.1.1 The authority competent to approve NIT for the combined cost and belonging to the major discipline will consolidate NITs for calling the bids. He will also nominate Division which will deal with all matters relating to the invitation of bids.

For composite bid, besides indicating the combined estimated cost put to bid, should clearly indicate the estimated cost of each component separately. The eligibility of bidders will correspond to the combined estimated cost of different components put to bid.

1.2 Criteria of eligibility for submission of bid documents:

A) Criteria for eligibility for approved and eligible CPWD contractors

- i) The enlistment of the CPWD contractors in appropriate class in Buildings & Roads category should be valid on the last of submission of bids.
- ii) In case the last date of submission of bid is extended, the enlistment of contractor should be valid on the original date of submission bids.
- iii) The Buildings & Roads category contractor shall have to associate other agency(s) for execution of each of the work(s), which fulfils the eligibility criteria as defined after taking prior approval. The building & road category contractor and the associated specialized agencies shall give required affidavit to confirm their association. Tender accepting authority may approve change of sub agency in case it is required during the currency of contract. However, the Buildings & Roads category contractor shall also be eligible to carry out himself any or all of these works without associating any specialized agency provided:-

a) He fulfills the prescribed eligibility criteria respectively for these work(s).

Sl. No.	Specialized work(s) / item of work(s)	Estimated Cost of Sub-Head (in Rupees)	Criteria of associated agencies
i)	Solar Photovoltaic Power Plant	24,96,880/-	Experience of having successfully completed works during last seven years ending previous day of last date of submission of bid. One similar work of financial value not less than Rs. 19.98 lacs OR Two similar works of financial value not less than Rs.14.98 lacs OR Three similar works of financial value not less than Rs.9.99 lacs Similar works means Supply, Installation, Testing and Commissioning of Solar Photovoltaic Power Generation system

- Note-1: The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple interest rate of 7% per annum, calculated from the date of completion to the previous day of the last date of receipt of application for tender.
- Note-2: Components of work executed other than those included in definition of similar work shall be deducted while calculating cost of similar work. Bidder shall submit abstract of cost of work in support of this, if required.
- Note-3: The consent and MOU for the association of agencies for above shall be submitted as per format provided in the NIT.
- Note-4: The MOU for the association of agencies for above shall be submitted on Affidavit of Rs. 100/- as per CPWD Works Manual.

In addition to this the main/ associated agency has to submit an Affidavit as under:-

“I/We undertake and confirm that eligible similar works(s) has/have not been got executed through another contractor on back to back basis. Further that, if such a violation comes to the notice of Department, then I/we shall be debarred for associated agency in CPWD in future forever.”

B) Criteria for eligibility for Non-CPWD Contractors

The bidders/ firms satisfying the eligibility criteria of the work shall be eligible to apply. Joint Ventures are not accepted.

- a) The bidder should have satisfactorily completed the works as mentioned below during the last 07 (seven) years ending last day of month previous to the one in which tenders are invited.

Sl. No.	Specialized work(s)/ item of work(s)	Estimated Cost of Sub-Head (in Rupees)	Criteria of associated agencies
i)	Solar Photovoltaic Power Plant	24,96,880/-	Experience of having successfully completed works during last seven years ending previous day of last date of submission of bid. One similar work of financial value not less than Rs. 19.98 lacs OR Two similar works of financial value not less than Rs.14.98 lacs OR Three similar works of financial value not less than Rs.9.99 lacs Similar works means 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 the date of completion of the work to last day of month previous to the one in which tenders are invited.

- b) The firm should have had average annual Financial Turnover of at least 30% of ECPT during the immediate last 3 consecutive financial years as per the balance sheets duly audited by Chartered Accountant with Unique Document Identification Number (UDIN). For this purpose, average annual financial turnover shall be worked out by considering turnover of 3 years ending **31.03.2026**. The value of annual turnover figures shall be brought to current value by enhancing the actual turnover figures at simple rate of 7% per annum.
- c) The bidder should not have incurred any loss (profit after tax should be positive) in more than two years during available last five consecutive balance sheet (balance sheet in case of private/ public limited company means its standalone financial statement and consolidated financial statement both) ending **31.03.2026**, duly audited and certified by the Chartered Accountant.
- d) Bankers Certificate from a Commercial Bank or Net worth Certificate:
The firm should have a Bankers Certificate of 40% of ECPT from a commercial Bank.
OR
Net worth Certificate of minimum of 10% of ECPT issued by the certified Chartered Accountant with Unique Document Identification Number (UDIN).
- e) The firm should submit the attested copies of completion certificate issued by the officer not below the rank of Executive Engineer of department where firm has executed similar

work. Incomplete certificate shall be summarily rejected. The completion certificate must clearly indicate the following (originals shall be produced for verification, if required).

- i) The date of completion of work
- ii) Nature and value of the work
- iii) That the work has been completed satisfactorily
- iv) Work done amount of completion certificate

f) In addition to this the tenderer has to submit an Affidavit as under:

"I/We undertake and confirm that eligible similar works(s) has/have not been got executed through another contractor on back-to-back basis. Further that, if such a violation comes to the notice of Department, then I/we shall be debarred for associated agency in CPWD in future forever."

2. Agreement shall be drawn with the successful bidder on prescribed Form No. CPWD-7 amended up to date which is available as a Govt. of India Publication and sample also available on website www.cpwd.gov.in. Bidder 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 **05 Months** from the date of start as defined in schedule 'F' or from the first date of handing over of the site, whichever is later, in accordance with the phasing, if any, indicated in the bid documents.
- 4 The site for the work is available.
- 5 The bid document consisting of plans, specifications, schedule of quantities of various types of items to be executed and set of terms & conditions of the contract to be complied with and other necessary documents except Standard General Conditions of Contract Form can be seen on website <https://etender.cpwd.gov.in> free of cost.
- 6 After submission of the bid, the contractor can re-submit revised bid any number of times but before last time and date of submission of bid as notified.
- 7 While submitting the revised bid, contractor can revise the quoted percentage any number of times, but before last time and date of submission of bid, as notified.
- 8 **Earnest Money of Rs. 49,938/-** in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt, Banker's Cheque or Bank Guarantee (for balance amount as prescribed) from any of the Commercial Banks (drawn in favour of **Executive Engineer (Elect.), Chandigarh Central Electrical Division, CPWD, Chandigarh** payable at **Chandigarh** 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 division office of any Executive Engineer, CPWD within the period of bid submission.
The EMD receiving Executive Engineer (including NIT issuing EE/AE) 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.
A part of earnest money is acceptable in the form of Bank Guarantee also. In such cases 50% of earnest money or Rs. 20.00 lakh whichever is less, will have to be deposited in shape prescribed above, and balance can be accepted in form of Bank Guarantee issued by a Commercial Bank having **validity for period of 90 Days or more** from the last date of receipt of bids which is to be scanned and uploaded by the intending bidders.
The earnest money given by all the tenderers except the lowest tenderer shall be refunded immediately after the expiry of stipulated bid validity period or immediately after acceptance of the successful bidder, whichever is earlier. However, in case of two/ three bid system, earnest money deposit of bidders unsuccessful during technical bid evaluation etc. should be returned within 30 days of declaration of result of technical bid evaluation.
- 9 Copy of Enlistment Order and certificate of work experience and other documents as specified in NIT shall be scanned and uploaded to the e-Tendering website within the period of bid submission. However, certified copy of all the scanned and uploaded documents as specified in NIT shall have to be submitted by the lowest bidder only along with physical EMD of the scanned copy of EMD uploaded within a week physically in the office of tender opening authority. Online bid documents submitted by intending bidders shall be opened only of those bidders, whose original EMD deposited with any division of CPWD and other documents scanned and uploaded are found in order.
- 10 The contractor registered prior to 01.04.2015 on e-tendering portal of CPWD shall have to deposit tender processing fee at existing rates or they have option to switch over to the new registration fee any time.

- 11 The bids will be submitted upto **03:00 PM on 10/11/2026**. The **PQ-cum-Eligibility bid shall be opened at 03:30 PM on 10/11/2026**. The time & date of opening of financial bid shall be intimated later on.
- 12 The bid submitted shall become invalid if:
- (i) The bidder is found ineligible.
 - (ii) The bidder does not deposit original EMD with division office of any Executive Engineer, CPWD.
 - (iii) The bidder does not upload scanned copies of all the documents stipulated in the bid document.
 - (iv) If any discrepancy is noticed between the documents as uploaded at the time of submission of bid and hard copies as submitted physically by the lowest bidder in the office of tender opening authority.
 - (v) If a tenderer quotes nil rates against each item in item rate tender or does not quote any percentage above / below on the total amount of the tender or any section / sub head in percentage rate tender, the tender shall be treated as invalid and will not be considered as lowest tenderer.
13. The contractor shall submit an irrevocable Performance Guarantee at specified percentage of the tendered amount as mentioned in Schedule 'E', in addition to other deposits mentioned elsewhere in the contract for his proper performance of the contract agreement, (not withstanding and/or without prejudice to any other provisions in the contract) within period specified in Schedule 'F' from the date of issue of letter of acceptance. This period can be further extended by the Engineer-in-Charge up to a maximum period as specified in schedule 'F' on written request of the contractor stating the reason for delays in procuring the Performance Guarantee. to the satisfaction of the Engineer-in-Charge. This Guarantee shall be in the form of insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt or Bank Guarantee from any of the Commercial Banks. In case a fixed deposit receipt of any Bank is furnished by the contractor to the Government as part of the performance guarantee and the Bank is unable to make payment against the said fixed deposit receipt, the loss caused thereby shall fall on the contractor and the contractor shall forthwith on demand furnish additional security to the Government to make good the deficit.
- (ii) The Performance Guarantee shall be submitted by the contractor on format as per GCC and shall be initially valid up to the stipulated date of completion plus minimum 6 months beyond that. In case the contractor fails to deposit the said performance guarantee within the period as indicated in Schedule 'F' including the extended period, if any, the Earnest Money deposited by the contractor shall be forfeited automatically without any notice to the contractor. The earnest money deposited along with bid shall be returned after receiving the aforesaid performance guarantee. The contractor whose bid is accepted will also be required to furnish either copy of applicable licenses / registrations or proof of applying for obtaining labour licenses, registration with EPFO, ESIC and BOCW Welfare Board including Provident Fund Code No. if applicable and also ensure the compliance of aforesaid provisions by the sub-contractors, if any engaged by the contractor for the said work and Programme Chart (Time and Progress) within the period specified in Schedule F.
14. **The description of the work is as follows:**
SITC of Grid Connected Rooftop Solar PV Panels in the Office Complex of Central Administrative Tribunal, Sector 17, Chandigarh.
- 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 bidder shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a bid by a bidder implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and rates at which stores, tools and plant, etc. will be issued to him by the Government and local conditions and other factors having a bearing on the execution of the work.
15. 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.
16. Canvassing whether directly or indirectly, in connection with bidders is strictly prohibited and the bids submitted by the contractors who resort to canvassing will be liable to rejection.
 17. The competent authority on behalf of President of India reserves to himself the right of accepting the whole or any part of the bid and the bidders shall be bound to perform the same at the rate quoted.
 18. The contractor shall not be permitted to bid for works in the CPWD Circle (Division in case of contractors of Horticulture/Nursery category) responsible for award and execution of contracts, in which his near relative is posted as Divisional Accountant or as an officer in any capacity between the grades of Chief 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 gazette officer in the Central Public Works Department or in the Ministry of Housing & Urban Affairs. Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of this Department.
 19. No Engineer of Gazetted rank or other Gazetted Officer employed in Engineering or Administrative duties in an Engineering Department of the Government of India is allowed to work as a contractor for a period of one year after his retirement from Government service, without the previous permission of the Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found any time to be such a person who had not obtained the permission of the Government of India, as aforesaid, before submission of the bid or engagement in the contractor's service.
 20. The bids for the work shall remain open for acceptance for a period of 30 (thirty) days from the date of opening of bids in case of single bid system or 75 days (seventy five) days from the date of opening of technical bids in case bids are invited in 2 or 3 bids system. Further
 - (i) If any tenderer withdraws his tender or makes any modifications in the terms & conditions of the tender which is not acceptable to the department within 7 days after last date of submission of bids, then the Government shall, without prejudice to any other right or remedy, be at liberty to forfeit 50% of the earnest money absolutely irrespective of letter of acceptance for the work is issued or not.
 - (ii) If any tenderer withdraws his tender or makes any modifications in the terms & conditions of the tender which is not acceptable to the department after expiry of 7 days after last date of submission of bids, then the Government shall, without prejudice to any other right or remedy, be at liberty to forfeit 100% of the earnest money absolutely irrespective of letter of acceptance for the work is issued or not.
 - (iii) In case of forfeiture of earnest money as prescribed in para (i) and (ii) above, the bidders shall not be allowed to participate in the rebidding process of the same work.
 21. This Notice Inviting bid shall form a part of the contract document. The successful bidder/contractor, on acceptance of his bid by the Accepting Authority, shall, within 15 days from the stipulated date of start of the work, sign the contract consisting of: -
 - (a) The Notice Inviting bid, all the documents including additional conditions, specifications and drawings, if any, forming the bid as 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 thereto.
 - (b) Standard CPWD Form-7 or other Standard CPWD Form as applicable.
 - 22. For Composite Bids**
 - 22.1 ~~The Executive Engineer in charge of the major component will call bids for the composite work. The cost of bid document and Earnest Money will be fixed with respect to the combined estimated cost put to tender for the composite bid.~~
 - 22.2 ~~The bid document will include following four components and civil & electrical drawings:~~
 - ~~Part A. CPWD-6, CPWD-7 including schedule A to F.~~
 - ~~Part B. General/ specific conditions, specifications etc. applicable to the work.~~
 - ~~Part C. Schedule of quantities applicable to the work.~~
 23. In case of reduction in scope of work no claim on account of reduction in value of work, loss of expected profit, consequential overheads etc. shall be entertained.
 24. The intending bidders are required to update their profile in CPWD e- tender portal and to upload their bids well in advance of last date of submission of tender. Any issue related to updating profile / uploading tender can be resolved through the concerned Executive Engineer (Phone no: 0172-2743366 & E-mail ID: eecced.chd@cpwd.gov.in) or ERP help line no. 18001803286 or e-mail Id cpwd.support@techmahindra.com. The e- tendering bidders are also advised not to wait to raise any issues till the last date of submission of bid in their own interest.

RECEIPT OF DEPOSITION OF ORIGINAL EMD

(Receipt No..... dated.....)

- 1 Name of work : **SITC of Grid Connected Rooftop Solar PV Panels in the Office Complex of Central Administrative Tribunal, Sector 17, Chandigarh.**
- 2 NIT No : 70/2026-27/CCED/Chandigarh/Div.
- 3 Estimated Cost : **Rs. 24,96,880/-**
- 4 Amount of Earnest Money Deposit : **Rs. 49,938/-**
- 5 Last date of submission of bid : 03:00 PM on 10/11/2026

(***** To be filled by EE at the time of uploading of NIT)

1. Name of Contractor :
2. Form of EMD :
3. Amount of original Bank guarantee as Earnest Money Deposit :
4. Date of submission of EMD :

Signature, Name and Designation of EMD
receiving Officer (EE/AAO/AE(P)/AE)
along with Office Stamp

INFORMATION AND INSTRUCTIONS FOR BIDDERS FOR e-TENDERING FORMING PART OF BID DOCUMENT AND TO BE POSTED ON WEBSITE

The Executive Engineer(Elect.)-Chandigarh, CPWD, Sector 9 A, Chandigarh (Tel.No. **0172-2743366** & E-mail ID: **eecced.chd@cpwd.gov.in**) on behalf of the President of India invites online Percentage Rate Bids from Manufacturers/ OEMs Approved by Ministry of New & Renewable Energy OR Specialized firms OR Approved & eligible CPWD Buildings & Roads category contractors in two bid system (PQ-cum-Eligibility Bid & Price Bid) for the following work:

NIT No.	:	70/2026-27/CCED/Chandigarh/Div.
Name of Work	:	SITC of Grid Connected Rooftop Solar PV Panels in the Office Complex of Central Administrative Tribunal, Sector 17, Chandigarh
Location	:	Central Administrative Tribunal, Sector 17, Chandigarh.
Estimated cost put to tender	:	Rs.24,96,880/-
Earnest Money	:	Rs. 49,938/-
Period of Completion	:	05 Months
Time & date of Pre-Bid Conference	:	At 11.30 AM on 24/10/2026 in the O/o Executive Engineer-Chandigarh, CPWD, 3 rd Floor, Kendriya Sadan, Sector 9-A, Chandigarh
Last date & time of online submission of PQ and Financial bids	:	Upto 3.00 PM on 10/11/2026
Time and date of opening of PQ-cum-Eligibility Bid	:	3.30 PM on 10/11/2026
Opening of financial bids of PQ-cum-Eligibility qualified bidders	:	Shall be intimated after approval PQ-cum-Eligibility bids.

1. Criteria of eligibility for submission of bid documents:

A) Criteria for eligibility for approved and eligible CPWD contractors

- The enlistment of the CPWD contractors in appropriate class in Buildings & Roads category should be valid on the last of submission of bids.
- In case the last date of submission of bid is extended, the enlistment of contractor should be valid on the original date of submission bids.
- The Buildings & Roads category contractor shall have to associate other agency(s) for execution of each of the work(s), which fulfils the eligibility criteria as defined after taking prior approval. The building & road category contractor and the associated specialized agencies shall give required affidavit to confirm their association. Tender accepting authority may approve change of sub agency in case it is required during the currency of contract. However the Buildings & Roads category contractor shall also be eligible to carry out himself any or all of these works without associating any specialized agency provided:-

(a) He fulfills the prescribed eligibility criteria respectively for these work(s).

Sl. No.	Specialized work(s)/ item of work(s)	Estimated Cost of Sub-Head (in Rupees)	Criteria of associated agencies
i)	Solar Photovoltaic Power Plant	24,96,880/-	Experience of having successfully completed works during last seven years ending previous day of last date of submission of bid. One similar work of financial value not less than Rs. 19.98 lacs OR Two similar works of financial value not less than Rs.14.98 lacs OR Three similar works of financial value not less than Rs.9.99 lacs Similar works means Supply, Installation, Testing and Commissioning of Solar Photovoltaic Power Generation system

- Note-1: The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple interest rate of 7% per annum, calculated from the date of completion to the previous day of the last date of receipt of application for tender.
- Note-2: Components of work executed other than those included in definition of similar work shall be deducted while calculating cost of similar work. Bidder shall submit abstract of cost of work in support of this, if required.
- Note-3: The consent and MOU for the association of agencies for above shall be submitted as per format provided in the NIT.
- Note-4: The MOU for the association of agencies for above shall be submitted on Affidavit of Rs. 100/- as per CPWD Works Manual.

In addition to this the main/ associated agency has to submit an Affidavit as under:-

“I/We undertake and confirm that eligible similar works(s) has/have not been got executed through another contractor on back to back basis. Further that, if such a violation comes to the notice of Department, then I/we shall be debarred for associated agency in CPWD in future forever.”

B) Criteria for eligibility for Non-CPWD Contractors

The bidders/ firms satisfying the eligibility criteria of the work shall be eligible to apply. Joint Ventures are not accepted.

- a) The bidder should have satisfactorily completed the works as mentioned below during the last 07 (seven) years ending last day of month previous to the one in which tenders are invited.

Sl. No.	Specialized work(s)/ item of work(s)	Estimated Cost of Sub-Head (in Rupees)	Criteria of associated agencies
i)	Solar Photovoltaic Power Plant	24,96,880/-	Experience of having successfully completed works during last seven years ending previous day of last date of submission of bid. One similar work of financial value not less than Rs. 19.98 lacs OR Two similar works of financial value not less than Rs.14.98 lacs OR Three similar works of financial value not less than Rs.9.99 lacs Similar works means 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 the date of completion of the work to last day of month previous to the one in which tenders are invited.

- b) The firm should have had average annual Financial Turnover of at least 30% of ECPT during the immediate last 3 consecutive financial years as per the balance sheets duly audited by Chartered Accountant with Unique Document Identification Number (UDIN). For this purpose, average annual financial turnover shall be worked out by considering turnover of 3 years ending **31.03.2026**. The value of annual turnover figures shall be brought to current value by enhancing the actual turnover figures at simple rate of 7% per annum.
- c) The bidder should not have incurred any loss (profit after tax should be positive) in more than two years during available last five consecutive balance sheet (balance sheet in case of private/ public limited company means its standalone financial statement and consolidated financial statement both) ending **31.03.2026**, duly audited and certified by the Chartered Accountant.
- d) Bankers Certificate from a Commercial Bank or Net worth Certificate:
The firm should have a Bankers Certificate of 40% of ECPT from a commercial Bank.
OR
Net worth Certificate of minimum of 10% of ECPT issued by the certified Chartered Accountant with Unique Document Identification Number (UDIN).
- e) The firm should submit the attested copies of completion certificate issued by the officer not below the rank of Executive Engineer of department where firm has executed similar

work. Incomplete certificate shall be summarily rejected. The completion certificate must clearly indicate the following (originals shall be produced for verification, if required).

- i) The date of completion of work
- ii) Nature and value of the work
- iii) That the work has been completed satisfactorily
- iv) Work done amount of completion certificate

f). In addition to this the tenderer has to submit an Affidavit as under:

"I/We undertake and confirm that eligible similar works(s) has/have not been got executed through another contractor on back-to-back basis. Further that, if such a violation comes to the notice of Department, then I/we shall be debarred for associated agency in CPWD in future forever."

2. The intending bidder must read the terms and conditions of CPWD-6 carefully. He should only submit his bid if he considers himself eligible and he is in possession of all the documents required.
3. Information and instructions for bidder posted on website shall form part of tender document.
4. Applicant has to deposit earnest money of **Rs. 49,938/-** in the form of Receipt/ Treasury challan/ Deposit at call receipt of a schedule bank/fixed deposit receipt of a schedule bank/demand draft of a schedule bank issued in favour of **Executive Engineer (Elect.), Chandigarh Central Electrical Division, CPWD, Chandigarh** along with tender document. A part of earnest money is acceptable in the form of bank guarantee also. In such case, minimum 50% of earnest money or Rs. 20.00 lac, whichever is less, shall have to be deposited in shape prescribed above, and balance may be deposited in shape of bank guarantee of any schedule bank having validity for 90 days or more from the last date of receipt of bids which is also to be scanned and uploaded by the intending bidders.
But the bid can only be submitted after deposition of original EMD either in the office of Executive Engineer inviting bids or division office of any Executive Engineer, CPWD 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 Commercial bank towards EMD in favour of Executive Engineer as mentioned in NIT, receipt for deposition of original EMD to division office of any Executive Engineer, (including NIT issuing EE) CPWD and other documents as specified.
5. Pre-Bid conference, for the work shall be held on **24/10/2026 at 11.30 AM in the office of Executive Engineer-Chandigarh, CPWD, 3rd Floor, Kendriya Sadan, Sector 9-A, Chandigarh** to clarify various provisions and techno-commercial of these bidding documents. All intending bidders shall be free to attend the conference and sought clarifications and make their submissions. It is upto the prospective bidders to take part in the pre-bid conference. Non attendance of pre-bid conference does not debar the prospective tenderer from participating & submission of tender. No separate pre-bid conference will be conducted for the firms who do not attend the pre-bid conference on the date & time fixed for the purpose. All submissions shall be thoroughly considered and if any change(s) is/are found necessary, the same will be made in the tender documents and displayed on the e-tendering website. The decision of the competent authority shall be final and binding. It will be the responsibility of the firms to check the website for amendments, if any, prior to the price bid. The submission of the price bid by the firm will be construed to be in conformity with the amendments issued.
6. The bids will be submitted upto **03:00 PM on 10/11/2026. The PQ-cum-Eligibility bid shall be opened at 03:30 PM on 10/11/2026.** The time & date of opening of financial bid shall be intimated later on.
7. Those contractors who are not registered on the website mentioned above are required to get registered beforehand. If needed they can be imparted training on online tendering process as per details available on the website.
8. The intending bidder must have valid class-III digital signature with encryption key (combo type) to perform any operations/transactions on the e-tendering portal / website and the bidder should download and install the eMSigner on their system as per instruction available on download section of <https://etender.cpwd.gov.in> to submit the tender.
9. On opening date, the contractor can login and see the tender opening process. After opening of tenders, he will receive the competitor's tender sheets.
10. Contractor can upload documents in the form of JPG format and PDF format.
11. Contractor must ensure to quote percentage rate for the work. The column meant for quoting percentage rate in figures appears in yellow colour and the moment rate is entered; it turns sky blue.

12. If a tenderer does not quote any percentage above/below/at par on the total amount of the tender or any section/sub head in percentage rate tender, the tender shall be treated as invalid and will not be considered as lowest tenderer.
13. Certain modifications may be required. Addendum / Corrigendum shall be uploaded by the Engineer-in-Charge, if felt necessary by him, which shall form part of tender document.
14. **The bidders are advised to visit the site before submitting his bid to have more clarity about the site conditions and availability of space and other factors for execution of the work.**
15. The intending bidders are required to update their profile in CPWD e-tender portal and to upload their bids well in advance of last date of submission of tender. Any issue related to updating profile/ uploading tender can be resolved through the concerned Executive Engineer (Phone No. 0172-2743366& E-mail ID: eeccd.chd@cpwd.gov.in) or ERP help line no. 18001803286 or e-mail id cpwd.support@techmahindra.com. The e-tendering bidders are also advised not to wait to raise any issues till the last date of submission of bid in their own interest.
16. The department reserves the right to reject any prospective application without assigning any reason and to restrict the list of qualified contractors to any number deemed suitable by it, if too many bids are received satisfying the laid down criterion.
17. **List of documents to be scanned and uploaded within the period of bid submission:**

A. For CPWD enlisted contractors in appropriate Building and Road category

(i)	Insurance Surety Bonds, Demand Draft/ Account Payee Banker's Cheque/ Fixed Deposit Receipt, Bank Guarantee (for balance amount as prescribed) from any of the Commercial Banks against EMD.
(ii)	Copy of receipt for deposition of original EMD to division office of any Executive Engineer, [including NIT issuing EE] CPWD.
(iii)	GST registration Certificate, if already obtained by the bidder. If the bidder has not obtained GST registration as applicable, then he shall scan and upload following undertaking (as per Form "F" enclosed) along with bid documents: "If work is awarded to me, I/We shall obtain GST registration certificate, as applicable, within one month from the date of receipt of award letter or before release of any payment by the CPWD, whichever is earlier, failing which I/We shall be responsible for any delay in payments which will be due towards me/us on account of the work executed and/or for any action taken by CPWD or GST department in this regard".
(iv)	Electrical contractor license OR undertaking that they will either, obtain valid electrical license at the time of execution of electrical work or associate contractor having valid electrical license of appropriate class.
(v)	Enlistment order of contractor with CPWD in Building and road category
(vi)	Certificate of ERP (Enterprise Resource Planning) training for enlisted contractors.
(vii)	Any other document as specified in the NIT.

B. For Non-CPWD Contractors.

(i)	Insurance Surety Bonds, Demand Draft/ Account Payee Banker's Cheque/ Fixed Deposit Receipt, Bank Guarantee (for balance amount as prescribed) from any of the Commercial Banks against EMD.
(ii)	Copy of receipt for deposition of original EMD to division office of any Executive Engineer, [including NIT issuing EE] CPWD.
(iii)	Certificate of Financial Turnover from CA (Form A).
(iv)	Banker's Certificate (Form B) or Net Worth Certificate (Form B-1).
(v)	Certificate of Work Experience in (Form 'C') and (Form 'C1')
(vi)	Affidavit on Rs.10 non-Judicial stamp paper as per clause 1.2.2 of CPWD 6 (Format – C).
(vii)	Letter of Transmittal (Format-D)
(viii)	Copy of PAN Card issued by Income Tax Department
(ix)	Structure and Organization Form 'E'
(x)	GST registration Certificate, if already obtained by the bidder. If the bidder has not obtained GST registration as applicable, then he shall scan and upload following undertaking (as per Form "F" enclosed) along with bid documents: "If work is awarded to me, I/ We shall obtain GST registration certificate, as applicable, within one month from the date of receipt of award letter or before release of any payment by the CPWD, whichever is earlier, failing which I/We shall be responsible for any delay in payments which will be due towards me/us on account of the work executed and/or for any action taken by CPWD or GST department in this regard".
(xi)	Any other document as specified in the NIT.

FORM 'A'

FINANCIAL INFORMATION

- i. Financial Analysis – Details to be furnished duly supported by figures in balance sheet/ profit & loss account for the last five financial years duly certified by the Chartered Accountant, as submitted by the applicant to the Income Tax Department (Copies to be attached).

Sl. No.	Description	Financial Years				
		2021-22	2022-23	2023-24	2024-25	2025-26
(i)	Gross Annual turnover On construction works					
(ii)	Profit/ Loss (Standalone financial statement)					

- ii. Financial arrangements for carrying out the proposed work.

Signature of Chartered Accountant with Seal

Signature of bidder(s)

FORM 'B'

FORM OF BANKERS' CERTIFICATE FROM A COMMERCIAL BANK

This is to certify that to the best of our knowledge and information that M/s 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...)

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

(Signature)
For the Bank

NOTE:-

- (1) Bankers' certificates should be on letter head of the Bank, addressed to Executive Engineer (E) Chandigarh, CPWD, Sector 9-A, Chandigarh.
- (2) In case of partnership firm, certificate should include names of all partners as recorded with the Bank.

FORM 'B-1'

CERTIFICATE OF NETWORTH FROM CHARTERED ACCOUNTANT

It is to certify that as per the audited balance sheet and profit and loss account during the **financial year 2025-26**, the Networth of M/s_____ (Name & Registered Address of individual/ Firm/ company), as on (the relevant date) is Rs._____-/- after considering all liabilities. It is further certified that the Networth of the company has not eroded by more than 30% in the last three years ending on (the relevant date)."

Unique Document Identification number (UDIN).....

Signature of Chartered Accountant
.....

Name of Chartered Accountant

.....Membership No. of ICAI

Date and Seal

FORM 'C'**PERFORMANCE REPORT OF WORKS REFERRED TO IN FORM "C"**

1.	Name of Work/ Project & Location	
2.	Agency	
3.	Agreement No.	
4.	Estimated Cost	
5.	Tendered Cost/Actual Cost	
6.	Date of Start	
7.	Date of Completion	
	(i) Stipulated date of completion	
	(ii) Actual date of completion	
8.	Amount of compensation levied for delayed completion, if any	
	(a) Whether case of levy of compensation for delay has been decided or not.	Yes/No
	(b) If decided, amount of compensation levied for delayed completion, if any	
9.	Amount of reduced rate items, if any	
10.	Performance Report	
	(i) Quality of Work	Outstanding/ Very Good / Good/ Poor
	(ii) Financial Soundness	Outstanding/ Very Good / Good/ Poor
	(iii) Technical Proficiency	Outstanding/ Very Good / Good/ Poor
	(iv) Resourcefulness	Outstanding/ Very Good / Good/ Poor
	(v) General Behavior	Outstanding/ Very Good / Good/ Poor

Dated.

Executive Engineer or Equivalent with full address,

Telephone Number & email.ID

Note:

- For considering the work as eligible work the minimum criteria shall be that no levy should have been made for the work. Thus, works where levy for delayed completion has been levied will not be considered as eligible work. For considering the work as eligible work where EOT has not been decided the minimum criteria will be that the ratio AT/ST, where AT= Actual Time for completion of work; ST= (Stipulated Time in the Agreement plus (+) justified period of Extension of Time granted) should be less than 2.
- For considering the work as eligible work under Sno.10 (Performance report) the minimum certification in each point should be "Good"

FORM 'C1'**DETAILS OF ELIGIBLE SIMILAR NATURE OF WORKS COMPLETED DURING THE LAST SEVEN
YEAR ENDING PREVIOUS DAY OF LAST DAY OF SUBMISSION OF TENDERS**

S. No.	Name of work/ project and location	Owner or sponsoring organization	Cost of work In crores of rupees	Date of commencem ent as per contract	Stipulated date of completion	Actual date of completion	Litigation/ arbitration cases pending/ in progress With details*	Name and address/ telephone number of officer to whom reference may be made	Whether the work was done on back to back basis Yes/ No
1	2	3	4	5	6	7	8	9	10

* Indicate gross amount claimed and amount awarded by the Arbitrator.

SIGNATURE OF BIDDER(S)

Format-C

**Undertaking on Rs. 10 Non-Judicial Stamp Paper.
(Scanned copy to be uploaded at the time of submission of bid)**

Name of work: SITC of Grid Connected Rooftop Solar PV Panels in the Office Complex of Central Administrative Tribunal, Sector 17, Chandigarh.

I/ We undertake and confirm that eligible similar works(s) has/ have not been got executed through another contractor on back-to-back basis. Further that, if such a violation comes to the notice of Department, then I/we shall be debarred for bidding in CPWD/ PWD Delhi 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.

Date

Signature of Agency

Format-D

LETTER OF TRANSMITTAL

[On the letter head paper of the bidder, or partner responsible including full postal address, telephone no., fax no. and E-Mail and communicable address]

No.-----

Date:

To,

The Executive Engineer(E), Chandigarh,
CPWD, Sector 9 A,
Chandigarh-160009.

Name of Work: SITC of Grid Connected Rooftop Solar PV Panels in the Office Complex of Central Administrative Tribunal, Sector 17, Chandigarh.

Sir,

Having examined the details given in NIT and bid document for the above work, I / We hereby submit the relevant information.

- (i) I / We hereby certify that all the statements made and information supplied in the enclosed Formats & Forms and accompanying statement are true and correct.
- (ii) I / We have furnished all information and details necessary for eligibility and have no further pertinent information to supply.
- (iii) I / We submit the requisite certified Bankers Certificate and authorize the Executive Engineer (Elect.), Chandigarh, CPWD, Sector 9 A, Chandigarh to approach the Bank issuing the Bankers Certificate to confirm the correctness thereof. I/ We also authorize the Executive Engineer (Elect.), Chandigarh, CPWD, Sector 9 A, Chandigarh to approach individuals, employers, firms and corporation to verify our competence and general reputation.
- (iv) I / We submit the following certificates in support of our suitability for having successfully completed the following eligible similar works:

S.No.	Name of work	Certificate from

Certificate:

It is certified that the information given by me/ us with the bid are correct. It is also certified that I/we shall be liable to be debarred, disqualified/ cancellation of enlistment in case any information furnished by me/ us found to be incorrect.

SIGNATURE(S) OF BIDDER(S)

FORM 'E'

STRUCTURE AND ORGANIZATION

1. Name & Address of the bidder
2. Telephone No./ Telex No./ Fax No./ Email id:
3. Legal status of the bidder (Scan & upload copies of original document defining the legal status)
 - a. An Individual
 - b. A proprietary firm
 - c. A firm in partnership
 - d. A limited company or corporation
4. Particulars of registration with various Government Bodies (Scan & upload attested photocopy)

Sr.No.	Organization/ Place of Registration	Registration No.
1.		
2.		
3.		

5. Names and titles of Directors & Officers with designation to be concerned with this work.
6. Designation of individuals authorized to act for the organization.
7. Has the bidder, or any constituent partner in case of partnership firm/ Limited Company/Joint Venture, ever been convicted by the court of law? If so, give details
8. In which field of Engineering construction, the bidder has specialization and interest?
9. Any other information considered necessary but not included above

Signature of Bidder(s)

FORM "F"

Undertaking regarding obtaining GST registration Certificate

If work is awarded to me, I/We shall obtain GST registration certificate, as applicable, within one month from the date of receipt of award letter or before release of any payment by the CPWD, whichever is earlier, failing which I/We shall be responsible for any delay in payments which will be due towards me/us on account of the work executed and/or for any action taken by CPWD or GST department in this regard.

**Signature of Bidder(s) or an authorized Officer of the firm
with stamp**

(On non-judicial stamp paper of minimum Rs. 100)
(Guarantee offered by Bank to CPWD in connection with the execution of contracts)
Form of Bank Guarantee for Earnest Money Deposit / Performance Guarantee/ Security
Deposit/ Mobilization Advance

1. Whereas the Executive Engineer (name of division) CPWD on behalf of the President of India (hereinafter called "The Government") has invited bids under..... (NIT number) dated for..... (name of work) The Government has further agreed to accept irrevocable Bank Guarantee for Rs. (Rupees only) valid upto (date)* as Earnest Money Deposit from (name and address of contractor) (hereinafter called "the contractor") for compliance of his obligations in accordance with the terms and conditions of the said NIT.

OR**

- Whereas the Executive Engineer (name of division) , CPWD on behalf of the President of India (hereinafter called "The Government") has entered into an agreement bearing number..... with (name and address of the contractor) (hereinafter called "the Contractor") for execution of work (name of work) The Government has further agreed to accept an irrevocable Bank Guarantee for Rs. (Rupees..... only) valid upto..... (date) as Performance Guarantee/Security Deposit/Mobilization Advance from the said Contractor for compliance of his obligations in accordance with the terms and conditions of the agreement.
2. 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 within 10 days of the demand.
 3. We, ... (indicate the name of the Bank), do here by undertake to pay the amount due and payable under this guarantee without any demur, 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 Contractor. 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)
 4. We, ... (indicate the name of the Bank), further undertake to pay the Government any money so demanded notwithstanding any dispute or disputes raised by the contractor in any suit or proceeding pending before any Court or Tribunal, our liability under this Bank Guarantee being absolute and unequivocal. The payment so made by us under this Bank Guarantee shall be a valid discharge of our liability for payment there under and the Contractor shall have no claim against us for making such payment.
 5. We, ... (indicate the name of the Bank), further agree that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligation here under to vary any of the terms and conditions of the said agreement or to extend time of performance by the said Contractor from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said contractor and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation or extension being granted to the said Contractor or for any forbearance, act of omission on the part of the Government or any indulgence by the Government to the said Contractor 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. We, ... (indicate the name of the Bank), further agree that the Government at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor at the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee the Government may have in relation to the Contractor's liabilities.
 7. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor.

8. We, ... (indicate the name of the Bank), undertake not to revoke this guarantee except with the consent of the Government in writing.
9. This Bank Guarantee shall be valid up to..... unless extended on demand by the Government. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to Rs. (Rupees only) and unless a claim in writing is lodged with us within the date of expiry or extended date of expiry of this guarantee, all our liabilities under this guarantee shall stand discharged.

Date

Witnesses:

- | | | |
|----|------------------------------------|--|
| 1. | Signature.....
Name and address | Authorized signatory
Name
Designation
Staff Code No.
Bank Seal |
| 2. | Signature.....
Name and address | |

*Date to be worked out on the basis of validity period of 90 days where only financial bids are invited and 180 days for two/three bid system from the date of submission of tender.

**In paragraph 1, strike out the portion not applicable. Bank Guarantee will be made either for earnest money or for performance guarantee/security deposit/mobilization advance, as the case may be.

GOVERNMENT OF INDIA
CENTRAL PUBLIC WORKS DEPARTMENT

Name of work: SITC of Grid Connected Rooftop Solar PV Panels in the Office Complex of Central Administrative Tribunal, Sector 17, Chandigarh.

CPWD FORM NO. 7

**GOVERNMENT OF INDIA
CENTRAL PUBLIC WORKS DEPARTMENT**

STATE: Chandigarh

DIVISION: Executive Engineer(E)-Chandigarh

BRANCH: E&M

SUB-DIVISION: II

PERCENTAGE RATE TENDER & CONTRACT FOR WORKS

Tender for the work of: SITC of Grid Connected Rooftop Solar PV Panels in the Office Complex of Central Administrative Tribunal, Sector 17, Chandigarh.

1. To be submitted/ uploaded online by 03:00 PM on 10/11/2026 through website <https://etender.cpwd.gov.in> to Executive Engineer(E)-Chandigarh, CPWD, Sector 9A, Chandigarh.
2. The bid to be opened online in presence of tenderers who may be present at 03:30 PM on 10/11/2026 in the office of Executive Engineer(E)-Chandigarh, CPWD, Sector 9 A, Chandigarh.

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 and other documents and Rules referred to in the conditions of contract and all other contents in the tender document for the work.

I/We hereby tender for the execution of the work specified for the President of India within the time specified in Schedule 'F', viz. Schedule of Quantities and in accordance in all respects with the Specifications / Special conditions, Designs, Drawings and instructions in writing as referred to in this tender document 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 **30 (Thirty) Days** from the date of opening of bid in case of **single bid system** and **75 (seventy five)** days from the date of opening of technical bids in case bids are invited **2 or 3 bid system** and not to make any modifications in its terms and conditions.

I/We have deposited EMD for the prescribed amount in the office of concerned Executive Engineer as per the bid document.

A copy of earnest money deposit receipt of prescribed amount deposited in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt, Banker's Cheque or Bank Guarantee as prescribed issued by commercial bank, is scanned and uploaded. If I/we fail to furnish the prescribed Performance Guarantee within prescribed period, I/we agree that the President of India or his successor 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 the work as specified. I/we agree that President of India or his successors in office shall, without prejudice to any other right or remedy available in law, be at liberty to forfeit the said earnest money and 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 the percentage mentioned in Schedule 'F' and those in excess of that limit at the rates to be determined in accordance with the provision contained in Clause 12.2 & 12.3 of the tender form.

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

I / We undertake and confirm that eligible similar work(s) has/ have not been got executed through another contractor on back to back basis. Further that, if such a violation comes to the notice of Department, then I/we shall be debarred

from the 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 therefrom to any person other than a person to whom I/we/am/are may authorized to communicate the same or use the information in any manner prejudicial to the safety of the State.

Dated: ☐☐
Witness: - ☐☐
Address: - ☐☐
Occupation: - ☐☐

Signature of Contractor
Postal Address: -

Telephone No.
Fax:-
E-Mail:-

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.

- i)
- ii)
- iii)

Signature

Dated: -

Executive Engineer
For & on behalf of the President of India.

PERFORMA OF SCHEDULES (A to F)

SCHEDULE 'A'

Schedule of quantities - As per NIT

SCHEDULE 'D'

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

Annexures - As per NIT
Form of performance security (Bank Guarantee Bond), Form of Earnest Money Deposit (Bank Guarantee Bond)

SCHEDULE 'E'

Reference to General Conditions of Contract:

1.1 Name of Work : **GCC 2023 Maintenance Works** for CPWD works modified & corrected up to previous day of the last date of submission of tender.
SITC of Grid Connected Rooftop Solar PV Panels in the Office Complex of Central Administrative Tribunal, Sector 17, Chandigarh.

1.2 Estimated Cost of work: - **Rs. 24,96,880/-**

1.3 Earnest Money : **Rs. 49,938/-**
(To be returned after receiving Performance Guarantee)

1.4 Performance Guarantee **(a) 5% of tendered value or Estimated Cost Put to Tender (ECPT) (whichever is higher).**
(b) Where the tendered amount is less than eighty percent (80%) of the Estimated Cost Put to Tender (ECPT), the Performance Guarantee, in addition to the requirement under (a) above, shall be increased by an amount equal to the difference between eighty percent (80%) of the ECPT and the tendered amount.

1.5 Security Deposit **2.50% of tendered value**

SCHEDULE 'F':

General Rules & Directions:-

1. Officer Inviting Tender Executive Engineer (Elect.)-Chandigarh, CPWD, CPWD, Chandigarh or his successor thereof

Definitions:-

2(vi) Engineer-In-Charge Executive Engineer (Elect.)-Chandigarh for Electrical Works or his successor thereof for Electrical Work

2(viii) Accepting Authority Executive Engineer (Elect.)-Chandigarh, CPWD, CPWD, Chandigarh or his successor thereof

2(x) Percentage on cost of materials and labour to cover all overheads and profits 15%

2(x)(b) Standard Schedule of Rates DSR 2025 (E&M) with upto date correction slip, prevailing labour rates and market rates modified & corrected upto the previous day of the last date submission of tender

2(xi) Department Central Public Works Department (CPWD)

9(ii) Standard CPWD Contract Form GCC 2023(Maintenance Work) and CPWD-7 as amended/ modified & corrected upto the previous day of the last date submission of tender.

Clause-1 :

- (i) Time allowed for submission of performance guarantee, programme chart (Time and Progress) and applicable labour licences, registration with EPFO, ESIC and BOCW Welfare Board, Provident Fund Nos. or proof of applying thereof from the date of issue of letter of acceptance. 07 days
- (ii) Maximum allowable extension with late fee @0.1% per day of the performance guarantee amounts beyond the period provided in (i) above 07 days

Clause-2:

Authority for fixing compensation under Clause 2

Superintending Engineer- Chandigarh, CPWD, Chandigarh or his successor thereof.

Clause-2A:

Whether Clause 2A shall be applicable

No

Clause 5

Number of days from the date of issue of letter of acceptance for reckoning date of start

14 days

Mile Stone

Sl. No.	Financial Progress	Time Allowed (from stipulated date of start)	Amount to be withheld in case of non-achievement of milestone
1.	Initial inspection (wherever specified) & delivery of material at site in good condition	02 Months	In the event of not achieving the milestone 2% of the tendered value of work will be withheld.
2.	Installation, testing, commissioning to the satisfaction of Engineer-in-charge.	04 Months	In the event of not achieving the milestone 2% of the tendered value of work will be withheld.
3.	Handing over of fully functional Solar Power Generation System	05 Months	In the event of not achieving the milestone 1% of the tendered value of work will be withheld.

Time allowed for execution of work

05 Months

- i. Authority to convey the decision of shifting of milestone and extension of time
- ii. Authority to decide rescheduling of Milestone and extension of time.
- iii. Shifting of date of start in case of delay in handing over of site.

Executive Engineer(E)-Chandigarh, CPWD, Chandigarh or his successor thereof.

Superintending Engineer- Chandigarh, CPWD Chandigarh or his successor thereof
Superintending Engineer- Chandigarh, CPWD Chandigarh or his successor thereof

Schedule of handing over of site:-

Part	Portion of site	Description	Time period for handing over reckoned from date of issue of letter of intent
Part A	Portion without any hindrance	100%	From date of start.
Part B	Portions with encumbrances	NIL	NIL
Part C	Portions dependent on work of other agencies	NIL	NIL

Clause-6:-Computerized Measurement Book (CMB)/
Electronic Measurement Book (EMB):
Mode of Measurement: CMB/ EMB

Electronic Measurement Book/ ERP

Clause-7: Gross work to be done together with net payment / adjustment of advances for material collected, if any, since the last such payment for being eligible to interim payment	Rs. 05.00 Lakh or as decided by Engineer-in-charge
Clause-7A:- Whether clause 7A applicable	Yes, Applicable
Clause-10A:- List of testing equipment to be provided by the contractor at site lab.	NIL
Clause-10-B (II). Whether clause 10-B (ii) shall be applicable	Not Applicable
Clause-10C:- Component of labour expressed as percent of value of work	Not Applicable
Clause-11:- Specifications to be followed for execution of work	Specifications to be followed CPWD General specifications for electrical works amended upto date & other terms & condition enclosed. i. Part I: - Internal 2023 ii. Part II: - External 2023
Clause-12: 12.2 (c) Deviation limit beyond which clauses 12.2(c) shall apply for building work	No Limit
12.4 (i) Deviation limit beyond which clauses 12.2(c) shall apply for foundation work (except items mentioned in earth work subhead in DSR and related items)	No Limit
(ii) Deviation limit for items mentioned in earth work subhead in DSR and related items)	No Limit
Clause-16:- Competent Authority for deciding reduced rates	SE(Chd.), CPWD, Chandigarh or his successor thereof.
Clause 18:- List of mandatory machinery, tools & plants to be deployed by the contractor at site	As per CPWD Specifications required as per type of work
Clause 19 C:- Authority to decide penalty for each default	Executive Engineer(E)-Chandigarh, CPWD, Chandigarh or his successor thereof
Clause 19 D:- Authority to decide penalty for each default	Executive Engineer(E)-Chandigarh, CPWD, Chandigarh or his successor thereof
Clause 19 G:- Authority to decide penalty for each default	Executive Engineer(E)-Chandigarh, CPWD, Chandigarh or his successor thereof
Clause 19 K:- Authority to decide penalty for each default	Executive Engineer(E)-Chandigarh, CPWD, Chandigarh or his successor thereof
Clause-25: (i) Conciliator (ii) Arbitrator Appointing Authority (iii) Place of Arbitration	SDG (Chandigarh) SE-Chandigarh or his successor thereof CHANDIGARH / ONLINE/ OFFLINE

Clause-32: Requirement of Technical Representative(s) and Recovery Rates

Sl. No	Minimum Qualification of Technical Representative	Discipline	Designation (Principal Technical / Technical representative)	Minimum experience	Number	Rate at which recovery shall be made from the contractor in the event of not fulfilling provision of clause 36(i)	
						Figures	Words
1.	Graduate Engineer or Diploma Engineer	Elect.	Project Manager cum Planning/ Quality/ Site/ Billing Engineer	2Years or 5Years	1 No.	Rs. 15000/- Per Month Per Person	Rs. Fifteen Thousand Per Month Per Person

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

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

Clause-38**Not Applicable**

CONSENT LETTER FROM ELIGIBLE ASSOCIATE AGENCY OF VARIOUS SPECIALISED WORKS

1. I / We hereby give my consent to associate with M/s _____, for executing the minor component of work of Electro Mechanical work (Mention category).
2. I / We will execute the work as per specifications and conditions of the agreement and as per directions of the Engineer-in-Charge for the corresponding minor work till the completion of the work.
3. I / We will be responsible for necessary action to handover the installations and for rectification of defects and repair during the maintenance / warranty period.
4. Also, I / We will employ full time technically qualified Engineer / supervisor for the minor component of the work as required for the work. I/ We will attend inspection of officers of the department as and when required.

Date:

Signature with date of Major component

Signature with date of Associate/ Minor Component

Contractor Address

Contractor Address

FORM- I

MEMORANDUM OF UNDERSTANDING (M.O.U) (to be submitted for various specialized works)

1. M/s. (Name of the firm with full address)
(Henceforth called the main Contractor)
2. M/s. (Name of the firm with full address)
(Henceforth called Associated Electrical Contractor or Electrical Contractor)

For the execution of Work “SITC of Grid Connected Rooftop Solar PV Panels in the Office Complex of Central Administrative Tribunal, Sector 17, Chandigarh”

(Electrical Component) as per schedule specifications, terms and conditions of the tender.

We state that M.O.U between us will be treated as an agreement and has legality as per Indian Contract Act (amended upto date) and the department (CPWD) can enforce all the terms and conditions of the agreement for execution of the above work. Both of us shall be responsible for the execution of work as per the agreement to the extent this MOU allows. Both the parties shall be paid consequent to the execution as per agreement to the extent this MOU permits. In case of any dispute, either of us will go for mediation by the Engineer In charge. Any of us may appeal against the mediation to the Superintending Engineer, Chandigarh Circle, CPWD, Chandigarh. His decision shall be final and binding on both of us.

We have agreed as under:

1. The electrical contractor will execute electrical works in the wholesome manner as per terms and conditions of the agreement.
2. The electrical contractor shall be liable for disciplinary action if he fails to discharge the action(s) and other legal action as per agreement.
3. All the machinery and equipments, tools and tackles required for execution of the electrical works, as per agreement, shall be the responsibility of the electrical contractor.
4. The site staff required for the electrical work shall be arranged by the electrical contractor as per terms and conditions of the agreement.
5. Site order book maintained for the said work shall be signed by the main contractor as well as by the Engineer of the Association Contractor and by Associated Contractor himself.
6. All the correspondence regarding execution of the electrical work shall be done by the department with the Associated Contractor with a copy to the main contractor. In case of non-compliance of the provisions of agreement, the main contractor, as well as the associated contractor shall be responsible. The action under clauses 2 and 3 shall be initiated and taken against the main contractor.

Date:

Signature with date of Major component

Signature with date of Associate/ Minor Component

Contractor Address

Contractor Address

1. Witness with address
(From major component contractor side)

2. Witness with address
(From minor component contractor side)

Government of India
Central Public Works Department

Name of work: SITC of Grid Connected Rooftop Solar PV Panels in the Office Complex of Central Administrative Tribunal, Sector 17, Chandigarh.

PART B

SOLAR PHOTO VOLT AIC POWER PLANT

GENERAL AND COMMERCIAL CONDITIONS

1.0 GENERAL

- 1.1 The work shall be generally carried out in accordance with tender specifications and the following specifications /rules with upto date amendments.
- i) CPWD General Specifications for Electrical work Part-I (Internal)-2023
 - ii) CPWD General Specifications for Electrical work Part-II (External)-2023
all above modified & corrected upto last date of receipt of tender
 - i) **MNRE Specifications.**
 - ii) Commercial and Additional conditions for this work
 - iii) The Indian Electricity Act, 2003, as amended upto date.
 - iv) Indian Electricity Rules 1956 amended upto date.
 - v) Local Fire Regulations, National electrical code 2011 amended up to date and Relevant sections of relevant IS codes of latest edition and CPWD special publications available on CPWD website. (Note: The higher specifications/ stringent conditions of CPWD specifications or ECBS-2026 shall be followed). Relevant BIS standards as modified up to date.
- 1.2 This specification covers manufacture, testing as may be necessary before dispatch, delivery at site, all preparatory work, assembly and installation, commissioning putting into operation of Interactive Grid Solar PV System consisting of all cabling, earthing and final testing etc. **Central Administrative Tribunal, Sector 17, Chandigarh.**
- 1.3 **Location:** The Interactive Grid Solar PV Power Plant will be installed at **Central Administrative Tribunal, Sector 17, Chandigarh.**
- 1.4 The tenderer should, in its own interest, visit the site and get familiarized with the site conditions before tendering.
- 1.5 **Work is to be executed in occupied building, there should not be any inconvenience to the occupants during execution of work. The work shall be programmed in consultation with Engineer-in-charge and the occupying department. If so required, the work may have to be done even before and after the office hours/ odd hours/ in night. Nothing extra shall be paid on this account.**
- 1.6 No T & P shall be issued by the Department and nothing extra shall be paid on account of this.
- 1.7 The tenderers are advised not to deviate from the technical specifications items, commercial terms and conditions of NIT like terms of payment, guarantee, arbitration clause, escalation etc.
- 1.8 The department reserves the right to reject any of all the price bids and call for fresh prices/ tenders as the case may be without assigning any reason.

2.0 TERMS OF PAYMENTS

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

Stage of Work	Terms of payment for original work
i) After initial inspection (wherever specified) & delivery at site in good condition on pro-rata basis	60%
ii) On completion of pro-rata installation	15%
iii) On testing, commissioning and handing over to the department for beneficial use	15%
iv) On completion of 1st major trial run of Solar PV Generation System	10%

3.0 Works to be carried out by CPWD

Unless otherwise mentioned in the tender specifications, the following works shall be carried out by the department.

- (a) Space for accommodating all the equipments and components involved in the work. However, watch and ward shall be responsibility of the contractor till completion & final handing over to department.

4.0 Works to be done by the contractor

In addition to supply, installation, testing and commissioning of all the equipments, as per schedule of work, and specifications, the following works shall be deemed to be included within the scope of work to be executed by the contractor. Nothing will be paid extra on this account.

- i) Tools and tackles required for handling and installation of equipments.
- ii) Protection required for the equipments from rain, dust storm etc. during transportation i.e. polythene cover and tarpaulin till completion & handing over to department.
- iii) Necessary equipments for commissioning/site testing.
- iv) Supplying & laying of suitable size copper conductor armoured control and power cable from SPV modules, main power cable to PCU units etc. i/c S&F of PVC channel steel conduit etc.
- v) Making arrangement of electricity and water required for installation.
- vi) Providing cement & concrete foundation and GI structure for the solar pv modules as per BOQ item and approved drawing by the department.
- vii) Minor building work i/c repairing/ closing of all holes for cable entry etc. complete as reqd.

5.0 RATES

The tender is for entering into item rate works contract. The rates shall be inclusive of all taxes, duties, levies, cess, packing, transportation, handling etc. The tendered rates should also include charges for installation, testing, commissioning etc. at site including temporary construction of storage. Service tax if any, shall be reimbursed by the department on production of proof of its payment by the contractor.

5.1 The contractor has to carry out maintenance as per manufacturer's standards for a period of **12 months** from the date of handing over for which nothing extra shall be paid.

5.2 Security deposit deducted from the running and final bill of the contractor shall be released proportionately in five years from the date of satisfactory completion of defect liability period.

6.0 After satisfactory completion of original work, final payment for original work executed by contractor shall be made on submission of provisional final bill by the contractor. There after Supplementary agreement shall be drawn separately for the comprehensive maintenance period and final bill of the agreement shall be paid after the satisfactory completion of comprehensive maintenance work.

7.0 COMPLETENESS OF TENDER

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

8.0 STORAGE AND CUSTODY OF MATERIALS

The Sub Station room may be used for storage of sundry materials and erection equipments or else the agency has to make its own arrangements. No separate storage accommodation shall be provided by the department. Watch and ward of the stores and their safe custody shall be the responsibility of the contractor till the final taking over of the installation by the department.

9.0 CARE OF THE BUILDING

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

10.0 COMPLETION PERIOD

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

11.0 GUARANTEE

11.1 All equipment (PV module & inverter) shall be guaranteed for a period of **120 months**, from the date of taking over the installation by the department, against unsatisfactory performance and /or breakdown due to defective design, workmanship or material. The contractor shall stand performance guarantee of solar PV system supplied and installed by them for a period of 120 months from the date of the handing over of the installation.

- 11.2 If the performance of Solar PV system is found unsatisfactory during the guarantee period or contractor repeatedly fails to replace/repair the defective solar PV system within 15 days time after written complaint in this regard, the amount of performance guarantee shall be forfeited absolutely. The decision of the Engineer-in-charge in this regard shall be final & binding on the contractor.
- 11.3 **Degradation in performance shall not exceed maximum 10% after 10 years and 20% after 25 years as per industrial standard warranty conditions on complete system from the date of commissioning of the system. If SPV modules do not perform satisfactorily as per above stated standards the manufacturer of the solar PV modules shall make proper check of the quality of material and should replace the unsatisfactorily solar PV modules with free of cost. Otherwise, department may take action to debar the manufacturer for CPWD works and may intimate to MNRE to take suitable action against such defaulting manufacturer.**
- 11.4 The tenderer shall guarantee among other things, the following:
- 11.4.1 Quality, strength and performance of the materials used as per manufacturers standards.
- 11.4.2 Safe mechanical and electrical stress on all parts under all specified conditions of operation.
- 11.4.3 Satisfactory operation during the maintenance period.
- 12.0 POWER SUPPLY/ WATER SUPPLY**
The power supply/ water supply has to be arranged by the contractor at his own cost. Nothing extra shall be paid on this account.
- 13.0 ACCEPTABLE MAKES OF VARIOUS EQUIPMENTS**
The acceptable makes of various equipments/components/accessories have been indicated in the List of Acceptable Makes of equipments/ materials. The tenderer shall work out the cost of the offer on this basis. Alternate makes are not acceptable and tender with any other make (s) shall be rejected.
- 14.0 DATA MANUAL AND DRAWINGS TO BE FURNISHED BY THE TENDERER.**
- 14.1 **With Tender:** The tenderer shall furnish alongwith the tender, detailed technical literature, pamphlets and performance data for appraisal and evaluation of the offer.
- 14.2 After award of work**
The successful tenderer would be required to submit the following drawings for approval of the department.
- 14.2.1 General arrangement drawing of the equipments
- 14.2.2 Single line diagram.
- 14.2.3 Schematic drawing including all safety interlocking.
- 14.2.4 Details of foundations for the equipments and the weights of assembled equipments.
- 14.2.5 Equipment details proposed to be procured for the execution of the work for the approval of the Engineer-in-charge.
- 14.2.6 Any other drawings necessary for the job.
The successful tenderer should furnish well in advance three copies of detailed instructions and manuals of manufacturer's for all items of equipments regarding installation, adjustments, operation and maintenance including preventive maintenance & trouble shooting together with all the relevant data sheets, spare parts catalogue etc. all in triplicate
- 15.0 The successful tenderer should furnish well in advance three copies of detailed instructions and manuals of manufacturer's for all items of equipments regarding installation, adjustments, operation and maintenance including preventive maintenance & trouble shooting together with all the relevant data sheets, spare parts catalogue etc. all in triplicate.
- 16.0 EXTENT OF WORK**
- 16.1 The work shall comprise of entire labour including supervision and all materials necessary to make a complete installation and such tests and adjustments and commissioning, as may be required by the department. The term complete installation shall not only mean major items of the plant and equipments covered by specifications but all incidental sundry components necessary for complete execution and satisfactory performance of installation with all layout charts whether or not those have been specifically mentioned in bill of quantity in the tender document. However, major equipment not covered in the scope of the work and required subsequently as an additional feature, not covered in the contract specifications, shall be paid extra. The decision of the engineer-in-charge in the matter shall be final and binding upon the contractor.
- 17.0 INSPECTION AND TESTING**
- 17.1 Copies of all manufacturer's routine and type test, certificates of the equipments shall be furnished to the inspecting officer at the time of inspection at the factory.

18.0 COMPLIANCE WITH REGULATIONS AND INDIAN STANDARDS

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

- (i) Factories Act.
- (ii) Indian Electricity Rules.
- (iii) B.I.S. & other standards as applicable.
- (iv) Workmen's compensation Act.
- (v) Statutory norms prescribed by local bodies like CEA, Power Supply Co., CPCB as amended upto date. etc.

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

18.3 Successful tenderer shall arrange for compliance with statutory provisions of safety regulations and departmental requirements of safety codes in respect of labour employed on the work by the tenderer. Failure to provide such safety requirement would make the tenderer liable for penalty of Rs 5000/- (Rs Five Thousand only) for each default. In addition, the department will be at liberty to make arrangement for the safety requirements at the cost of tenderer and recover the cost thereof from him.

19.0 ERECTION TOOLS

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

20.0 COOPERATION WITH OTHER AGENCIES

The successful tenderer shall co-ordinate with other contractors and agencies engaged in the construction of buildings, if any, and exchange freely all technical information so as to make the execution of this work/contract smooth. No remuneration should be claimed from the department for such technical cooperation. If any unreasonable hindrance is caused to other agencies and any completed portion of the work has to be dismantled and re-done for want of cooperation and coordination by the tenderer during the course of work, such expenditure incurred will be recovered from the successful tenderer if the restoration work to the original condition or specification of the dismantled portion of the work was not undertaken by the tenderer himself.

21.0 The work will be carried out with least disturbance during shifting & shut down taken in consultation with the client department.

22.0 MOBILIZATION ADVANCE

No mobilization advance shall be paid to the contractor.

23.0 INSURANCE AND STORAGE

All consignments are to be duly insured up to the destination from warehouse at the cost of the contractor. The insurance covers shall be valid till the equipment is handed over duly installed, tested and commissioned.

24.0 VERIFICATION OF CORRECTNESS OF EQUIPMENT AT DESTINATION

The contractor shall have to produce all the relevant records to certify that the genuine equipments from the manufacturers has been supplied and erected.

25.0 PAINTING

This shall include cost of painting of the entire installation. The major equipments shall be factory final finish painted. The agency shall be required to do only touching to the damages caused to the painting during transportation, handling & installation at site, if there is no major damage to the painting. However, hangers, supports etc. of bus trunking shall be painted with required shade including painting with two coats of anticorrosive primer paint at site.

26.0 TRAINING

The scope of works includes the on job technical training of two persons of department at site. Nothing extra shall be payable on this account.

27.0 MAINTENANCE

27.1 *Sufficient trained and experienced staff shall be made available to meet any exigency of work during the guarantee period of 12 months from the handing over of the installation.*

27.2 *The maintenance, routine as well as preventive, for 12 months from the date of taking over the installation as per manufacturer's recommendation shall be carried out on quarterly basis. The work shall cover all routine and breakdown maintenance.*

27.3 *Experienced and Trained Engineer should also be made available as & when required during the guarantee period.*

28.0 INTERPRETING SPECIFICATIONS

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

- (a) Schedule of quantities
- (b) Technical specifications
- (c) Drawing (If any)
- (d) General Specifications
- (e) Relevant BIS or other international code in case BIS code is not available

Assistant Engineer (Elect.) 'P',
O/o EE(E), CPWD, Chandigarh.

Executive Engineer (Elect.) Chd.,
Central P.W.D., Chandigarh.

SPECIAL CONDITIONS

SCOPE OF WORK

1. The scope of work involves complete design, engineering, manufacture, supply, storage, civil work, erection, installation, testing and commissioning of complete Solar PV system as per BOQ and these specifications at **Central Administrative Tribunal, Sector 17, Chandigarh**. The drawings along with detailed design and equipment datasheet shall be submitted for approval before starting the work. The work shall be carried out as per designs approved by the Engineer-In-Charge.
2. The support mounting structure / elevated structure & foundation of solar PV modules shall be designed to withstand minimum wind speed 150 kmph or as per actual site conditions, whichever is higher.
3. All equipment and materials to be used in work shall be manufactured in factories of good repute having excellent track record of quality manufacturing, performance and proper after sales service.
4. The Contractor shall guarantee minimum generation as MNRE recommendation per annum per Kwp of commissioned generation capacity of Solar Power Plant. This shall be subject to the annual de-generation acceptable as per norms.
5. The trial run of electrical work / equipment shall be carried out by the firm in presence of Engineer-in-charge or his representative at the site as per requirement of department.
6.
 - a) Earthing System:
 - i. Earthing Protection: Each array structure of the PV yard should be grounded/ earthed properly as per IS:3043-1987. In addition, the lightning arrester/masts should also be earthed inside the array field. Earth Resistance shall be tested in presence of the representative of Department as and when required after earthing by calibrated earth tester. PCU, ACDB and DCDB should also be earthed properly. Earth resistance shall not be more than 5 ohms. It shall be ensured that all the earthing points are bonded together to make them at the same potential.
 - ii. 2 Nos. GI strip of size 25mm x 5mm shall be supplied and fixed as per CPWD specification for earth bus of the sub-station to connect the system within the quoted rates. Nothing extra shall be paid on this account.
 - b) AC Distribution Box (ACDB)
 - i. All switches and the circuit breakers, connectors should conform to IEC 60947, part I, II and III/ IS60947 part I, II and III.
 - ii. The change-over switches, cabling work, Manual isolation of Inverters/Grid should be undertaken by the bidder as part of the project within quoted rates.
 - c) DATA ACQUISITION SYSTEM / PLANT MONITORING (for 500kWp and above)
 - i. PV array energy production: Digital Energy Meters to log the actual value of AC/ DC voltage, Current & Energy generated by the PV system shall be provided.
 - ii. All instantaneous data shall be shown on the computer screen.
 - iii. 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 PMB before commissioning of SPV plant. Nothing extra shall be paid on this account.
 - d) PRIORITY FOR POWER CONSUMPTION:
 - i. Regarding the generated power consumption, in case of string inverter, priority need to given for internal consumption first and thereafter any excess power can be exported to grid.
 - e) Grid Islanding:
 - i. In the event of a power failure on the electric grid, it is required that any independent power-producing inverters attached to the grid turn off in a short period of time. This prevents the DC-to-AC inverters from continuing to feed power into small sections of the grid, known as –islands.
 - ii. Powered islands present a risk to workers who may expect the area to be unpowered, and they may also damage grid-tied equipment. The ground mounted 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.
 - iii. A manual disconnect pole isolation switch beside automatic disconnection to grid would have to be provided at utility end to isolate the grid connection by the utility personnel to carry out any maintenance. This switch shall be locked, if required, by the utility personnel.

13. The scope of work for the bidder includes inspections & necessary permissions from competent Electrical authorities -CEA/Electrical Inspector, obtaining No Objection Certificate (NOC) from Distribution Company for grid connectivity i/c necessary liasoning for net metering arrangement, and get electric connection with metering equipment from the local electricity company for which no extra payment shall be made.
14. Additionally, a Feeder panel with suitable rating switchgears, accessories for Local Power supply meter mounting shall have to be provided as per requirements of Local Power supply for which no extra payment shall be made.
15. Safety equipment like Fire Extinguishers, rubber mats, danger signages to be provided as per Electricity Rules near all solar inverters are included in scope of work.
16. In case of reduction in scope of work, the contractor shall have no claim on account of loss of expected profit, consequential overheads etc. due to reduction in value of work.
17. The contractor will take full precaution & safety measure during execution of work. If any kind of miss happenings/human loss occurs during execution of work at site, the contractor will be fully responsible for it and liable to bear all losses and has to pay full compensation. The department will not take any responsibility for such type of happening.
18. All concealed works and earthing shall have to be done in presence of the Engineer-in-Charge or his authorized representative.
19. Earth continuity and availability shall be ensured by the contractor during execution of work.
20. The contractor shall ensure that all the persons executing the electrical works have the valid electrical license issued by competent authority.
21. The contractor will make his own arrangements for transportation of his men and materials upto the site of work and taking the men and material upto place of installation. Scrutiny and watch & ward of the materials brought at site and the work/installation executed by him, safety of his men and materials shall be his responsibility till the work as a whole is completed and handed over to the department for its beneficial use and nothing extra shall be paid by the department on this account.
22. All the cable terminals for connection to MCB's/MCCB's/Switch gear etc. shall be provided with suitable capacity of thimbles/ sockets.
23. All repairs & patch work shall be neatly carried out to match with the original finish & all damages caused to the electrical installations during the execution of work, shall have to be made good by the contractor immediately at his own cost to the entire satisfaction of Engineer-in-charge. In case contractor fails to comply with the instructions, the Engineer-in-charge shall be at liberty to get the work done by any third agency at the cost of the contractor and recover such amount paid from the bill(s) of the contractor.

Assistant Engineer (Elect.)'P',
O/o EE(E), CPWD, Chandigarh.

Executive Engineer (Elect.) Chd.,
Central P.W.D., Chandigarh.

TECHNICAL SPECIFICATIONS

1. AMBIENT CONDITION & SOLAR INSOLATION

LOCATION/SITE DETAILS FOR THE SPV POWER PROJECT

- Address of site: Central Administrative Tribunal, Sector 17, Chandigarh.
- Location: Central Administrative Tribunal, Sector 17, Chandigarh

Bidders shall seek from relevant database / source, all the data pertaining to the ambient conditions like temperature, humidity, wind load, rain, weather condition and historical solar radiation etc., pertaining to the site location and optimize the design accordingly. All design calculations and installation details shall be submitted by the contractor after the award of work.

2. EQUIPMENT SPECIFICATION

Technical Specifications for Solar PV Module

General Description

The SPV power plant shall have a total capacity of 46 KWp. The power plant shall provide a reliable and independent power supply to the LT Panel at 415 V, 50 Hz

3. Solar Photovoltaic Modules

- The total Solar PV minimum array capacity should be as per requirement and should comprise of modules with latest technological features to provide minimum of 23% module efficiency with minimum 535 Wp and above wattage of module. The module type must be qualified as per IEC 61215. SPV module conversion efficiency should not be less than 20.5% under STC of 1000w/m² and cell operating temp of 25° C as per MNRE Guideline and AM 1.5 radiations. Modules must qualify to IEC 61730 Part I and II for safety qualification testing. Certificate for module qualification from IEC or equivalent to be submitted as part of the bid offer.
- The PV module shall perform satisfactorily in humidity up to 100% with temperature between — 40°C to + 85°C. Since the modules would be used in a high voltage circuit, the high voltage insulation test shall be carried out on each module and a test certificate to that effect provided.
- Manufacturers / Contractors should confirm whether they are supplying PV module using a RF identification tag (RFID), which must contain the following information. The RFID can be inside or outside the module laminate, but must be able to withstand harsh environmental conditions.
 - Name of the manufacturer of PV Module
 - Name of the Manufacturer of Solar cells
 - Month and year of the manufacture (separately for solar cells and module)
 - Country of origin (separately for solar cells and module)
 - I-V curve for the module
 - Peak Wattage, 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 series.
- Other general requirement for the PV modules and subsystems shall be the following
 - a. 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 IP65 rated.
 - b. Necessary I-V curves at 25°C, 45°C, 60°C and at NOCT are required to be furnished. Offers to provide PV module warranty of 10 years with no more than 10% degradation in performance/ output.

Solar PV module array will be made by utilizing mono crystalline high efficiency Silicon Solar PV cells with (PERC) Passivated Emitter and Rear Cell technology. Minimum power output guarantee offered for the SPV Module shall not be less than 25 years.

Modules must qualify to relevant IEC standards Part-I and II for safety qualification testing.

Note: I-V curve of each PV module with Sl. Nos. should be submitted along with modules. Solar PV modules shall conform to IEC-61215 standards. Documentary evidence towards IEC- 61215 certification shall be submitted after award of work. Minimum following parameters should be provided by the agency:

Maximum Power, P_{max} Minimum Power, P_{min} Open Circuit Voltage, V_{oc} Short Circuit Current, I_{sc} Voltage at Max Power V_{mp} Current at Max power I_{mp} Fill Factor, FF Efficiency of cell, E_{f,c} Efficiency of module, E_{f,m}

Solar PV Module (Mechanical Features)

Solar PV Module design will conform to following Mechanical requirements

- Toughened, anti reflective, low iron content, high transmissivity front glass.
 - Anodized Aluminum Frame
 - Ethyl Vinyl Acetate (EVA) encapsulate
 - Silicon edge sealant around laminate
 - Tedlar/Polyester tri laminate back surface
 - ABS plastic terminal box for the module output termination with gasket to prevent water moisture.
 - Resistant to water, abrasion, hail impact, humidity & other environment factor for the worst situation at site.
 - Bypass diode.
 - The module frame, if any, shall be made of a corrosion-resistant material which shall be electrolytically compatible with the structural material used for mounting the modules.
 - 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, weatherproof lid with captive screws and cable gland entry points or may be of sealed type and IP65 rated.
- A. The PV modules convert the light reaching them into DC power. The amount of power they produce is roughly proportional to the intensity and the angle of the light reaching them. They are therefore required to be positioned to take maximum advantage of available sunlight within string constraints. Bidder will position the PV modules in such a manner that the maximum power is obtained with the sun's movements during the day.
 - B. The Photovoltaic modules must be qualified as per IEC 61215 and in addition, the modules must conform to IEC 61730-1 and IEC 61730-2 requirements for construction & Part-2 requirements for testing, for safety qualification. The modules shall be RoHS compliant. The test certificates can be from any of the International Accredited Testing Calibration Laboratories
 - C. The PV Modules shall be —PID Free and the certification of the same shall be submitted along with the modules by the supplier from a Internationally Recognized certification agency for PID testing.
 - D. The PV Modules shall be —LID Free and there shall not any effect of LID on the modules in the first year of installation.
 - E. The efficiency of the module should not be less than 23%. Supplier shall follow the latest engineering practice; ensure long-term compatibility requirements and continuity of equipment supply and the safety of the operating staff.
 - F. The optimum generation of electricity of PV capacity installed vis-à-vis available solar radiation at the site may be obtained through use of either a seasonal tilt structural arrangement or single axis solar tracking system, lower cable losses, maximization of power transfer from PV modules to electronics, maximization of power generation by enhancing incident radiation by optional methods like seasonally changing tilt angles etc.
 - G. The manufacturer of the modules shall provide certification on qualification of PV modules.
 - H. The SPV cells shall be manufactured using unique highly efficient diffusion process or any other technology in vogue so as to ensure uniform diffusion profiler to achieve close spread and higher efficiency for each cell.
 - I. Stabilized net output of the Solar PV Array for the Solar Power System should not be less than the Nominal design level for the System under Standard Test Condition.
 - J. The PV module shall perform satisfactorily in humidity up to 100 % with temperature between -20 deg. C to +40 deg C and with stand wind dust up to 150 km/h from back side of the panel. Photo / electrical conversion efficiency of the modules of SPV module shall not be less than 23%. Since the modules would be used in a low/medium voltage circuit, the insulation test shall be carried out on each module and a test certificate to that effect provided. The bidder shall indicate minimum efficiency. PV modules used in solar power plants/ systems must be warranted for minimum 90% output of Peak minimum capacity for the first ten years and 80% output of Peak minimum capacity at the end of 25 years. The product workmanship shall be guaranteed for 10 years.
 - K. The panel should have positive tolerance of Maximum output power and the maximum voltage shall not exceed 1000V. The negative temperature coefficient of power max shall be equal to or less than -0.3% per deg C temperature.
 - L. The PV modules shall be suitable for continuous outdoor use.
 - M. The material used for constructing the PV module shall be selected in such a way that its gives the maximum efficiency and the latest technology shall be adopted for the construction of PV module.

- N. PV module shall be provided with frame of Anodized Aluminum (either Black or Other) channels for size and simplicity in installation offered as a single module or series parallel combination of modules. The module frame, if any, shall be made of a corrosion-resistant material which shall be electrolytically compatible with the structural material used for mounting the modules
- O. The PV modules shall be made of light weight cells, resistant to abrasion, hail impact, rain, water and environmental pollution. The PV modules shall be provided with Anti Reflection coating and the Glass shall be AR Coated tempered glass.
- P. The PV module shall use lead wire with weatherproof connector for output terminal.
- Q. The power output of the PV system under Standard Test Conditions (STC) should be sufficient to meet the requirement and the required power made of suitable module size depending upon manufacturer prudent practice with required output voltage. The number of modules to be supplied shall be worked out accordingly. Module less than 535Wp capacity should not be supplied or installed.

BIS Registration

As per the Solar Photovoltaics, Systems, Devices and Components Goods (Requirements for compulsory registration) order, 2017 by Government of India, PV modules used in the Grid connected solar power projects in India shall be registered with BIS and bear the standard mark as notified by Bureau of Indian Standards.

Power Conditioning Unit (PCU):

The PCU is a combination of Inverter, AC Charger and data logger all housed in a single unit. Maximum power point tracker (MPPT) shall be integrated into the PCU to maximize energy drawn from the solar PV array. MPPT shall be microprocessor/microcontroller based to minimize power losses and maximize energy utilization. The efficiency of MPPT shall not be less than 93%.(Minimum)

PCU shall include self-protective and self-diagnostic features to protect itself and the PV array from damage in the event of PCU component failure.

Power conditioning unit will comply the following requirements.

- 415V AC $\pm$ 5% 50Hz, 3Phase
- Overload capacity–150% for 60sec.
- Output wave shape: sinewave with <3% total harmonic distortion (THD).
- Adjust the Voltage and Frequency Levels to suit the MAIN LT panel/ feeder pillar BUS near the individual building.

4. Parallel Operation with Grid

- The INVERTER shall be capable of operating in parallel with the grid utility service and shall be capable of interrupting line-to-line fault currents and line to- ground fault currents.
- The INVERTER shall include appropriate self-protective and self-diagnostic features to protect itself and the PV array from damage in the event of INVERTER component failure or from parameters beyond the INVERTER's safe operating range due to internal or external causes. The self-protective features shall not allow signals from the INVERTER front panel to cause the INVERTER to be operated in a manner which may be unsafe or damaging. Faults due to malfunctioning within the INVERTER, including commutation failure, shall be cleared by the INVERTER protective devices and not by the existing site utility grid service circuit breaker.
- The INVERTER shall go to shut down/standby mode, with its contacts open, under the following conditions before attempting an automatic restart after an appropriate time delay; in sufficient solar power output.
- Insufficient Solar Power Input.
When the power available from the PV array is insufficient to supply the losses of the INVERTER, the INVERTER shall go to a standby/shutdown mode. The INVERTER control shall prevent excessive cycling during rightly shut down or extended periods of insufficient solar radiation.
- Utility-Grid Over or Under Voltage
The INVERTER shall restart after an over or under voltage shutdown when the utility grid voltage has returned to within limits for a minimum of two minutes.
- Utility-Grid Over or Under Frequency
The INVERTER shall restart after an over or under frequency shutdown when the utility grid voltage has returned to the within limits for minimum of two minutes.
- The INVERTER Power factor at the point of utility service connection shall be >0.99 lagging or leading when operating at above 25 percent of the rated output, but may be less than 0.99 lagging below 25 percent of the rated output
- The high voltage and power circuits of the INVERTER shall be separated from the low-voltage and control circuits. The internal copper wiring of the INVERTER shall have flame resistant insulation. Use of PVC is not acceptable. All conductors shall be made of standard copper.
- The INVERTER shall withstand a high voltage test of 2000 V rms, between either the input or the output terminals and the cabinet (chassis).

- Full protection against accidental open circuit and reverse polarity at the input shall be provided.
 - The INVERTER shall not produce Electromagnetic Interference (EMI) which may cause malfunctioning of electronic and electrical instruments including communication equipment, which are located within the facility in which the INVERTER is housed.
 - The INVERTER shall have an appropriate display on the front panel to display the instantaneous AC power output and the DC voltage, current and power input. Each of these measurement displays shall have an accuracy of 1 percent of full scale or better. The display shall be visible from outside the INVERTER enclosure. Operational status of the INVERTER, alarms, trouble indicators and ac and the dc disconnect switch positions shall also be communicated by appropriate messages or indicator lights on the front cover of the INVERTER enclosure.
 - Communication Modbus protocol with supported communication interface CAT6 Cable/RS485 Cable.
- 5. Electrical safety, Earthing and protection**
- Internal Faults: In built protection for internal faults including excess temperature, commutation failure, overload and cooling fan failure (if fitted) is obligatory.
 - Galvanic Isolation: Galvanic Isolation is required to avoid any DC component being injected into the grid and the potential for AC components appearing at the array (required inc central inverters).
 - Over Voltage Protection: Over Voltage Protection against atmospheric lightning discharge to the PV array is required. Protection is to be provided against voltage fluctuations in the grid itself and internal faults in the power conditioner, operational errors and switching transients.
 - Earth fault supervision: An integrated earth fault device shall have to be provided to detect eventual earth fault on DC side and shall send message to the supervisory system.
 - Cabling practice: Cable connections must be made using PVC Copper cables, as per BIS standards. All cable connections must be made using suitable terminations for effective contact. The XLPO DC Grade Copper cables of 1.1 kV grade must be run in PVC/UPVC pipes on GI trays with covers for protection.
 - Fast acting semiconductor type current limiting fuses at the main bus-bar to protect from the grid short circuit contribution. The INVERTER shall include an easily accessible emergency OFF button located at an appropriate position on the unit
 - The INVERTER shall include ground lugs for equipment and PV array grounding. The DC circuit ground shall be a solid single point ground connection in accordance with IEC 69042.
 - All exposed surfaces of ferrous parts shall be thoroughly cleaned, primed, and painted or otherwise
- 6. General Features of Inverter:**
- The INVERTER enclosure shall be weatherproof and capable of surviving climatic changes and should keep the INVERTER intact under all conditions in the room where it will be housed. The INVERTER shall be located outdoor with suitable protection and should be either wall/ pad mounted. Moisture condensation and entry of rodents and insects shall be prevented in the INVERTER enclosure.
- Components and circuit boards mounted inside the enclosures shall be which shall also serve to identify the items on the supplied drawings
 - All doors, covers, panels and cable exists shall be gasket or otherwise designed to limit the entry of dust and moisture. All doors shall be equipped with locks. All openings shall be provided with grills or screens with openings no larger than 0.95 cm. (about 3x8 inch).
 - In the design and fabrication of the INVERTER the site temperature (5°C to 55°C), incident sunlight and the effect of ambient temperature on component life shall be considered carefully and derating shall be applied. Similar consideration shall be given to the heat sinking and thermal for blocking diodes and similar components.
- 7. Operating Modes:**
- The following operating modes are to be made available: Night or Sleep mode: Where the inverter is almost completely turned off, with just the timer and control system still in operation, losses should not exceed 1 watts per 5 kilowatt.
- a. Standby mode: Where the control system continuously monitors the output of the solar generator until pre-set value is exceeded (typically 10 watts)
 - b. Operational or MPPT tracking mode: The control system continuously adjust the voltage of the generator to optimize the power available. The power conditioner must automatically re-enter stand- by mode when input power reduces below the standby mode threshold. Front Panel display should prove the status of the INVERTER, including AC Voltage, Current, Power output & DC Current, Voltage and Power input, pf and fault Indication (if any).

TECHNCIAL SPECIFICATIONS FOR ARRAY STRUCTURE

Module mounting structure (minimum 80 microns galvanizing)

Suitable number of PV panel structures shall be provided as per site conditions. Structures shall be of flat-plate design either I or L sections of reputed make.

Structural material shall be corrosion resistant and electrolytic ally compatible with the materials used in the module frame, its fasteners, nuts and bolts. Galvanizing should meet ASTM-A-123 hot dipped galvanizing or equivalent.

Structures shall be supplied complete with all members to be compatible for allowing easy installation. The structures shall be designed to allow easy replacement of any module & can be either designed to transfer point loads on the ground as per site conditions and design to be approved by CPWD. Each structure shall have a provision to adjust its angle of inclination to the horizontal as per the site conditions by way of Manual operation.

Each panel frame structure be so fabricated as to be fixed on the shed without drilling. Care shall be taken during installation so that existing water proofing if any should not be damaged. The structure should be capable of withstanding a wind load of minimum 150km/hr or as per site conditions after grouting & installation.

At the time of execution, if any strengthening of existing structure is required, the same is in the scope of work & nothing extra shall be paid on account of this.

The array structure shall support SPV modules at a given orientation. All nuts and bolts shall be of very good quality stainless steel. Detailed design and Drawing shall have to be submitted to Engineer In charge for acceptance and approval for execution of work.

The work should be completed with supply, fitting fixing of clamps, saddles, nut & bolts etc. While quoting the rate, the bidder may mention the design & type of structure offered. All nuts & bolts shall be made of very good quality steel.

The structure shall be designed to allow easy replacement of any module and shall be in line with site requirements.

The array structure shall be so designed that it will occupy minimum space without sacrificing the output from SPV panels & shall withstand heavy winds.

The supplier / manufacturer shall specify installation details of the PV modules and the support structures with appropriate diagrams and drawings.

The agency shall provide an elevated structure, wherever required as per site conditions, with G.I. pipe/structural member as per the drawing duly approved by the Engineer Incharge. The agency shall also obtain the certification from the structural Engineer for withstanding a wind speed of minimum 150 KMPH or as per site conditions.

- a) The Contractor shall specify installation details of the PV modules and the support structures with appropriate diagrams and drawings. Such details shall include, but not limited to, the following;
- (i) Determination of true south at the site;
 - (ii) Array tilt angle to the horizontal, with permitted tolerance;
 - (iii) Details with drawings for fixing the modules;
 - (iv) Details with drawings of fixing the junction/terminal boxes;
 - (v) Interconnection details inside the junction/terminal boxes;
 - (vi) Structure installation details and drawings;
 - (vii) Electrical grounding (earthing);
 - (viii) Inter-panel/Inter-row distances with allowed tolerances; and
 - (ix) Safety precautions to be taken.

NOTE: The structural design of the complete system should be compatible with the structural strength and load bearing capacity of the sheds. Design calculations and certificate to this effect shall be provided by a qualified chartered structural engineer

Junction Boxes

The junction boxes shall be dust, vermin and waterproof and made of FRP / Thermo Plastic. The terminals shall be connected to copper bus bar arrangement of proper size. The junction boxes shall have suitable cable entry points fitted with cable glands of appropriate sizes for both incoming and outgoing cables. Suitable marking shall be provided on the bus bar for easy identification and cable ferrules shall be fitted at the cable termination points for identification. The junction boxes shall have suitable arrangement for the following:

- Combine groups of modules into independent charging sub-arrays that shall be wired to the controller.
- Provide arrangement for disconnection for each of the groups.
- Provide a test point for each sub-group for quick fault location.
- To provide group array isolation.
- The rating of the JB's shall be suitable with adequate safety factor to interconnect the Solar PV array.
- Metal oxide varistors shall be provided inside the Array Junction Boxes.

SPECIFICATIONS FOR PV PANEL SUPPORT / MODULE MOUNTING STRUCTURE

S. No	Description	Specification Requirement
1	Material	Hot dip galvanized steel with minimum 80 micron galvanizing as per IS5905, Capable of withstand wind pressure of wind speed of Minimum 150 Km/hour or as per site conditions
2	Thickness of member	Suitable wind Speed of Minimum 150 Km/hour or as per site conditions. STAAD analysis to be submitted. (4mm minimum)
3	Overall dimensions	As per manufacturer standard
4	Wind rating	Minimum 150 Km/hour or as per site conditions, whichever is higher.
5	Tilt angle and adjustment	Tilt angle shall be calculated to provide the maximum annual energy output to take maximum insulation. This shall be decided based on the location of array installation.
6	Pitch of structure	Max.7 Mtr or as per manufacturer standard
7	Hardware & fastener	SS304

PLANT METERING/ DATA LOGGING REQUIREMENTS

- a) PV array energy production: Digital Meters to log the actual value of AC/ DC Voltage, Current **One-way LT energy meter (Export metering) Class 0.2 SABT Compliant shall be incorporated in the system on the main AC Grid supply complete with electrical switchgear in the main plant.**
- b) Solar Irradiance: An integrating Pyrano meter should be provided, with the sensor mounted in the plane of the array. Readout should be integrated with data logging system.
- c) Wind Speed: An integrated wind speed measurement unit to be provided.
- d) Temperature Sensor: Integrated temperature sensors for measuring the module surface temperature, inverter inside enclosure temperature and ambient temperature to be provided complete with readouts integrated with the data logging system.

Protection against lightning

Surge voltage induced at output due to external source Set point pre-selection for VAR control Remote control via telephone modem or mini web server Integrated protection in the DC and three phase system Insulation monitoring of the PV array Ground fault detector which is essential for large PV generators in view of appreciable discharge current with respect to ground.

Overvoltage protection against atmospheric lightning discharge to the PV array is required.

The power conditioner must be entirely self-managing and stable in operation. A self-diagnostic system check should occur on startup. Functions should include test of key parameters on startup.

DC distribution board/Array Junction Box

- a) DC distribution board shall be provided in between solar array and PCU. A DC distribution box shall be mounted close to the solar grid inverter. The junction boxes shall be made of FRP / Thermo Plastic with impact resistant transparent cover, waterproof, dust free, vermin with IP65 protection, DIN-rail mounting type and shall comprise the following components and cable terminations:
- b) Incoming positive and negative DC cables from the DC Combiner Box;
- c) DC Fuse for each string will connected in positive terminal cable
- d) DC surge protection device (SPD), class 2 as per IEC 60364-5-53;
- e) Outgoing positive and negative DC cables to the solar grid inverter.
- f) DC fuse shall be installed inside the DC Distribution Box to protect the DC cable that runs from the DC Distribution Box to the Solar Grid Inverter.

The terminals shall be connected to copper bus bar arrangement of proper sizes. The junction boxes shall have suitable cable entry points fitted with cable glands of appropriate sizes for both incoming and outgoing cables. Suitable markings shall be provided on the bus bar for easy identification and cable ferrules shall be fitted at the cable termination points for identification. Array junction box shall have suitable reverse blocking diodes of minimum DC blocking voltage of 800V with suitable arrangement for its connecting. The array box shall also have suitable surge protection.

The junction boxes shall have suitable arrangement for the following: Combine groups of modules into independent charging sub-arrays that shall be wired to the controller. Provide arrangement for disconnection for each of the groups.

Provide a test point for each sub-group for quick fault location. To provide group array isolation. The rating of the JB's shall be suitable with adequate safety factor to interconnect the Solar PV array.

Surge protection system

The DIN channel mountable pluggable surge protection shall be installed in a network configuration, consisting of a single block MOV (Metal Oxide Varistor) based surge arrester having nominal surge handling capacity of 15 KA 8/20 μ s & maximum surge handling capacity of 30 KA 8/20 μ s to provide protection between (L+, L-, earth). All surge arresters in these network configurations shall be of same manufacturer. The Protection unit shall be based on Single block HighCapacity Metal Oxide Varistors (MOV), capable of handling 15 KA8/20 μ s surges and shall be able to give an indication in the event module failure and shall be pluggable to facilitate the on- site replacement without disturbing the lines. One extra set of replacement protective device shall be furnished to the job site. Protection shall be manufactured to withstand a maximum continuous operating voltage of not less than 115% of normal RMS system voltage.

AC Distribution Board (AC DB)

AC DB shall be provided in between PCU and loads.

An AC distribution box/Panel/Feeder pillar shall be mounted close to the solar grid inverter. The AC distribution box/Panel shall be of the cubical type compartmentalized, 2mm thick CRCA sheet duly powder coated, 7 tank process, gland plate, copper busbars etc **or** Outdoor feeder pillar type and shall comprise the following components and cable terminations:

- Incoming 4 core (three-phase) cable from the solar grid inverter
- 4-pole AC circuit breaker:-MCCB type with suitable KA breaking capacity, $I_{cs}=100\% I_{cu}$
- AC surge protection device (SPD), class1 plus 2 as per IEC60364-5-53
- Outgoing cable to the Solar meter/load.

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O/o EE(E), CPWD, Chandigarh.

Executive Engineer (Elect.) Chd.,
Central P.W.D., Chandigarh.

TECHNICAL SPECIFICATIONS FOR CABLES & WIRES

1. **Cabling:** Cabling shall be carried out as per IE Rules. All other cabling above ground should be suitably mounted on cable trays with proper covers. Only LSHZ XLPO cables must be used for DC side, DC grade cables shall be used. For AC power shall be XLPE insulated PVC sheathed copper/Aluminium conductor armoured cables, 1.1 KV grade as specified.
2. **Cables Ends:** All connections are to be made through suitable cable with lug/terminals/ MC-4 connectors; crimped properly & with use of Cable Glands. For armoured cables- brass compression glands shall be used with copper/aluminium lugs.
3. **Cable Marking:** All cable/wires are to be marked in proper manner by good quality ferule or by other means so that the cable can be easily identified. All cable schedules/layout drawings have to be got approved from the Department prior to installation.
4. **Multi Strand, Annealed high conductivity copper conductor**
 - Overall PVC insulation for UV protection and confirm to IEC 69947
 - All cables shall conform to BIS standards (IS 694) and (IS 1554) 28
 - The size of each type of cable selected shall be based on minimum voltage drop, however, the maximum drop shall be limited to 2%
 - All electrical control / power cables / wires inside the building to be fixed in accordance with CPWD specifications for electrical works Part-I Internal only.
 - Proper laying of cables have to be ensured in appropriate cable trays, pipes / trenches as per site requirement.
 - For laying / termination of cables, latest BIS / IEC codes / standards be followed.

The total voltage drop on the cable segments from the solar PV modules to the solar grid inverter shall not exceed 2.0%. Cable size to be selected accordingly.

The total voltage drop on the cable segments from the solar grid inverter to the building distribution board shall not exceed 2.0%. Cable size to be selected accordingly.

All cables and conduit pipes shall be clamped to the rooftop, walls and ceilings with thermoplastic Clamps/GI saddles double grooved at intervals not exceeding 50cm. In three phase systems, the size of the neutral wire size shall be equal to the size of the phase wires. The following colour coding shall be used for cable wires:

- DC positive: red (the outer PVC sheath can be black with a red line marking)
- DC negative: black
- AC single phase: Phase: red; neutral: black
- AC three phase: Phases: red, yellow, blue; neutral: black
- Earth wires: green

APPROVAL & CLEARANCE

All associated activities required for necessary clearances / permissions / approvals /licenses from concerned Electrical authorities /Local bodies are included in the scope of contractor.

EARTHING AND PROTECTION

Each array structure of the PV plant at roof top shall be grounded properly using adequate number of earthing. Provision should be kept for shorting and grounding of the PV array at the time of maintenance work. All metal casing / shielding of the plant shall be thoroughly grounded to ensure safety of the power plant. Earthing shall be in line with IE rules. The earthing & grounding shall also meet the requirement of PV module/cell manufacturer. Detailed specifications have been provided in the Earthing section.

Earth Resistance should be tested in presence of the representative of CPWD after earthing by calibrated earth tester. INVERTERS, AC DB/Panel/Feeders and DC DB should also be earthed properly. The 433 Volt/11KV side equipment and parts shall be earthed in compliance to Indian Electricity Rules 1956, all non current carrying metal parts shall be earthed with two separate and distinct earth continuity conductors to an efficient earth electrode.

LIGHTNING AND OVER VOLTAGE PROTECTION

There shall be the required number of suitable lightning arrestors installed in the array field. Suitable earthing such that induced transients find an alternate route to earth. Protection shall meet the safety rules as per Indian Electricity Act. All building earth conductors shall be interconnected through the concept of earth mats for interconnection with separate earth pits. For each earth pits necessary test points shall have to be provided.

DANGER BOARDS

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

TOOLS & TACKLES AND SPARES :

After completion of installation & commissioning of the power plant, necessary tools & tackles are to be provided free of cost by the contractor for maintenance purpose. A list of requisite spares in case of INVERTER comprising of a set of control logic cards, IGBT driver cards etc. Junction Boxes, Fuses, MCCBs etc. along with spare set of PV modules, which shall be supplied & kept ready in stock during maintenance period. 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.

Cable and accessories

All the cables shall be supplied conforming to IS:694 & shall be of 650 V/ 1.1 kV grade as per requirement. The size of the cables between array interconnections, array to junction boxes, junction boxes to DCDB, DCDB to PCU and PCU to main grid (LOCAL POWER SUPPLY COMPANY) etc shall be so selected to keep the voltage drop and losses to the minimum and all cables are included in the scope of work. For DC connections, the cable shall be of XLPO type Solar cables.

Bidders are required to mention each size of cables used and should consider their resistance / impedance in the design optimization. Such calculation should be submitted along with the TDS approvals. The contractor shall supply all cables, installation accessories, which are required to install and successfully commission the power plant.

The cables shall be run on GI trays with covers for protection.

Space for Solar Array

The bidder shall give the details of array layout be for execution for approval.

Bidders are advised to visit the site and conduct a survey for deciding the most suitable layout from the installation & maintenance point of view.

Type tests

Type test reports of all major equipment (Solar modules & PCU) shall be submitted to the Engineer in Charge.

Installation and commissioning

Detailed project execution program shall be submitted along with the offer. The contractor will be responsible for arranging all tools & plants for installation and commissioning the complete system.

The contractor shall also submit the erection, testing & commissioning procedure for approval to the owner. These procedures will form integral part of the acceptance report for successful erection and commissioning the system. These reports will be prepared and signed by contractor's representative & representative of Client/CPWD.

Inspection

All major equipment like solar PV modules, inverters, LT panels/feeders shall be inspected by the Engineer-In-Charge or his representative before their dispatch. For other items, the contractor shall obtain the prior approval before dispatch.

The contractor shall obtain approval for all equipment drawings & data sheets from the Engineer- In-Charge before commencement of the manufacturing/procuring/outsourcing.

Training & after sales service

Training and after sales service is an important component of supply and is included the scope of work. An explanation of details and operation of system, preventative maintenance schedule, plan of operation, scope and implementation of the after sales service shall be imparted to the Operating personnel of the Client/CPWD.

Documentation

Three sets of installation manual / user manual shall be supplied along with each power plant. The manual shall include complete system details such as array layout, schematic of the system, inverter details, working principle etc. Step by step maintenance and troubleshooting procedures shall be given in the manuals. The contractor shall supply three sets of soft copies (in CD form) of all documents including drawings and user manual and three sets in hard copy.

Standard to be followed:

PV Modules IEC61215/IEC61730

Power Conditioners IEC61683/IEC60068-2

Charge Controller/MPPT Units : IEC62093/IEC60068-2 Cables IEC60189/ IS694/IS7098

MAINTENANCE SCHEDULE & GUIDELINES (for one Year during DLP period)

Following preventive/Routine/Comprehensive maintenance schedule as per their standard practice after completion of work. (included in scope of work for which nothing extra will be paid)

WEEKLY CHECK:

The contractor has to perform the weekly checks at site including cleaning of the panel etc.

MONTHLY CHECK:

- a) Inspect the modules/panels of the array for any damage.
- b) Check the wiring for physical damage & also for any sign of excessive heating.
- c) Check all the junction Boxes for covers and sealing
- d) Check the nut-bolts of the mounting structure and array for proper torque & lightening
- e) Inspect the modules/panels of the array for any damage.

QUARTERLY:

- a. Check cells for discoloration or breakage.
- b. Clean the modules/panels of the array for dust if required.
- c. Check for all the connection and ensure that they are not loose.
- d. Check & Verify that the array does not come under shadow during 9 to 15 hours.

COMPREHENSIVE MAINTENANCE

1. The system will be comprehensively maintained by the contractor free of cost for one year from the date of taking over by the department i.e. during warranty / guaranty period.
2. Fortnightly Inspection/ Service of the equipment round the year by a experienced Service Engineer covering physical examination of the equipment for healthy & smooth functioning of the equipment/ system. Checking of the equipment for their satisfactory operation and performance and rectify the fault/ defects if any.
3. Preventive maintenance checks as per the standard recommendation of the OEM manufacturer and rectification/replacement of the deteriorated/defective part are also covered in the AMC.
4. 24 hours call back service for fault rectification on lodging of complaint. The fault rectification shall be carried out by skilled staff. All fault rectification shall be done within reasonable time preferably within 24 hrs and all faulty equipment shall be collected from site and repaired equipment delivered at site without any extra cost.
5. Comprehensive maintenance of all equipment includes proper upkeepment of all equipment and replacement of all defective parts/ spares including rubber parts etc. within quoted rates.
6. Maintenance will also include:-
 - i) Providing on call services for any breakdown and rectification and fault within 24 hours of the reporting of the problem.
 - ii) Any delay in attending the complaints after 24 hours of lodging complaint will attract a penalty of Rs. 2,000/- per day.
 - iii) Travel, boarding, lodging and other incidental expenses of their staff that the successful bidder may need to incur during the course of such repair.

Note : All spare parts, tools and tackles, connectors, testing instruments, rubber parts if any etc. required for comprehensive maintenance of system are deemed to be included in the scope of comprehensive maintenance contract and nothing extra shall be paid by the department.

7. The contractor shall deploy qualified and experienced Engineering staff, skilled & trained technicians/manpower for effectively maintaining the equipment & supervising the system. The staff provided should be well conversant with the system installed and should be knowledgeable to rectify the minor defects.
8. The staff should be available on mobile phone and should be in a position to reach the site within Four hours of the intimation of a complaint.
9. All the local labour by laws, safety rules by laws have to be obeyed. Any fine / penalty imposed by such bodies shall be paid by the tenderer and nothing will be payable/ reimbursed by the department.
10. The maintenance service provided shall ensure proper functioning of the SPV system as a whole to the extent covered in the contract. All preventive/routine maintenance and breakdown/ corrective maintenance required for ensuring maximum uptime shall have to be provided.
 - a) The bidder shall perform **the preventive/Routine maintenance schedule as per their standard practice after completion of work. Breakdown maintenance shall be done as and when required.** However, the scope shall also include activities such as regular cleaning (including making arrangement for water pressure pumps, hoses etc) and checking the health of the SPV system, cleaning of module surface, tightening of all electrical connection and any other activity that may be require for proper functioning of the SPV system as a whole.

- b) The contractor staff shall maintain work diary/record at the site and immediately upon attending a complaint, have to be got it signed from the client dept. /Engineer-in-charge in token of having attended the complaints.
 - c) Agency shall coordinate with all other agencies/client involved in this job.
 - d) The agency shall submit the warranty certificate of the equipment which have been replaced.
 - e) The complaint register, log books and preventive maintenance register shall be produced as and when asked or at a regular interval, duly completed, as decided by the Engineer-in-charge or his authorized representatives. All the register etc. connected with the work shall be returned to the department. Failing recovery @500/-per month shall be made if any register/log book not produced.
 - f) The contractor will deploy adequate staff to attend the breakdown, also appropriate mechanism will be devised to register the complaints. Any breakdown reported either by telephonically, through SMS, WhatsApp, e-mail etc or in writing shall be attended promptly.
 - g) Following recovery shall be made:-
 - i) Failure to attend break down complaints @ Rs.1000/- per day after 24 Hrs. of complaint.
 - ii) Failure to do fortnightly and monthly visit @ Rs.2000/- Per visit per Month. Additionally a recovery @ Rs. 1000/- per day per fault shall be recovered from the bill. If the system is not made operational with reasonable period, the same shall be got done immediately by department for which necessary recoveries shall be made from the withheld amount of bill of the contractor/ firm and will be binding on the contractor.
Repairing of faulty equipment's from OEM shall be carried out strictly within 3 days failing which recovery @ Rs. 1000 per day shall be made from withheld amount from bill of contractor.
11. The contractor shall maintain a complaint register which will monitor the time and receipt/attending the complaint. The complaint shall be attended to on the same day as early as possible. The complaints received at site shall be attended by the contractor within 24 hours, else penalty shall be imposed for non attending the complaint within 24 hours as above, hindrance if any to attend the complaint, shall be reported to Engineer in-charge with proper record. In case the contractor fails to attend the complaint in reasonable time [within the same day] then deptt. shall be free to get the complaint attended through other agency and shall deduct the amount from the bill of the contractor at double the rate spent on such work. The decision of the Executive Engineer (E) will be final & binding in accessing the expenditure involved for attending the fault by the other agency.
 12. Log books, Complaint register and periodical maintenance/inspection books (printed and numbered) will be supplied & maintained by the Contractor of various installations under taken by him as per Proforma decided by Engineer-in-charge & also obtain the countersignature of such officers designated by the Engineer-in-charge on the records maintained before the payment is released. The contractor shall maintain logbook exhibiting all the checks, fault with date and time, history of replacement of spares etc. The same shall be submitted along with running / final payment. The required stationary / forms / registers etc shall be arranged by contractor for all services. The above records cannot be taken by the contractor or his workforce for any purpose whatsoever.
 13. During operation if there is any loss or damage of any component of the power plant due to miss management/miss handling or due to any other reasons, what so ever, the contractor shall be responsible for immediate replacement/rectification. The damage component shall be repaired and if, after repairing the performance of the components is not found satisfactory, the defective components shall have to be replaced with new one without any extra cost. The decision of Engineer-in-charge shall be final & binding in this regard.
 14. The bidder shall be preserving all recorded data in either manually or through computer and shall submit the same quarterly to CPWD/Dept.
 15. **10% tendered amount of SPV component shall be withheld from various R.A./Final Bill towards One-year comprehensive maintenance work. The withheld amount shall be released only after satisfactory maintenance of installations for defect liability period of one year & submission of service/ maintenance reports duly verified from AE(E)/JE(E) and found satisfactory.**

Assistant Engineer (Elect.)'P',
O/o EE(E), CPWD, Chandigarh.

Executive Engineer (Elect.) Chd.,
Central P.W.D., Chandigarh.

SCHEDULE - A TECHNICAL PARTICULARS

(TO BE SUBMITTED AT THE TIME OF APPROVAL OF SOLAR PV EQUIPMENT/MATERIAL)

Name of Contractor:

Sr. No.	Details of Particulars	To be filled by tenderer
	(A) Solar PV Module	
1	Rated power range output at STC	
2	No. of solar cells in each solar PV module	
3	Voc/Isc	
4	MPP Voltage (Vmpp) V	
5	MPP current (imp) A	
6	Normal operating cell temperature	
7	Operating Temperature range	
8	Module dimensions (LxWxH) Appx.	
9	PV Module type	
10	Min. efficiency of solar cell	
11	Solar module frame material	
12	Weather resistant junction	
13	Front Glass	
14	Glass iron content	
15	Glass transmissivity	
16	Frame	
17	Encapsulation	
18	Trilaminate back surface	
19	By-pass diode	
20	Standard	
21	Performance warranty	
	(B) Solar Inverter	
1	Type	
2	Max. DC Array Input Voltage	
3	DC voltage tolerance	
4	Type of solar charge controller	
5	Switching Device	
6	Continuous inverter output rating	
7	Output wave form	
8	Total harmonic distortion	
9	Nominal AC output voltage and frequency	
10	Output frequency	
11	Grid frequency tolerance	
12	Grid frequency synchronization range	
13	No-Load losses	
14	Power factor	
15	PCU efficiency	
16	Noise level	
17	Certifications	
18	Idle current	
19	Regulation	
20	Over load features	
21	Cooling	
22	Operating Temperature	
23	Relative Humidity	
24	LED/LCD display	
25	Data Monitor and display controls	
26	Protections	
27	Enclosure Protection Safety	
28	Warranty	

Sr. No.	Details of Particulars	To be filled by tenderer
	(C) Array Junction Box (DCDB)	
1	No. of module in series	
2	No. of module in parallel	
3	Switch gears	
4	Connectors	
5	Wiring	
6	Enclosure Protection	
7	Enclosure	
8	Size	
9	Capacity of each SPV panel and nos.	
	(D) PANEL SUPPORT/MODULE MOUNTING STRUCTURE	
1	Material	
2	Thickness of member	
3	Over all dimensions	
4	Wind rating	
5	Tilt angle and adjustment	
6	Peach of structure	
7	Hard wears & fastener	
8	Foundation	

LIST OF PREFERRED MAKES

All materials and equipment shall conform to the relevant standards and shall be one of the preferred makes indicated below:

Sr. No.	Component	Preferred makes
1.	Manufacturer of Solar PV Cells and Modules	Renew Sys/ Waaree Energies Limited /TATA Power solar / Vikram Solar / REC/Adani/ Manufacturers approved by Ministry of New & Renewable Energy
2.	Power Conditioning Unit / Grid Tied Inverter	ABB–Fimer/ Emerson/ SMA (America)/ Delta electronics India/ Fronius/ statcon energia/hitachi hi-rel power/ Havells/ SOFAR/ Luminious
3.	Accessories/ PV Module Connectors	Phoenix Contact/ Huber + Suhner/Cooper busman/staubli india/ renogy/ amphenol/bizlink
4.	Energy Meters /Digital Meters (Networkable)	LK/ SIEMENS/ SCHNEIDER/ABB/ Conzerv/ AE/ MECO/ HPL/Secure
5.	Junction Box	Hensel/Spelsberg/ABB/Cooper Busman
6.	LT Jointing Kit/Termination	Raychem/Mahindra/M–Seal/3M
7.	Cable Glands	Comet/ Dowells/ Jainsons/Braco
8.	Bimetallic/Copper/Aluminium Cable Lug	Comet/ Dowells/ Jainsons/Braco
9.	GI pipes	SAIL/Jindal-Hissar/TATA/ZENITH/Prakash Surya
10.	DC connector	Tyco/ Cooper Busman/MC/ Elmex/ Siemens/ Staubli
11.	PVC/UPVC pipe (duly ISI marked)	Precision/ AKG/ Prince/ Diamond/ Asian/ FINOLEX/ Astral/ Supreme
12.	Surge Protection Device	Schneider Electric/OBO Betterman/ L&T/ Legrand/ ABB
13.	XLPE insulated PVC sheathed aluminum /copper Conductor cables	Finolex/ Lapp Kabel / KEI/Havells/R R KABEL/ Polycab/ Grandlay/ Universal (SATNA)/Rallison
14.	Solar Cables (XLPO)	SIECHEM/Havells/Finolex/Polycab/Nexan
15.	HDPE DWC pipe	Gemini/ Sudhakar/ Supreme/ Astral/ REX/ Duraline/
16.	CT's	AE/ KAPPA/ SIEMENS/ ABB/ L&T/Alstom/ RECO
17.	Bi Metal Relays /Protection Relays	ABB/Siemens/ Schneider Electric/LK
18.	Contactor, Timer, starters	Siemens / Schneider Electric / ABB/Legrand/Lk
19.	Voltmeter, Ammeter	Schneider/Secure/Socomec/ABB/AE /Conzerv
20.	Power Quality Meters	Schneider/Eaton Power/PSL/ Siemens/LK
21.	Connectors	Connectwell /Siemens/ABB/Elmex/ Essen
22.	Indication Lamps	Siemens / GE Power / ABB / Schneider /Tecknic/ Lk
23.	Selector Switches	AE / Kaycee/Siemens/Salzer/ Lk
24.	Local Push Button Stations	BCH/Teknic/Siemens/ Schneider / Vaishnov/LK
25.	Terminals/ Terminal Block	Phoenix Contacts/ Wago & Controls/ Weidmuller/ Elmex/ Connectwell/ Essen
26.	Material for Structure	TATA/JINDAL (Hisar)/ SAIL
27.	Perforated/Ladder Cable Tray	System Steel/ Slotco/ Pilco/ Ricco/ Tolmega/ Cablofi (Legrand)/ OBO BETTERMEN
28.	Fastners	Hilti / Fisher/ Wruth
29.	Synthetic Enamel Paint	Asian Paints/Nerolac /Berger /ICI –Dulux
30.	SCADA i/c DG-PV Controller, Data Logger, Reverse Power Relay, Monitoring and Control System, Weather Monitoring System etc.	Iplon / Innova / Trackso / Comamp/ Aron / Meatech Solutions / ABB / L&T / Seimens / Schneider / Neptune
31.	Any other item	As approved by Engineer-in-Charge

Note:-

1. The Mentioning of particular make under preferred makes does not fulfill automatically for acceptance. The make shall comply all the particulars specifications, item of work and other conditions of the contract.
 2. Either the model shall be got approved or sample shall be submitted for approval by Engineer-in-Charge before confirming any order to supplier /OEM/its authorized dealer by the contractor. The decision of Engineer-in-charge is binding in this regard and no variation is acceptable. The contractor/agency is required to submit all relevant test certificates documents and along with the proposal for approval.
 3. For any item not covered in the above list, the contractor shall submit the makes and sample seeking approval from the Engineer-in-Charge before supply of the materials.
 4. Incase of Solar PV Panels, it shall satisfy the performance and warranty conditions stipulated in the agreement. Necessary undertaking/Certificate from the OEM shall be obtained and submitted to the Engineer-in-Charge before making any payments. Willingness/ conformity of specifications and performance from the OEM shall be submitted alongwith the proposal for product approval.
- For items for which makes of materials are not specified, the same shall be got approved/ decided by the Engineer-in-charge and the decision taken by the Engineer- in-charge shall be final and binding on the contractor

Assistant Engineer (Elect.)'P',
O/o EE(E), CPWD, Chandigarh.

Executive Engineer (Elect.) Chd.,
Central P.W.D., Chandigarh

**GOVERNMENT OF INDIA
CENTRAL PUBLIC WORKS DEPARTMENT**

**Name of work: SITC of Grid Connected Rooftop Solar PV
Panels in the Office Complex of Central
Administrative Tribunal, Sector 17,
Chandigarh.**

**PART C
(SCHEDULE OF QUANTITIES)**

SCHEDULE OF QUANTITIES

Name of work: SITC of Grid Connected Rooftop Solar PV Panels in the Office Complex of Central Administrative Tribunal, Sector 17, Chandigarh.

S.No.	Description of Item	Qty		Rate	Unit	Amount	Remarks
1	Supplying Installation, Testing and Commissioning of on-grid Solar Photovoltaic Power Plant conforming to various applicable standards BIS, IEC, MNRE guidelines, the Central Electricity Authority Regulations and CPWD Specifications as amended up to date, consisting of Mono/Poly Crystalline silicon solar cells module, net metering facility, necessary control, protections, earthing, cabling, mounting structure, junction boxes, power conditioning units, Real time online web interfaced Data Monitoring System, Distribution panels, grid connecting arrangement, conduits, pipes, cable trays and other accessories etc. as required.						
	a) High Energy Efficiency Solar Photovoltaic Module of capacity 330 Wp or above, manufactured in India, conforming to IS 14286/IEC 61215, IS/IEC 61730- Part-1, IS/IEC 61730-Part-2. Solar Photovoltaic Module conversion efficiency shall not be less than 23% at STC with temperature coefficient of Pmax better than -0.30% per 0C. 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. Solar Modules shall be designed to operate in relative humidity upto 100% with temperature between -10 0C and +85 0C. Further, each PV module used in any solar power project must have Radio frequency identification tag with information such as name of manufacturer, month and year of manufacturing, country of origin (separately for Solar cell and module), I-V curve, Unique Serial No and Model No of the module, Wattage, Im, Vm and FF, name of test lab issuing IEC certificate.						
	b)Power Conditioning Unit (PCU) of 350-800 V DC Input voltage range and 415 V AC, three phase, 4 wire, 50Hz +/- 2.5 Hz, output voltage suitable to generate AC with a variation of 10% at nominal voltage. Power with efficiency not less than 97%, total harmonic distortion less than 3% and suitable for ambient temperature from 0 to 50 0C, Minimum IP-65 for outdoor and Minimum IP 21 for indoor, Built-in meter and data logger, MPPT, switching devices						

S.No.	Description of Item	Qty		Rate	Unit	Amount	Remarks
	IGBT/MOSFETs and controller Microprocessor /DSP						
	PCU/inverter shall be capable of complete automatic operation including wake-up, synchronization & shutdown. The PCU shall be able to withstand unbalanced load conforming to IEC standard with shutdown/standby mode. It must be provided with grid islanding along with manual disconnect pole isolation switch besides automatic disconnection. Minimum protections: Mains Under / Over Voltage, Over current, Over/Under grid frequency, Over temperature, Surge voltage induced at output due to external source, Short-circuit, Lightening, Anti Islanding (for grid synch. Mode) and other protections as per applicable standards. LCD/LED display of minimum parameters: DC input voltage, DC current, AC Voltage and current (all 3 phases, in case of 3 phase), Instantaneous & cumulative AC output power, Daily DC energy produced and other parameters applicable standard. Communication interface RS 485 / RS 232.						
	c) Module mounting structure: The roof top solar plant generation units shall be installed by using supporting Aluminium/Galvanized MS structure (mass of zinc coating shall be as per IS4759) having minimum head room clearance of 2.4 meter above the terrace level / ground level. The mounting structure would be designed to sustain wind load and seismic parameter of the site of installation. All the structure shall be design as per applicable BIS code and the material shall also confirm the applicable BIS Code. Structural material shall be corrosion resistant and electrolytically compatible with the materials used in the module frame, its fasteners, nuts and bolts. The suitable arrangements for maintenance and cleaning shall be provided.						
	d) Real time online web interfaced Data Monitoring System complete with accessories for various parameters such as Solar Irradiance, temperature, AC Output Voltage and current, Output Power, Power factor, DC Input Voltage and Current, Time Active, Time disabled, Time Idle, Power produced and other parameters as per standard practices.						

S.No.	Description of Item	Qty		Rate	Unit	Amount	Remarks
	e) Array junction box & Main junction box with IP 65 protection and termination arrangement for incoming and outgoing cable along with glands, lugs and other accessories etc. as required. Each junction box shall be made of GRP/FRP/Powder Coated Aluminium /cast aluminium alloy with full dust, water & vermin proof arrangement with High quality Suitable capacity Metal Oxide Varistors(MOVs) (semiconductor diode with resistant applied voltage)/ surge arrestors and suitable Reverse Blocking Diodes, isolation switches isolate the DC input to Inverter, copper bus bar etc.						
	f) Lightning, surge voltage protection, earthing protection and grid islanding.						
	g) Cables: Connections & Interconnections by required size IR/UV protected XLPE insulated copper conductor 1.1 kV grade armored power and control cables(ISI Marked) along with supplying & fixing of necessary channel/conduit, GI cable trays, supports, lugs, thimble and other accessories etc. as required.						
	h) DC Distribution Board And AC Distribution Panel Board: IP65, free standing, metal cladded, having copper bus bar, having required protection and control gears, connection-interconnection, etc. as required.	46	Kwp	54280.00	Kwp	2496880.00	DSR 2025 (E&M) 17.1
		Total Rs.				2496880.00	

Assistant Engineer (Elect.)'P',
O/o EE(E), CPWD, Chandigarh.

Executive Engineer (Elect.) Chd.,
Central P.W.D., Chandigarh.