# NOTICE INVITING E-TENDER

## GOVERNMENT OF INDIA
## Ministry of Home Affairs
## Border Security Force

## NIT NO.70/NIT-ELECT/SOLAR/BADP/FTR-KMR/2020-21.

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**Name of work: - "** Supply, Installation, testing and commissioning of 5 KWp off Grid Solar Power Plant at 10 Nos FDLs ( THQ TRAGBAL, RAJDHAN,HANUMAN,GOVIND,CHAKNALA BRIDGE & CHUNTIWARI OF 101 BN BSF,KANJALWAN & NEERU ARTY OF 1066 ARTY, NEERU & KABULGALI OF 115 BN BSF) UNDER SHQ BSF BANDIPUR).

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This is certified that this E-NIT contains 31 No. Pages only which are serially numbered as 1to 31.

**EXECUTIVE ENGINEER (ELECT)**
**FTR HQ BSF KASHMIR**

# CPWD–6 FOR E-TENDERING

## GOVERNMENT OF INDIA
## Ministry of Home Affairs
## Border Security Force

**1.** Executive Engineer (Electrical) FTR HQ BSF KASHMIR calling the **Item rate e-tenders are invited on behalf of President of India from the Enlisted/Empanelled contractors of Jammu And Kashmir Energy Development Agency (JAKEDA)** /MNRE/SECI APPROVED SOLAR PANEL INSTALLATION firms for Solar Photovoltaics (Off-grid) for the work "Supply, Installation, testing and commissioning of 5 KWp off Grid Solar Power Plant at 10 Nos FDLs ( THQ TRAGBAL, RAJDHAN,HANUMAN,GOVIND,CHAKNALA BRIDGE & CHUNTIWARI OF 101 BN BSF,KANJALWAN & NEERU ARTY OF 1066 ARTY, NEERU & KABULGALI OF 115 BN BSF) UNDER SHQ BSF BANDIPUR)" as per the guidelines of the **Ministry of New and Renewable Energy,GOI. MNRE, GOI/SECI/JAKEDA**.

**1.** In case the last date of submission of tender is extended, the enlistment of contractor should be valid on the original date of submission of tenders.

1.1 The work is estimated to cost **Rs. 45,36,000/-** This estimate, however, is given merely as a rough guide.

1.2 Intending tenderer is eligible to submit the bid provided he has definite proof from the appropriate authority, which shall be to the satisfaction of the competent authority, of having satisfactorily completed similar works of magnitude specified below:-

**//Criteria of eligibility for submission of tender documents//**

2. Agreement shall be drawn with the successful tenderer on prescribed Form No. CPWD 8 which is available as a Govt. of India Publication. Tenderer 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 **90Days from** the date of start as defined in schedule 'F' or from the first date of handing over of the site, whichever is later, in accordance with the phasing, if any, indicated in the tender documents.

4. The site for the work is available.

5 The tender documents consisting of specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents except Standard General Conditions of Contract Form - 2010 amended & corrected up to date can be seen from website **www.eprocure.gov.in**.

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 tender as notified.

7. While submitting the revised bid, contractor can revise the rate of one or more item(s) any number of times (he need not re-enter rate of all the items) but before last time and date of submission of tender as notified.

8. Earnest Money **Rs.90,720/-** in the form of Demand Draft or Deposit at Call Receipt (**drawn in favour of DIG SHQ BSF BANDIPUR)** of any Scheduled Bank shall be scanned and uploaded to the e-tendering website within the period of tender submission and original should be deposited in office of **Accounts branch SHQ BSF BANDIPUR )** within the stipulated period.

The physical EMD of the scanned copy of EMD uploaded shall be deposited by the tenderer within in a weak after opening of financial bid falling which the tender shall be rejected and enlistment of the agency shall be withdrawn by the enlistment authority.

***The intending bidders shall also upload the following undertakings in this regards.***

"The physical EMD shall be deposited by the me/us with the **DIG SHQ BSF BANDIPUR** in case I/We become the tenderer within a week after opening of financial bid otherwise department may reject the tender an also take action to withdraw my/our enlistment"

The intending bidders shall also upload the following undertaking s in this regards.

" The physical EMD shall be deposited by the me/us with the DIG SHQ BSF BANDIPUR in case I/We become the tender within in a week after opening of financial bid otherwise department may reject the tender an also take action to withdraw my/our enlistment"

Interested contractor who wish to participate in the tender has also to make following payments in the form of Demand Draft/Pay order &FDR.

(i) **E-Tender Fee** - **Rs.500** in shape of Bank draft/Demand draft in favour of **DIG SHQ BSF BANDIPUR** shall be scanned and uploaded to the e-tendering web site original should be deposited in Accounts branch of **SHQ BSF BANDIPUR** Within stipulated period.

The Copy of Enlistment/Empanelment order of JAKEDA/MNRE/SECI and other documents as specified in this E-TENDER notice shall be scanned and uploaded to the e-tendering website within the period of bid submission. However certified copy of all scanned and uploaded document as specified in BSF website notice shall have to be submitted by the bidders along with physical EMD of the scanned copy of EMD uploaded within a week after opening of financial bid physically in the office of tender opening authority.

Online bid/tender document submitted by intending bidders shall be opened only of those bidders who have deposit e- tender fee with and Earnest Money Deposit and other documents scanned and uploaded are found in order. Tender fee will not be reimbursed back once the tenderer participated in e-tender (irrecoverable).

The bid submitted shall be opened at **1130 Hrs as per the notification published.**

9. The bid/tender submitted shall become invalid and if:
(i) The bidder is found ineligible.

(ii) The bidders does not upload all the documents (i/c GST registration /sales tax registration ) as stipulated in the bid document i/c the undertaking about deposited of physical EMD of the scanned copy of EMD uploaded.

(iii) 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 tender in the office of the tender opening authority.

(iv) The bidders does not deposit the physical EMD within a week of opening of tender.

10. Intending Tenderers are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their tenders as to the nature of the ground and sub-soil (so far as is practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their tender. A tenderer shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charge consequent on any misunderstanding or otherwise shall be allowed. The tenderer shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a tender by a tenderer implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and rates at which stores, tools and plant, etc. will be issued to him by the Government and local conditions and other factors having a bearing on the execution of the work.

11. The competent authority on behalf of the President of India does not bind itself to accept the lowest or any other tender and reserves to itself the authority to reject any or all the tenders received without the assignment of any reason. All tenders in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the tenderer shall be summarily rejected.

12. Canvassing whether directly or indirectly, in connection with tenderers is strictly prohibited and the tenders submitted by the contractors who resort to canvassing will be liable to rejection.

13. The competent authority on behalf of President of India reserves to himself the right of accepting the whole or any part of the tender and the tenderer shall be bound to perform the same at the rate quoted.
.

14. The tender for the works shall remain open for acceptance for a period of 90 days (Ninety Days) from the date of opening of tenders. If any tenderer withdraws his tender before the said period or issue of letter of acceptance, whichever is earlier, or makes any modifications in the terms and conditions of the tender which are not acceptable to the department, then the Government shall, without prejudice to any other right or remedy, be at liberty to forfeit 50% of the said earnest money as aforesaid. Further the tenderer shall not be allowed to participate in the retendering process of the work.

15. This notice inviting Tender shall form a part of the contract document. The successful tenderer/contractor, on acceptance of his tender 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 Tender, all the documents including additional conditions, specifications and drawings, if any, forming part of the tender as uploaded at the time of invitation of tender and the rates quoted online at the time of submission of bid and acceptance thereof together with any correspondence leading thereto.

b) Standard C.P.W.D. Form 8.

16. In case any discrepancy is noticed between the documents as uploaded at the time of submission of the bid online and hard copies as submitted physically in the office of Assistant Engineer, then the bid submitted shall become invalid and the Government shall, without prejudice to any other right or remedy, be at liberty to forfeit 50% of the said earnest money as aforesaid. Further the tenderer shall not be allowed to participate in the retendering process of the work.

**Signature of Executive Engineer/DC (Elect)**

**FOR & ON BEHALF OF THE PRESIDENT OF INDIA.**

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The Executive Engineer (Elect), Ftr HQrs BSF Kashmir on behalf of President of India invites online Item rate tenders from enlisted/Empanelled firms of Jammu And Kashmir Energy Development Authority (JAKEDA)/MNRE/SECI for the following work.

| S.No. | N. I. T. No | Name of work& Location | Estimated cost put to tender | Earnest Money | Period of Completion | Tender Fee | Last date & time of submission Of tender | Period during which, Tender Fee shall be submitted | Time & date of opening of tender |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | | 7 | 8 | 9 |
| 1 | NIT NO. | Supply, Installation, testing and commissioning of 5 KWp off Grid Solar Power Plant at 10 Nos FDLs ( THQ TRAGBAL, RAJDHAN,HANUMAN,GOVIND,CHAKNALA BRIDGE & CHUNTIWARI OF 101 BN BSF,KANJALWAN & NEERU ARTY OF 1066 ARTY, NEERU & KABULGALI OF 115 BN BSF) UNDER SHQ BSF BANDIPUR) | **Rs. 45,36,000/-** | **Rs.90,720/-** | 90 days | Rs.500 | Up to 1000HRS on as mentioned in publication notice | After last date & time of submission of bid and Up to Opening of bids. | At 1130HRs on as mentioned in publication notice. |

The tender document consisting of specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents can be seen and downloaded from website www.eprocure.gov.in.
The enlistment of the contractors should be valid on the last date of submission of tenders.

In case only the last date of submission of tender is extended, the enlistment of contractor should be valid on the original date of submission of tenders.

Earnest Money in the form of Demand Draft or Deposit at Call Receipt (drawn in favour of DIG SHQ BSF

BANDIPUR) of any Scheduled Bank shall be scanned and uploaded to the E-tendering website within the period of tender submission and original should be deposited in office of Accounts branch SHQ BSF BANDIPUR).

Interested contractor who wish to participate in the tender has also to make following payments in the form of Demand Draft or CDR of any Scheduled Bank and to be scanned and uploaded to the E-tendering website within the period of tender submission:

Demand Draft or Deposit at Call Receipt of any Scheduled Bank against EMD, Cost of Tender Document and Cost of Tender Processing Fee shall be placed in single sealed envelope superscripted as "Earnest Money, Cost of Tender Document and Cost of Tender Processing Fee" with name of work and due date of opening of the bid also mentioned thereon.

Copy of Enlistment Order of JAKEDA and certificate of work experience as required shall be scanned and uploaded to the E- tendering website within the period of tender submission and certified copy of each shall be deposited in a separate envelop marked as "Other Documents".

Both the envelopes shall be placed in another envelope with due mention of Name of work, date & time of opening of tenders and to be submitted in the Accounts Branch SHQ BSF BANDIPUR during the period mentioned above.

Online tender documents submitted by intending bidders shall be opened only of those bidders, whose Earnest Money Deposit, Cost of Tender Document and other documents placed in the envelope are found in order.

***//List of Documents to be scanned and uploaded within the period of tender submission//***

1. **Demand Draft/Pay order Deposit at Call Receipt/Bank Guarantee of any Scheduled Bank against EMD.**
2. **Enlistment/Empanelment Order of JAKEDA/MNRE/SECI.**
3. ***Certificates of Work Experience for satisfactory installation of 25 Kwp capacity Solar Power plant in last three (3) years and executed projects should be of equal or more than 25Kwp and overall cost of executed projects equals or more than 50% of estimated cost put to tender. All supportive documents signed by end user/departments with remarks of satisfactory working also required.***
4. **Affidavit as per clause 1.2.3 of CPWD.**
5. **Certificate of Registration for GST.**
6. **PAN card & Income tax certificate.**
7. **An undertaking that "The physical EMD shall be deposited by the me/us with the Accounts Branch SHQ BSF of SECTOR HQ BSF BANDIPUR the tender , in case I/We become the tenderer**

**within a week of the opening of the technical bid otherwise department may reject the tender an also take action to withdraw my/our enlistment"**

**Additional point to be noted by the contractor before quoting the rates:-**

The contractor may visit the site of work physically, its accessibility for cartage of material, lead involved and other related activities etc. before quoting his rates. The rates shall be for carrying out all activities of work including all material, T&P, labour and other inputs unless otherwise specified nothing extra shall be paid on this account.

The work is required to be carried out adjacent to FDLs in Kashmir Region. The contractor shall not be compensated in case the work is not executed in part or in full due to protest or hostile activity from Pak side. No claim whatsoever shall be entertained on this account.

The contractor shall engage manpower duly verified by the local Police as per requirement of BSF Units/HQrs, nothing extra shall be paid on this account.

The security deposit will be refunded after the prescribed period as stipulated in the agreement or after the final bill has been prepared or after the work is handed over to BSF concerned Units/ HQrs authorities in all respect, whichever is later.

The work is of paramount importance and is to be carried out within the stipulated time. Any laxity, delay and non-diligence /dilatory action on the part of contractor will attract severe action under various clauses of agreement.

The contractor has to start the work after submitting the programme duly approved by the Engineer-in Charge. Physical progress shall be similar to the programme submitted by the contractor and in accordance with the mile stone as in schedule 'F'.

***To become eligible for issue of tender, the tenderer shall have to furnish an affidavit as under:-***

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

**CPWD FORM NO. 8**

**GOVERNMENT OF INDIA**
**Ministry of Home Affairs**
**Border Security Force**

| | | | |
|---|---|---|---|
| **STATE:** | **J & K** | **CIRCLE :** | |
| **BRANCH:** | **Engineering** | **DIVISION: FTR HQ KHASMIR** | |
| **ZONE:** | | **SUB-DIV.: SHQ BSF BANDIPUR.** | |

## ITEM RATE TENDER & CONTRACT FOR WORKS

(A) Tender for the work of: -

Name of work: - - Supply, Installation, testing and commissioning of 5 KWp off Grid Solar Power Plant at 10 Nos FDLs ( THQ TRAGBAL, RAJDHAN,HANUMAN,GOVIND,CHAKNALA BRIDGE & CHUNTIWARI OF 101 BN BSF,KANJALWAN & NEERU ARTY OF 1066 ARTY, NEERU & KABULGALI OF 115 BN BSF) UNDER SHQ BSF BANDIPUR) to be submitted online by 1000Hours **on or before last date of submission of tenders as mentioned in the publication notice of DIG SHQ BSF BANDIPUR, at web site.** www.eprocure.gov.in

To be opened through online in presence of tenderers who may be present at **1130Hrs on as per tender notice** in the office **DIG SHQ BSF BANDIPUR.**

i) Issued to:- .....

Signature of officer issuing the documents. Designation:-

ii) Date of issue:- .....

## T E N D E R

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, Designs, Drawings and instructions in writing referred to in Rule-1 of General Rules and Directions and in Clause 11 of the Conditions of Contract and with such materials as are provided for, by and in respects in accordance with, such conditions so far as applicable.

**CPWD FORM NO. 8**

We agree to keep the tender open for (90) ninety days from the date of opening of tender) and not to make any modifications in its terms and conditions.

A sum of **Rs.90,720/-** is hereby forwarded Deposit at Call Receipt of a Scheduled Bank/ FDR of a Scheduled Bank / Demand Draft of a Scheduled Bank as earnest money. If I/we fail to furnish the prescribed Performance Guarantee within prescribed period, I/we agree that the said President of India or his 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, up to maximum of the percentage mentioned in Schedule 'F' and those in excess of that limit at the rates to be determined in accordance with the provision contained in Clause 12.2 & 12.3 of the tender form. **Further, I/We agree that in case of forfeiture of earnest money or both Earnest Money & Performance Guarantee as aforesaid, I/We shall be debarred for participation in the re-tendering process of the work**

I / We undertake and confirm that eligible similar work(s) has/ have not been got executed through another contractor on back to back basis. Further that, if such a violation comes to the notice of Department, then I/we shall be debarred for tendering in BSF in future forever. Also, if such a violation comes to the notice of Department before date of start of work, the Engineer-in-Charge shall be free to forfeit the entire amount of Earnest Money Deposit/Performance Guarantee
I/We hereby declare that I/we shall treat the tender documents, drawings and other records connected with the work as Secret / Confidential documents and shall not communicate information / derived there from to any person other than a person to whom I/we am/are may authorized to communicate the same or use the information in any manner Prejudicial to the safety of the State.

Dated:

-

Address: -

Occupation: -

Signature of Contractor..... Witness:

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)
iv)
v)
vi)
vii)

**Signature**

**Executive Engineer (Elect)**
**Dated:** **For & on behalf of the President of India.**

## SCHEDULES

**SCHEDULE 'A'**

Schedule of quantities - As per BOQ

**SCHEDULE 'B'**

Schedule of materials to be issued to the contractor.

| S.No. | Description of item. of at which the material will contractor | Quantity. | Rate in figures & words issue be charged to the | Place |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| **NIL** | | | | |

**SCHEDULE 'C'**

Tools and plants to be hired to the contractor

| S.NO. | DESCRIPTION. | HIRE CHARGES PER DAY | PLACE OF ISSUE |
|---|---|---|---|
| ~~NIL~~ | | | |

**SCHEDULE 'D'**

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

~~NIL~~

1. Special Conditions Page to
2. Additional Condition Page to
3.. Annexure Page to

**SCHEDULE 'E'**

Reference to General Conditions of contract – General Condition of contract for CPWD works 2014 with up to date correction slips /Amendments.

Clause 10CC

Clause 10 CC to be applicable in contracts with stipulated period of completion exceeding the period shown in next column ....12..... months

months schedule of component of other materials, labour etc. for price escalation .

Component of elect (except materials covered under clause 10 CA /Electrical work. -

Xm .....%Schedule of

N/A

Component of Labour -
Expressed as percent of total value of work. Y .....%

Note : Xm..... % should be equal to (100) –( materials covered under clause 10 CA i.e. cement,steel,POL and other material specified in clause 10 CA + component of labour)

Name of work: - - Supply, Installation, testing and commissioning of 5 KWp off Grid Solar Power Plant at 10 Nos FDLs ( THQ TRAGBAL, RAJDHAN,HANUMAN,GOVIND,CHAKNALA BRIDGE & CHUNTIWARI OF 101 BN BSF,KANJALWAN & NEERU ARTY OF 1066 ARTY, NEERU & KABULGALI OF 115 BN BSF) UNDER SHQ BSF BANDIPUR).

1.2 Estimated Cost of work: - **Rs.45,36,000/- only**

1.3 Earnest Money: - **Rs.90,720/- only (Shall be returned after receiving the performance guarantee)**

1.4 Performance Guarantee 5.00% of tendered value

1.5 Security Deposit 2.50 % of tendered value

**General Rules & Directions:-**
Officer Inviting Tender: - Executive Engineer (Elect), FTR HQ BSF KASHMIR

| | |
|---|---|
| Maximum percentage for quantity of items of work to be executed beyond which rates are to be determined in accordance with Clauses 12.2 & 12.3 | Refer Clause-12 |

**Definitions:-**

| | | |
|---|---|---|
| 2 (v) | Engineer-In-Charge | EE/DC (ELECT), FTR HQ Kashmir. |
| 2(viii) | Accepting Authority | EE/DC (ELECT), FTR HQ KMR |
| 2(x) | Percentage on cost of materials and labour to cover all overheads and profits | 15% |
| 2(xi) | Rates | MNRE & MR |
| 2(xii) | Department | Border Security Force |
| 9(ii) CPWD Contract Form 2010, as modified and corrected up to date. | | Standard CPWD Form 8 |

**Clause-1:-**

| | | |
|---|---|---|
| (i) | Time allowed for submission of Performance guarantee after date of issue of letter of acceptance | **15** days |
| (ii) | Maximum allowable extension with late fee @ 0.10% of PG amount | **7** days |

| | |
|---|---|
| **Clause-2**:- Authority for fixing compensation Engineer, under clause-2. | Commandant (Elect)/ Superintending FHQ BSF New Delhi |
| **Clause-5**:- Number of days from the date of issue of letter of acceptance for reckoning date of start | **15** days |
| Time allowed for execution of work | (90Days) |

Mile Stone Table As Below

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**Authority to decide**

| | |
|---|---|
| i) Extension of time for completion of work. | DC (ELECT) FTR HQ BSF KMR |
| ii) Re-scheduling of Mile stone | Engineer-in-charge/SE |
| **Clause-6,6A:**- Clause applicable | N/A |
| **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 — NIL

**Clause-10:-** List of testing equipment to be provided by the contractor at site lab — NIL

**Clause-11:-** Specifications to be followed for Execution of work
Conditions and additional specifications
as attached in NIT and manufacturers specifications — MNRE/ SECI/JAKEDA Specifications.

**Clause-12**:- where applicable

12.2 & 12.3 Deviation limit beyond which Clause 12.2 & 12.3 shall apply For complete work — 30%

**Clause-16**:- Competent Authority for Deciding reduced rates. — NA

**Clause-18**:-

List of mandatory machinery tools & Plants to be deployed by the Contractor at site — N/A

**Clause-36 (i)**

**Requirement of technical representative(s) and recovery rate. Appx 18 of CPWD**

| S.No. | Minimum Qualification of Technical Representative | Discipline | Designation (Principal Technical/ Technical Representative | Minimum Experience | Number | Rate at which recovery shall be made from contractor in the event of non-deployment. | |
|---|---|---|---|---|---|---|---|
| | | | | | | Figures | Words |
| 1 | QUALIFIED DEEE/BE/BTECH ENGINEER WILL POSSESS EXPERIENCE IN SOLAR PLANT INSTALLATIONS | ELECTRICAL/ (SOLAR PLANT EXPERIENCE) | SOLAR POWER PLANT ENGINEER | 05 YEARS FOR DIPLOMA HOLDER/ 03 YEARS FOR ENGINEERING | 01 | Rs.15000/- ONLY | FIFTEEN THOUSAND only |

**Clause-42:-**

i) Schedule / Statement for determining Theoretical quantity of wiring and electrical items — MR

ii) Variations permissible on theoretical Quantities. ``````````

a) Elect item for works with estimated cost put to tender for more than Rs. 5 Lacs. — N/A

**RECOVERY RATES FOR QUANTITIES BEYOND PERMISSIBLE VARIATION**

| Sr. No. | Description of item | Rates in figures and words at which recovery shall be made from the contractor | |
|---|---|---|---|
| | | Excess beyond Permissible Variation | Less use from the permissible variation |
| 1. | NIL | NIL | NIL |

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# //SCOPE OF THE PROJECT//

## A. EXPERIENCE ON SOLAR PROJECT :

1. JAKEDA/MNRE/SECI empanelled registered firms should possess installation experience of Off-grid solar power plant projects in ground GI structure mounted and fulfilling the eligibility Criteria would be eligible for Supply, Installation and Commissioning of **"OFF GRID"** stand mounted Solar PV Power Plants of 5 KWp capacity as per the latest technical specifications of MNRE, GOI and relevant IEC / BIS specifications/JAKEDA.

## B. SIZE OF THE PROJECTS:-

1. The size of each project shall be **5 KWp**. One solar power plant may however comprise of several stand mounted panels as per the number of solar PV modules taken in schedule of work in BOQ excel format.

## //TECHNICAL SPECIFICATIONS//

The proposed projects shall be commissioned as per the technical specifications of MNRE, GOI/JAKEDA for safety and protection and respective OEM installation manuals for SOLAR INVERTERS, MPPT CHARGE CONTROLLERS, BATTERY MONITIORS, LITHIUM FERRO PHOSPHATE BATTERY PACKS strictly without any compromise and installer should go through respective product specifications in depth before engagement in this project.

## C. SOLAR PV MODULE:-

**1.** A Solar stand mounted Photovoltaic (SPV) power plant consists of SPV array, Module Mounting Structure, Intelligent solar inverter cum charger unit, Batteries and Controls & management Protection, interconnected DC/AC cables, IP rated Junction boxes, Distribution boxes for AC power outlets and switches for inverter DC/AC and PV inputs etc as required. PV Array should be mounted on a GI "C" channel structure from ground level and all the outer sides. All the internal supports of the mounting structure should be done with lipped "C" GI channels and lipped GI strut channels for effective structure with stability. SPV power system should be state-of-art designed with necessary features to supplement the AC power by means of direct conversion of available solar power and energize the AC connected loads during day time and charge the battery pack as per OEM safe permitted level. Intelligent inverter should possess advance power management algorithms build-in to monitor AC input power and charge the

batteries as per state-of-charge conditions and also feeds the available AC connected load without any intervention. All the Components and parts used in the SPV power plants including the PV modules, metallic structures, cables, junction box, switches, PCUs etc., should conform to the BIS and IEC specifications to the international standards, wherever such specifications are available and applicable unless otherwise mentioned and up to the satisfaction of Engr-in-charge.

**2.** Indigenous make PV modules should be used and test certification of PV panels should be made available for each panels from approved labs by SECI/MNRE.

**3.** The PV modules used must qualify to the latest edition of IEC, PV module qualification test or equivalent BIS standards Crystalline Silicon Solar Cell Modules IEC 61215/IS14286. In addition, the modules must conform to IEC 61730 Part-1 - requirements for construction & Part 2 – requirements for testing, for safety qualification or equivalent IS.

**4.** For the PV modules to be used in a highly corrosive atmosphere throughout their lifetime, they must qualify to IEC 61701.

**5.** Adequate protective devices against surges at the PV module shall be provided.

**6.** Low voltage drop bypass diodes shall be provided.

**7.** PV modules must be tested and approved by one of the MNRE/ IEC authorized test centres. Test report should be attached.

**8.** The module frame shall be made of corrosion resistant materials, preferably having anodized aluminium. Modules should works in hard cold weather condition like sub-zero temperatures without any mechanical damages, glass materials used for PV should be tested for loading of snow and wind and certified properly.

**9.** The Bidder shall carefully design & accommodate requisite numbers of the modules to achieve the rated power and follow BOQ in principle. Department may increase PV modules as per site conditions at the time of execution.

**10.** Other general requirement for the PV modules and subsystems shall be the following:

i. The rated output power of any supplied module shall have tolerance within +/- 2 %.

ii. The module shall be provided with a junction box with either provision of external screw terminal connection or sealed type and with arrangement for provision of by-pass diode. The box shall have hinged, weather proof lid with captive screws and cable gland entry points or may be of sealed type and IP-65 rated.

## 11. WARRANTIES:-

### i) Material Warranty:

i. Material Warranty is defined as: The project developer should warrant the Solar Module(s) to be free from the defects and/or failures specified below for a period not less than five (05) years from the date of sale to the original customer ("Customer")
ii. Defects and/or failures due to manufacturing.
iii. Defects and/or failures due to quality of materials.
iv. Non conformity to specifications due to faulty manufacturing and/or inspection processes. If the solar Module(s) fails to conform to this warranty, the project developer will repair or replace the solar module(s), at the Owners sole option.

## 12. SOLAR ARRAY MOUNTING STRUCTURE :-

i) Hot dip galvanized Iron mounting structures may be used for mounting the modules/ panels/arrays. Minimum thickness of galvanization should be as per MNRE specifications.

ii) Each structure should have angle of inclination as per the site conditions to take maximum insolation. However to accommodate more capacity the angle inclination may be reduced until the plant meets the specified performance ratio requirements. Executing firm should conduct proper testing by means of software/on ground tools to ensure that the plant should operate in its peak output power with respect to insolation prevails at the site during entire year.

iii) The Mounting structure shall be so designed to withstand the speed for the wind zone of the location where a PV system is proposed to be installed. Suitable fastening arrangement such as grouting and calming should be provided to secure the installation against the specific wind speed. A reference design sheet to be followed is attached with the project which can be amended/modified to minor level to get rigid, structurally sound structure as per site conditions.

iv) The mounting structure steel shall be as per latest IS 2062: 1992 and galvanization of the mounting structure shall be in compliance of latest IS 4759.

v) Structural material shall be corrosion resistant and electrolytic ally compatible with the materials used in the module frame, its fasteners, and nuts and bolts.

vi) The fasteners used should be made up of **stainless steel**. The structures shall be designed to allow easy replacement of any module. The array structure shall be so designed that it will occupy minimum space without sacrificing the output from the SPV panels.

vii) Regarding civil structures the Bidder need to take care of the load bearing capacity of the frame and need arrange suitable structures based on the site requirement.

viii) The minimum clearance of the structure from the ground level should be followed as per the design sheet and not deviate from dimensional details.

ix) Proper PCC foundation of ratio 1:2:4 should be provided for solar mounting structure which is specified in design sheet. Frame work for foundation should be made properly and all GI structure should be inserted in middle of the foundations with proper supports till curation.

## 13. WETHERPROOF COMBINER JUNCTION BOXES (WPCJBs) :-

i) The junction boxes are to be provided in the PV array for termination of connecting cables. The combiner Junction Boxes (JBs) shall be made of GRP/FRP/Powder Coated Aluminium/cast aluminium alloy with full dust, water & vermin proof arrangement. All wires/cables must be terminated through cable lugs preferably MC4 connectors. The JBs shall be such that input & output termination can be made through suitable weather proof cable glands/MC4 connector inlets.

ii) Copper bus bars/terminal blocks housed in the junction box with suitable termination threads Conforming to IP65 standard and IEC 62208 Hinged door with EPDM rubber gasket to prevent water entry. Single / double compression cable glands. Provision of earthing etc should be placed at 5 feet height or above, for ease of accessibility.

iii) Each Junction Box shall have High quality Suitable capacity Metal Oxide Varistors (MOVs) / SPDs, suitable Reverse Blocking Diodes. The Junction Boxes shall have suitable arrangement monitoring and disconnection for each of the groups.

iv) Suitable markings shall be provided on the bus bar for easy identification and the cable ferrules must be fitted at the cable termination points for identification.

v) All fuses shall have DIN rail mountable fuse holders and shall be housed in thermoplastic IP 65 enclosures with transparent covers.

## 14. DC DISTRIBUTION BOARD:-

i) DC Distribution panel to receive the DC output from the array field.

ii) DC DPBs shall have sheet from enclosure of dust & vermin proof conform to IP 65 protection. The bus bars be made of copper of desired size. Suitable capacity MCBs/MCCB shall be provided for controlling the DC power output to the intelligent inverter/PCU along with necessary surge arrestors to avoid permanent damage.

## 15. AC DISTRIBUTION PANEL BOARD:-

i) AC Distribution Panel Board (DPB) shall control the AC power from PCU/ inverter, and should have necessary surge arrestors. Interconnection from ACDB to mains at LT Bus bar while in grid tied mode.

ii) All switches and the circuit breakers, connectors should conform to IEC 60947, part I, II and III/ IS60947 part I, II and III.

iii) The changeover switches, cabling work should be undertaken by the Bid holder as part of the project.

iv) All the Panel's shall be metal clad, totally enclosed, rigid, floor mounted, air - insulated, cubical type suitable for operation on three phase / single phase, 415 or 230 volts, 50 Hz.

v) The panels shall be designed for minimum expected ambient temperature of 60 degree Celsius, 80 percent humidity and dusty weather.

vi) All indoor panels will have protection of IP54 or better. All outdoor panels will have protection of IP65 or better.

vii) Should conform to Indian Electricity Act and rules (till last amendment).

viii) All the 230VAC volts devices / equipment like bus support insulators, circuit breakers, SPDs, VTs etc., mounted inside the switchgear shall be suitable for continuous operation and satisfactory performance under the following supply conditions.

| | |
|---|---|
| Variation in supply voltage | +/- 5 % |
| Variation in supply frequency | +/- 1.5 Hz |
| | |

## 16. SOLAR INTELLIGENT INVERTER CUM CHARGER /ARRAY SIZE RATIO:-

i) The combined wattage of all inverters should not be less than rated capacity of power plant under STC.

## 17. ADVANCED TRUE SINE WAVE INVERTER CUM CHARGER/PCU UNIT:-

| | |
|---|---|
| Switching devices | IGBT/MOSFET |
| Control | Microprocessor /DSP |
| Nominal AC output voltage and frequency | 230V, 1 Phase, 50 Hz. |
| Output frequency | 50 Hz |
| Ambient temperature considered | -30° C to 50° C |
| Humidity | 95 % Non-condensing |
| Protection of Enclosure | IP-20(Minimum) for indoor. |
| | IP-65(Minimum) for outdoor. |
| No-load losses | Less than 1% of rated power |
| Inverter efficiency(minimum) | >93% (In case of 10 kW or above with in-built galvanic isolation)<br>>97% (In case of 10 KW or above without in-built galvanic isolation) |
| Inverter efficiency (minimum) | > 90% (In case of less than 10 kW) |
| THD | < 3% |
| PF | > 0.9 |

a. With each power plant system single phase inverter should be used.

b. The output of power factor of true sine wave inverter is suitable for all voltage ranges or sink of reactive power, inverter should have internal protection arrangement against any sustainable fault in feeder line and against the lightning on feeder.

c. The power conditioning units / inverters should comply with applicable IEC/ equivalent BIS standard for efficiency measurements and environmental tests as per standard codes IEC 61683/IS 61683 and IEC 60068-2 (1,2,14,30)/ Equivalent BIS Std.

d. The inverters cum charger unit should be tested from the MNRE approved test centres/ NABL/ BIS/ IEC accredited testing- calibration laboratories of international standards. In case of imported power conditioning units, these should be approved by international test houses and department may ask for random testing of any supplied unit in such case all the expenses/transportation should be borne by executing firm.

## 18. LITHIUM FERRO PHOSPHATE BATTERY PACKS:-

a). The Battery used in the proposed system is called Lithium FERRO PHOSPHATE (LFP). *There is a pack with individual BMS formations and fulfill an entire pack will feed the inverter within OPTIMAL INPUT DC VOLTAGE range.*

The battery used is one of the most advance batteries available that has a longer life, smaller and is lighter compared to other batteries.
The main features/advantages of Lithium Ferro phosphate (LFP) batteries are:-

1. Long Life more than 4000 charge- discharge cycles.
2. High Effective Capacity- High amount of actual usable energy over wide range of State of Charge (SOC).
3. Low Temperature Operation- Usable in extremely cold environments.
4. Rapid Recharging- to enable faster recharge by solar panel.
5. High Input & Out- Usable with high current.
6. All BMS with proper communication with PCU for proper charging.

The Batteries OEM specifications should comply with the relevant BIS/IEC or MNRE/SECI standards. The battery shall be lithium Ferro phosphate (LFP) type.

**19. BATTERY RACK**

Battery rack shall be of non-corrosive materials. Placing of battery should be such that maintenance of the battery may be carried out easily. The non-reactive water proof mats shall be provided to cover the entire floor space of the battery and suitable mounting arrangements should be made for proper accommodation of battery bank.

**20. TOOLS KIT:-**

Necessary tool kit is to be provided along with each battery bank for any immediate maintenance. Adequate fire-fighting equipment such as portable fire extinguishers be incorporated for fire protection of control room. The firefighting equipment should conform to BIS standards.

**21. PROTECTIONS :-**

i) The system should be provided with all necessary protections like earthing, Lightning arrestors, and grid anti-islanding as follows:

**LIGHTNING PROTECTION:-**

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

**EARTHING PROTECTION:-**

iii) Each array structure of the PV yard should be grounded/ earthed properly as per IS: 3043-1987. In addition the lighting 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.

iv) 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.

## 22. TOOLS & TACKLES AND SPARES:-

i) After completion of installation & commissioning of the power plant, necessary tools & tackles are to be provided free of cost by the Bidder for maintenance purpose. The list of tools and tackles and its make, to be supplied by the Bidders, will have to be approved by JAKEDA.

ii) All requisite spares, tools & tackles shall be handed over to the O&M vendors for maintenance purposes.

## 23. DRAWINGS & MANUALS:-

i) Two sets of Engineering, electrical drawings and Installation and O&M manuals are to be supplied. Bidders shall provide complete technical data sheets for each equipment giving details of the specifications along with make/makes in their Bid along with basic design of the power plant and power evacuation, synchronization along with protection equipment.

ii) All OEM equipments should be delivered to Engineering Office for verification of internal contents and no any items will be permitted to site without inspection of Engr-in-charge directly to site. All the manuals, software CDs, Firmware upgradation tools should be matched with OEM packaging contents. No any second hand products of any items/unboxed items /pre-utilized products will be accepted at any cost. Department will reject such items and no any claim of financial losses/ transportation responsibilities will be entertained at any cost.

iii) Approved ISI and reputed makes for equipment be used.

iv) For complete electro-mechanical works, Bidders shall supply complete design, details and drawings for approval to owners before progressing with the installation work.

## 24. PLANNING AND DESIGNING:

i) The Bidder should carry out Shadow Analysis at the site and accordingly design strings & arrays layout considering optimal usage of space, material and labour. The Bidder should submit the array layout drawings along to owner for approval. Proper orientation as per longitude and latitude should be calculated by means of certified software tools and accordingly the angle of solar panels should be mounted at site.

Blind folded execution and erection of solar panels should be avoided by executing firm and not accepted by department at any cost.

## 25. DRAWINGS TO BE FURNISHED BY CONTRACTOR/CHANNEL PARTNER AFTER AWARD OF CONTRACT FROM BENEFICIARY:-

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

## 26. SAFETY MEASURES:-

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

## II. TECHNICAL

| | | |
|---|---|---|
| 1. | Whether relevant drawings of SPV plant enclosed | Yes / No |
| 2. | Whether the material fully corresponds to the NIT specifications. | Yes / No |
| 3. | Whether the list and photocopies giving status of past orders received and accomplished in last THREE years enclosed. | Yes / No |
| 4. | Test certificate issued by MNRE/IEC/BIS/IS etc for all products available with firm/contractor. | Yes / No |

**Signature of the bidder**

## //SPECIAL CONDITIONS//

1. The contractor may visit the site of work physically before quoting his rates. The work may be carried out on the defined location LC, Hilly area/FDLs and near existing fencing already provided along the Indo-Pak border. The site of the work may be at High altitude fully, or partly. The contractor shall make all necessary arrangement for carriage of materials and labour up to site of work. The rates shall be for carrying out all activity of work, including carriage of labour and material up to FDL/Site of work and nothing extra shall be paid on this account.

   ***Department may increase or decrease the number of FDLs from listed QTY (ie 10 Nos) according to the requirements and financial implications of this projects contractor must obey to this conditions and no any deviations from this conditions will be accepted by department after award of work.***

2. The work is required to be carried out at FDLs in Kashmir FTR under BANDIPUR Sector. The contractor shall not be compensated in case the work is not executed in part or in full due to protest or hostilities from Pak side. No claim whatsoever shall be entertained on this account.

3. The contractor shall engage manpower duly verified by the local police as per requirement of BSF. Nothing extra shall be paid on this account.

4. All tools, plant and machinery provided by the contractor shall, when brought to the site, be deemed to be exclusively intended for construction and completion of this work and contractor shall not remove the same or any part thereof without the consent of the Engineer-in-charge.

5. The rates quoted by the contractor shall be all inclusive keeping in view the specifications, additional and special conditions and lead involved for various material and other inputs for carrying out the work , nothing extra shall be payable whatsoever, unless otherwise specified.

6. Labour Cess @ 1% of Gross value of work done shall be deducted from each bill as per Building & Other Construction Workers Welfare Cess Act 1996.

8. The contractor shall have to make approaches to the site and keep them in good condition for transportation of labour and materials as well as inspection of works by the Engineer -in-charge. Nothing extra shall be paid on this account.

**13. TESTING OF MATERIAL**

13.1 The testing of materials if required by the Engineer - in –Charge/BOO of BSF or his authorized representative shall also be carried out in authorised/specified laboratory of the Contractor wherever possible. The cost of samples including packing, transportation and other incidental charges shall be borne by the Contractor.

13.2 The test results shall be final and binding on the contractor. The decision of the Engineer-in-Charge in this regard shall be final and binding on the contractor.

13.3 All necessary tests as per the manufacturers/MNRE /relevant BIS codes shall be carried out on all the materials whatsoever ISI marked or otherwise. T he tests shall be carried out as per the directions of the Engineer-In-Charge. Nothing extra, what so ever, shall be payable on this account.

14. No payment will be made to the contractor for damages caused by earthquake, cyclones, hurricanes, sand storms, flood waters, elect fault or by pounding of water due to any reason etc. During execution of the work and no claim on these accounts will be entertained.

15. The Scaffoldings/garbage, removed from the site shall be disposed - off by the contractor at any suitable place as directed by the Engineer-in-Charge.

16. Some restrictions may be imposed by the security Staff/BSF/Army etc. on the working and or movement of labour, materials etc. and the contractor shall be bound to follow all such restriction
/instructions and nothing extra shall be payable on this account or due to less reduced working hours etc.

17. Wherever any reference to the Indian Standard Codes of BIS has been made, it shall be with reference to the latest revisions upto the date of receipt of tender.

18. No compensation shall be payable to the contractor for any damage caused by rains, lightening wind, storm, flood, tornados, earthquakes or other natural calamity or unforeseen accidents / incidents during execution of work. The contractor shall make good all such damages at his own costs and no claim on this account will be entertained.

19. The contractor shall be responsible to arrange at his own cost all necessary tools and plants required for execution of the work.

20. The rates for all items of work, shall unless clearly specified otherwise include cost of all labour, materials T&P and other inputs involved in the execution of the item.

21. The work shall be carried out in a manner so as not to cause any obstruction or to affect the progress of the works being carried out in the area.

22. Whenever any reference to any Indian Standard Specifications occurs in the documents relating to this contract the same shall be inclusive of all the amendments issued there to or revision thereof, if any, up to the date of receipt tenders

.

23. The rate for all items of work shall, unless clearly specified otherwise, be for all

leads and lifts and nothing extra shall be admissible on that account.

24. The work shall be carried out strictly in conformity with the drawings and in accordance with the Nomenclature of the items, specifications etc. Any discrepancy in the drawing /nomenclature of item /additional specification etc shall be got clarified from Engineer in Charge. Decision of Engineer in Charge shall be final and binding on the agency.

25. The security deposit will be refunded after six month (6) from the date of physical completion of work or after the work is handed over to BSF authorities in all respect, whichever is later.

26. The contractor will procure all the materials in advance so that there is sufficient time for testing and approving of the materials and clearance of the same before use in work.

27. All materials brought by the contractor for execution of work will be got checked from the Engineer-In-charge or his authorized representative of the work on receipt of the same at site, before use.

28. The contractor will also employ necessary watch and ward establishment for the safe custody of materials at his own cost.

**SPECIFICATIONS OF SOLAR POWER PLANT**

| S/NO | SPECIFICATION | PARAMETERS |
|---|---|---|
| 01. | **Type of Solar Power Plant** | |
| | Design, Supply, Installation, Testing and Commissioning of 5 KWp off Grid Solar Power Plant with Minimum 6(Six) Hours Battery Backup, mounted on a single suitable angle iron frame of minimum 1200 mm from front side ground clearance and fitted in a suitable angle to tap maximum sunlight. The angle iron frame should be as per the MNRE specifications and the panels can be of easily removable type for removing the same in the snow fall days (As per the specifications of MNRE GOI). The battery shall be of Lithium Ferro Phosphate type (Maintenance free battery type) as per the relevant specifications. The solar power plant shall be provided with Chemical earthing and lightning conductor including grouting the structure in cement concrete as per the site requirement. The complete solar power plant system shall be as per the specifications of MNRE/JAKEDA complete as required with following accessories :-<br><br>a) Solar PV module - 5 KWp.<br>b) Fixed type rust free mounting Galvanized structure.<br>c) Havells/Luminous/ABB/ schneider electric/Microtech/V Guard/consul neowatt make (OR OTHER APPROVED MAKE BY MNRE/SECI/JKEDA)<br>d) Copper Cables size 6 Sqmm -50 Mtrs.<br>e) Batteries (Lithium Ferro Phosphate) – 150 Ah – (15000WH EQUIVALENT). (150 AH Exide, Luminous, Microtek/ULTRALIFE/vision mechatronics | |

/JAKEDA/MNRE/SECI Approved Make(Lithium Ferro Phosphate type)
(With 5 years replacement warranty) -08 nos. (EQUIVALENT 15000WH).
f) Chemical Earthing, 2 Mtrs length -01 Set.
g) Lightning conductor standalone type 5 meter height.
h) All miscellaneous items such as connectors, ferrules, lugs, cable tray, and conduits as required.
i) Maintenance Tools - 01 set along with the solar plant.

**TECHNICAL OVERVIEW:**

Key Facts of the Plant:

| | |
|---|---|
| Plant capacity in KWP | 5 KWP Solar Power Plant-Hybrid |
| PV Technology/ Module: | Poly crystalline modules (Luminous/UTL, Solarium/ JEKEDA Approved make) |
| PCU: | Luminous/UTL / JAKEDA Approved make |
| Power Evacuation: | Single Phase |

**Each system comprises of the following components:**

1. Solar Module
2. PCU
3. Array Junction Box (AC DB/ DC DB)
4. Structure
5. Lightning Arrestor
6. Cables & Accessories
7. Solar Luminous Batteries
8. Earthing Kit
9. Installation

**Technology Selections:**

**Solar Modules:** The Solar PV system should be designed using Polycrystalline silicon modules. Photovoltaic solar systems use the light available from the sun to generate electricity. PV panels convert the light reaching the system into DC power. The amount of power they produce is roughly proportional to the intensity and the angle of the light reaching them.

**Inverter**:

A Hybrid inverter complement the solar power generated. Inverter based on MPPT based technology. The suggested type of inverter will meet the requisite reactive power supply and thus reliably participating in efficient backup management.

**Others (Junction Boxes, Combiners, Protection Equipment):**

In addition to disconnecting from the grid (islanding protection) on detecting no grid/DG supply or under and over voltage conditions, the PV system shall be provided with adequately rated fuses on the inverter input side (DC) as well as the output side (AC) side for overload and short circuit protection. Disconnect switches to isolate the DC and AC system for maintenance or other relevant functions are also

provided.

**Integration of PV Power Plant:**

A Hybrid inverter is used to complement the solar power generated. In addition to regulating the voltage and current received from the solar panels, a Hybrid will ensure that the power supplied to the distribution panel of the building will be in correspondence. On the DC side will optimize the power output by varying the closed loop system voltage. On the AC side, this inverter will ensure that the sinusoidal output is synchronized to the grid frequency.

**LIST OF MATERIAL:**

| S. No | Description | Make | Qty |
|---|---|---|---|
| **1** | Solar PV Module | Make: Luminous/UTL Module Size: 1956mm x992mm Product Warranty: **a).** 10 Year Workmanship Warranty **b)** 25 Year Power Generation Guarantee (As per the MNRE/SECI/JAKEDA Specifications) | 5 KWP |
| **2** | Mounting Structure | Fixed Type Rust free Structure Galvanized Structure | 1 Set |
| **3** | Solar PCU | Inverter Type: Hybrid Brand:- (Havells/Luminous/ABB/ schneider electric/Microtech/V Guard/consul neowatt make(OR OTHER APPROVED MAKE BY MNRE/SECI/JKEDA) Capacity: 5 KVA Warranty: 2 Year Phase- Single Phase | 1 Set |
| **4** | Cables | Size Required rating: 6 Sqmm Earthing: 6 sqmm Cable Material: Copper Make: Polycab/Havells/Finolex | 1 set |
| **5** | PVC Pipe | Polycab, Finolex, Ashirvad pipes, Apollo pipes, astral pipes. | |
| **6** | Chemical earthling | Diameter: 50mm With Cover and Accessories Length -2 meter ( reputed brand) | 1 set |
| **7** | Accessories | -Conduits<br>-Cable Tray<br>-Ferrules<br>-Mounting Structure<br>-Nut and bolts<br>-Lugs<br>-Tools<br>-Ferrules<br>-MC4 Connectors | 1 Set |

| | | | | |
|---|---|---|---|---|
| | | | -Civil Materials<br>-Installations | |
| | **7.1** | Electrical Conduits and accessories | Reputed Make/PVC | |
| | **7.2** | Cable Tray | Reputed Make/GI | |
| | **7.3** | MC4 Connectors | Reputed Make | |
| | **7.4** | Lugs | Reputed Make | |
| | **7.5** | | Reputed Make | |
| | **7.6** | Design, Installation and Civil Work | As per Standards | |
| | **8** | Solar Batteries | 150 AH Exide, Luminous, Microtek/ULTRALIFE/vision mechatronics /JAKEDA/MNRE/SECI Approved Make (Lithium Phosphate type) (battery voltage should be selected as per inverter specs) (EQUIVALENT 15000WH CAPACITY). | 8 Nos (5Years replacement Warranty/As per the MNRE specifications.) |

**Physical Check**: - In this category specifications of equipment will be checked physically by the BOO against the quality and functionality of the Solar Plant.

**Submission of certificate:-** Relevant certificate of tests shown against each will be provided by firm during physical trial of the equipment of Required brand .(Test report).

xxxSDxxx23/02/2021
**Executive Engineer (Elect)**
**FTR HQ BSF KASHMIR**

**SIGNATURE OF THE BIDDER WITH SEAL**